Redland
CITY COUNCIL

AGENDA

GENERAL MEETING

Wednesday, 19 June 2019
commencing at 9.30am

The Council Chambers
91 - 93 Bloomfield Street
CLEVELAND QLD

Order Of Business

1 DECLARATION OF OPENING

On establishing there is a quorum, the Mayor will declare the meeting open.

Recognition of the Traditional Owners

Council acknowledges the Quandamooka people who are the traditional custodians of the land on which we meet. Council also pays respect to their elders, past and present, and extend that respect to other indigenous Australians who are present.

2 RECORD OF ATTENDANCE AND LEAVE OF ABSENCE

Motion is required to approve leave of absence for any Councillor absent from today's meeting.

3 DEVOTIONAL SEGMENT

Member of the Ministers' Fellowship will lead Council in a brief devotional segment.

4 DECLARATION OF MATERIAL PERSONAL INTEREST OR CONFLICT OF INTEREST ON ANY ITEMS OF BUSINESS

Councillors are reminded of their responsibilities in relation to a councillor's material personal interest and conflict of interest at a meeting (for full details see Division 5A of the *Local Government Act 2009*).

In summary:

If a councillor has a material personal interest, in a matter before the meeting:

Under s.175C *Local Government Act 2009, the councillor must inform the meeting of the councillor's material personal interest in the matter, including the following particulars:*

- *The name of the person or other entity who stands to gain benefit or suffer a loss from the outcome of the consideration of the matter at the meeting;*
- *How the person or other entity stands to gain the benefit or suffer the loss;*
- *If the person or other entity who stands to gain the benefit or suffer the loss is not the councillor, the nature of the councillor's relationship to the person or entity.*

If the councillor has a material personal interest they must leave the meeting, including any area set aside for the public while the matter is discussed and voted on, unless the councillor has approval from the Minister to be present while the matter is discussed and voted on pursuant to section 175F.

Record of material personal interest

Under s.175J of the Local Government Act 2009, if a councillor has a material personal interest under section 175C of the Local Government Act 2009, the following information must ***be recorded in the minutes of the meeting, and published on the local government's website****—*

(a) the name of the councillor who has the material personal interest in the matter;

(b) the material personal interest including the particulars mentioned in section 175C(2)(a) as described by the councillor;

(c) whether the councillor participated in the meeting, or was present during the meeting, under an approval given by the Minister under section 175F.

If a councillor has a conflict of interest (a real conflict of interest), or could reasonably be taken to have a conflict of interest (a perceived conflict of interest) in a matter before the meeting:

The councillor must, under s.175E of the Local Government Act 2009, inform the meeting about the councillor's personal interests in the matter, including the following particulars:

- *The nature of the interest;*
- *If the personal interest arises because of the councillor's relationship with, receipt of a gift from, another person-*
  - *The name of the other person;*
  - *The nature of the relationship or the value and date of the receipt of gift; and*
  - *The nature of the other person's interest in the matter.*

If the other councillors in the meeting are informed about a councillor's personal interests in a matter and the councillor has not voluntarily left the meeting while the matter is discussed and voted on, the other councillors must decide:

- *Whether there is a real or perceived conflict; and*
- *If the councillors decide that there is a real or perceived conflict, whether the councillor-*
  - *Must leave the meeting including any area set aside for the public, while the matter is voted on and discussed; or*
  - *May participate in the meeting in relation to the matter, including voting on the matter.*

Record of conflict of interest

Under s.175J of the *Local Government Act 2009*, if a councillor has a conflict of interest under section 175E, *the following information must be* ***recorded in the minutes of the meeting, and published on the local government's website****—*

(a) *the name of the councillor who has a real conflict of interest or perceived conflict of interest in the matter;*

(b) the councillor's personal interests in the matter, including the particulars mentioned in section 175E(2) as described by the councillor;

(c) the decisions made by the other councillors in relation to the existence and nature of the conflict and whether the councillor was permitted to participate in the meeting in relation to the matter, and the reasons for the decisions;

(d) whether the councillor participated in the meeting, or was present during the meeting, under an approval under section 175F;

(e) if the councillor voted on the matter—how the councillor voted on the matter;

(f) how the majority of councillors who were entitled to vote at the meeting voted on the matter.

Duty to report another councillor's material personal interest or conflict of interest

Section 175G of the *Local Government Act 2009* imposes an obligation on councillors to report undisclosed material personal interests and conflicts of interest at a meeting relating to other councillors.

If a councillor at a meeting reasonably believes, or reasonably suspects:

- *That another councillor at a meeting has a material personal interest or a real or perceived conflict in a matter; and*

- *The other councillor has not informed the meeting about the interest under section 175C(2) or 175E(2);*

The councillor who has the belief or suspicion, must as soon as practicable, inform the person who is presiding at the meeting about the facts and circumstances that form the basis of the belief or suspicion.

Note: *Section 175H makes it an offence for a person to prejudice, intimidate or harass a councillor or another person take action that is likely to be detrimental to a councillor because a councillor has complied with their disclosure obligation under s.175G.*

5 RECOGNITION OF ACHIEVEMENT

Mayor to present any recognition of achievement items.

6 RECEIPT AND CONFIRMATION OF MINUTES

General Meeting - 5 June 2019

7 MATTERS OUTSTANDING FROM PREVIOUS COUNCIL MEETING MINUTES

7.1 OPPORTUNITY TO PARTICIPATE IN A JOINT LOCAL GOVERNMENT ACTIVITY – REGIONAL APPROACH TO WASTE AND RESOURCE MANAGEMENT

At the General Meeting 12 December 2018 (Item 19.8 refers), Council resolved as follows:

That Council resolves as follows:

1. *In accordance with section 228 2(b) of the Local Government Regulation 2012 to invite Expressions of Interest for the provision of waste disposal services, including the use of alternative waste disposal and recycling technologies, to service the needs of the Redland City Council (Council) Local Government Area, or as part of a regional arrangement, joint government entity or joint local government with other Councils in South East Queensland.*
2. *To record its reasons for making the resolution, as detailed in Clause 1 above, as follows:*
    a) *A regional waste management solution may make alternative waste technologies feasible and economical where those technologies would not otherwise be viable options for Council due to the relatively small volume of waste disposed of by Council each year;*
    b) *A regional waste management solution may enable Council to implement an advanced solution to waste disposal not seen before in Queensland or Australia and be at the forefront of advanced alternative waste technology in Australia;*
    c) *Redland City Council and the SEQ-West region of councils are each involved in the management of recyclables and residual waste in their respective local government area;*
    d) *Redland City Council recognises that some existing methods of waste treatment and disposal including landfill disposal may not be sustainable in the long term;*
    e) *Redland City Council wishes to understand and compare all available options for long term treatment and/or disposal solution(s) for residual waste under their management;*
    f) *Redland City Council wishes to be positioned to benefit from and respond to developments in Queensland's new Waste Strategy and associated regulatory frameworks and local industry developments. Notably, the recently announced landfill levy (to be introduced in July 2019) may provide direct or indirect incentives for resource recovery projects; and*

g) Redland City Council believes that it is in its interests and its community's interests to investigate a regional approach to waste treatment and disposal, consider alternative waste treatment technologies and solutions, including energy from waste solutions, and derive the benefits from greater waste volumes. Noting that this investigation opportunity does not preclude RCC from pursuing or participating in other market based waste collection and disposal service delivery options and/or maintaining an active engagement with BCC, to understand future waste disposal contract opportunities and costs that may be offered by BCC.

3. *To delegate to the Chief Executive Officer under s.257 (1)(b) of the Local Government Act 2009, the authority to prepare and adopt a Tender Consideration Plan in accordance with section 230 of the Local Government Regulation 2012 outlining how Redland City Council can proceed to implement a local solution if required following the EOI process;*

4. *To delegate to the Chief Executive Officer under s.257 (1)(b) of the Local Government Act 2009, the authority to execute any agreements between councils participating in the Expression of Interest process, as detailed in Clauses 1 and 3 above; and*

5. *The Group Manager Water and Waste Infrastructure be requested to submit a report to a future meeting detailing the outcomes of the Expressions of Interest, as detailed in Clause 1 and 3 above.*

A report will be presented to Council at the end of the year.

7.2 PURCHASE OF LAND - CONSERVATION PURPOSES, ORMISTON

At the General Meeting 8 May 2019 (Item 19.2 refers), Council resolved as follows:

That Council resolves to:

1. *request officers bring a further report back to Council by 30 June 2019, providing a detailed plan, valuation, affordability and feasibility of a purchase with the intent of retaining high conservation areas and reselling developable areas of the property; and*

2. *maintain this report and attachments as confidential, subject to maintaining the confidentiality of legally privileged, private and commercial in confidence information.*

A report is listed on this agenda as Item 19.1.

8 PUBLIC PARTICIPATION

In accordance with s.31 of POL-3127 Council Meeting Standing Orders:

1. In each meeting (other than special meetings), a period of 15 minutes may be made available by resolution to permit members of the public to address the local government on matters of public interest relating to the local government. This period may be extended by resolution.

2. Priority will be given to members of the public who make written application to the CEO no later than 4.30pm two days before the meeting. A request may also be made to the chairperson, when invited to do so, at the commencement of the public participation period of the meeting.

3. The time allocated to each speaker shall be a maximum of five minutes. The chairperson, at his/her discretion, has authority to withdraw the approval to address Council before the time period has elapsed.

4. The chairperson will consider each application on its merits and may consider any relevant matter in his/her decision to allow or disallow a person to address the local government, e.g.

a) Whether the matter is of public interest;

b) The number of people who wish to address the meeting about the same subject

c) The number of times that a person, or anyone else, has addressed the local government previously about the matter;

d) The person's behaviour at that or a previous meeting' and

e) If the person has made a written application to address the meeting.

5. Any person invited to address the meeting must:

a) State their name and suburb, or organisation they represent and the subject they wish to speak about;

b) Stand (unless unable to do so);

c) Act and speak with decorum;

d) Be respectful and courteous; and

e) Make no comments directed at any individual Council employee, Councillor or member of the public, ensuring that all comments relate to Council as a whole.

9 PETITIONS AND PRESENTATIONS

Councillors may present petitions or make presentations under this section.

10 MOTION TO ALTER THE ORDER OF BUSINESS

The order of business may be altered for a particular meeting where the Councillors at that meeting pass a motion to that effect. Any motion to alter the order of business may be moved without notice.

11 REPORTS FROM THE OFFICE OF THE CEO

Nil

12 REPORTS FROM ORGANISATIONAL SERVICES

12.1 MAY 2019 MONTHLY FINANCIAL REPORT

Objective Reference:

Authorising Officer: **Deborah Corbett-Hall, Chief Financial Officer**

Responsible Officer: **Deborah Corbett-Hall, Chief Financial Officer**

Report Author: **Udaya Panambala Arachchilage, Corporate Financial Reporting Manager**

Attachments: **1. May 2019 Monthly Financial Report ⇩**

PURPOSE

The purpose of this report is to note the year to date financial results as at 31 May 2019.

BACKGROUND

Council adopts an annual budget and then reports on performance against the budget on a monthly basis. This is not only a legislative requirement but enables the organisation to periodically review its financial performance and position and respond to changes in community requirements, market forces or other outside influences.

ISSUES

Final Budget Review 2018-2019 adopted

Council adopted the final budget review on 8 May 2019 and the revised budget numbers are reflected in this report.

Revaluation of other infrastructure assets and condition assessment on final one third of the sewerage pump stations

Inspection of the other infrastructure assets have been completed in line with the 2018-2019 comprehensive valuations and the final one third of the sewerage pump stations have been condition assessed, in accordance with Australian Accounting Standard 116 *Property, Plant and Equipment*.

STRATEGIC IMPLICATIONS

Council has either achieved or favourably exceeded the following key financial stability and sustainability ratios as at the end of May 2019.

- Operating surplus ratio
- Net financial liabilities
- Level of dependence on general rate revenue
- Ability to pay our bills – current ratio
- Ability to repay our debt – debt servicing ratio
- Cash balance
- Cash balances – cash capacity in months
- Longer term financial stability – debt to asset ratio
- Operating performance
- Interest coverage ratio

The asset sustainability ratio did not meet the target at the end of May 2019 and continues to be a stretch target for Council with renewal spends of $22.13M and depreciation expense of $51.85M year to date on infrastructure assets. This ratio is an indication of how Council currently maintains, replaces and renews its existing infrastructure assets as they reach the end of their useful life. Capital spend on non-renewal projects increases the asset base and therefore increases depreciation expense, resulting in a lower asset sustainability ratio.

Council's Capital Works Prioritisation Policy (POL-3131) demonstrates its commitment to maintaining existing infrastructure and the adoption of a renewal strategy for its existing assets ahead of 'upgrade' and/or 'new' works.

Legislative Requirements

The May 2019 financial reports are presented in accordance with the legislative requirement of section 204(2) of the *Local Government Regulation 2012,* requiring the Chief Executive Officer to present the financial report to a monthly Council meeting.

Risk Management

The May 2019 financial reports have been noted by the Executive Leadership Team and relevant officers who can provide further clarification and advice around actual to budget variances.

Financial

There is no direct financial impact to Council as a result of this report; however it provides an indication of financial outcomes at the end of May 2019.

People

Nil impact expected as the purpose of the attached report is to provide financial information to Council based upon actual versus budgeted financial activity.

Environmental

Nil impact expected as the purpose of the attached report is to provide financial information to Council based upon actual versus budgeted financial activity.

Social

Nil impact expected as the purpose of the attached report is to provide financial information to Council based upon actual versus budgeted financial activity.

Alignment with Council's Policy and Plans

This report has a relationship with the following items of the 2018-2023 Corporate Plan:

8. Inclusive and ethical governance

   Deep engagement, quality leadership at all levels, transparent and accountable democratic processes and a spirit of partnership between the community and Council will enrich residents' participation in local decision-making to achieve the community's Redlands 2030 vision and goals.

   8.2 Council produces and delivers against sustainable financial forecasts as a result of best practice Capital and Asset Management Plans that guide project planning and service delivery across the city.

CONSULTATION

Consulted	Date	Comment
Council departmental officers	Year to date May 2019	Consulted on financial results and outcomes
Financial Services Group officers	Year to date May 2019	Consulted on financial results and outcomes
Executive Leadership Team and Senior Leadership Team	Year to date May 2019	Recipients of variance analysis between actual and budget. Consulted as required

OPTIONS

Option One

That Council resolves to note the financial position, results and ratios for May 2019 as presented in the attached Monthly Financial Report.

Option Two

That Council resolves as follows to request additional information.

OFFICER'S RECOMMENDATION

That Council resolves as follows to note the financial position, results and ratios for May 2019 as presented in the attached Monthly Financial Report.

Monthly Financial Report

May 2019

MAKE A DIFFERENCE MAKE IT COUNT

Redland CITY COUNCIL

Redland CITY COUNCIL

CONTENTS

Redland CITY COUNCIL

1. EXECUTIVE SUMMARY

This monthly report illustrates the financial performance and position of Redland City Council compared to its adopted budget at an organisational level for the period ended 31 May 2019. The year to date and annual revised budget referred to in this report reflects the final revised budget as adopted by Council on 8 May 2019.

Key Financial Highlights and Overview

Key Financial Results ($000)	Annual Revised Budget	YTD Revised Budget	YTD Actual	YTD Variance	YTD Variance %	Status Favourable ✓ Unfavourable ✗
Operating Surplus / (Deficit)	(2,900)	6,815	**7,606**	791	12%	✓
Recurrent Revenue	276,881	258,387	**256,204**	(2,183)	-1%	✗
Recurrent Expenditure	279,781	251,572	**248,598**	(2,974)	-1%	✓
Capital Works Expenditure	91,252	65,206	**54,808**	(10,398)	-16%	✓
Closing Cash & Cash Equivalents	137,269	155,381	**164,867**	9,486	6%	✓

Council reported a year to date operating surplus of $7.6M which is favourable to the revised budget by $791K. The favourable variance in recurrent expenditure is mainly due to underspend in contractor and consultant costs as well as underspend in bulk water costs and vacancies across the organisation.

Capital grants, subsidies and contributions are below budget due to timing of developer cash contributions. Loss on disposal of non-current assets is mainly due to sale of fleet assets and replacement of road assets.

Council's capital works expenditure is below budget by $10.4M due to underspend in the fleet replacement program and timing of works for a number of infrastructure projects.

Cash balance is higher than budget mainly due to underspend on payments for property, plant and equipment. Constrained cash reserves represent 67% of the cash balance.

2. KEY PERFORMANCE INDICATORS

Key Performance Indicators

Financial Stability Ratios and Measures of Sustainability	Status Achieved ✓ Not achieved ✗	Annual Revised Budget	YTD May 2019	Target
Operating Surplus Ratio (%)	✓	-1.05%	**2.97%**	Between 0% and 10% (on average over the long-term)
Asset Sustainability Ratio (%)	✗	70.28%	**42.68%**	Greater than 90% (on average over the long-term)
Net Financial Liabilities (%)*	✓	-29.78%	**-46.20%**	Less than 60% (on average over the long-term)
Level of Dependence on General Rate Revenue (%)	✗	35.27%	**37.76%**	Less than 37.5%
Ability to Pay Our Bills - Current Ratio	✓	3.11	**3.99**	Between 1.1 & 4.1
Ability to Repay Our Debt - Debt Servicing Ratio (%)	✓	2.83%	**3.06%**	Less than or equal to 10%
Cash Balance $M	✓	$137.269M	**$164.867M**	Greater than or equal to $50M
Cash Balances - Cash Capacity in Months	✓	7.70	**9.03**	Greater than 3 months
Longer Term Financial Stability - Debt to Asset Ratio (%)	✓	1.34%	**1.25%**	Less than or equal to 10%
Operating Performance (%)	✓	24.76%	**25.13%**	Greater than or equal to 15%
Interest Coverage Ratio (%)**	✓	-0.81%	**-0.87%**	Less than 5%

* The net financial liabilities ratio exceeds the target range when current assets are greater than total liabilities (and the ratio is negative)
** The interest coverage ratio exceeds the target range when interest revenue is greater than interest expense (and the ratio is negative)

Redland CITY COUNCIL

3. STATEMENT OF COMPREHENSIVE INCOME

STATEMENT OF COMPREHENSIVE INCOME
For the period ending 31 May 2019

	Annual Original Budget $000	Annual Revised Budget $000	YTD Revised Budget $000	YTD **Actual $000**	YTD Variance $000
Recurrent revenue					
Rates charges	100,486	100,486	99,828	**99,577**	(251)
Levies and utility charges	146,618	145,046	133,909	**132,007**	(1,902)
Less: Pensioner remissions and rebates	(3,493)	(3,313)	(3,271)	**(3,223)**	48
Fees	13,673	14,367	13,005	**12,075**	(930)
Rental income	912	912	798	**749**	(49)
Interest received	4,289	4,675	4,159	**4,454**	295
Dividend received	1,000	-	-	**-**	-
Sales revenue	3,735	3,745	3,420	**3,407**	(13)
Other income	694	764	714	**1,141**	427
Grants, subsidies and contributions	11,223	10,199	5,825	**6,017**	192
Total recurrent revenue	279,136	276,881	258,387	**256,204**	(2,183)
Recurrent expenses					
Employee benefits	86,248	87,685	80,165	**78,933**	(1,232)
Materials and services	129,100	126,739	111,494	**109,824**	(1,670)
Finance costs	2,840	2,856	2,608	**2,659**	51
Depreciation and amortisation	63,505	62,577	57,375	**57,505**	130
Other expenditure	507	630	579	**418**	(161)
Net internal costs	(713)	(705)	(649)	**(741)**	(92)
Total recurrent expenses	281,487	279,781	251,572	**248,598**	(2,974)
OPERATING SURPLUS / (DEFICIT)	(2,351)	(2,900)	6,815	**7,606**	791
Capital revenue					
Grants, subsidies and contributions	32,501	20,549	15,660	**14,860**	(800)
Non-cash contributions	6,868	10,219	7,129	**4,740**	(2,389)
Total capital revenue	39,369	30,768	22,789	**19,600**	(3,189)
Capital expenses					
(Gain) / loss on disposal of non-current assets	289	101	83	**2,596**	2,513
Total capital expenses	289	101	83	**2,596**	2,513
TOTAL INCOME	**318,505**	**307,649**	**281,176**	**275,804**	**(5,372)**
TOTAL EXPENSES	**281,776**	**279,882**	**251,655**	**251,194**	**(461)**
NET RESULT	**36,729**	**27,767**	**29,521**	**24,610**	**(4,911)**
Other comprehensive income / (loss)					
Items that will not be reclassified to a net result					
Revaluation of property, plant and equipment	-	-	-	**-**	-
TOTAL COMPREHENSIVE INCOME	**36,729**	**27,767**	**29,521**	**24,610**	**(4,911)**

Redland CITY COUNCIL

3. STATEMENT OF COMPREHENSIVE INCOME - CONTINUED

LEVIES AND UTILITY CHARGES ANALYSIS
For the period ending 31 May 2019

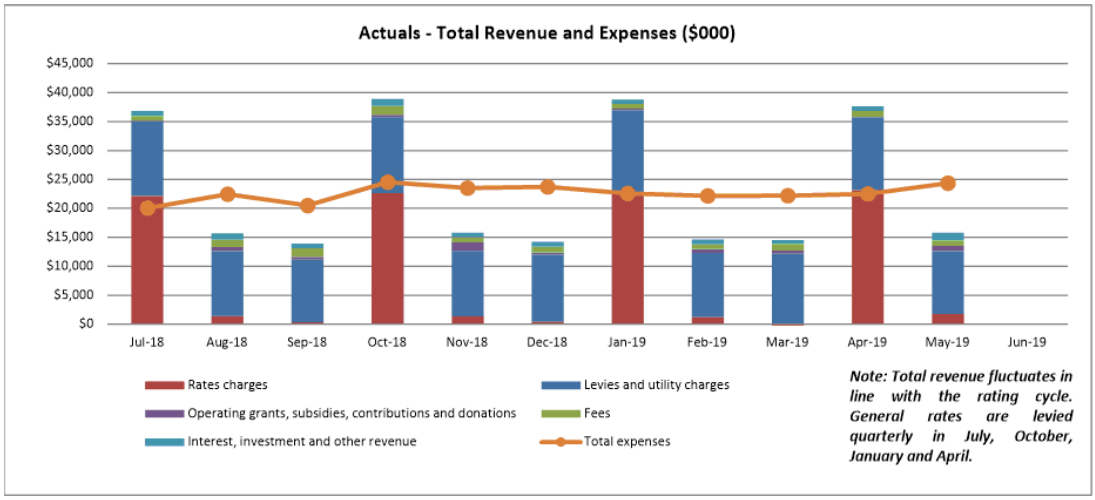
	Annual Original Budget $000	Annual Revised Budget $000	YTD Revised Budget $000	YTD Actual $000	YTD Variance $000
Levies and utility charges					
Refuse collection rate charge	24,307	24,307	22,281	**22,141**	(140)
Special charges	723	723	723	**723**	-
SES separate charge	478	478	478	**481**	3
Environment separate charge	8,180	8,181	8,181	**8,162**	(19)
Separate charge landfill remediation	3,106	3,106	2,847	**2,841**	(6)
Wastewater charges	44,951	44,951	41,205	**40,482**	(723)
Water access charges	18,665	18,591	17,046	**17,005**	(41)
Water consumption charges	46,207	44,709	41,148	**40,172**	(976)
Total levies and utility charges	146,618	145,046	133,909	132,007	(1,902)

MATERIALS AND SERVICES ANALYSIS
For the period ending 31 May 2019

	Annual Original Budget $000	Annual Revised Budget $000	YTD Revised Budget $000	YTD Actual $000	YTD Variance $000
Materials and services					
Contractors	33,755	33,882	27,929	**27,461**	(468)
Consultants	4,500	4,117	3,240	**2,746**	(494)
Other Council outsourcing costs*	16,902	17,545	15,496	**16,366**	870
Purchase of materials	48,229	46,349	42,425	**41,591**	(834)
Office administration costs	8,649	8,052	7,181	**7,374**	193
Electricity charges	5,786	5,786	5,457	**5,009**	(448)
Plant operations	4,190	4,302	3,869	**3,571**	(298)
Information technology resources	2,820	2,605	2,303	**2,327**	24
General insurance	1,423	1,213	1,119	**1,000**	(119)
Community assistance**	1,583	1,627	1,497	**1,354**	(143)
Other material and service expenses	1,263	1,261	978	**1,025**	47
Total materials and services	129,100	126,739	111,494	109,824	(1,670)

** Other Council outsourcing costs are various outsourced costs including refuse collection and disposal, waste disposal, legal services, traffic control, external training, valuation fees, etc.*

*** Community assistance costs represent community related costs including community grants, exhibitions and awards, donations and sponsorships.*



Redland CITY COUNCIL

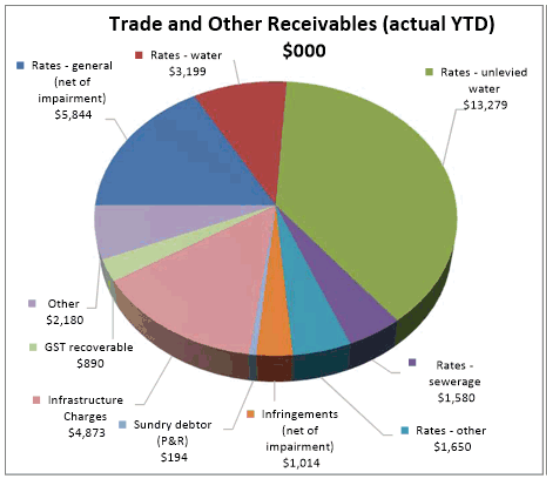
4. STATEMENT OF FINANCIAL POSITION

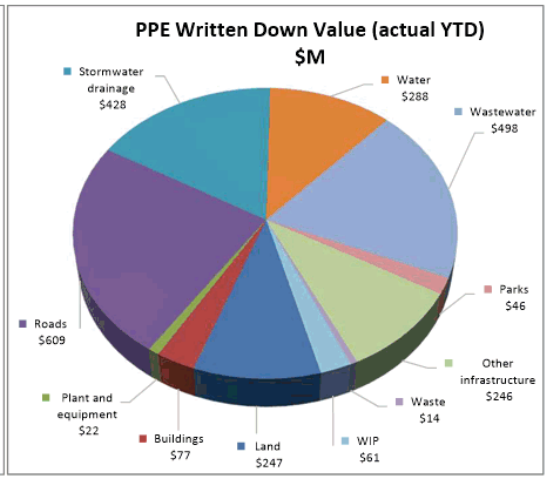
STATEMENT OF FINANCIAL POSITION
As at 31 May 2019

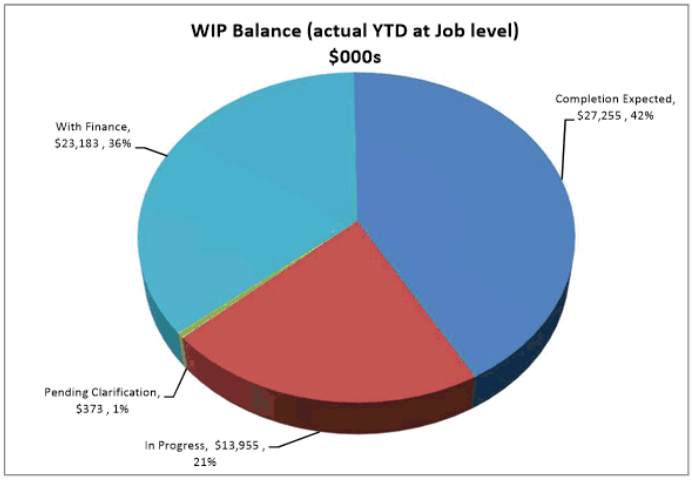
	Annual Original Budget $000	Annual Revised Budget $000	YTD Revised Budget $000	YTD Actual $000
CURRENT ASSETS				
Cash and cash equivalents	167,263	137,269	155,381	**164,867**
Trade and other receivables	27,273	33,477	33,539	**34,703**
Inventories	556	1,108	1,108	**920**
Non-current assets held for sale	262	11,113	11,113	**11,113**
Other current assets	2,073	2,033	2,033	**1,636**
Total current assets	**197,428**	**185,000**	**203,174**	**213,239**
NON-CURRENT ASSETS				
Investment property	1,091	1,091	1,091	**1,091**
Property, plant and equipment	2,608,476	2,575,809	2,552,165	**2,536,278**
Intangible assets	826	1,011	1,091	**1,621**
Other financial assets	73	73	73	**73**
Investment in other entities	14,712	14,791	14,791	**14,629**
Total non-current assets	**2,625,178**	**2,592,775**	**2,569,211**	**2,553,692**
TOTAL ASSETS	**2,822,606**	**2,777,775**	**2,772,385**	**2,766,931**
CURRENT LIABILITIES				
Trade and other payables	40,840	31,435	21,941	**22,964**
Borrowings - current	7,713	7,728	7,728	**7,728**
Provisions - current	13,742	15,747	14,223	**10,334**
Other current liabilities	1,747	4,654	11,767	**12,361**
Total current liabilities	**64,041**	**59,564**	**55,659**	**53,387**
NON-CURRENT LIABILITIES				
Borrowings - non-current	29,651	29,537	26,838	**26,838**
Provisions - non-current	12,115	13,449	12,905	**14,637**
Total non-current liabilities	**41,766**	**42,986**	**39,743**	**41,475**
TOTAL LIABILITIES	**105,807**	**102,550**	**95,402**	**94,862**
NET COMMUNITY ASSETS	**2,716,799**	**2,675,225**	**2,676,983**	**2,672,069**
COMMUNITY EQUITY				
Asset revaluation surplus	1,070,838	1,003,168	1,003,168	**1,003,168**
Retained surplus	1,517,043	1,570,374	1,571,216	**1,558,938**
Constrained cash reserves	128,918	101,683	102,599	**109,963**
TOTAL COMMUNITY EQUITY	**2,716,799**	**2,675,225**	**2,676,983**	**2,672,069**

Redland CITY COUNCIL

4. STATEMENT OF FINANCIAL POSITION - CONTINUED







PROPERTY, PLANT AND EQUIPMENT (PPE) MOVEMENT*
For the period ending 31 May 2019

	Annual Original Budget $000	Annual Revised Budget $000	YTD Revised Budget $000	YTD **Actual Balance $000**
PPE movement				
Opening balance (includes WIP from previous years)	2,598,959	2,537,638	2,537,638	**2,537,638**
Acquisitions and WIP in year movement	73,748	101,455	72,319	**59,163**
Depreciation in year	(62,532)	(61,585)	(56,463)	**(56,591)**
Disposals	(1,699)	(1,699)	(1,329)	**(4,095)**
Other adjustments**	-	-	-	**163**
Closing balance	**2,608,476**	**2,575,809**	**2,552,165**	**2,536,278**

** This table includes movement relating to property, plant and equipment only and is exclusive of intangible assets.*

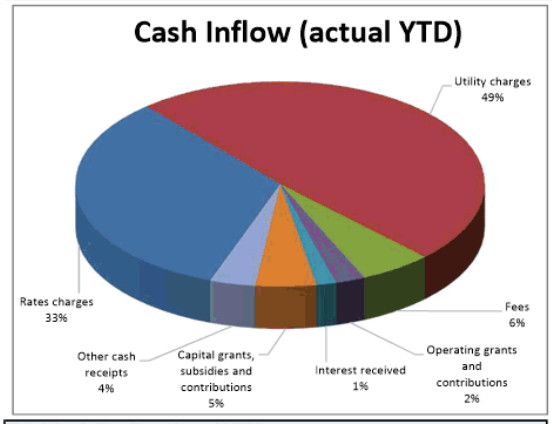
*** Other adjustments include transfers between asset classes, revaluation adjustments, prior period adjustments and depreciation thereon.*

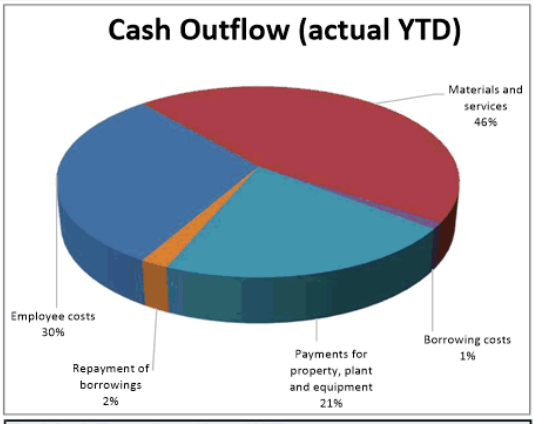
Redland CITY COUNCIL

5. STATEMENT OF CASH FLOWS

STATEMENT OF CASH FLOWS
For the period ending 31 May 2019

	Annual Original Budget $000	Annual Revised Budget $000	YTD Revised Budget $000	YTD Actual $000
CASH FLOWS FROM OPERATING ACTIVITIES				
Receipts from customers	261,712	264,862	258,424	**254,715**
Payments to suppliers and employees	(213,794)	(210,992)	(199,744)	**(197,942)**
	47,919	**53,869**	**58,680**	**56,773**
Interest received	4,289	4,675	4,159	**4,454**
Dividend received*	1,000	-	-	**1,500**
Rental income	912	912	798	**749**
Non-capital grants and contributions	11,223	10,199	5,825	**6,721**
Borrowing costs	(2,809)	(2,809)	(2,809)	**(2,809)**
Net cash inflow / (outflow) from operating activities	**62,533**	**66,846**	**66,653**	**67,388**
CASH FLOWS FROM INVESTING ACTIVITIES				
Payments for property, plant and equipment	(66,880)	(91,236)	(65,189)	**(54,393)**
Payments for intangible assets	-	(16)	(16)	**(415)**
Proceeds from sale of property, plant and equipment	1,410	1,598	1,246	**1,498**
Capital grants, subsidies and contributions	32,501	20,549	15,660	**13,762**
Other cash flows from investing activities**	-	3,500	3,500	**3,500**
Net cash inflow / (outflow) from investing activities	**(32,969)**	**(65,605)**	**(44,799)**	**(36,048)**
CASH FLOWS FROM FINANCING ACTIVITIES				
Proceeds of borrowings	2,500	2,500	-	**-**
Repayment of borrowings	(5,035)	(5,035)	(5,035)	**(5,035)**
Net cash inflow / (outflow) from financing activities	**(2,535)**	**(2,535)**	**(5,035)**	**(5,035)**
Net increase / (decrease) in cash held	**27,030**	**(1,293)**	**16,819**	**26,305**
Cash and cash equivalents at the beginning of the year	140,234	138,562	138,562	**138,562**
Cash and cash equivalents at the end of the financial year / period	**167,263**	**137,269**	**155,381**	**164,867**





Total Cash Funding (Actual YTD)	**286,899**
Total Cash Funding (Annual Revised Budget)	308,795
% of Budget Achieved YTD	93%

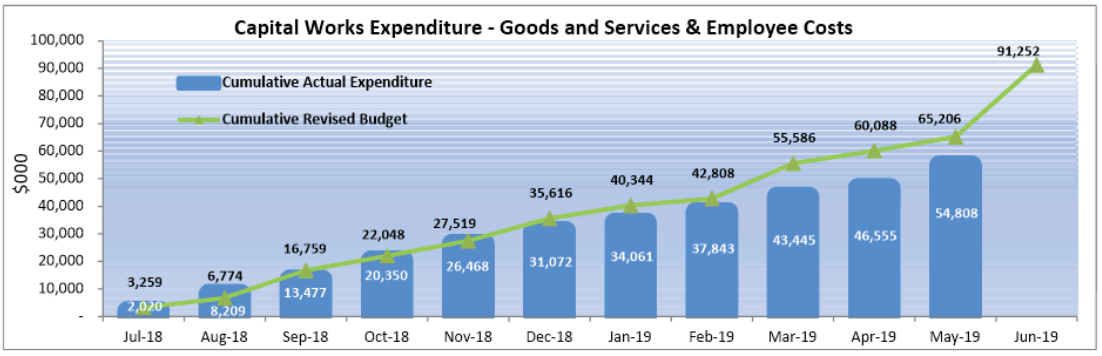
Total Cash Expenditure (Actual YTD)	**260,594**
Total Cash Expenditure (Annual Revised Budget)	310,088
% of Budget Achieved YTD	84%

** Reclassified as operating cash flow to align with Annual Financial Statements and permitted by Australian Accounting Standard AASB 107 Statement of Cash Flows.*

*** Reclassified as cash flows from investing activities to align with Annual Financial Statements and permitted by Australian Accounting Standard AASB 107 Statement of Cash Flows.*

Redland CITY COUNCIL

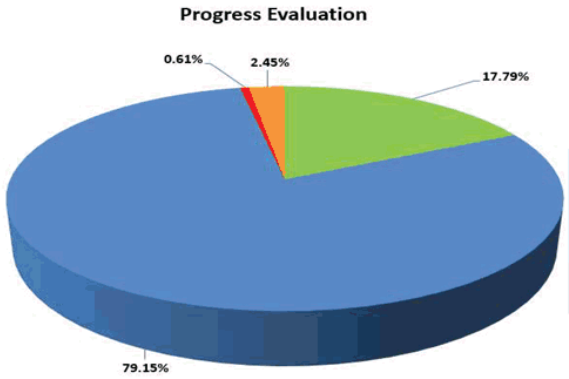
6. CAPITAL EXPENDITURE



	Annual Revised Budget $000	YTD Revised Budget $000	**YTD Actual $000**	YTD Variance $000
Capitalised goods and services	84,141	59,327	**48,282**	(11,045)
Capitalised employee costs	7,111	5,879	**6,526**	647
Total	**91,252**	**65,206**	**54,808**	**(10,398)**

7. PROGRAM AND PROJECT UPDATE

Favourable (budget under/schedule on track) | Meeting expectations (budget and schedule on track) | Within tolerance (either budget or schedule not on track) | Unfavourable (budget and schedule not on track)



Programs and projects are what Council uses to introduce change to achieve corporate outcomes. They allow new infrastructure, products, systems, procedures and services to be delivered. Projects may be undertaken on a standalone basis or as part of a program. Programs and projects may span multiple financial years.

Council is currently progressing 163 programs and projects.

Total Programs and Projects in Progress	Annual Revised Budget $000	**YTD Actual $000**	Commitments $000
Capital*	69,934	43,858	6,230
Operational	8,760	5,944	3,926

*The capital spend on programs and projects is a subset of Council's total capital budget and excludes business as usual capital spend such as replacement of computers, fleet etc.

Notable Projects

Financially significant programs and projects with an annual budget of more than $1M constitute 20 programs and projects and accounts for 68.25% of the total programs and projects budget. The status of two notable projects are as follows:

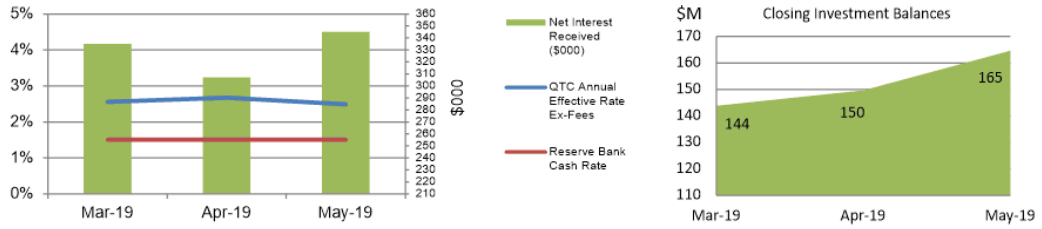
Project description	Progress
Koala Conservation Program aims to retain and sustain a viable koala population and conserve and manage suitable habitats both on the mainland and North Stradbroke Island through addressing various threats faced by the Redlands koala population.	Meeting Expectations
Traffic Safety Improvement Program aims to increase safety for all traffic across the Redlands, currently focussing on West Mt Cotton Road, Thorneside Road pedestrian and cycle access and Shore Street West.	Meeting Expectations

Redland CITY COUNCIL

8. INVESTMENT & BORROWINGS REPORT

For the period ending 31 May 2019

INVESTMENT RETURNS - QUEENSLAND TREASURY CORPORATION (QTC)



Total Investment at End of Month was $164.63M

All Council investments are currently held in the Capital Guaranteed Cash Fund, which is a fund operated by the Queensland Treasury Corporation (QTC).

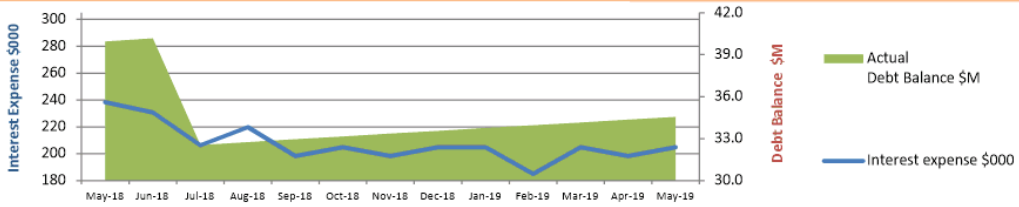
The movement in interest earned is indicative of both the interest rate and the surplus cash balances held, the latter of which is affected by business cash flow requirements on a monthly basis as well as the rating cycle.

Note: the Reserve Bank reduced the cash rate down to 1.5% in the August 2016 sitting - this has not changed in subsequent months.

On a daily basis, cash surplus to requirements is deposited with QTC to earn higher interest as QTC is offering a higher rate than what is achieved from Council's transactional bank accounts. The current annual effective interest rate paid by QTC of 2.63% exceeds the Bloomberg AusBond Bank Bill Index (previously the UBS Bank Bill Index) of 1.99% as at the end of May 2019 in accordance with Corporate POL-3013. Term deposit rates are being monitored to identify investment opportunities to ensure Council maximises its interest earnings.

Council adopted its revised Investment Policy (POL-3013) in June 2018 for the 2018/2019 financial year

BORROWINGS AND BORROWING COSTS



The existing loan accounts were converted to fixed rate loans on 1 April 2016 following a QTC restructure of loans and policies. In line with Council's debt policy, debt repayment of $7.84M, being $5.03M principal and $2.81M interest has been made *annually* in advance for 2018/2019 which will result in the loans being repaid approximately one year earlier.

The debt balance shows a decrease as the Annual Debt Service Payment (ADSP) was made during July 2018. Interest will accrue monthly on a daily balance until next ADSP in July 2019 which is reflected in the increasing debt balance.

Total Borrowings at End of Month were $34.57M

General pool allocated to capital works is 99.4% and 0.6% is attributable to RedWaste.

Council adopted its revised Debt Policy (POL-1838) in June 2018 for the 2018/2019 financial year

Redland CITY COUNCIL

9. CONSTRAINED CASH RESERVES

Reserves as at 31 May 2019	Purpose of reserve	Opening Balance $000	To Reserve $000	From Reserve $000	Closing Balance $000
Special Projects Reserve:					
Weinam Creek Reserve	Maintenance and improvements associated with Weinam Creek projects	3,625	450	(609)	3,466
Red Art Gallery Commissions & Donations Reserve	Purchases of art work for the RCC art collection	7	-	(7)	-
Raby Bay Revetment Wall Reserve	To fund Raby Bay revetment wall works program	-	2,978	(534)	2,444
Fleet Plant & Capital Equipment Reserve	To support the long term fleet replacement program	-	7,452	(3,135)	4,317
		3,632	**10,880**	**(4,285)**	**10,227**
Constrained Works Reserve:					
Public Parks Trunk Infrastructure Reserve	Capital projects for public parks trunk infrastructure	7,324	1,988	(806)	8,506
Land for Community Facilities Trunk Infrastructure Reserve	Land for community facilities trunk infrastructure	2,192	314	-	2,506
Water Supply Trunk Infrastructure Reserve	Upgrade, expansion or new projects for water supply trunk infrastructure	10,107	4,111	-	14,218
Sewerage Trunk Infrastructure Reserve	Upgrade, expansion or new projects for sewerage trunk infrastructure	9,222	2,064	(8)	11,278
Constrained Works Reserve-Capital Grants & Contributions	Unexpended capital grants and contributions received for specific projects	651	-	(225)	426
Local Roads Trunk Infrastructure Reserve	Capital projects for local roads trunk infrastructure	35,922	4,395	(4,817)	35,500
Cycleways Trunk Infrastructure Reserve	Capital projects for cycleways trunk infrastructure	10,783	1,588	(33)	12,338
Stormwater Trunk Infrastructure Reserve	Capital projects for stormwater trunk infrastructure	8,884	908	-	9,792
Constrained Works Reserve-Operating Grants & Contributions	Unexpended operating grants and contributions received for specific projects	919	-	(711)	208
Tree Planting Reserve	Acquisition and planting of trees on footpaths	88	35	(40)	83
		86,092	**15,403**	**(6,640)**	**94,855**
Separate Charge Reserve - Environment:					
Environment Charge Acquisition Reserve	Acquisitions of land and facilities to support or enhance environmental outcomes	234	1,224	-	1,458
Environment Charge Maintenance Reserve	Ongoing conservation and maintenance operations	1,708	6,939	(6,415)	2,232
SES Separate Charge Reserve	On-going costs of maintaining the Redland SES	-	482	(355)	127
		1,942	**8,645**	**(6,770)**	**3,817**
Special Charge Reserve - Other:					
Bay Island Rural Fire Levy Reserve	Pass on revenue collected from levy to the Bay Island Rural Fire Brigade	-	215	-	215
SMBI Translink Reserve*	Offset payment made to the State Govt. to assist with transport service to the Bay Islands	(8)	483	(475)	-
		(8)	**698**	**(475)**	**215**
Special Charge Reserve - Canals:					
Aquatic Paradise Canal Reserve	Maintenance and repairs of Aquatic Paradise canals	743	10	-	753
Sovereign Waters Lake Reserve	Maintenance and repairs of Sovereign Lake	422	5	-	427
1718 Raby Bay Canal Reserve	Service, facility or activity of works in respect of the canals of the Raby Bay canal estate	1,036	-	(816)	220
1718 Aquatic Paradise Canal Reserve	Service, facility or activity of works in respect of the canals of the Aquatic Paradise canal estate	(495)	-	-	(495)
1718 Sovereign Waters Lake Reserve	Service, facility or activity of works in respect of the lake	(56)	-	-	(56)
		1,650	**15**	**(816)**	**849**
TOTALS		93,308	35,641	(18,986)	109,963

Closing cash and cash equivalents	**164,867**
Reserves as percentage of cash balance	**67%**

** Note: During the month the SMBI Translink reserve was closed. Prior to its closure the reserve was approximately $6K overdrawn, which may be attributed to a number of different rating factor calculations. There remains a continuing unpaid rates debt and interest component that Council will continue to recover through normal operations.*

Redland CITY COUNCIL

10. REDLAND WATER STATEMENTS

REDLAND WATER SUMMARY OPERATING STATEMENT
For the period ending 31 May 2019

	Annual Original Budget $000	Annual Revised Budget $000	YTD Revised Budget $000	YTD **Actual $000**	YTD Variance $000
Total revenue	112,745	111,253	102,158	**100,662**	(1,496)
Total expenses	66,297	65,023	58,896	**57,889**	(1,007)
Earnings before interest, tax and depreciation (EBITD)	46,448	46,230	43,262	**42,773**	(489)
Interest expense	15,352	15,352	14,072	**14,072**	-
Depreciation	23,228	23,586	21,644	**21,969**	325
Operating surplus / (deficit)	**7,868**	**7,292**	**7,546**	**6,732**	**(814)**

REDLAND WATER CAPITAL FUNDING STATEMENT
For the period ending 31 May 2019

	Annual Original Budget $000	Annual Revised Budget $000	YTD Revised Budget $000	YTD **Actual $000**	YTD Variance $000
Capital contributions, donations, grants and subsidies	6,798	6,560	4,920	**2,408**	(2,512)
Net transfer (to) / from constrained capital reserves	(6,608)	(4,160)	(2,872)	**(6,159)**	(3,287)
Non-cash contributions	6,648	6,202	4,135	**1,680**	(2,455)
Funding from utility revenue	5,614	5,880	1,655	**5,351**	3,696
Total sources of capital funding	**12,452**	**14,482**	**7,838**	**3,280**	**(4,558)**
Contributed assets	6,648	6,202	4,135	**1,619**	(2,516)
Capitalised expenditure	5,804	8,279	3,703	**1,661**	(2,042)
Total application of capital funds	**12,452**	**14,482**	**7,838**	**3,280**	**(4,558)**

11. REDWASTE STATEMENTS

REDWASTE OPERATING STATEMENT
For the period ending 31 May 2019

	Annual Original Budget $000	Annual Revised Budget $000	YTD Revised Budget $000	YTD **Actual $000**	YTD Variance $000
Total revenue	25,901	25,901	23,755	**24,041**	286
Total expenses	19,155	19,557	17,869	**18,329**	460
Earnings before interest, tax and depreciation (EBITD)	6,746	6,344	5,886	**5,712**	(174)
Interest expense	30	26	24	**24**	-
Depreciation	216	266	244	**247**	3
Operating surplus / (deficit)	**6,500**	**6,052**	**5,618**	**5,441**	**(177)**

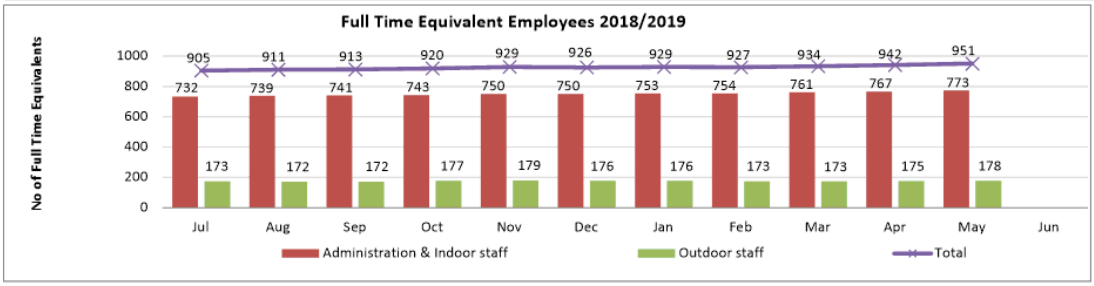
REDWASTE CAPITAL FUNDING STATEMENT
For the period ending 31 May 2019

	Annual Original Budget $000	Annual Revised Budget $000	YTD Revised Budget $000	YTD **Actual $000**	YTD Variance $000
Non-cash contributions	-	-	-	**-**	-
Funding from utility revenue	547	679	588	**382**	(206)
Total sources of capital funding	**547**	**679**	**588**	**382**	**(206)**
Capitalised expenditure	456	589	496	**290**	(206)
Loan redemption	91	90	92	**92**	-
Total application of capital funds	**547**	**679**	**588**	**382**	**(206)**

Redland CITY COUNCIL

12. APPENDIX: ADDITIONAL AND NON-FINANCIAL INFORMATION

Workforce Reporting



May 2019: Headcount	Employee Type						
Department Level	Casual	Contract of Service	Perm Full	Perm Part	Temp Full	Temp Part	Total
Office of CEO	8	2	28	4	8	-	50
Organisational Services	8	6	179	12	27	5	237
Community and Customer Services	35	5	234	64	45	12	395
Infrastructure and Operations	29	6	313	15	24	-	387
Total	80	19	754	95	104	17	1,069

Note: Full Time Equivalent Employees includes all full time employees at a value of 1 and all other employees, at a value less than 1. The table above demonstrates the headcount by department (excluding agency staff) and does not include a workload weighting. It includes casual staff in their non-substantive roles as at the end of the period where relevant.

Overdue Rates Debtors

Days Overdue	May-19	% Overdue	May-18	% Overdue	$ Variance	% Variance	Comment
0 - 30	$5,987,826	2.2%	$7,155,234	2.8%	-$1,167,408	-0.6%	Revenue Collection team continues to monitor and work with ratepayers who are unable to promptly meet their financial obligation to Council.
31 - 60	$2,518	0.0%	$1,114	0.0%	$1,404	0.0%	
61 - 90	$1,843	0.0%	$1,285	0.0%	$558	0.0%	
91 - 180	$2,174,602	0.8%	$2,160,646	0.8%	$13,956	0.0%	
>180	$4,237,074	1.6%	$3,793,395	1.5%	$443,679	0.1%	
Total	**$12,403,863**	**4.6%**	**$13,111,674**	**5.1%**	**-$707,811**	**-0.5%**	

Redland CITY COUNCIL

13. GLOSSARY

Key Terms

Written Down Value:
This is the value of an asset after accounting for depreciation or amortisation, and it is also called book value or net book value.

Work In Progress:
This represents an unfinished project that costs are still being added to. When a project is completed, the costs will be either capitalised (allocated to relevant asset class) or written off.

Definition of Ratios

Operating Surplus Ratio*: *This is an indicator of the extent to which revenues raised cover operational expenses only or are available for capital funding purposes*	Net Operating Surplus / Total Operating Revenue
Asset Sustainability Ratio*: *This ratio indicates whether Council is renewing or replacing existing non-financial assets at the same rate that its overall stock of assets is wearing out*	Capital Expenditure on Replacement of Infrastructure Assets (Renewals) / Depreciation Expenditure on Infrastructure Assets
Net Financial Liabilities*: *This is an indicator of the extent to which the net financial liabilities of Council can be serviced by operating revenues*	Total Liabilities - Current Assets / Total Operating Revenue
Level of Dependence on General Rate Revenue: *This ratio measures Council's reliance on operating revenue from general rates (excludes utility revenues)*	General Rates - Pensioner Remissions / Total Operating Revenue - Gain on Sale of Developed Land
Current Ratio: *This measures the extent to which Council has liquid assets available to meet short term financial obligations*	Current Assets / Current Liabilities
Debt Servicing Ratio: *This indicates Council's ability to meet current debt instalments with recurrent revenue*	Interest Expense + Loan Redemption / Total Operating Revenue - Gain on Sale of Developed Land
Cash Balance - $M: *Cash balance includes cash on hand, cash at bank and other short term investments.*	Cash Held at Period End
Cash Capacity in Months: *This provides an indication as to the number of months cash held at period end would cover operating cash outflows*	Cash Held at Period End / [[Cash Operating Costs + Interest Expense] / Period in Year]
Longer Term Financial Stability - Debt to Asset Ratio: *This is total debt as a percentage of total assets, i.e. to what extent will our long term debt be covered by total assets*	Current and Non-current loans / Total Assets
Operating Performance: *This ratio provides an indication of Council's cash flow capabilities*	Net Cash from Operations + Interest Revenue and Expense / Cash Operating Revenue + Interest Revenue
Interest Coverage Ratio: *This ratio demonstrates the extent to which operating revenues are being used to meet the financing charges*	Net Interest Expense on Debt Service / Total Operating Revenue

* These targets are set to be achieved on average over the longer term and therefore are not necessarily expected to be met on a monthly basis.

12.2 AMENDMENT TO TIME OF SPECIAL BUDGET MEETING SCHEDULED 27 JUNE 2019

Objective Reference:

Authorising Officer: **John Oberhardt, General Manager Organisational Services**

Responsible Officer: **Tony Beynon, Group Manager Corporate Governance**

Report Author: **Marita West, Governance Service Manager**

Attachments: **Nil**

PURPOSE

The purpose of this report is to seek a Council resolution to amend the start time of the Special Budget Meeting scheduled for Thursday 27 June 2019 by 90 minutes.

BACKGROUND

At the General meeting of 10 October 2018, Council resolved to adopt the 2019 meeting calendar.

This calendar included the date and time of the Special Budget Meeting scheduled for Thursday 27 June 2019 at 9.30am.

ISSUES

STRATEGIC IMPLICATIONS

Legislative Requirements

The recommendation of this report is in accordance with:

1. Section 258 of the *Local Government Regulation 2012* – Notice of Meetings.
2. Section 277 of the *Local Government Regulation 2012* – Public Notice of Meetings.

Risk Management

There are no significant risk management issues associated with this report

Financial

There are no specific financial implications associated with this report.

People

There are no specific people implications associated with this report.

Environmental

There are no specific environmental implications associated with this report.

Social

There is sufficient time to notify and publicise the change of start time for the Special Meeting scheduled for Thursday 27 June 2019 as per sections 258 and 277 of the *Local Government Regulation 2012*.

Alignment with Council's Policy and Plans

This report aligns with Council's 2018-2023 Corporate Plan key outcome:

8. Inclusive and ethical governance – Deep engagement, quality leadership at all levels, transparent and accountable democratic processes and a spirit of partnership between the community and Council will enrich residents' participation in local decision-making to achieve community's Redlands 2030 vision and goals.

CONSULTATION

Consulted	Consultation Date	Comments/Actions
Mayor and Divisional Councillors	June 2019	
Executive Leadership Team	June 2019	
General Counsel	June 2019	
Corporate Governance Group Manager	June 2019	
Governance Services Manager	June 2019	
Corporate Meetings & Registers Team	June 2019	

OPTIONS

Option One

That Council resolves as follows:

1. To amend the start time of the Special Budget Meeting from 9.30am to 11.00am on Thursday 27 June 2019.

2. To publish the amended start time of the Special Meeting in accordance with section 277 of the *Local Government Regulation 2012.*

Option Two

That Council resolves to not amend the start time of the Special Budget Meeting scheduled for Thursday 27 June 2019.

OFFICER'S RECOMMENDATION

That Council resolves as follows:

1. **To amend the start time of the Special Budget Meeting from 9.30am to 11.00am on Thursday 27 June 2019.**
2. **To publish the amended start time of the Special Meeting in accordance with section 277 of the *Local Government Regulation 2012.***

12.3 DELEGATIONS FOR PLUMBING & DRAINAGE ACT 2019

Objective Reference:

Authorising Officer: **John Oberhardt, General Manager Organisational Services**

Responsible Officer: **Tony Beynon, Group Manager Corporate Governance**

Report Author: **Lizzi Striplin, Corporate Meetings & Registers Supervisor**

Attachments:
1. **Plumbing and Drainage Act 2018 - Council to CEO Delegations ⇩**
2. **Plumbing and Drainage Regulation 2019 - Council to CEO Delegations ⇩**

PURPOSE

The purpose of this report is to update delegations to the CEO under the *Plumbing and Drainage Act 2018* and the *Plumbing and Drainage Regulation 2019.*

BACKGROUND

Section 257 of the *Local Government Act 2009* allows a local government to delegate a power under the *Local Government Act 2009* or another Act and specifically provides for a power to be delegated to the CEO. Section 259 of the *Local Government Act 2009* allows a CEO to then sub-delegate powers to appropriately qualified officers, other than where the local government specifically directs that the power not be further delegated or it is a power to keep a register of interests.

On 23 January 2019 Council resolved to delegate powers and functions under the various Acts and Regulations to the CEO. Included in the delegations adopted at this time was the *Plumbing and Drainage Act 2002* and the *Plumbing and Drainage Regulation 2003.*

A new Plumbing and Drainage Act and Plumbing and Drainage Regulation have been introduced and set to commence 1 July 2019.

ISSUES

The attachments to this report provide a list of delegations supplied by the LGAQ as part of their delegations register. This report seeks a resolution of Council to provide delegations to the CEO in accordance with s.259 of the *Local Government Act 2009*:

- *Plumbing & Drainage Act 2018* – Attachment 1
- *Plumbing & Drainage Regulation 2019* – Attachment 2

STRATEGIC IMPLICATIONS

Legislative Requirements

This review and the recommendations of this report are in accordance with the legislative requirements relating to the delegation of powers to the CEO.

Risk Management

Council risks not meeting legislative obligations under the *Plumbing and Drainage Act 2018* and the *Plumbing and Drainage Regulation 2019* if these powers are not delegated.

Using the delegation registers supplied by the LGAQ helps ensure Council's delegations are accurate, consistent and in accordance with the relevant legislation.

Financial

There are no financial implications.

People

The recommendations of this report seek to provide delegations to the CEO and allow the appropriate on-delegation of powers to suitably qualified officers to provide for routine decisions and responsibilities required under the *Plumbing and Drainage Act 2018* and the *Plumbing and Drainage Regulation 2019*.

Environmental

There are no specific environmental implications associated with this report.

Social

There are no specific social implications associated with this report.

Alignment with Council's Policy and Plans

This review and officer's recommendation align with relevant Council policies and plans.

CONSULTATION

Consulted	Consultation Date	Comments/Actions
Legal Services	June 2019	
Environment & Regulation	June 2019	
LGAQ	Ongoing	

OPTIONS

Option One

That Council resolves to delegate the Chief Executive Officer, under s.257(1)(b) of the *Local Government Act 2009*, all functions and powers, including relevant limitations, as listed in Attachments 1 and 2 of this report from 1 July 2019.

Option Two

That Council resolves to delegate to the Chief Executive Officer different or amended functions and powers.

OFFICER'S RECOMMENDATION

That Council resolves to delegate the Chief Executive Officer, under s.257(1)(b) of the *Local Government Act 2009*, all functions and powers, including relevant limitations, as listed in Attachments 1 and 2 of this report from 1 July 2019.

REGISTER OF DELEGATIONS
COUNCIL TO CEO

Plumbing and Drainage Act 2018

NOTE: this Act does not commence until 1 July 2019.

Document Reviewed:	11/03/2019
Reprint:	19/10/2018
Updated:	
New:	90(1)(d), 135(1), 135(4), 136,137, 139(1), 142(a), 142(b), 143)(1), 143(2), 144, 149(2), 150
Removed:	
Note:	NOTE: this Act does not commence until 1 July 2019.

DELEGATE	DESCRIPTION OF POWER DELEGATED	LEGISLATION
Chief Executive Officer	Power to start a prosecution for an offence against the Act.	s. 90(1)(d) *Plumbing and Drainage Act 2018*
Chief Executive Officer	Power to administer the Act within Council's area.	s. 135(1) *Plumbing and Drainage Act 2018*
Chief Executive Officer	Power, in the circumstances set out in subsection (3), to, if asked by the entity that has control of the area, administer the act within the area.	s. 135(4) *Plumbing and Drainage Act 2018*
Chief Executive Officer	Power to monitor grey water use facilities prescribed by regulation, in Council's area.	s. 136 *Plumbing and Drainage Act 2018*
Chief Executive Officer	Power to monitor on-site sewage facilities prescribed by regulation in Council's area.	s. 137 *Plumbing and Drainage Act 2018*
Chief Executive Officer	Power to appoint an authorised person as an inspector under the Act.	s. 139(1) *Plumbing and Drainage Act 2018.*
Chief Executive Officer	Power to advise the commissioner of each appointment of an inspector made by Council.	s. 142(a) *Plumbing and Drainage Act 2018*
Chief Executive Officer	Power to give the commissioner a list of Council's inspectors as at 1 July in each year.	s. 142(b) *Plumbing and Drainage Act 2018.*

REGISTER OF DELEGATIONS
COUNCIL TO CEO

Plumbing and Drainage Act 2018

NOTE: this Act does not commence until 1 July 2019.

DELEGATE	DESCRIPTION OF POWER DELEGATED	LEGISLATION
Chief Executive Officer	Power, in the circumstances set out in subsection (1) to give a person who carried out plumbing or drainage work an enforcement notice.	s. 143(1) *Plumbing and Drainage Act 2018*
Chief Executive Officer	Power to, in the circumstances set out in subsection (2), give the owner of premises an enforcement notice.	s. 143(2) *Plumbing and Drainage Act 2018.*
Chief Executive Officer	Power to give a show cause notice before giving an enforcement notice.	s. 144 *Plumbing and Drainage Act 2018*
Chief Executive Officer	Power, in the circumstances set out in subsection (1), to:- (a) do anything reasonably necessary to ensure the enforcement notice is complied with; and (b) recover any reasonable costs and expenses incurred in doing so as a debt.	s. 149(2) *Plumbing and Drainage Act 2018.*
Chief Executive Officer	Power to give the responsible person for plumbing or drainage work an action notice.	s. 150 *Plumbing and Drainage Act 2018.*

REGISTER OF DELEGATIONS
COUNCIL TO CEO

Plumbing and Drainage Regulation 2019

NOTE: this Regulation does not commence until 1 July 2019.

Document Reviewed:	29/4/19
Reprint:	05/04/2019
Updated:	
New:	
Removed:	
Note:	NEW REGISTER commencing 1 July 2019

DELEGATE	DESCRIPTION OF POWER DELEGATED	LEGISLATION
Chief Executive Officer	Power to apply to the chief executive for a treatment plant approval.	Section 16(1) *Plumbing and Drainage Regulation 2019*
Chief Executive Officer	Power to apply to the chief executive to amend a treatment plant approval.	Section 16(2) *Plumbing and Drainage Regulation 2019*
Chief Executive Officer	Power to give the chief executive the information asked for under subsection (2).	Section 17(3) *Plumbing and Drainage Regulation 2019*
Chief Executive Officer	Power, as the new holder, to give the chief executive notice of the transfer in the approved form.	Section 24(2) *Plumbing and Drainage Regulation 2019*
Chief Executive Officer	Power to comply with a notice issued by the chief executive under subsection (1)	Section 26(2) *Plumbing and Drainage Regulation 2019*
Chief Executive Officer	Power, as the owner of premises, to consent to the entry of the premises to carry out the inspection of the treatment plant.	Section 27(c) *Plumbing and Drainage Regulation 2019*
Chief Executive Officer	Power, as the holder of a treatment plant approval, to make written representations about the show cause notice to the chief executive.	Section 29(1) *Plumbing and Drainage Regulation 2019*
Chief Executive Officer	Power, as the holder of an existing treatment plant approval, to apply to the chief executive to renew the approval.	Section 34(1) *Plumbing and Drainage Regulation 2019*

REGISTER OF DELEGATIONS
COUNCIL TO CEO

Plumbing and Drainage Regulation 2019

NOTE: this Regulation does not commence until 1 July 2019.

DELEGATE	DESCRIPTION OF POWER DELEGATED	LEGISLATION
Chief Executive Officer	Power, where Council makes a fast-track work declaration or fast-track opt-out declaration, to:- (a) publish the declaration on Council's website; (b) give a copy of the declaration to the chief executive; (c) if Council is a participating local government for a distributor retailer – give a copy of the declaration to the distributor retailer; (d) ensure a copy of the declaration may be inspected, free of charge, at Council's public office.	Section 41 *Plumbing and Drainage Regulation 2019*
Chief Executive Officer	Power, in a circumstance listed in subsection (1), to give the applicant an information request.	Section 45(2) *Plumbing and Drainage Regulation 2019*
Chief Executive Officer	Power to consider each properly made application and decide to:- (a) approve the application with or without conditions; or (b) refuse the application.	Section 46 *Plumbing and Drainage Regulation 2019*
Chief Executive Officer	Power, where Council decides to approve an application, to:- (a) issue a permit, or an amended permit, to the applicant; and (b) give a copy of the permit, or amended permit, to each entity listed in subsection (b).	Section 48 *Plumbing and Drainage Regulation 2019*
Chief Executive Officer	Power, in a circumstance listed in subsection (1), to give an information notice about the decision.	Section 50(2) *Plumbing and Drainage Regulation 2019*
Chief Executive Officer	Power to give written consent for an application relating to SEQ water work.	Section 53(e)(i) *Plumbing and Drainage Regulation 2019*
Chief Executive Officer	Power to give written consent for an application relating to SEQ sewerage work.	Section 53(f)(i) *Plumbing and Drainage Regulation 2019*

REGISTER OF DELEGATIONS
COUNCIL TO CEO

Plumbing and Drainage Regulation 2019

NOTE: this Regulation does not commence until 1 July 2019.

DELEGATE	DESCRIPTION OF POWER DELEGATED	LEGISLATION
Chief Executive Officer	Power, where Council has issued a permit and has not given a final inspection certificate for the work carried out under the permit at least 3 months before the permit is to end, to give notice of the day the permit is to end to the entities listed in subsection (3).	Section 59(3) *Plumbing and Drainage Regulation 2019*
Chief Executive Officer	Power in the circumstances listed in the subsection (1), to allow the responsible person to give a covered work declaration for the work.	Section 67(2) *Plumbing and Drainage Regulation 2019*
Chief Executive Officer	Power to inspect the work if the public sector entity asks Council to inspect the work under subsection (2).	Section 68(3) *Plumbing and Drainage Regulation 2019*
Chief Executive Officer	Power to, instead of inspecting on-site sewage work, allow an appropriate person to give Council an on-site sewage work declaration.	Section 69(2) *Plumbing and Drainage Regulation 2019*
Chief Executive Officer	Power, where Council has passed a resolution under subsection (1), to:- (a) publish each declaration on its website; (b) give the chief executive a copy of the declaration; (c) ensure the declaration may be inspected, free of charge, at the local government's public office; and (d) ensure each remote area declaration includes a map identifying the remote area.	Section 71(2) *Plumbing and Drainage Regulation 2019*
Chief Executive Officer	Power, in the circumstances identified in subsection (1), to decide to:- (a) accept the remote area compliance notice; or (b) otherwise, refuse to accept the notice.	Section 73(2) *Plumbing and Drainage Regulation 2019*
Chief Executive Officer	Power, in the circumstances identified in subsection (1) and where Council has made a decision under subsection (2), to give the responsible person a decision notice.	Section 73(3) *Plumbing and Drainage Regulation 2019*

REGISTER OF DELEGATIONS
COUNCIL TO CEO

Plumbing and Drainage Regulation 2019

NOTE: this Regulation does not commence until 1 July 2019.

DELEGATE	DESCRIPTION OF POWER DELEGATED	LEGISLATION
Chief Executive Officer	Power, in the circumstances identified in subsection (1) and where Council has refused to accept the remote area compliance notice, to ensure the decision notice includes, or is accompanied by, an information notice.	Section 73(4) *Plumbing and Drainage Regulation 2019*
Chief Executive Officer	Power, where Council is taken to have decided to refuse to accept the remote area compliance notice, to give an information notice about the decision.	Section 73(6) *Plumbing and Drainage Regulation 2019*
Chief Executive Officer	Power, in the circumstances identified in subsection (1), to amend the approved plan so that it correctly represents the work carried out under the permit.	Section 75(2) *Plumbing and Drainage Regulation 2019*
Chief Executive Officer	Power to give an inspection certificate for the work to the responsible person for the work.	Section 83(1) *Plumbing and Drainage Regulation 2019*
Chief Executive Officer	Power to give a final inspection certificate for the work to the responsible person for the work.	Section 84(1) *Plumbing and Drainage Regulation 2019*
Chief Executive Officer	Power to give a copy of the final inspection certificate to the entities listed in subsection (1).	Section 86(1) *Plumbing and Drainage Regulation 2019*
Chief Executive Officer	Power, where Council receives a notice under subsection (2), to comply with the notice.	Section 86(3) *Plumbing and Drainage Regulation 2019*
Chief Executive Officer	Power, where Council is taken under subsection (2) to have decided to refuse to give an inspection certificate or final inspection certified, to give an information notice about the decision.	Section 87(3) *Plumbing and Drainage Regulation 2019*
Chief Executive Officer	Power, where Council considers that a responsible person has not complied with the action notice, to give a copy of the notice to the owner of the premises.	Section 98(3) *Plumbing and Drainage Regulation 2019*

REGISTER OF DELEGATIONS
COUNCIL TO CEO

Plumbing and Drainage Regulation 2019

NOTE: this Regulation does not commence until 1 July 2019.

DELEGATE	DESCRIPTION OF POWER DELEGATED	LEGISLATION
Chief Executive Officer	Power to establish a program for:- (a) registering each testable backflow prevention device installed at premises in Council's area; (b) monitor the maintenance and testing of each device.	Section 101 *Plumbing and Drainage Regulation 2019*
Chief Executive Officer	Power, in the circumstances listed in subsection (1), to:- (a) remove the obstruction or fix the damage; and (b) fairly apportion the reasonable cost of removing the obstruction or fixing the damage between the owners; and (c) recover as a debt from each owner, the owner's share of the cost.	Section 107(2) *Plumbing and Drainage Regulation 2019*
Chief Executive Officer	Power, in the circumstances listed in subsection (1), to require by notice to the owner of the old building and the owner of the new building:- (a) the owner of the old building to change the affected vents; and (b) the owner of the new building to pay the owner of the old building the reasonable cost of changing the affected vents.	Section 108(2) *Plumbing and Drainage Regulation 2019*
Chief Executive Officer	Power to keep a register containing each document listed in subsection (1).	Section 112 *Plumbing and Drainage Regulation 2019*
Chief Executive Officer	Power to keep a register containing each notice given to Council under section 102(2) or 103(3).	Section 113 *Plumbing and Drainage Regulation 2019*
Chief Executive Officer	Power to keep a register containing each service report for a greywater use facility or on-site sewage facility given to Council under section 106.	Section 114 *Plumbing and Drainage Regulation 2019*
Chief Executive Officer	Power to keep a register containing a copy of each show cause notice and enforcement notice given by Council.	Section 115(1) *Plumbing and Drainage Regulation 2019*

REGISTER OF DELEGATIONS
COUNCIL TO CEO

Plumbing and Drainage Regulation 2019

NOTE: this Regulation does not commence until 1 July 2019.

DELEGATE	DESCRIPTION OF POWER DELEGATED	LEGISLATION
Chief Executive Officer	Power to remove a notice mentioned in subsection (1) from the register if the premises to which the notice relates are demolished or removed.	Section 115(2) *Plumbing and Drainage Regulation 2019*
Chief Executive Officer	Power, in relation to each register kept under part 8, division 2, to allow a person to:- (a) inspect the register, free of charge, at Council's public office; or (b) buy a copy of an entry in the register for not more than the reasonable cost of producing the copy.	Section 116 *Plumbing and Drainage Regulation 2019*

12.4 MAKING LOCAL LAW AND SUBORDINATE LOCAL LAW NO. 7 (BATHING RESERVES) 2015

Objective Reference:

Authorising Officer: **John Oberhardt, General Manager Organisational Services**

Responsible Officer: **Tony Beynon, Group Manager Corporate Governance**

Report Author: **Kristene Viller, Policy and Local Laws Coordinator**

Attachments:

1. **Amending Subordinate Local Law No. 5 (Miscellaneous Subordinate Local Laws) 2015) 2019** ⇩
2. **Subordinate Local Law No. 4 (Local Government Controlled Areas, Facilities and Roads) 2015** ⇩
3. **Subordinate Local Law No. 7 (Bathing Reserves) 2015** ⇩
4. **Amending Local Law No. 4 (Local Law No. 7 (Bathing Reserves) 2015) 2019** ⇩
5. **Local Law No. 7 (Bathing Reserves) 2015** ⇩
6. **Review of Anti-Competitive Provisions** ⇩
7. **State Interest Check** ⇩
8. **Community Consultation Submission Review** ⇩
9. **Gazettal Notice Wellington Point Bathing Reserve** ⇩

PURPOSE

The purpose of this report is to:

1. Present the results of the community consultation process that was undertaken for *Subordinate Local Law No. 4 (Local Government Controlled Areas, Facilities and Roads) 2015* and *Subordinate Local Law No. 7 (Bathing Reserves) 2015*.
2. Present the results of the State Interest Check undertaken on *Local Law No. 7 (Bathing Reserves) 2015*.
3. Present the results of the anti-competitive assessment undertaken on *Local Law No. 7 (Bathing Reserves)* 2015, *Subordinate Local Law No. 7 (Bathing Reserves) 2015* and *Subordinate Local Law No. 4 (Local Government Controlled Areas, Facilities and Roads) 2015*.
4. Proceed with the making of *Amending Local Law No 4 (Local Law No. 7 (Bathing Reserves) 2015) 2019*.
5. Proceed with the making of *Amending Subordinate Local Law No. 5 (Miscellaneous Subordinate Local Laws) 2015) 2019*.

BACKGROUND

On 3 June, 2015 Council resolved to make application to the State Government for the gazettal of part of Wellington Point Reserve as a bathing reserve. Council's application for control of foreshores and bathing reserves was submitted on 3 January, 2019. On 2 May 2019, the Governor in Council made the *Redland City Council (Control of Bathing Reserve) Notice (No. 1) 2019* which places the proposed bathing reserve at Wellington Point under the control of Redland City Council. Council's control of the bathing reserve commenced upon gazettal which occurred on 10 May 2019 (Attachment 9). A bathing reserve is part of the seashore, adjacent land under the sea and sea placed under the control of the local government by virtue of gazettal under the Local Government Act 2009. A bathing area is an area marked out by an authorised person within a

bathing reserve and is marked out by the placement of 2 patrol flags at different points adjacent to the foreshore. The restrictions imposed in the local law amendments apply from the edge of the bathing area not the bathing reserve.

At the General Meeting on 7 March 2018, in preparation for the gazettal Council resolved to commence the process for amending *Subordinate Local Law No. 4 (Local Government Controlled Areas, Facilities and Roads) 2015* and *Subordinate Local Law No. 7 (Bathing Reserves) 2015.*

At the General Meeting on 10 October 2018, Council further resolved to commence a community consultation process, inviting submissions on the proposed local law amendments.

The amendments to *Subordinate Local Law No. 4 (Local Government Controlled Areas, Facilities and Roads) 2015* are detailed in the amending instrument (Attachment 1).

Please note that in the consolidated version of *Subordinate Local Law No. 4 (Local Government Controlled Areas, Facilities and Roads) 2015* the only changes made are:

Section	Amendment
Schedule 2, item 2(a)	Updated legislative reference from s66(3)(b) to s66(3)(d)
Schedule 7, Dictionary	Amended definition of bathing reserve
Schedule 7, Dictionary	Amended definition of plant to remove outdated legislative reference
Schedule 7, Dictionary	Updated legislative reference from 26ZPA to 26ZKB

The amendments to *Subordinate Local Law No. 7 (Bathing Reserves) 2015* are detailed in the amending instrument (Attachment 1).

Please note that in the consolidated version of *Subordinate Local Law No. 7 (Bathing Reserves) 2015* the only changes made are:

Section	Amendment
Schedule 2, item 1, column 2	Updated description of restricted aquatic equipment
Schedule 2, item 1, column 3	Added note regarding the extent of the restriction, being determined by placement of beach safety flags
Schedule 2, item 2	Inserted new section for non-motorised equipment in bathing reserves

Following community consultation it was identified that changes would be required to *Local Law No. 7 (Bathing Reserves) 2015* to reduce the outward boundary of the bathing area. At the General Meeting on 23 January, 2019 Council resolved to commence the local law making process for *Local Law No. 7 (Bathing Reserves) 2015* and that the changes being proposed are insubstantial and do not affect anti-competitive provisions.

The amendments to *Local Law No. 7 (Bathing Reserves) 2015* are detailed in the amending instrument (Attachment 4).

Please note that in the consolidated version of *Local Law No. 7 (Bathing Reserves) 2015* the only changes made are:

Section	Amendment
Section 6(4)(c)	Alter to indicate the 400m outer boundary does not apply to Wellington Point
Section 6(4)(c)	At the end of sentence insert the word ‘and’
Section 6(4)(d)	Inclusion of new provision stipulating a 200m outer boundary for Wellington Point bathing reserve

ISSUES

State Interest Checks

In accordance with Council's adopted local law making process a state interest check was completed on *Local Law No. 7 (Bathing Reserves) 2015*.

All relevant State Government Departments were invited to provide comments on the draft local law. The Department of Environment and Science raised some concerns, each of these concerns has been reviewed and addressed in the State Interest Check Report (Attachment 7).

Public Interest Review

The *Local Government Act 2009* (the Act) requires that any local law made with anti-competitive provisions is to comply with the procedures prescribed under a regulation for the review of the anti-competitive provisions. Review of the attached local laws found only one anti-competitive provision present in *Subordinate Local Law No. 4 (Local Government Controlled Areas, Facilities and Roads) 2015*.

A review of the anti-competitive provision (Attachment 6) indicates that there is no significant impact and Council can proceed noting that the public will need to be made aware of the existence of the provision by noting same on Council's website.

Community Consultation

In accordance with Council's adopted local law making process and Council's resolution of 10 October 2018, community consultation was undertaken on *Subordinate Local Law No. 7 (Bathing Reserves) 2015* and *Subordinate Local Law No. 4 (Local Government Controlled Areas, Facilities and Roads) 2015* to allow the community the opportunity to provide comment on the proposed local laws. Submissions were invited from 7 November 2018 and 5 December 2018. All properly made submissions were considered. The report detailing the community feedback is provided in Attachment 8.

A bathing reserve is part of the seashore, adjacent land under the sea and sea placed under the control of the local government by virtue of gazettal under the Local Government Act 2009. A bathing area is an area marked out by an authorised person within a bathing reserve and is marked out by the placement of 2 patrol flags at different points adjacent to the foreshore. The restrictions imposed in the local law amendments apply from the edge of the bathing area not the bathing reserve.

Amendments to *Local Law No. 7 (Bathing Reserves) 2015* were undertaken as a result of the community consultation. No community consultation was undertaken on *Local Law No. 7 (Bathing Reserves) 2015* due to the insubstantial nature of the change.

Local Law Implementation

Should Council make *Amending Local Law No. 4 (Local Law No. 7 (Bathing Reserves) 2015) 2019* and *Amending Subordinate Local Law No. 5 (Miscellaneous Subordinate Local Laws) 2015) 2019* attached to this report, notice must be given to the public within one month, through publication in the Queensland Government Gazette and on Council's website. The law comes into effect on either the date published in the gazette or a date nominated by Council in the gazettal notice.

STRATEGIC IMPLICATIONS

Legislative Requirements

The *Local Government Act 2009* Chapter 3, Part 1, provides power for local governments to make and enforce local laws and sets the framework that the local governments must adhere to. Council has adopted a Local Law Making Process that is consistent with the *Local Government Act 2009* provisions. This process has been followed in the making of the local law attached to this report.

The local laws and subordinate local laws have been drafted by Council's external solicitors in accordance with the *Local Government Act 2009*, the Guidelines for Drafting Local Laws issued by the Parliamentary Counsel and the principles under the *Legislative Standards Act 1992*.

Part D of Council's adopted Local Law Making Process (adopted 20 March 2019) sets out the required steps for making the Amending Instrument. The first 6 steps in the Local Law Making Process involve making the Amending Instrument and steps 7 to 10 relate to notifying the public and Minister about the Amending Instrument.

Risk Management

The risks associated with making the local law and subordinate local laws has been managed by:

a) ensuring the process to make the local law and subordinate local laws is in accordance with legislative standards and the adopted Redland City Council Local Law Making Process;

b) comprehensive internal stakeholder engagement to ensure the local law and subordinate local laws will promote effective governance to the community;

c) utilising external solicitors to draft the local law and subordinate local laws to ensure the legislative principles are followed in the drafting; and

d) conducting a review of the identified anti-competitive provisions to ensure adherence to the National Competition Policy Guidelines.

Financial

The cost of drafting the local law and subordinate local laws is funded through existing budget allocations within the Legal Services Unit.

People

The local law will have an impact on the resourcing within the City Sports and Venues Unit. It is anticipated that this work will be absorbed by current resourcing.

Environmental

There are no environmental implications.

Social

Local Government provides for the good governance of the local government area through their local laws. *Local Law No. 7 (Bathing Reserves) 2015, Subordinate Local Law No. 7 (Bathing Reserves) 2015* and Subordinate *Local Law No. 4 (Local Government Controlled Areas, Facilities and Roads) 2015;* attached to this report has the potential to impact all members of the Redlands Community.

Community consultation provided the opportunity for community members to have their say on the proposal through providing a submission. The attached Community Consultation Report details the outcome of this consultation period (Attachment 8).

Alignment with Council's Policy and Plans

The process for making the proposed local law and subordinate local laws is in accordance with Council's adopted practice for making local laws.

This process is in keeping with Council's Corporate Plan Priority 8, Inclusive and Ethical Governance for deep engagement, quality leadership at all levels, transparent and accountable democratic processes and a spirit of partnership between the community and Council.

CONSULTATION

Consulted	Consultation Date	Comments/Actions
Service Manager City Sports and Venues	July 2018 – May 2019	• Initial establishment of requirements; • Provided feedback on community consultation submissions; and • Participated in face to face discussions with the community.
Senior Advisor Strategic Communication and Community Engagement	November – December 2018	• Input into the community consultation approach.
Senior Advisor Community Engagement	November – December 2018	• Preparation of community consultation material; • Management of yoursay site and data collection; and. • Provided input into the analysis of responses.
Group Manager Corporate Governance	December 2018 – January 2019	• Participated in face to face discussions with the community.
Governance Service Manager	December 2018 – May 2019	• Reviewed the community consultation results and the final report requesting adoption of the local laws.
Policy and Local Laws Coordinator	July 2018 – May 2019	• Prepared submission to the State seeking gazettal of the site; • Prepared community consultation plan; • Reviewed results and prepared community consultation report; • Facilitated the drafting of amending instruments; • Conducted state interest checking process; and • Participated in face to face discussions with the community.
External Solicitors	July 2018 – May 2019	• Prepared amending instruments and drafted amended consolidated local laws; • Provided input into application for gazettal; • Reviewed responses from state interest checks; and • Conducted anti-competitive assessments.
Elected Representatives	July 2018 – May 2019	• Division 1 Councillor was provided updates regarding State application and all details on the community consultation process. • Councillor participated in face to face discussions with the community.
State Government Departments	July 2018 – May 2019	• Reviewed survey plans for formality prior to submission of application for gazettal. • Assessed and approved Council's application to gazette the bathing area.

OPTIONS

Option One

That in accordance with Council's Local Law Making Process adopted on 20 March 2019, pursuant to section 29 of the *Local Government Act 2009*, Council resolves as follows:

1. To receive and note the Community Consultation Submission Review (Attachment 8) and to implement the recommendations of this report.
2. To receive and note the review of Anti-Competitive Provisions (Attachment 6) and to implement the recommendations of this report.
3. To receive and note the State Interest Check (Attachment 7).
4. To receive and note the Gazettal Notice for Wellington Point Bathing Reserve (Attachment 9).
5. To proceed:
    a. As advertised with the making of *Amending Local Law No. 4 (Local Law No. 7 (Bathing Reserves) 2015) 2019*;
    b. To make *Amending Local Law No. 4 (Local Law No. 7 (Bathing Reserves) 2015) 2019*;
    c. To adopt the consolidated version of *Local Law No. 7 (Bathing Reserves) 2015*;
    d. To give notice of the making of *Amending Local Law No. 4 (Local Law No. 7 (Bathing Reserves) 2015) 2019* by publication in the Queensland Government Gazette.
6. To proceed:
    a. As advertised with the making of Amending Subordinate Local Law No. 5 (Miscellaneous Subordinate Local Laws) 2015) 2019.
    b. To make Amending Subordinate Local Law No. 5 (Miscellaneous Subordinate Local Laws) 2015) 2019.
    c. To adopt the consolidated version of Subordinate Local Law No. 4 (Local Government Controlled Areas, Facilities and Roads) 2015 and Subordinate Local Law No. 7 (Bathing Reserves) 2015.
    d. To give notice of the making of Amending Subordinate Local Law No. 5 (Miscellaneous Subordinate Local Laws) 2015) 2019 by publication in the Queensland Government Gazette.
7. That Council notes that *Subordinate Local Law No. 4 (Local Government Controlled Areas, Facilities and Roads) 2015* contains anti-competitive provisions.
8. To authorise the Chief Executive Officer to make any necessary administrative and formatting amendments prior to gazettal.

Option Two

That Council resolves not to make *Amending Local Law No. 4 (Local Law No. 7 (Bathing Reserves) 2015) 2019* or *Amending Subordinate Local Law No. 5 (Miscellaneous Subordinate Local Laws) 2015) 2019*.

OFFICER'S RECOMMENDATION

That in accordance with Council's Local Law Making Process adopted on 20 March 2019, pursuant to section 29 of the *Local Government Act 2009*, Council resolves as follows:

1. **To receive and note the Community Consultation Submission Review (Attachment 8) and to implement the recommendations of this report.**
2. **To receive and note the review of Anti-Competitive Provisions (Attachment 6) and to implement the recommendations of this report.**
3. **To receive and note the State Interest Check (Attachment 7).**
4. **To receive and note the Gazettal Notice for Wellington Point Bathing Reserve (Attachment 9).**
5. **To proceed:**
    a. **As advertised with the making of *Amending Local Law No. 4 (Local Law No. 7 (Bathing Reserves) 2015) 2019*.**
    b. **To make *Amending Local Law No. 4 (Local Law No. 7 (Bathing Reserves) 2015) 2019*.**
    c. **To adopt the consolidated version of *Local Law No. 7 (Bathing Reserves) 2015*.**
    d. **To give notice of the making of *Amending Local Law No. 4 (Local Law No. 7 (Bathing Reserves) 2015) 2019* by publication in the Queensland Government Gazette.**
6. **To proceed:**
    a. **As advertised with the making of *Amending Subordinate Local Law No. 5 (Miscellaneous Subordinate Local Laws) 2015) 2019*.**
    b. **To make *Amending Subordinate Local Law No. 5 (Miscellaneous Subordinate Local Laws) 2015) 2019*.**
    c. **To adopt the consolidated version of *Subordinate Local Law No. 4 (Local Government Controlled Areas, Facilities and Roads) 2015* and *Subordinate Local Law No. 7 (Bathing Reserves) 2015*.**
    d. **To give notice of the making of *Amending Subordinate Local Law No. 5 (Miscellaneous Subordinate Local Laws) 2015) 2019* by publication in the Queensland Government Gazette.**
7. **That Council notes that *Subordinate Local Law No. 4 (Local Government Controlled Areas, Facilities and Roads) 2015* contains anti-competitive provisions.**
8. **To authorise the Chief Executive Officer to make any necessary administrative and formatting amendments prior to gazettal.**

Amending Subordinate Local Law No. 5

(Miscellaneous Subordinate Local Laws)

2018

It is hereby certified that this a true and correct copy of *Amending Subordinate Local Law No. 5 (Miscellaneous Subordinate Local Laws) 2018* made, in accordance with the *Local Government Act 2009*, by the Council of the City of Redland, by resolution dated 19 June 2019

_____

A. Chesterman
Chief Executive Officer

Redland City Council

Amending Subordinate Local Law No. 5 (Miscellaneous Subordinate Local Laws) 2018

Contents

Redland City Council
Amending Subordinate Local Law No. 5
(Miscellaneous Subordinate Local Laws) 2018

Part 1 Preliminary

1 Short title

This amending local law may be cited as *Amending Subordinate Local Law No. 5 (Miscellaneous Subordinate Local Laws) 2018*.

2 Object

The object of this amending subordinate local law is to amend—

(a) *Subordinate Local Law No. 4 (Local Government Controlled Areas, Facilities and Roads) 2015* to amend Schedule 6 to include Wellington Point Beach and Raby Bay Foreshore beaches as bathing reserves and to update and clarify references to legislation; and

(b) *Subordinate Local Law No. 7 (Bathing Reserves) 2015* to amend Schedule 2 to place different restrictions on motorised and non-motorised restricted aquatic equipment within bathing reserves in the local government area.

3 Commencement

This amending subordinate local law commences on the date of publication of the notice of the making of *Amending Subordinate Local Law No. 5 (Miscellaneous Subordinate Local Laws) 2018* in the gazette.

Part 2 Amendment of Subordinate Local Law No. 4 (Local Government Controlled Areas, Facilities and Roads) 2015

4 Subordinate Local Law Amended

This part amends *Subordinate Local Law No. 4 (Local Government Controlled Areas, Facilities and Roads) 2015*

5 Amendment of Sch 2 (Restricted activities for local government controlled areas or roads)

(1) Schedule 2, item 2(a), '' (see s.66(3)(b)'—

omit, insert—

(see s.66(3)(d)

6 Amendment of Sch 7 (Dictionary)

(1) Schedule 7, definition *bathing reserve*—

omit, insert—

bathing reserve means an area placed under the control of a local government as a bathing reserve under section 62 (Bathing reserves) of the *Local Government Regulation 2012*.

(2) Schedule 7, definition *plant*—

omit, insert—

plant means a member of the plant kingdom, other than a protected plant under the *Nature Conservation Act 1992*, and includes all or any part of the flowers, seeds or genetic or reproductive material of the plant.

(3) Schedule 7, definition *public transport waiting point,* '26ZPA'—

omit, insert—

26ZKB

Part 3 Amendment of Subordinate Local Law No. 7 (Bathing Reserves) 2015

7 Subordinate Local Law Amended

This part amends *Subordinate Local Law No. 7 (Bathing Reserves) 2015*

8 Amendment of Sch 2 (Restricted aquatic equipment for bathing reserves or parts of bathing reserves)

(1) Schedule 2, item 1, column 2, Restricted aquatic equipment—

omit, insert—

(a) a motorised boat or vessel; or

(b) a jet ski; or

(c) another motorised device for use on or in water to carry a person or thing across or through water or for recreational use in water.

(2) Schedule 2, item 1, column 3,Extent of restriction , after (a)

insert –

Note: The 60m distance may be determined by the placement of a black and white beach safety flag (BF04) of the design prescribed by Australian Standard No. 2416 by an authorized person.

(3) Schedule 2, after item 1—

insert—

2	All bathing reserves within the local government area	(a) a non-motorised boat or vessel; or (b) a surf ski; or (c) a surf board; or (d) a sail board; or (e) another non-motorised device for use on or in water to carry a person or thing across or through water or for recreational use in water.	(a) Not permitted within 10m of a bathing area in a bathing reserve. Note—The 10m distance may be determined by the placement of a black and white beach safety flag (BF.04) of the design prescribed by Australian Standard No. 2416 by an authorised person. (b) This section does not apply to life-saving equipment used by members of a life-saving patrol for surveillance of the bathing reserve or to assist bathers in distress.

Redland City Council

Subordinate Local Law No. 4 (Local Government Controlled Areas, Facilities and Roads) 2015

It is hereby certified that this a true and correct copy of *Subordinate Local Law No. 4 (Local Government Controlled Areas, Facilities and Roads) 2015* made, in accordance with the *Local Government Act 2009*, by the Council of the City of Redland, by resolution dated 19 June 2019.

_____

A. Chesterman
Chief Executive Officer

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Redland City Council

Subordinate Local Law No. 4 (Local Government Controlled Areas, Facilities and Roads) 2015

Contents

Part 1 Preliminary

1 Short title

This subordinate local law may be cited as *Subordinate Local Law No. 4 (Local Government Controlled Areas, Facilities and Roads) 2015*.

2 Purpose and how it is to be achieved

(1) The purpose of this subordinate local law is to supplement *Local Law No.4 (Local Government Controlled Areas, Facilities and Roads) 2015* in order to protect the health and safety of persons using local government controlled land, facilities, infrastructure and roads and preserve features of the natural and built environment and other aspects of the amenity of local government controlled land, facilities, infrastructure and roads.

(2) The purpose is to be achieved by providing for—

(a) the regulation of access to local government controlled areas; and

(b) the prohibition or restriction of particular activities in local government controlled areas or roads.

3 Authorising local law

The making of the provisions in this subordinate local law is authorised by *Local Law No.4 (Local Government Controlled Areas, Facilities and Roads) 2015* (the ***authorising local law***).

4 Definitions

(1) Particular words used in this subordinate local law have the same meaning as provided for in the authorising local law.

(2) The dictionary in schedule 7 defines particular words used in this subordinate local law.

Part 2 Use of local government controlled areas, facilities and roads

5 Prohibited and restricted activities—Authorising local law, s 5(1)

(1) For section 5(1)(a) of the authorising local law, the activities prescribed in column 2 of schedule 1 are declared to be prohibited in the corresponding local government controlled area or road (or part thereof) mentioned in column 1 of schedule 1.

(2) For section 5(1)(b) of the authorising local law, the activities prescribed in column 2 of schedule 2 are declared to be restricted in the corresponding local government controlled area or road (or part thereof) mentioned in column 1 of schedule 2, to the extent described in column 3 of schedule 2.

6 Motor vehicle access in local government controlled areas—Authorising local law, s 6(1)(b)

For section 6(1)(b) of the authorising local law, the areas prescribed in column 1 of schedule 3 are declared to be motor vehicle access areas.

7 Prohibited vehicles—Authorising local law, s 6(3)

For section 6(3) of the authorising local law, the specific types of motor vehicle prescribed in column 2 of schedule 3 are declared to be prohibited vehicles in the corresponding specified motor vehicle access area in column 1 of schedule 3.

8 Opening hours for local government controlled areas—Authorising local law, s 7(1)

(1) For section 7(1) of the authorising local law, the times prescribed in column 2 of schedule 4 are declared to be the opening hours for the local government controlled areas mentioned in column 1 of schedule 4.

(2) However, the local government may, from time to time, by resolution, declare other times when a local government controlled area is open to the public.

9 Permanent closure of local government controlled area—Authorising local law, s 8(3)

For section 8(3) of the authorising local law, the local government controlled areas described in schedule 5 are permanently closed to public access.

Part 3 Matters affecting roads

10 Notice requiring owner of land adjoining road to fence land—Authorising local law, s 9(3)

For section 9(3) of the authorising local law, the minimum standards for a fence that is the subject of a compliance notice under section 9(2) of the authorising local law are as follows—

(a) the fence must be constructed of materials which are of sufficient strength to—

(i) restrain the types of animals to be contained in the area adjacent to the fence; and

(ii) stop the animals from escaping over, under or through the fence; and

(b) the height of the fence must be sufficient to restrain the types of animals to be contained in the area adjacent to the fence from jumping or climbing over the fence; and

(c) if an animal to be contained in the area adjacent to the fence has the ability to dig — the fence must include a barrier installed directly below the fence to prevent the animal digging its way underneath the fence; and

(d) if the fence includes a gate — the gate must be kept closed and latched except when in immediate use by a person entering or leaving the area adjacent to the fence.

Schedule 1 Prohibited activities for local government controlled areas or roads

Section 5(1)

	Column 1 Local government controlled area or road	Column 2 Prohibited activity
1	All local government controlled areas within the local government area	(a) Riotous, disorderly, indecent, offensive, threatening or insulting behaviour; (b) Carrying or displaying a placard or other sign bearing an offensive or threatening message or image; (c) Injuring, misusing, defacing, marking or otherwise damaging a building or structure; (d) Entering or interfering with a building or structure associated with the water supply system, stormwater drain system or sewerage system of the local government unless the person entering or interfering with the building or structure is an emergency services officer entering or interfering with the building or structure in the course of his or her duties as an emergency services officer; (e) Camping, sleeping, occupying or remaining overnight unless the local government controlled area is a park or reserve; (f) Parking or standing a vehicle bearing a sign or advertisement that the vehicle is offered for sale or hire; (g) Parking or leave standing, an unregistered vehicle.

	Column 1 **Local government controlled area or road**	**Column 2** **Prohibited activity**
2	All roads within the local government area	(a) Painting an object other than a vehicle in, on or over a road; (b) Repairing, altering or carrying out maintenance on an object other than a vehicle in, on or over a road; (c) Intentionally or negligently damaging a road or a structure associated with a road; (d) Creating a nuisance on a road; (e) Camping, sleeping, occupying or remaining overnight in a vehicle stopped on a footpath, shared path, water-channel or gutter; (f) Parking or standing a vehicle bearing a sign or advertisement that the vehicle is offered for sale or hire; (g) Parking or leave standing, an unregistered vehicle.
3	All off-street regulated parking areas within the local government area as declared in section 6 of *Local Law No. 5 (Parking) 2015*	Parking or leave standing, an unregistered vehicle.
4	All local government cemeteries within the local government area	(a) Interfering with a funeral or commemorative service lawfully conducted in a local government cemetery; (b) Distributing or putting up any handbill, card, circular or advertisement; (c) Interfering with any tree, shrub or plant; (d) Discharging a firearm, except at a military or police funeral or other recognised type of funeral service ordinarily involving such discharge; (e) Damaging or disturbing or interfering with any memorial,

	Column 1 Local government controlled area or road	Column 2 Prohibited activity
		inscription plaque, epitaph or inscription, or any flowers or tokens placed on or adjacent to a grave or niche; (f) Riding or driving or permitting to be ridden or driven, any vehicle of any description or any horse otherwise than on a paved roadway or path; (g) Engaging in conduct which is dangerous or creates a risk to the safety of members of the public; (h) Deliberately or recklessly damaging or destroying any building, fence, structure, improvement or other property; (i) Bringing an animal into or allowing an animal to be within a local government cemetery other than— (i) for the purposes of a funeral or commemorative service; or (ii) a dog which is under effective control as defined in section 11 of *Local Law No. 2 (Animal Management) 2015*; (j) Entering or being within a local government cemetery except for the purpose of— (i) visiting a grave, memorial or interment site; or (ii) attending a funeral; or (iii) maintaining or repairing a grave, memorial or interment site in accordance with a written authorisation of the chief executive officer; (k) Taking part in any meeting other than a meeting of a religious or commemorative nature.

	Column 1 **Local government controlled area or road**	**Column 2** **Prohibited activity**
5	All parks and reserves within the local government area	(a) Damaging or interfering with vegetation; (b) Discharging or carrying a firearm or other weapon or any kind of explosive device; (c) Throwing a stone, projectile or other missile; (d) Using or carrying a trap, snare or net; (e) Hitting a golf ball; (f) Behaving in a riotous disorderly, indecent, offensive, threatening or insulting manner; (g) Carrying out an activity or behaving in a manner reasonably likely to injure, endanger, obstruct, inconvenience or cause fear, a nuisance or excessive annoyance to another person; (h) Interfering with a plant or any turf, sand, clay, soil or other material; (i) Interfering with any facility or equipment located at the park or reserve; (j) Disposing of any waste of any kind other than in a waste container provided for that purpose; (k) Depositing, storing or abandoning any goods; (l) Bathing in any ornamental pond or lake; (m) Using a boat, canoe, craft, surf ski, surf board or other recreational floating device in an ornamental pond or lake;

	Column 1 **Local government controlled area or road**	**Column 2** **Prohibited activity**
		(n) Any activity which fouls, litters, pollutes or interferes with a park or reserve or a facility in a park or reserve; (o) Permitting or allowing a water tap in a park or reserve to run water to waste; (p) Removing any timber or wood provided by the local government for use as firewood; (q) Propagating or cultivating any plant, vegetation or vegetative matter; (r) Park or leave standing, a motor vehicle overnight or at any time outside of the opening hours specified in schedule 4 (Opening hours for local government controlled areas) for parks and reserves; (s) Park or leave standing, a motor vehicle if the person is not a bona fide user of the park or reserve; (t) Use a road within a park or reserve for the sole purpose of a thoroughfare, rather than as a means of access to or from the park or reserve as a bona fide user.
6	All local government accommodation parks within the local government area	(a) Disposing of liquid waste other than at a drainage point provided for that purpose; (b) Disposing of waste other than in a waste container provided for that purpose; (c) Using facilities in a way that makes them unclean or insanitary; (d) Behaving in a riotous disorderly, indecent, offensive, threatening or insulting manner;

	Column 1 Local government controlled area or road	Column 2 Prohibited activity
		(e) Carrying out an activity or behaving in a manner reasonably likely to injure, endanger, obstruct, inconvenience or cause fear or excessive annoyance to another person; (f) Interfering with a plant or any turf, sand, clay, soil or other material; (g) Interfering with any facility or equipment located at the local government caravan park.
7	The boat ramps and landings within the local government area identified in schedule 6	(a) Carrying out maintenance or repairs to a ship on a boat ramp; (b) Carrying out maintenance or repairs to a ship in the water around a boat ramp or landing unless the person has a reasonable excuse; (c) Wilfully breaking, destroying, damaging, defacing, disfiguring or writing upon a boat ramp, landing or a notice erected or displayed by the local government at a boat ramp or landing; (d) Wilfully damaging any lighting upon a boat ramp or a landing; (e) Riding an animal on a boat ramp or a landing; (f) Carrying a loaded or cocked spear gun on a boat ramp or a landing; (g) Lighting a fire on a boat ramp or a landing, whether in a container or otherwise; (h) Diving off a boat ramp or a landing; (i) A person causing themselves or any other person or object to fall or be projected into waters surrounding a boat ramp or a landing;

	Column 1 Local government controlled area or road	Column 2 Prohibited activity
		(j) Obstructing another person's use of a boat ramp or landing; (k) Using a boat ramp or landing in a manner which is inconsistent with — (i) the safe, secure and efficient operation of the boat ramp or landing; or (ii) the protection of the environment at the boat ramp or landing; or (iii) the maintenance or improvement of the convenience of users of the boat ramp or landing; (l) Cleaning or gutting fish or other marine life; (m) Casting or discharging, or causing to be cast or discharged, any material, object or substance from a boat ramp or landing; (n) Occupying a ship or mooring a ship at a boat ramp or landing for the purpose of habitation; (o) While involved in the use of a ship at a boat ramp or landing, casting or discharging, or causing to be cast or discharged, from the ship, any material, object or substance into the waters surrounding the ship; (p) Mooring a ship at a boat ramp or landing except to a bollard or other fastening appliance that is provided for that purpose at the boat ramp or landing; (q) Mooring a ship to any steps or landing place for passengers or cargo at a boat ramp or landing; (r) Permitting a ship to lie alongside a boat ramp or landing, unless it is properly moored;

	Column 1 **Local government controlled area or road**	**Column 2** **Prohibited activity**
		(s) Placing or mooring a ship in the approach fairway to a boat ramp or landing; (t) If a ship is moored at a boat ramp or landing—allowing the ship to lie alongside, or remain attached to, the boat ramp or landing, except for the purpose of embarking or disembarking passengers or crew, or loading or unloading cargo, stores or goods from the boat ramp or landing; (u) Operating a ship in a manner that obstructs or interferes with the use of a boat ramp or landing by another ship; (v) If the boat ramp or landing is used by a ship (a ***ferry service ship***) for the purposes of a ferry service—mooring, or allowing a ship to lie alongside the boat ramp or landing in a manner that obstructs or interferes with the use of the boat ramp or landing by a ferry service ship used in the operation of the ferry service.
8	The canoe/kayak pontoons within the local government area identified in schedule 6	(a) Breaking, destroying, damaging, defacing, disfiguring, removing or writing on a canoe/kayak pontoon or a notice erected or displayed by the local government at a canoe/kayak pontoon; (b) Damaging any lighting on a canoe/kayak pontoon; (c) Riding an animal on a canoe/kayak pontoon; (d) Carrying a loaded or cocked spear gun on a canoe/kayak pontoon; (e) Lighting a fire on a canoe/kayak pontoon, whether in a container or otherwise; (f) Diving or jumping off a canoe/kayak pontoon or

	Column 1 Local government controlled area or road	Column 2 Prohibited activity
		infrastructure attached to a canoe/kayak pontoon; (g) A person causing themselves or any other person or object to fall or be projected into waters surrounding a canoe/kayak pontoon; (h) Obstructing another person's use of a canoe/kayak pontoon; (i) Using a canoe/kayak pontoon in a manner that is inconsistent with — (i) the safe, secure and efficient operation of the canoe/kayak pontoon; or (ii) the protection of the environment at the canoe/kayak pontoon; or (iii) the maintenance or improvement of the convenience of users of the canoe/kayak pontoon; (j) Cleaning or gutting fish or other marine life; (k) Casting or discharging, or causing to be cast or discharged, any material, object or substance from a canoe/kayak pontoon; (l) Anchoring, mooring, placing, launching, using, maintaining, repairing or operating a ship, motorised aquatic equipment or non-motorised aquatic equipment, other than a canoe or kayak, in the water around, at or from a canoe/kayak pontoon; (m) Operating a canoe or kayak in a manner that obstructs or interferes with the use of a canoe/kayak pontoon by another user of the canoe/kayak pontoon;

	Column 1 **Local government controlled area or road**	**Column 2** **Prohibited activity**
		(n) Driving, standing, parking or bringing a vehicle onto a canoe/kayak pontoon; (o) Fishing, using a cast net or other bait catching devices or using a crab pot or other device for catching a crustacean on a canoe/kayak pontoon; (p) Attaching or affixing, whether temporary or permanent, a rope swing, ladder or the like to a canoe/kayak pontoon.
9	All local government swimming pools within the local government area, including each local government swimming pool identified in schedule 6	(a) Bringing any glass or any item made from glass onto the pool deck surrounding the swimming pool or into the swimming pool; (b) Engaging in conduct which is dangerous or which creates a risk to the safety of other users of the swimming pool; (c) Causing wilful damage to the swimming pool or any facilities at the swimming pool; (d) Behaving in a way that endangers the safety of, or causes a nuisance to, other users of the swimming pool; (e) If a person is more than 5 years of age — entering any part of the swimming pool which is set apart for the exclusive use of the opposite sex, other than for the purpose of rendering emergency assistance; (f) Entering the land on which the swimming pool is located whilst intoxicated or under the influence of a stupefying drug; (g) Entering the swimming pool whilst carrying or having possession of any alcohol or a stupefying drug;

	Column 1 Local government controlled area or road	Column 2 Prohibited activity
		(h) Disposing of waste other than in a waste container provided by the local government for the purpose of the collection of waste; (i) Entering the water in the swimming pool if the person has an infectious or contagious disease or illness or a skin complaint; (j) Interfering with the property of another person on the land on which the swimming pool is located other than with the consent of the other person; (k) Entering the land on which the swimming pool is located unless the person has paid the entrance fee prescribed by the local government from time to time for entry to the swimming pool; (l) Using a season ticket for the swimming pool otherwise than in accordance with the rules of the local government for the use of a season ticket for the swimming pool; (m) Behaving in a threatening, abusive or insulting manner to another person at the swimming pool; (n) Leaving a child or children under the age of 10 at the land on which the swimming pool is located otherwise than under the direct supervision of a person who is a parent or guardian of the child or children and at least 16.
10	All local government offices, libraries and depots within the local government area	(a) Obstructing or interfering with a person who is a local government employee or a contractor of the local government in the performance of the duties to be performed by the person at the local government controlled area;

	Column 1 Local government controlled area or road	Column 2 Prohibited activity
		(b) Disposing of waste other than in a waste container provided for that purpose; (c) Using facilities in a way that makes them unclean or insanitary; (d) Behaving in a riotous, disorderly, indecent, offensive, threatening or insulting manner; (e) Carrying out an activity or behaving in a manner reasonably likely to injure, endanger, obstruct, inconvenience or cause fear or excessive annoyance to another person; (f) Interfering with any facility or equipment located at the local government controlled area; (g) Depositing, storing or abandoning any goods; (h) Any activity which fouls, litters, pollutes or interferes with the local government controlled area or a facility in the local government controlled area; (i) Wilfully breaking, destroying, damaging, defacing, disfiguring or writing upon any part of the local government controlled area or a notice erected or displayed by the local government at the local government controlled area; (j) Using any part of the local government controlled area in a manner which is inconsistent with— (i) the safe, secure and efficient operation of the local government controlled area; or (ii) the maintenance or improvement of the convenience of users of the

	Column 1 **Local government controlled area or road**	**Column 2** **Prohibited activity**
		local government controlled area.
11	Footpaths on roads as follows— (a) the footpath on either side of each road within the Cleveland Central Business District bounded by, and including, each of Wynyard, Shore, Waterloo and Queen Streets; (b) the footpath commonly known as Capalaba Place between Noeleen Street and Capalaba Central Shopping Centre; (c) the footpath on either side of Main Road, Wellington Point, from the intersection with Apsley Street to the intersection with Douro Road.	Riding a bicycle, wheeled recreational device or wheeled toy, as defined in the *Transport Operations (Road Use Management) Act 1995*.
12	The public transport waiting points at each boat ramp and landing within the local government area identified in schedule 6	(a) Smoking; (b) Fishing; (c) Using a cast net or other bait collecting device; (d) Using a crab pot or other device for catching a crustacean.
13	The Swan Bay region of Main Beach, North Stradbroke Island	(a) Camping; (b) Bringing onto, or driving a vehicle, including a motor vehicle, on the local government controlled area.
14	Brown Lake, North Stradbroke Island	(a) Using a motorised ship on the local government controlled area; (b) Bringing onto, or driving a vehicle, including a motor vehicle, on the foreshore of the local government controlled area; (c) Washing or cleansing a vehicle on the foreshore, or in the near vicinity of, the local government controlled area.

	Column 1 **Local government controlled area or road**	**Column 2** **Prohibited activity**
15	Weinam Creek Commuter Terminal	(a) Obstructing or impeding another person's use of the Terminal; (b) Mooring or fastening a ship to any part of the Terminal, except to a fastening that is provided for that purpose; (c) Carrying out repairs on a jetty at the Terminal whilst moored at the jetty; (d) Anchoring or mooring a ship in the approach fairway to a jetty at the Terminal; (e) Swimming or diving into, or allowing any animal under the person's control to swim in, or dive into— (i) any waters at the Terminal; or (ii) any navigational channel at the Terminal; or (iii) any waters within 100m of the edge of a navigational channel at the Terminal.
16	Each area of bathing reserve and foreshore identified in schedule 6	Bringing or driving a motor vehicle on the area of bathing reserve or foreshore.

Schedule 2 Restricted activities for local government controlled areas or roads

Section 5(2)

	Column 1 Local government controlled area or road	Column 2 Restricted activity	Column 3 Extent of restriction
1	All local government controlled areas within the local government area	(a) Busking	(a) Permitted only if authorised under the conditions of an approval for a prescribed activity.
		(b) Depositing, storing, dumping or leaving unattended a shopping trolley.	(b) Permitted only in the area of a shopping centre car park that is open to or used by the public and is developed for, or has as 1 of its main uses, the driving or riding of motor vehicles.
2	All roads within the local government area	(a) The painting, repairing, alteration or maintenance of vehicles on a road' (see s.66(3)(d) of the *Transport Operations (Road Use Management) Act 1995*, which permits local laws to regulate these activities on roads).	(a) Permitted only if the vehicle is temporarily disabled with a minor fault and the driver of the vehicle stops for no longer than is necessary for the performance of maintenance work limited to the minimum necessary to allow the vehicle to be moved from the road.
		(b) Temporarily closing a road to all traffic, or traffic of a particular class.	(b) Permitted only with the written authorisation of the chief executive officer of the local government.
		(c) Depositing, storing, dumping or leaving unattended a shopping trolley.	(c) Permitted only in the area of a shopping centre car park that is open to or used by the public and is developed for, or has as 1 of its main uses, the driving or riding of motor vehicles.

	Column 1 Local government controlled area or road	Column 2 Restricted activity	Column 3 Extent of restriction
3	All local government cemeteries within the local government area	(a) Carrying out a burial outside the hours during which burials may be performed as fixed by the local government.	(a) Permitted only— (i) between the hours of 9am and 4pm; or (ii) with the written authorisation of the chief executive officer of the local government.
		(b) Disposing of human remains in a local government cemetery.	(b) Permitted only with the written authorisation of the chief executive officer of the local government.
		(c) Digging or preparing a grave in a local government cemetery.	(c) Permitted only if the grave is dug or prepared by a person employed by the local government or with the written authorisation of the sexton.
		(d) After a burial — reopening a grave for a further burial.	(d) Permitted only with the written authorisation of the sexton.
		(e) Bringing human remains into a local government cemetery.	(e) Permitted only— (i) with the written authorisation of the chief executive officer of the local government; and (ii) if the remains are enclosed in a coffin or other form of container appropriate to the proposed form of disposal.
		(f) Erecting or installing a memorial to a deceased person in a local government cemetery.	(f) Permitted only with the written authorisation of the chief executive officer of the local government.

	Column 1 **Local government controlled area or road**	**Column 2** **Restricted activity**	**Column 3** **Extent of restriction**
		(g) Reserving a niche or site in a local government cemetery.	(g) Permitted only under the conditions of a written authorisation of the chief executive officer of the local government.
		(h) Carrying out maintenance or repair work on a memorial to a deceased person in a local government cemetery.	(h) Permitted only— (i) by a member of the family of the deceased person, or another person who has a proper interest in the maintenance of the memorial to the deceased person; and (ii) with the written approval of the sexton; and (iii) subject to conditions about how the work is to be carried out as are included in the written authorisation of the sexton.
4	All parks and reserves within the local government area	(a) Lighting or maintaining a fire.	(a) Permitted only if the fire is— (i) lit and maintained in a fireplace established by the local government for the purpose; or (ii) lit and maintained in accordance with the written authorisation of the chief executive officer of the local government.

	Column 1 Local government controlled area or road	Column 2 Restricted activity	Column 3 Extent of restriction
		(b) Sleeping, occupying or remaining overnight in a park or reserve.	(b) Permitted only with the written authorisation of the chief executive officer of the local government.
		(c) Erecting or installing a building, structure or facility in, on, across or over a park or reserve.	(c) Permitted only if authorised under the conditions of an approval for a prescribed activity.
		(d) Conducting or taking part in an organised sporting activity of regional, State or national significance.	(d) Permitted only if authorised under the conditions of an approval for a prescribed activity.
		(e) Operating a model vehicle or aircraft propelled by a motor.	(e) Permitted only with the written authorisation of the chief executive officer of the local government.
		(f) Using, storing or possessing fireworks.	(f) Permitted only with the written authorisation of the chief executive officer of the local government.
		(g) Displaying a sign or advertisement.	(g) Permitted only if authorised under the conditions of an approval for a prescribed activity.
		(h) Playing golf.	(h) Permitted only with the written authorisation of the chief executive officer of the local government.
		(i) Undertaking the sport of archery.	(i) Permitted only with the written authorisation of the chief executive officer of the local government.

	Column 1 Local government controlled area or road	Column 2 Restricted activity	Column 3 Extent of restriction
		(j) Using a megaphone, loud speaker, or other similar amplification device.	(j) Permitted only— (i) with the written authorisation of the chief executive officer of the local government; or (ii) if authorised under the conditions of an approval for a prescribed activity.
		(k) Public entertainment.	(k) Permitted only— (i) with the written authorisation of the chief executive officer of the local government; or (ii) if authorised under the conditions of an approval for a prescribed activity.

	Column 1 **Local government controlled area or road**	**Column 2** **Restricted activity**	**Column 3** **Extent of restriction**
		(l) Research. *Examples of activities which are research for this section—* • *The collection of entire fauna or flora specimens.* • *The collection of portions of fauna or flora specimens (such as cuttings or DNA samples).* • *The installation of monitoring equipment.*	(l) Permitted only with the written authorisation of the chief executive officer of the local government.
5	All local government accommodation parks within the local government area	(a) Lighting or maintaining a fire in the open.	(a) Permitted only — (i) if the fire is in a fireplace or incinerator approved for the purpose by the local government; or (ii) with the written authorisation of an authorised person.
		(b) Camping, sleeping, occupying or remaining overnight in a caravan or complementary accommodation at an accommodation site at a local government accommodation park.	(b) Permitted only if— (i) the person undertaking the activity maintains the accommodation site and any caravan or complementary accommodation on the accommodation site in a clean and sanitary condition; and (ii) the person deposits all waste in a waste container, or a waste disposal system,

	Column 1 Local government controlled area or road	Column 2 Restricted activity	Column 3 Extent of restriction
			provided by the local government for the purpose; and (iii) the person does not use facilities at the local government accommodation park in a way that makes them unclean or unsanitary; and (iv) the person who occupies the accommodation site allows onto the site no more persons than the limit fixed under a relevant approval or as notified by notice displayed by the local government at the local government accommodation park; and (v) the person pays all fees for use of the accommodation site in advance to the local government; and (vi) if required by the local government or an Act—the person enters into a written agreement with the local government about undertaking the activity at the local government accommodation park; and (vii) at the end of the period of occupation of the accommodation site

	Column 1 Local government controlled area or road	Column 2 Restricted activity	Column 3 Extent of restriction
			— the person vacates and leaves the accommodation site in a clean and tidy condition; and (viii) the person ensures that the caravan or complementary accommodation is not let or hired to another person; and (ix) the person ensures that the accommodation site is kept and maintained in good repair and clean, tidy and sanitary condition; and (x) the person ensures that the accommodation site is not left unoccupied for more than 2 days; and (xi) the person ensures that the activity does not cause a nuisance, annoyance, disturbance or inconvenience to other persons using the local government accommodation park.
		(c) Use or operation of a generator in a part of a local government accommodation park that is made available for camping overnight or for a period longer than overnight.	(c) Permitted only— (i) with the written authorisation of an authorised person ; and (ii) in any event (even where written authorisation is

	Column 1 Local government controlled area or road	Column 2 Restricted activity	Column 3 Extent of restriction
			granted) not between the hours of 9:30pm and 7:00am.
6	The boat ramps and landings within the local government area identified in schedule 6	(a) Driving or standing a vehicle on a boat ramp.	(a) Permitted only to launch or retrieve a ship from the boat ramp.
		(b) Launching or retrieving a ship at a boat ramp.	(b) Permitted only if the person launching or retrieving the ship does so as quickly as is reasonably possible.
		(c) Anchoring, mooring or placing a ship in the water around a boat ramp or a landing.	(c) Permitted only if the anchoring, mooring or placing of the ship is not likely to obstruct another person's use of the boat ramp or landing.
		(d) Carrying out the rigging of a sailing ship on a boat ramp or landing.	(d) Permitted only if the carrying out of the rigging does not, or is not likely to, impede access to the boat ramp or landing.
		(e) Taking or driving a vehicle onto a boat ramp.	(e) Permitted only if the mass of the vehicle and its load (if any), together with any trailer that the vehicle is towing and its load (if any), is not more than— (i) 5 tonnes; or (ii) if the local government erects on or near the boat ramp a notice approved by the local government

	Column 1 Local government controlled area or road	Column 2 Restricted activity	Column 3 Extent of restriction
			and displaying a greater mass—the greater mass.
		(f) Taking or driving a vehicle onto a landing.	(f) Permitted only with the authorisation of an authorised person.
		(g) Taking or driving a vehicle onto a boat ramp or landing.	(g) Permitted only if the vehicle moves on wheels fitted with pneumatic or rubber tyres.
		(h) Fishing on a boat ramp or landing, or a part of a boat ramp or landing, that is not a public transport waiting point.	(h) Permitted only if the activity does not obstruct or interfere with the use of the boat ramp or landing by a ship, vehicle or another person.
		(i) Using a cast net or other bait collecting device on a boat ramp or landing, or a part of a boat ramp or landing, that is not a public transport waiting point.	(i) Permitted only if the activity does not obstruct or interfere with the use of the boat ramp or landing by a ship, vehicle or another person.
		(j) Using a crab pot or other device for catching a crustacean on a boat ramp or landing, or a part of a boat ramp or landing, that is not a public transport waiting point.	(j) Permitted only if the activity does not obstruct or interfere with the use of the boat ramp or landing by a ship, vehicle or another person.
		(k) Using a boat ramp or landing for the purposes of a ferry service, including operating a ferry service from a boat ramp or landing.	(k) Permitted only if authorised under the conditions of an approval for a prescribed activity.

	Column 1 Local government controlled area or road	Column 2 Restricted activity	Column 3 Extent of restriction
		(l) Using a boat ramp or landing for the purposes of a ship charter service, including operating a ship charter service from a boat ramp or landing.	(l) Permitted only if authorised under the conditions of an approval for a prescribed activity.
		(m) Using a boat ramp or landing for a ship hire service, including operating a ship hire service from a boat ramp or landing.	(m) Permitted only if authorised under the conditions of an approval for a prescribed activity.
		(n) Packing or unpacking any goods into or from any case or container on a boat ramp or landing.	(n) Permitted only with the written authorisation of an authorised person.
		(o) Erecting, installing or maintaining any sign board, notice board or other fixture or erection for the exhibition of bills or notices on a boat ramp or landing.	(o) Permitted with the written authorisation of the chief executive officer of the local government.
		(p) Refuelling a ship on a boat ramp or landing.	(p) Permitted only with the written authorisation of an authorised person.
		(q) Exhibiting, affixing or maintaining a bill or notice on a boat ramp or landing.	(q) Permitted with the written authorisation of the chief executive officer of the local government.
		(r) Operating a system of public address or sound amplification on— (i) a boat ramp or landing; or	(r) Permitted only with the written authorisation of an authorised person.

	Column 1 Local government controlled area or road	Column 2 Restricted activity	Column 3 Extent of restriction
		(ii) a ship moored at a boat ramp or landing.	
		(s) Playing music or a musical instrument at a volume, or in a manner, which interferes with another person's reasonable enjoyment or use of a boat ramp or landing on— (i) the boat ramp or landing; or (ii) any ship moored at the boat ramp or landing.	(s) Permitted only with the written authorisation of an authorised person.
		(t) Carrying out maintenance or repairs to a ship moored at a boat ramp or landing, or on a boat ramp or landing, except in an emergency situation— (i) to permit the ship to leave the boat ramp or landing; or (ii) where to move the ship from its position would involve danger to the ship or a person.	(t) Permitted with the written authorisation of the chief executive officer of the local government.
		(u) Mooring a ship at a boat ramp or landing for longer than 20 minutes.	(u) Permitted only— (i) if authorised under the conditions of an approval for a prescribed activity; or

	Column 1 **Local government controlled area or road**	**Column 2** **Restricted activity**	**Column 3** **Extent of restriction**
			(ii) with the written authorisation of an authorised person; or (iii) if authorised by a notice displayed by the local government at the boat ramp or landing; or (iv) in an emergency situation as prescribed in item 6(t).
7	The canoe/kayak pontoons within the local government area identified in schedule 6	a) Erecting, installing or maintaining any sign board, notice board or other fixture or erection for the exhibition of bills or notices on a canoe/kayak pontoon.	a) Permitted only with the written authorisation of the chief executive officer of the local government.
		b) Exhibiting, affixing or maintaining a bill or notice on a canoe/kayak pontoon.	b) Permitted only with the written authorisation of the chief executive officer of the local government.
		c) Operating a system of public address or sound amplification on a canoe/kayak pontoon.	c) Permitted only with the written authorisation of an authorised person.
		d) Anchoring, mooring, placing, launching, using, maintaining, repairing or operating a canoe or kayak in the	d) Permitted only if the anchoring, mooring, placing, launching, using, maintaining, repairing or operating of the canoe or kayak is not

	Column 1 Local government controlled area or road	Column 2 Restricted activity	Column 3 Extent of restriction
		water around, at or from a canoe/kayak pontoon.	likely to obstruct another person's use of the canoe/kayak pontoon.
		e) Mooring a canoe or kayak at a canoe/kayak pontoon for longer than 20 minutes.	e) Permitted only— (i) if authorised under the conditions of an approval for a prescribed activity; or (ii) with the written authorisation of an authorised person; or (iii) if authorised by a notice displayed by the local government at the canoe/kayak pontoon.
8	All local government swimming pools within the local government area, including each local government swimming pool identified in schedule 6	(a) Conducting— (i) a swimming club competition or carnival; or (ii) an inter-school or intra-school swimming competition or carnival; or (iii) learn to swim training, lifesaving training or competitive swimming training by a swimming club or school; or (iv) a private function.	(a) Permitted only if authorised under the conditions of an approval for a prescribed activity.

	Column 1 Local government controlled area or road	Column 2 Restricted activity	Column 3 Extent of restriction
		(b) Bringing an object (including water sports equipment) into a swimming pool if the object is dangerous or may be used in a dangerous way.	(b) Permitted only with the written authorisation of an authorised person.
		(c) Bringing a animal onto the land on which the swimming pool is situated.	(c) Permitted only if— (i) the animal is an assistance dog, a guide dog or a hearing dog; and (ii) the person is the handler of the dog.
9	All local government offices, libraries and depots within the local government area.	(a) Bringing an animal onto, or permitting or allowing an animal to remain on, the local government controlled area.	(a) Permitted only if— (i) the animal is an assistance dog, a guide dog or a hearing dog; and (ii) the person is the handler of the dog.
		(b) Entering or remaining at the local government controlled area or a part of a local government controlled area.	(b) Permitted if— (i) the local government controlled area or relevant part of the local government controlled area is a public place; and (ii) if the local government erects on or near the local government controlled area or the relevant part of the local government controlled area, a notice that is approved by the local government which authorises entry to the local

	Column 1 **Local government controlled area or road**	**Column 2** **Restricted activity**	**Column 3** **Extent of restriction**
			government controlled area or the relevant part of the local government controlled area—the person complies with the requirements of the notice.
10	Point Halloran Conservation Area Reserve, Orana Street, Victoria Point	Public access	Permitted only on the constructed boardwalk and paths throughout the Conservation Area.
11	Local government bridges and Local government culverts within the local government area.	Fishing on a local government bridge or a local government culvert.	Permitted only if- (i) where the activity is on a local government bridge, the activity does not obstruct or interfere with the use of the local government bridge by a vehicle or another person; and (ii) where the activity is on a local government culvert, the activity does not obstruct or interfere with the operation of the local government culvert; and (iii) no sign authorised by the local government is erected on or adjacent to the bridge or culvert indicating that fishing is prohibited.

Schedule 3 Motor vehicle access areas in local government controlled areas

Sections 6 and 7

	Column 1 Motor vehicle access areas	Column 2 Prohibited vehicles
	No motor vehicle access area prescribed.	

Schedule 4 Opening hours for local government controlled areas

Section 8

	Column 1 Local government controlled area	Column 2 Opening hours[1]
1	All canoe/kayak pontoons, parks and reserves within the local government area.	4.00a.m. to 10.00p.m. daily unless traversing a park or reserve is necessary and for the purpose of accessing or leaving a boat ramp or landing.
2	All boat ramps and landings within the local government area identified in schedule 6.	All times.

[1]Public holidays excepted.

Schedule 5 Permanent closure of local government controlled areas

Section 9

No local government controlled area described.

Schedule 6 Identification of local government controlled areas

schedules 1, 2 and 4

Boat ramps and landings

Description	Location Description
Jetty, Fixed Platform - Banana St Harbour	Mainland Areas - Redland Bay
Jetty, Fixed Platform - Ron Field	Moreton Bay - Macleay Island
Jetty, Fixed Platform - High St Harbour	Moreton Bay - Russell Island
Jetty, Fixed Platform - Brighton Rd Harbour	Macleay Island - Brighton Road
Jetty, Fixed Platform - Masters Ave Harbour	Victoria Point - Masters Avenue
Jetty, Fixed Platform - Yabby Street	Dunwich - Yabby Street
Jetty, Fixed Platform - Junner St Harbour	Dunwich - Junner Street
Jetty, Fixed Platform - Clayton Rd Harbour	Amity - Claytons Road
Jetty, Fixed Platform - Main Rd Boat Haven	Wellington Point - Main Road Foreshore
Jetty, Pontoon - High St Harbour	Russell Island - High Street
Jetty, Pontoon - Lucas Drive Harbour	Lamb Island - Lucas Drive
Jetty, Pontoon - The Esplanade Harbour	Karragarra Island - The Esplanade
Jetty, Pontoon - Brighton Rd Harbour	Macleay Island - Brighton Road
Jetty, Pontoon - Weinam Creek Marine Facility	Mainland Areas - Redland Bay
Jetty, Pontoon - Raby Bay Canals	Cleveland - Raby Bay Harbour Park
Jetty, Pontoon - Elizabeth St Harbour	Coochiemudlo Island - Elizabeth Street
Jetty, Pontoon – Masters Ave Harbour	Victoria Point – Masters Avenue
Jetty Pontoon – Yabby Street	Dunwich – Yabby Street
Jetty, Pontoon - Marina - Banana St Harbour	Mainland Areas - Redland Bay
Weinam Creek Pontoon Landing Upgrade	

Description	Location Description
Ramp - Main Road, Wellington Point	Wellington Point - Main Road
Ramp - Vmr Cleveland	Cleveland - William Street
Ramp, Barge - Brighton Rd Harbour	Macleay Island - Brighton Road
Ramp, Barge - Junner St Harbour	Dunwich - Junner Street
Ramp, Barge – Masters Ave Harbour	Victoria Point – Masters Avenue
Ramp, Barge - Weinam Street	Redland Bay - Weinam Street
Ramp, Boat - Weinam Street	Redland Bay - Weinam Street
Ramp, Boat - Banana Street	Redland Bay - Weinam Creek Marine Commuter Facility
Ramp, Boat - Boulevard Esplanade	Redland Bay - The Boulevard (Moores Road)
Ramp, Boat - Brighton Rd Harbour	Moreton Bay - Macleay Island
Ramp, Boat - Clayton Rd Harbour	Amity - Claytons Road
Ramp, Boat - Colburn Avenue	Victoria Point - Colburn Avenue
Ramp, Boat - Dalpura Street Road Reserve	Macleay Island - Dalpura Street Road Reserve
Ramp, Boat - Emmett Drive	Cleveland Emmett Drive - Toondah Harbour Carpark
Ramp, Boat - Helen Street	Thorneside - Helen Street
Ramp, Boat - Main Road	Mainland Areas - Wellington Point
Ramp, Boat - Main Road - North Of Jetty	Wellington Point - Main Road Foreshore
Ramp, Boat - Main Road 4 Lane Ramp	Wellington Point - Main Road Foreshore
Ramp, Boat - Toondah Harbour	Cleveland Emmett Drive - Toondah Harbour Carpark
Ramp, Boat - Wahine Drive	Moreton Bay - Russell Island
Ramp, Boat – William Street North	Cleveland – William Street
Ramp, Boat – William Street South	Cleveland - William Street

Ramp, Boat – Masters Ave Harbour	Victoria Point – Masters Avenue
Ramp, Boat - Yabby Street	Dunwich - Yabby Street
Ramp, Combined - Elizabeth St Harbour	Coochiemudlo Island - Elizabeth Street
Ramp, Combined - High St Harbour	Russell Island - High Street
Ramp, Combined - Lucas Drive Harbour	Lamb Island - Lucas Drive
Ramp, Combined - The Esplanade Harbour	Karragarra Island - The Esplanade
Ramp, Boat - Jock Kennedy Park	Russell Island – Jock Kennedy Park
Ramp, Recreational - Ferry Road	Thorneside - Ferry Road
Floating Walkway – Colburn Ave	Victoria Point – Colburn Avenue
Floating Walkway – William St	Cleveland – William Street

Canoe/kayak pontoons

Description	Location Description
Pontoon – canoe/kayak	Mainland - Ormiston

Local government swimming pools

1. Cleveland Aquatic Centre
2. Russel Island Aquatic Centre

Bathing reserves

Description	Location Description
Main Beach	Coochiemudlo Island
Thompsons Beach	Victoria Point
Cylinder Beach	Point Lookout, North Stradbroke Island
Main Beach	Point Lookout, North Stradbroke island
Amity	Amity, North Stradbroke Island
Wellington Point Beach	Wellington Point Reserve

Foreshore Swimming Enclosures

Description	Location Description
Foreshore Swimming Enclosure	Amity Point - Cabarita Park
Foreshore Swimming Enclosure	Dunwich - Ron Stark Oval
Foreshore Swimming Enclosure	Karragarra Island - Karragarra Island Foreshore (North)
Foreshore Swimming Enclosure	Lamb Island - Pioneer Park
Foreshore Swimming Enclosure	Macleay Island - Pat's Park
Foreshore Swimming Enclosure	Moreton Bay - Russell Island
Foreshore Swimming Enclosure	Redland Bay - Rusters Reserve

Schedule 7 Dictionary

Section 4

accommodation, at a local government accommodation park, means—

(a) a caravan; or

(b) a complementary accommodation.

accommodation park means a place for parking and residing in caravans, including a place that provides also for complementary accommodation.

accommodation site, at a local government accommodation park, means a part of the local government accommodation park which is designated for a single accommodation of a particular type.

animal has the meaning given in *Local Law No. 2 (Animal Management) 2015*.

assistance dog has the meaning given in the *Guide, Hearing and Assistance Dogs Act 2009.*

authorised person has the meaning given in *Local Law No. 1 (Administration) 2015.*

barge loading ramp means a ramp or other device or structure which is—

(a) owned, held in trust or otherwise controlled by the local government; and

(b) used or capable of use, or designed or intended for use, for the purpose of—

(i) loading or unloading goods; or

(ii) loading or unloading vehicles between a ship and the barge loading ramp; and

(c) includes part of a barge loading ramp.

bathing reserve means an area placed under the control of a local government as a bathing reserve under section 62 (Bathing reserves) of the ***Local Government Regulation 2012.***

boat ramp —

(a) means a ramp or other device or structure which is—

(i) owned, held in trust or otherwise controlled by the local government; and

(ii) used or capable of use, or designed or intended for use, for the purpose of launching and retrieving trailerable ships; and

(iii) includes a part of a boat ramp; and

(b) includes a barge loading ramp.

bona fide user, for a park or reserve, means a person who is genuinely using or in the process of using a park or reserve for a lawful purpose relevant to the community purpose of the park or reserve which, for the purpose of this definition, does not include using a park or reserve for the sole purpose of parking or leaving standing a motor vehicle.

Examples of a bona fide user – A person who uses the park for a picnic or barbeque or for swimming in the foreshore.

Examples of someone who is not a bona fide user – A person who parks their vehicle in a park or reserve while they attend to other business or personal affairs outside of the park or reserve.

building has the meaning given in the *Building Act 1975*.

busking means a musical or theatrical performance undertaken by a person—

(a) to entertain the public; and

(b) seeking voluntary reward for the performance.

camping, at a place, includes sleeping, occupying or remaining overnight at the place.

canoe/kayak pontoon means a canoe/kayak pontoon identified in schedule 6.

caravan has the meaning given in *Local Law No. 1 (Administration) 2015*.

collection day, for a waste container, means, if the local government has arranged for the collection of waste from a waste container at premises—each day on which the local government has arranged for the collection of waste from the waste container at the premises.

complementary accommodation has the meaning given in *Subordinate Local Law No. 1.8 (Operation of Accommodation Parks) 2015*.

culvert means a structure used to enclose a flowing body of water under a road, with such structure having clear openings at each end.

driver has the meaning given in the *Transport Operations (Road Use Management) Act 1995*.

emergency services officer means—

(a) an officer of the Queensland Ambulance Service or an Ambulance Service of another State; or

(b) an officer of the Queensland Fire and Rescue Service or a Fire and Rescue Service of another State; or

(c) an officer or employee of another entity with the written permission of the Commissioner of the Police Service; or

(d) an officer of the State Emergency Service or a State Emergency Service of another State; or

(e) an officer or employee of an authority permitted by law to conduct utility installation or utility maintenance; or

(f) an officer of Emergency Management Queensland.

ferry has the meaning given in the *Transport Operations (Passenger Transport) Act 1994*.

ferry service has the meaning given in the *Transport Operations (Passenger Transport) Act 1994*.

footpath has the meaning given in the *Transport Operations (Road Use Management) Act 1995*.

foreshore has the meaning given in the *Local Government Regulation 2012*.

goods includes wares, merchandise, chattels, money, stone, timber, metal, fluid and any other article, substance or material whatsoever.

guide dog has the meaning given in the *Guide, Hearing and Assistance Dogs Act 2009*.

handler has the meaning given in the *Guide, Hearing and Assistance Dogs Act 2009*.

hearing dog has the meaning given in the *Guide, Hearing and Assistance Dogs Act 2009*.

interfere means prevent from continuing or being carried out properly, get in the way of, or handle or adjust without permission, and ***interference*** has a corresponding meaning.

jetty includes—

(a) any jetty, landing place, launching ramp, pier, platform, quay, stage, or like premises which is—

(i) owned, held in trust or otherwise controlled by the local government; and

(ii) used or capable of use, or designed or intended for use, for the purpose of taking goods or persons to, or removal of goods or persons from, a ship; and

(b) where necessary, all buildings, railways, tramways and other works on the jetty and the appurtenances of the jetty, and the approaches to the jetty; and

(c) a part of a jetty.

landing includes jetty, pontoon and wharf, but does not include a canoe/kayak pontoon.

local government accommodation park means an accommodation park under the control of the local government, including an accommodation park located on land owned by the local government or on land for which the local government is the trustee.

local government bridge means a bridge which is under the control of the local government.

local government cemetery has the meaning given in *Local Law No. 1 (Administration) 2015*.

local government culvert means a culvert which is under the control of the local government.

local government employee has the meaning given in the *Local Government Act 2009*.

local government office includes—

(a) the public office of the local government; and

(b) each place used by the local government for local government administration or management purposes.

local government swimming pool means a swimming pool under the control of the local government, including a swimming pool located on land owned by the local government or on land for which the local government is the trustee.

memorial includes—

(a) a headstone; and

(b) an inscribed plaque or commemorative plate; and

(c) monumental, ornamental or other structures erected on a grave site; and

(d) anything else erected or placed to mark the site where human remains have been buried or placed, or to commemorate a deceased person.

motor vehicle has the meaning given in the *Transport Operations (Road Use Management) Act 1995*.

non-public place means—

(a) the whole or any part of a local government office that is not a public place; and

(b) the whole or any part of a local government office, including a public place, that is designated as a non-public place by—

(i) an authorised person; or

(ii) a notice displayed at a prominent place at—

(A) if the whole of the local government office is a non-public place—the local

government office; or

(B) if a part of the local government office is a non-public place—the part of the local government office.

park means a public place which the local government has, by resolution, set apart for park, recreational or environmental purposes, and includes land designated as a park in the planning scheme of the local government.

plant means a member of the plant kingdom, other than a protected plant under the *Nature Conservation Act 1992*, and includes all or any part of the flowers, seeds or genetic or reproductive material of the plant.

public office has the meaning given in the *Local Government Act 2009*.

public place —

(a) has the meaning given in the *Local Government Act 2009*; but

(b) does not include a non-public place.

public transport waiting point has the meaning given in section 26ZKB of the *Tobacco and Other Smoking Products Act 1998*.

reserve means land dedicated as a reserve, or granted in trust, under the *Land Act 1994* and for which the local government is a trustee under that Act and other land held in trust by the local government which the local government has, by resolution, set apart for recreational or environmental purposes, and includes land designated as a reserve in the planning scheme of the local government.

road has the meaning given in the *Local Law No. 1 (Administration) 2015*.

sewerage system has the meaning given in the *Plumbing and Drainage Act 2002*.

sexton means a person appointed by the local government to act as the sexton of a local government cemetery

ship has the meaning given in the *Transport Operations (Marine Safety) Act 1994.*

shopping trolley means a wheeled basket or frame used for transporting purchases from a supermarket or shop.

stormwater drain has the meaning given in the *Local Government Act 2009.*

structure has the meaning given in the *Local Government Act 2009.*

swimming pool has the meaning given in the *Building Act 1975.*

unregistered, for a vehicle that is required to be registered under the *Transport Operations (Road Use Management – Vehicle Registration) Regulation 2010*, means that a current registration certificate has not been issued by the chief executive for the vehicle.

utility installation means—

(a) the supply of water, hydraulic power, electricity or gas; or

(b) the provision of sewerage or drainage services; or

(c) the provision of telecommunications services.

utility maintenance means the maintenance of—

(a) water, hydraulic power, electricity or gas services; or

(b) sewerage or drainage services; or

(c) telecommunications services.

vegetation means trees, plants and all other organisms of vegetable origin (whether living or dead).

vehicle has the meaning given in the *Transport Operations (Road Use Management) Act 1995*.

waste has the meaning given in the *Environmental Protection Act 1994*.

waste container—

(a) means a container of a type approved by the local government for storing domestic waste, commercial waste or recyclable waste at premises in the local government's area; but

(b) does not include a bin placed by the local government in a public place for the purpose of the collection of waste.

water supply system has the meaning given in the *Standard Plumbing and Drainage Regulation 2003*.

Redland City Council

Subordinate Local Law No. 7 (Bathing Reserves) 2015

It is hereby certified that this a true and correct copy of *Amending Local Law No. 4(Local Law No. 7 (Bathing Reserves) 2015) 2019* made, in accordance with the *Local Government Act 2009*, by the Council of the City of Redland, by resolution dated 19 June 2019

_____

A. Chesterman
Chief Executive Officer

Redland City Council

Subordinate Local Law No. 7 (Bathing Reserves) 2015

Contents

Part 1 Preliminary

1 Short title

This subordinate local law may be cited as *Subordinate Local Law No. 7 (Bathing Reserves) 2015.*

2 Purpose and how it is to be achieved

(1) The purpose of this subordinate local law is to supplement *Local Law No. 7 (Bathing Reserves) 2015*, which provides for the orderly management and regulation of activities within bathing reserves placed under the local government's control.

(2) The purpose is to be achieved by providing for—

(a) the regulation of the use of aquatic equipment within bathing reserves; and

(b) the appointment and powers of authorised persons to manage and enforce the regulation of conduct within bathing reserves.

3 Authorising local law

The making of the provisions in this subordinate local law is authorised by *Local Law No. 7 (Bathing Reserves) 2015* (the ***authorising local law***).

4 Definitions

Particular words used in this subordinate local law have the same meaning as provided for in the authorising local law.

Part 2 Bathing reserves

This part in the authorising local law does not contain any matters to be provided for by subordinate local law.

Part 3 Use of aquatic equipment in bathing reserves

5 Prohibition or restriction of aquatic equipment—Authorising local law, s 12(1)

(1) For section 12(1) of the authorising local law, the equipment mentioned in column 2 of schedule 1 is prohibited in the corresponding bathing reserve or part of a bathing reserve mentioned in column 1 of schedule 1.

(2) For section 12(1) of the authorising local law, the equipment mentioned in column 2 of schedule 2 is restricted in the corresponding bathing reserve or part of a bathing reserve mentioned in column 1 of schedule 2, to the extent described in column 3 of schedule 2.

Part 4 Behaviour in bathing reserves

6 Prohibited equipment—Authorising local law, s 15(3)

For section 15(3) of the authorising local law, the following equipment is prohibited equipment—

(a) any item of equipment which, in the opinion of an authorised person, could cause injury or danger to others; and

(b) any item of equipment which has sharp broken edges or projections liable to cause injury.

7 Circumstances where prohibited equipment permitted—Authorising local law, s 15(2)

For section 15(2) of the authorising local law, the circumstances excluded from the application of the section are—

(a) where the prohibited equipment is used during a competition or event approved by the local government; and

(b) where the prohibited equipment is used for surveillance of a bathing reserve or to assist a bather in distress by a member of a life-saving patrol; and

(c) where the use of the prohibited equipment is necessary in an emergency.

Part 5 Life-saving clubs and powers of authorised persons

This part in the authorising local law does not contain any matters to be provided for by subordinate local law.

Part 6 Authorised persons

8 Appointment of authorised persons—Authorising local law, s 26(1)(a)

For section 26(1)(a) of the authorising local law, an authorised person for the local law is a person who holds the rank of patrol captain in a life-saving patrol organised by a life-saving club that has been assigned the responsibility for patrolling a bathing reserve or a part of a bathing reserve under section 19 of the authorising local law.

9 Limitation of authorised persons' powers—Authorising local law, s 27

For section 27 of the authorising local law, the powers of an authorised person appointed under section 8 of this subordinate local law are limited as follows—

(a) an authorised person may only exercise the powers of an authorised person in the part of the bathing reserve assigned to the life-saving club under section 19 of the authorising local law and during the times that

the person is part of a life-saving patrol; and

(b) an authorised person who is a captain of a life-saving patrol may only exercise the powers under sections 6(1) and (6), 7(1) and (2), 8(1), 11(2)(c), 12(3), 13(1), 18, 22(1), 23(1), 24(1), 25(2) and 35(1) and (2) of the authorising local law.

10 Conditions of office for authorised persons—Authorising local law, s 28(1)

For section 28(1) of the authorising local law, an authorised person appointed under section 8 of this subordinate local law holds office on the condition that if there is any conflict between an authorised person appointed under section 26(1)(b) of the authorising local law and an authorised person appointed under section 8 of this subordinate local law regarding the way the powers of an authorised person should be exercised under the local law, the powers shall be exercised as directed by the authorised person appointed under section 26(1)(b).

Part 7 Miscellaneous

This part in the authorising local law does not contain any matters to be provided for by subordinate local law.

Schedule 1 Prohibited aquatic equipment for bathing reserves or parts of bathing reserves

Section 5(1)

	Column 1 **Bathing reserve or part of bathing reserve**	**Column 2** **Prohibited aquatic equipment**
		No equipment mentioned

Schedule 2 Restricted aquatic equipment for bathing reserves or parts of bathing reserves

Section 5(2)

	Column 1 Bathing reserve or part of bathing reserve	Column 2 Restricted aquatic equipment	Column 3 Extent of restriction
1	All bathing reserves within the local government area.	(a) a motorised boat or vessel; or (b) a jet ski; or (c) another motorised device for use on or in water to carry a person or thing across or through water or for recreational use in water.	(a) Not permitted within 60m of a bathing area in a bathing reserve. Note – The 60m distance may be determined by the placement of a black and white beach safety flag (BF04) of the design prescribed by Australian Standard No. 2416 by an authorised person. (b) This section does not apply to life-saving equipment used by members of a life-saving patrol for surveillance of the bathing reserve or to assist bathers in distress.
2	All bathing reserves within the local government area	(a) a non-motorised boat or vessel; or (b) a surf ski; or (c) a surf board; or (d) a sail board; or (e) another non-motorised device for use on or in water to carry a person or thing across or through water or for recreational use in water.	(a) Not permitted within 10m of a bathing area in a bathing reserve. Note—The 10m distance may be determined by the placement of a black and white beach safety flag (BF04) of the design prescribed by Australian Standard No. 2416 by an authorised person. (b) This section does not apply to life-saving equipment used by members of a life-saving patrol for

			surveillance of the bathing reserve or to assist bathers in distress.

Amending Local Law No. 4

(Local Law No. 7 (Bathing Reserves)

2015) 2019

It is hereby certified that this a true and correct copy of *Amending Local Law No. 4(Local Law No. 7 (Bathing Reserves) 2015) 2019* made, in accordance with the *Local Government Act 2009*, by the Council of the City of Redland, by resolution dated 19 June 2019

_____

A. Chesterman
Chief Executive Officer

Redland City Council

Amending Local Law No. 4 (Local Law No. 7 (Bathing Reserves) 2015) 2019

Contents

Redland City Council Amending Local Law No. 4 (Local Law No. 7 (Bathing Reserves) 2015) 2019

Part 1 Preliminary

1 Short title

This amending local law may be cited as *Amending Local Law No. 4 (Local Law No. 7 (Bathing Reserves) 2015) 2019*.

2 Object

The object of this amending local law is to amend *Local Law No. 7 (Bathing Reserves) 2015* to reduce the outer boundary of the bathing area at Wellington Point bathing reserve.

3 Commencement

This amending local law commences on the date of publication of the notice of the making of *Amending Local Law No. 4 (Local Law No. 7 (Bathing) 2015) 2019* in the gazette.

Part 2 Amendment of Local Law No. 7 (Bathing Reserves) 2015

4 Local Law Amended

The *Amending Local Law No. 4 (Local Law No. 7 (Bathing Reserves) 2015) 2019* amends *Local Law No. 7 (Bathing Reserves) 2015*.

5 Amendment of s 6 (Bathing areas)

(1) Section 6(4)(c), before 'an outer boundary'—

insert—

for all bathing reserves other than Wellington Point—

(2) Section 6(4)(c), '.'—

omit, insert—

; and

(3) After section 6(4)(c)—

insert—

(d) for Wellington Point bathing reserve—an outer boundary parallel to, and 200 metres to the seaward side of, the imaginary line.

Redland
CITY COUNCIL

Redland City Council

Local Law No. 7 (Bathing Reserves) 2015

It is hereby certified that this a true and correct copy of *Amending Local Law No. 4(Local Law No. 7 (Bathing Reserves) 2015) 2019* made, in accordance with the *Local Government Act 2009*, by the Council of the City of Redland, by resolution dated 19 June 2019

_____

A. Chesterman
Chief Executive Officer

Redland City Council

Local Law No. 7 (Bathing Reserves) 2015

Contents

Part 1 Preliminary

1 Short title

This local law may be cited as *Local Law No. 7 (Bathing Reserves) 2015*.

2 Purpose and how it is to be achieved

(1) The purpose of this local law is to enhance the public safety and convenience of bathing reserves placed under the local government's control[1] through orderly management and regulation of activities within these reserves.

(2) The purpose is achieved by providing for—

(a) the designation and management of safe, supervised bathing areas within bathing reserves; and

(b) the regulation of conduct and the use of aquatic equipment within bathing reserves; and

(c) the assignment of responsibility to life-saving clubs for managing, patrolling and supervising bathing reserves; and

(d) the appointment and powers of authorised persons to manage and enforce the regulation of conduct within bathing reserves.

3 Definitions—the dictionary

The dictionary in the schedule defines particular words used in this local law.

4 Relationship with other laws[2]

(1) This local law is to be read with *Local Law No. 1 (Administration) 2015*.

(2) However, a reference to an authorised person in *Local Law No. 1 (Administration) 2015* does not include an authorised person appointed under this local law.

Part 2 Bathing reserves

Division 1 Designation of bathing reserves

5 Signs indicating existence of bathing reserve

(1) If the local government proposes to regulate the use of a bathing reserve under this local law, the local government must erect and maintain signs (***reserve signs***) in prominent positions on or adjacent to the foreshore to indicate the existence of the bathing reserve.

(2) Reserve signs must be erected at the lateral boundaries of the bathing reserve indicating the position of the boundaries.

(3) The signs must face both seawards and shorewards.

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[1] As declared by gazette notice under the Act.

[2] This local law and any subordinate local law made under it do not apply to the extent of any inconsistency with a law of the State or the Commonwealth. See the Act, section 27.

Division 2 Bathing areas

6 Bathing areas

(1) An authorised person may mark out an area (a bathing area) within a bathing reserve.

(2) The area selected as a bathing area must be the part of the bathing reserve that is, in the authorised person's opinion, the safest and most suitable for bathing in view of the prevailing conditions.

(3) The bathing area is marked out by placing 2 patrol flags at different points on or adjacent to the foreshore.

(4) The bathing area consists of the area defined by—

(a) an imaginary line between the 2 patrol flags; and

(b) lateral boundaries extending seaward from each patrol flag at right angles from the imaginary line; and

(c) for all bathing reserves other than Wellington Point—an outer boundary parallel to, and 400 metres to the seaward side of, the imaginary line; and

(d) for Wellington Point bathing reserve—an outer boundary parallel to, and 200 metres to the seaward side of, the imaginary line.

(5) Where the boundary of the bathing reserve is less than 400 metres to the seaward side of an imaginary line between the 2 patrol flags, then the boundary of the bathing area shall be the outer boundary of the bathing reserve.

(6) An authorised person may, in view of prevailing conditions, change the boundaries of a bathing area by changing the position of the patrol flags.

(7) Patrol flags must not be exhibited if the bathing area is not under surveillance by a life-saving patrol.

7 Flags to inform bathers about prevailing conditions

(1) This section applies if—

(a) an authorised person has marked out a bathing area under section 6; and

(b) in the authorised person's opinion, there are potentially hazardous conditions prevailing within the bathing area.

(2) The authorised person must exhibit in a prominent position on or adjacent to the foreshore a yellow flag warning bathers of the potentially hazardous conditions.

8 Closure of bathing reserve

(1) An authorised person may close a bathing reserve or part of a bathing reserve to bathing by erecting a red flag in a prominent position on or adjacent to the foreshore.[3]

Example—

The authorised person may close the bathing reserve if the prevailing conditions pose a risk

[3] Although this local law does not require strict compliance with Australian Standard No. 2416 (Design and Application of Water Safety Signs), that standard should, where practicable, be complied with.

to the lives of members of the public bathing in the reserve.

(2) If patrol flags marking out a bathing area have been placed in position, the patrol flags must be removed on closure of the bathing reserve or a part of the bathing reserve in which the bathing area is situated.

(3) A person must not bathe in a bathing reserve or part of a bathing reserve while the reserve or the relevant part of the reserve is closed to bathing.

Maximum penalty for subsection (3)—20 penalty units.

Division 3 Reservation for training, competitions and special occasions

9 Reservation for life-saving training

(1) An authorised person may—

(a) temporarily set apart the whole or a part of a bathing reserve for life-saving training; and

(b) impose restrictions on access to the area set apart.

(2) However an authorised person may not set apart any part of a bathing reserve for life-saving training exclusively.

(3) An area set apart under this section, and the restrictions applying to access, must be clearly indicated by signs erected in prominent positions on the bathing reserve.

10 Reservation for competitions and special occasions

(1) For the purposes of *Local Law No.1 (Administration) 2015*, section 5(b), it is a prescribed activity[4] to—

(a) set apart a bathing reserve or a part of a bathing reserve for life-saving training on an exclusive basis; or

(b) use any part of a bathing reserve for the conduct of a surfing competition, a life-saving competition or another aquatic activity.

(2) Where an approval for an activity mentioned in subsection (1) permits restrictions on access to any part of a bathing reserve, the area set apart for the activity and the restrictions applying to access must be clearly indicated by signs erected in prominent positions on the bathing reserve.

(3) A person must not contravene a restriction on access imposed under this section.

Maximum penalty for subsection (3)—20 penalty units.

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[4] *Local Law No.1 (Administration) 2015*, section 6, creates an offence for a person to undertake a prescribed activity without a current approval granted by the local government. Section 7 requires that the approval be obtained under part 2 of that local law.

Part 3 Use of aquatic equipment in bathing reserves

11 Prohibition of use of aquatic equipment in bathing areas

(1) A person must not use aquatic equipment in a bathing area.

Maximum penalty for subsection (1)—20 penalty units.

(2) However—

(a) this section does not prevent the use of aquatic equipment if its use at a place within a bathing reserve is authorised under another law; and

(b) a rubber float or board that does not give rise to risk of injury to other bathers may be used in a bathing area; and

(c) if an authorised person authorises the use of other aquatic equipment in a bathing area, the equipment may be used subject to conditions fixed by the authorised person when giving the authorisation; and

(d) life-saving equipment may be used in a bathing area by members of a life-saving patrol for surveillance of the bathing area or to assist bathers in distress.

12 Restrictions on use of aquatic equipment in bathing reserves

(1) The local government may, by subordinate local law, prohibit or restrict the use of aquatic equipment or a specified class of aquatic equipment within a bathing reserve or a particular part of a bathing reserve.

(2) Notice of a prohibition or restriction imposed under this section must be included on the reserve signs or on notices adjacent to the reserve signs.

(3) A person must not use aquatic equipment in contravention of a prohibition or restriction imposed under this section unless authorised to do so by an authorised person under section 13, or authorised under another law.

Maximum penalty for subsection (3)—20 penalty units.

13 Reservation of areas for use of aquatic equipment

(1) An authorised person may temporarily set apart a particular part of a bathing reserve for the use of aquatic equipment of a particular type.

(2) A part of the bathing reserve set apart under this section must be defined by signs and flags or in some other way that clearly indicates the relevant part of the reserve and the use for which it is set apart.

(3) If a part of a bathing reserve is set apart for the use of aquatic equipment of a particular type under this section, a person must not—

(a) use aquatic equipment of the relevant type in the bathing reserve outside the part of the reserve set apart for its use; or

(b) use aquatic equipment, in the relevant part of the reserve, that is not of the type for which the relevant part of the reserve is set apart.

Maximum penalty for subsection (3)—20 penalty units.

Part 4 Behaviour in bathing reserves

14 Dangerous objects

(1) A person must not bring an item of aquatic equipment or other object into a bathing reserve, or use aquatic equipment or anything else in a bathing reserve, if the item or object is dangerous.

Maximum penalty for subsection (1)—20 penalty units.

(2) This section does not apply to life-saving equipment used by members of a life-saving patrol for surveillance of the bathing reserve or to assist bathers in distress.

15 Prohibited equipment

(1) A person must not have prohibited equipment in a bathing reserve.

Maximum penalty for subsection (1)—20 penalty units.

(2) However, this section does not apply in circumstances excluded under a subordinate local law from the application of this section.

(3) In this section—

prohibited equipment means—

(a) a spear gun; or

(b) a fishing spear; or

(c) another object classified as prohibited equipment under a subordinate local law for this paragraph.

16 Dangerous conduct

A person must not use aquatic equipment or anything else in a bathing reserve in a way that creates a risk to the safety of others.

Maximum penalty—20 penalty units.

17 Emergency evacuation alarm

(1) If an emergency evacuation alarm is given, a person within a bathing reserve—

(a) must leave the water as soon as practicable; and

(b) must not enter or re-enter the water until the all-clear is given.

Maximum penalty for subsection (1)—20 penalty units.

(2) An emergency evacuation alarm is given by—

(a) the prolonged ringing of a bell or sounding of a siren; and

(b) the exhibition of a red flag.

(3) The all-clear is given by—

(a) a short ringing of the bell or sounding of the siren; and

(b) the replacement of the red flag by a yellow flag.

(4) An emergency evacuation and the all-clear may also be given in ways recognised by SLSQ.

Example—

The emergency evacuation alarm may be given by holding up a red and white quartered flag and the all-clear may be given by taking down the flag when the danger has passed.

18 False alarms

A person must not, without the authority of an authorised person—

(a) give an emergency evacuation alarm or do anything likely to be reasonably interpreted as an emergency evacuation alarm; or

(b) give the all-clear after an emergency evacuation alarm or do anything likely to be reasonably interpreted as the all-clear after an emergency evacuation alarm.

Maximum penalty—50 penalty units.

Part 5 Life-saving clubs and powers of authorised persons

Division 1 Life-saving clubs and patrols

19 Recognised life-saving clubs

(1) The local government may, after consultation with interested life-saving clubs, assign to a life-saving club the responsibility for patrolling a bathing reserve or a particular part of a bathing reserve.

(2) The responsibility—

(a) may be assigned on conditions the local government considers appropriate; and

(b) may only be assigned with the agreement of the club to which the responsibility is assigned.

20 Enclosure for life-saving patrols

A recognised life-saving club may, with the local government's written approval, enclose a part of a bathing reserve for the exclusive use of members of life-saving patrols.

21 Distinctive clothing

A member of a life-saving patrol must wear a distinctive uniform appropriate to the member's rank in a design approved by SLSQ.

Division 2 Powers of authorised persons

22 Power to remove or reduce danger

(1) If a person brings a dangerous object or dangerous item of aquatic equipment onto a bathing reserve, an authorised person may direct the person to take specified action to remove or reduce the danger posed by the object or item.

Example—

If a person brings a beach umbrella onto a bathing reserve and the umbrella appears likely to blow away, an authorised person might direct the person to take specified action to secure the umbrella.

(2) A person must comply with a direction under this section.

Maximum penalty for subsection (2)—20 penalty units.

23 Power to stop dangerous and antisocial conduct

(1) If a person behaves in a bathing reserve in a way that endangers the safety of the person or someone else, or causes a nuisance to someone else, an authorised person may direct the person to stop the behaviour.

(2) A person must comply with a direction under this section.

Maximum penalty for subsection (2)—20 penalty units.

24 Power to require bathers to leave water

(1) An authorised person may give a direction to a bather to leave the water if—

(a) the bathing reserve, or the relevant part of the bathing reserve, is closed to bathing; or

(b) an emergency evacuation alarm has been given; or

(c) there is some other risk to the bather's safety.

(2) A person must comply with a direction under this section.

Maximum penalty for subsection (2)—20 penalty units.

25 Seizure and detention of dangerous objects and prohibited equipment

(1) This section applies if, in a bathing reserve, a person—

(a) possesses, uses or has used a dangerous object or dangerous item of aquatic equipment; or

(b) uses or has used an object in a dangerous way; or

(c) has prohibited equipment.

(2) An authorised person may seize the object, item or equipment (the seized thing).

(3) The authorised person must give the person from whom the seized thing is taken a receipt—

(a) stating the nature of the seized thing; and

(b) stating the date and time of seizure; and

(c) stating a period (which must be at least 1 hour and not more than 6 months) for which the seized thing is to be detained; and

(d) stating a place where the seized thing may be reclaimed.

(4) The seized thing must, if not reclaimed on the day on which it was seized, be delivered into the custody of the local government or the life-saving club of which the authorised person is a member.

(5) The local government or the relevant life-saving club must take all reasonable measures to ensure the safe custody of the seized thing.

(6) At the conclusion of the period fixed for its detention under subsection (3)(c), if

the seized thing is in the custody of a life-saving club it must be delivered into the custody of the local government.

(7) At the conclusion of the period fixed for its detention under subsection (3)(c), the seized thing must be dealt with by the local government as an impounded item under *Local Law No.1 (Administration) 2015*, section 40.

Part 6 Authorised persons

26 Who are authorised persons

(1) The following persons are authorised persons for this local law—

(a) a person who is an authorised person under a subordinate local law for this paragraph;

(b) a person appointed as an authorised person for this local law under this section.

Example for paragraph (a)—

- The subordinate local laws might provide that a person who holds a particular rank in a life-saving patrol is an authorised person.
- The subordinate local laws might provide that a life guard or a beach inspector is, while he or she holds that position, an authorised person.

(2) A local government may appoint any of the following persons as authorised persons for this local law—

(a) employees of the local government;

(b) other persons who are eligible for appointment as authorised persons under the Act.[5]

(3) An appointment of a person as an authorised person under this section must state the provisions of this local law for which the person is appointed as an authorised person.

(4) A local government may appoint a person as an authorised person under this section only if—

(a) the local government considers the person has the necessary expertise or experience for the appointment; or

(b) the person has satisfactorily finished training approved by the local government for the appointment.

27 Limitation on authorised person's powers

An authorised person's powers may be limited in the person's instrument of appointment or under a subordinate local law for this section.

28 Authorised person's appointment conditions

(1) An authorised person holds office on the conditions stated in the instrument of appointment or a subordinate local law for this subsection.

(2) An authorised person—

[5] See the Act, chapter 6, part 6.

(a) if the instrument or subordinate local law provides for a term of appointment—ceases holding office at the end of the term; and

(b) if appointed as an authorised person under section 26(1)(b)—may resign by signed notice of resignation given to the local government; and

(c) if the person holds a particular rank or position, and is an authorised person under a subordinate local law because he or she holds the relevant rank or position—ceases holding office as an authorised person on ceasing to hold the relevant rank or position; and

(d) if the conditions of appointment provide—ceases holding office as an authorised person on ceasing to hold another office stated in the appointment conditions (the main office).

(3) However, an authorised person may not resign from the office of authorised person (the secondary office) under subsection (2)(b) if a condition of the authorised person's employment in the main office requires the authorised person to hold the secondary office.

29 Authorised person's identity card

(1) Each authorised person must hold an identity card issued by the local government or a recognised life-saving club.

(2) An identity card issued by the local government must—

(a) contain a recent photograph of the authorised person; and

(b) be signed by the authorised person; and

(c) identify the person as an authorised person for the local government; and

(d) include an expiry date.

(3) An identity card issued by a recognised life-saving club must—

(a) contain a recent photograph of the authorised person or state the authorised person's date of birth; and

(b) be signed by the authorised person; and

(c) identify the person as an authorised person for the life-saving club; and

(d) include an expiry date.

(4) A person who ceases to be an authorised person must return the person's identity card to the local government or the life-saving club that issued it within 21 days after the person ceases to be an authorised person.

Maximum penalty for subsection (4)—10 penalty units.

(5) This section does not prevent the giving of a single identity card to a person for this part and for other purposes.

30 Production of identity card

(1) An authorised person may exercise a power in relation to someone else (the ***other person***) only if the authorised person—

(a) first produces his or her identity card for the other person's inspection; or

(b) has the identity card displayed so it is clearly visible to the other person.

(2) However, if for any reason it is not practicable to comply with subsection (1), the authorised person must produce the identity card for the other person's inspection at the first reasonable opportunity.

31 Offence

A person must not pretend to be an authorised person or a member of a life-saving patrol.

Maximum penalty—50 penalty units.

32 Protection from liability

(1) This section applies to—

(a) an authorised person; and

(b) a person acting under the direction of an authorised person.

(2) The person does not incur civil liability for an act done or omission made honestly and without negligence under this local law.

(3) A liability that would, apart from this section, attach to the person attaches instead to the local government.

Part 7 Miscellaneous

33 Compliance with Australian standards

(1) The flags and signs to be used for the purposes of this local law should comply with any relevant Australian Standard issued or approved by the Standards Association of Australia.

(2) However, non-compliance with an applicable standard does not invalidate anything done under this local law.

34 Obstruction of authorised persons and life-savers

(1) A person must not obstruct an authorised person or a member of a life-saving patrol in the conduct of their duties.

Maximum penalty for subsection (1)—50 penalty units.

(2) A person must not use insulting or abusive language to an authorised person or a member of a life-saving patrol.

Maximum penalty for subsection (2)—20 penalty units.

35 Interference with flags and life-saving equipment

(1) A person must not, without the approval of an authorised person, damage, destroy or interfere with a sign or flag erected or placed under this local law.

Maximum penalty for subsection (1)—50 penalty units.

(2) A person must not, without the approval of an authorised person, interfere with life-saving equipment on a bathing reserve.

Maximum penalty for subsection (2)—50 penalty units.

36 Subordinate local laws

The local government may make subordinate local laws about—

(a) prohibiting or restricting the use of aquatic equipment;[6] or

(b) the classification of objects as prohibited equipment;[7] or

(c) the circumstances in which a person may have prohibited equipment in a bathing reserve;[8] or

(d) the appointment of authorised persons for this local law;[9] or

(e) the limitation of an authorised person's powers;[10] or

(f) conditions of office for authorised persons.[11]

[6] See section 12(1).

[7] See section 15(3).

[8] See section 15(2).

[9] See section 26(1)(a).

[10] See section 27.

[11] See section 28(1).

Schedule Dictionary

Section 3

aquatic equipment means—

(a) a boat or vessel; or

(b) a surf ski; or

(c) a jet ski; or

(d) a surf board; or

(e) a sail board; or

(f) a body board; or

(g) another device (whether motorised or not) for use on or in water to carry a person or thing across or through water or for recreational use in water.

authorised person means a person who is an authorised person for this local law under part 6.

bathing includes all activities involving the immersion or partial immersion of the body in water.

bathing area see section 6.

bathing reserve—

(a) means a part of the seashore, adjacent land under the sea, and sea placed under the control of the local government as a bathing reserve under the Act; and

(b) includes each area of bathing reserve identified in schedule 6 of *Subordinate Local Law No. 4 (Local Government Controlled Areas, Facilities and Roads) 2015*.

dangerous item of aquatic equipment means an item of aquatic equipment that is of such a nature that, in the absence of care or precaution in its use or management, the life, safety or health of any person may be endangered.

Examples of dangerous items of aquatic equipment—

- A surfboard with sharp or broken edges.
- A boat with projections liable to cause injury to bathers.

dangerous object means an object that is of such a nature that, in the absence of care or precaution in its use or management, the life, safety or health of any person may be endangered.

life-saving club means a body—

(a) affiliated with—

(i) Surf Life Saving Queensland Inc (SLSQ); or

(ii) the Head Centre of the Royal Life Saving Society; and

(b) accredited by the Department of Community Safety.

life-saving equipment means equipment for use in sea rescue, life-saving, or the provision of first aid.

life-saving patrol means the members of a recognised life-saving club assigned by the club or SLSQ to patrol a bathing reserve, or part of a bathing reserve, at a particular time.

patrol flag means a red and yellow flag of the design prescribed by Australian Standard No.

2416.

recognised life-saving club means a life-saving club to which the local government has assigned the responsibility for patrolling a bathing reserve or a particular part of a bathing reserve.[12]

reserve sign see section 5(1).

SLSQ means Surf Life Saving Queensland Inc.

surveillance means the visual supervision of an area.

the Act means the *Local Government Act 2009*.

[12] See section 19.

Review of Anti-Competitive Provisions

An anti-competitive provision in a local law is a provision which creates a barrier to entry to a market or competition within a market.

Section 38 of the *Local Government Act 2009* **(Act)** provides that a local government cannot make a local law that contains an anti-competitive provision unless the local government has complied with the procedures prescribed under a regulation for the review of anti-competitive provisions. If the local government does not comply with the procedure prescribed under a regulation, the local law has no effect.

Section 15 of the *Local Government Regulation 2012* **(Regulation)** provides that the procedure for review of anti-competitive provisions is set out in the National Competition Policy – guidelines for conducting reviews on anti-competitive provision in local laws **(Guideline).**

The below table sets out those provisions in the local laws and subordinate local laws attached to this paper which may be considered to be anti-competitive provisions, which exclusions apply to those provisions (if any) and any significant impacts that exist:

Local Law	Provision	What the provision provides	Reason(s)	Exclusions	Significant impacts
SLL4	Schedule 2	The addition of Wellington Point Beach as a bathing reserve means that it will become a 'local government controlled area'. As a local government controlled area, 'busking' becomes a restricted activity that may only be undertaken if authorised by an approval	Possibly anti-competitive requires busker to obtain approval before performing in the area of the bathing reserve.	No exclusion has been identified	N/A

RECOMMENDATION

There are no anti-competitive provisions within the local law which would result in a significant impact requiring a comprehensive review of the local law to be conducted.
As an anti-competitive provision is contained within the local laws the minutes of the Council meeting should reflect:

Council notes that Subordinate Local Law No. 4 (Local Government Controlled Areas, Facilities and Roads) 2015 contains anti-competitive provisions.

A notice must be published on Council's website noting that the local law contains anti-competitive provisions.

State Interest Check Report

Redland City Council		
State Interest Check on Proposed *Local Law No. 7 (Bathing Reserves) 2015*		
Department of Environment and Science		
Agency Issue	Agency Suggested Action to Rectify Issue	Local Government proposed response/action to agency comments
The proposed bathing reserve appears to cover a significant larger area than is commonly used for bathing. The restrictions able to be imposed in a bathing reserve , such as prohibition or restriction on the use of aquatic equipment (e.g. vessels , surf skis, sail boards and kayaks) and the standard restrictions within a bathing area (no aquatic equipment allowed) could impact on the activities of marine park users. The use of these types of aquatic equipment are allowed 'as of right' in Moreton Bay Marine Park and should be allowed to continue in areas not actively used for bathing	Reduce the size of the proposed bathing reserve to cover the primary area used for bathing only , which would minimise potential impacts on marine park users .	The bathing area within the bathing reserve, which will be the primary area used for bathing, will be determined on a day by day assessment by SLSQ. The bathing reserve has been made large to provide SLSQ with options to deal with tides and currents. Marine park users will be able to access the other sections of the bathing reserve outside the bathing area within the limits set out in the local Law, minimizing impacts to park users and maintaining the dual purpose of the location.
The reduced size of the proposed bathing area within the bathing reserve to 200 m seaward (as opposed to the usual 400m seaward) of the flags on the shoreline is supported	Not Applicable	The amendments do reduce the size of the bathing area from 400m to 200m for Wellington Point.
Impact and displacement of other marine park users.	1. Reduce size of proposed bathing reserve or allocate the northern end	1. The bathing area within the bathing reserve which controls the level of restriction on aquatic equipment is

The proposed bathing reserve location is popular for boating, kite surfing, fishing, kayaking, wind surfing and stand up paddle boarding and the Marine Parks (Moreton Bay) Zoning Plan 2018 provides for these activities to occur.	of the bathing reserve for continued access and egress by aquatic craft. 2. Recreational planning and strategy to accommodate diverse recreation opportunities. 3. Consult with State Government regarding future potential regulation of aquatic equipment in the bathing reserve	smaller in size (half) to accommodate continued access and egress by aquatic craft. Also, the bathing area within the bathing reserve will be determined by SLSQ on a day by day basis. The bathing reserve has been made large to provide SLSQ with options to deal with tides and currents. The locations of the bathing areas will still provide access and egress for aquatic craft in the bathing reserve. 2. Discussions were held with a number of recreational groups such as Windsurfing Queensland where access and egress were discussed. Based on the locations of the bathing area within the proposed reserve groups were comfortable that they still had sufficient access from which to launch their craft. The activities are not being prohibited, this is a dual purpose location and Council intends for it to continue as one. The restrictions apply only at times the bathing areas are patrolled. 3. Council will continue to consult with State government regarding future potential regulation of aquatic equipment in bathing reserves as required under the *Local Government Act 2009*.
Environmental and social impacts on other areas from displaced activities. Displacement of existing activities such as kite surfing and boating may result in activities encroaching on sensitive environmental areas (e.g. King Island Conservation Park) and greater congestion on the eastern side of the reserve which is more exposed to weather conditions and less safe for aquatic craft.	1. Reduce size of proposed bathing reserve or allocate the northern end of the bathing reserve for continued access and egress by aquatic craft. 2. Recreational planning and strategy to have regard for environmental values.	1. See above. 2. In line with the above, recreational groups were comfortable that they still had sufficient access from which to launch their craft so as to not displace them to sensitive environmental areas and the area will continue as a dual purpose location

Impede access and use of designated mooring area. If aquatic craft such as tender vessels are prohibited from navigating in the bathing reserve then access and egress to the mooring area will be impeded. Access to the boat ramp on the eastern side of the reserve may be outside of legal limits of navigation for tender vessels and constrained by weather and tides.	Reduce size of proposed bathing reserve or allocate the northern end of the bathing reserve for continued access and egress by aquatic craft.	See above
Notification of the public Awareness of marine park users accessing from the land and water is required	Bathing area could be outlined with a buoy line and shore signage.	Signage will be placed on the beach and bathing reserve patrol flags will be located to identify the width of the bathing area. Council will consider, along with SLSQ, the use of a buoy line to mark the seaward boundary
Management of domestic animals by local council. Access of uncontrolled dogs in the Marine Park and King Island Conservation Park is a significant issue for QPWS.	Implement local laws in the bathing reserve and local government area to ensure that domestic animal laws apply and dogs are under control (on leash) at all times.	Council's Local Law No. 2 (Animal Management) 2015 and Subordinate Local Law No. 2 (Animal Management) 2015 address the issue of dogs in public places. Dogs are prohibited in the designated swimming beach in the Wellington Point Reserve at all times. Dogs are prohibited in the other areas on Saturday, Sunday and Statutory Holidays between the hours of 9am and 4pm. Dogs are allowed on the sandbar between the reserve and King Island outside the above prohibited times but need to be on-leash and under effective control

Wellington Point Bathing Reserve)
Community Consultation Report

Prepared by Corporate Governance
February 2019

Redland CITY COUNCIL

Contents

Introduction

This report outlines the community consultation that was undertaken between 7 November 2018 and 5 December 2018. Consultation involved:

- public notice in the Redlands Bulletin on 14 November 2018;
- Yoursay page and survey available from 7 November 2018 to 5 December 2018; and
- social media advertising.

A total of 97 submissions were received.

Community Consultation Process

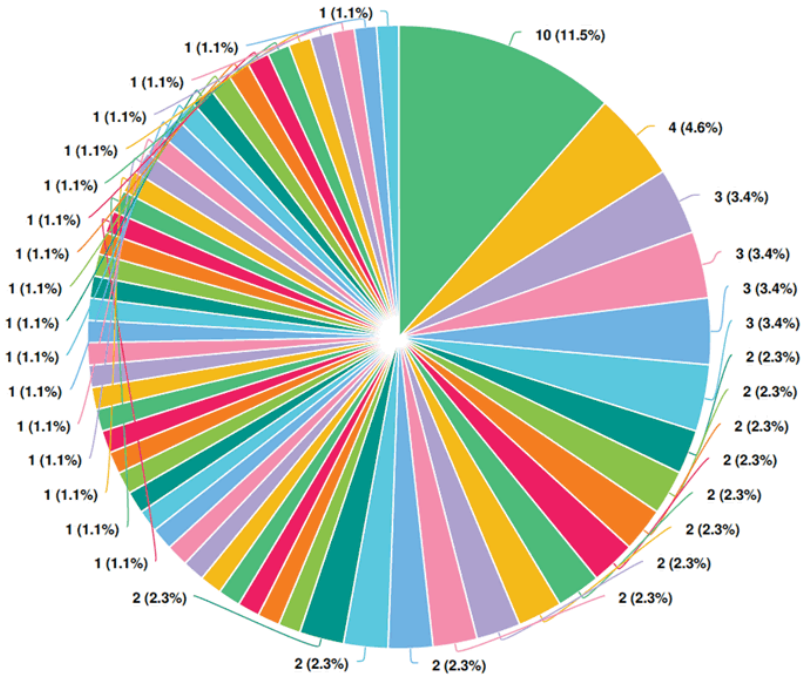
During the course of the consultation period 1,700 visits to the site were recorded and 89 surveys completed. Hard copy forms were also made available at Customer Service Centres.

Aware Participants	1,502
Aware Actions Performed	Participants
Visited a Project or Tool Page	1,502
Informed Participants	**364**
Informed Actions Performed	Participants
Viewed a video	0
Viewed a photo	0
Downloaded a document	209
Visited the Key Dates page	0
Visited an FAQ list Page	0
Visited Instagram Page	0
Visited Multiple Project Pages	272
Contributed to a tool (engaged)	89

Engaged Participants	89		
Engaged Actions Performed	Registered	Unverified	Anonymous
Contributed on Forums	0	0	0
Participated in Surveys	6	72	11
Contributed to Newsfeeds	0	0	0
Participated in Quick Polls	0	0	0
Posted on Guestbooks	0	0	0
Contributed to Stories	0	0	0
Asked Questions	0	0	0
Placed Pins on Places	0	0	0
Contributed to Ideas	0	0	0

A total of 97 responses were received; 89 online and 8 written submissions.

Respondents were not required to identify themselves but for those that did the following is a representation of the locations they reside in. This demonstrates that the Wellington Point Reserve is utilised by a population broader than the Redlands Coast.



Question options

WELLINGTON POINT, QLD · BIRKDALE, QLD · ALEXANDRA HILLS, QLD · BRISBANE CITY, QLD · CLEVELAND, QLD · WEST END, QLD · THORNLANDS, QLD · MANLY, QLD · REDLAND BAY, QLD · WYNNUM, QLD · VICTORIA POINT, QLD · SEVEN HILLS, QLD · SHAILER PARK, QLD · MOUNT GRAVATT EAST, QLD · BRIGHTON, QLD · TOOWONG, QLD · MANLY WEST, QLD · LUTWYCHE, QLD · GUMDALE, QLD · CARINA, QLD · PETRIE, QLD · COORPAROO, QLD · CANNON HILL, QLD · NORMAN PARK, QLD · WYNNUM CENTRAL, QLD · TINGALPA, QLD · INDOOROOPILLY, QLD · HOLLYWELL, QLD · PARADISE POINT, QLD · NEWMARKET, QLD · SPRINGWOOD, QLD · MOUNT ABUNDANCE, QLD · HELENSVALE, QLD · TANAH MERAH, QLD · KIPPA-RING, QLD · WINDSOR, QLD · THORNESIDE, QLD · YARRABILBA, QLD · MUDGEERABA, QLD · SOUTH WEST ROCKS, NSW · SIPPY DOWNS, QLD · ASCOT, QLD · ORMISTON, QLD · RABY BAY, QLD · BUNDALL BC, QLD · ANNERLEY, QLD · RUNCORN, QLD · BELMONT, QLD · NORTH LAKES, QLD · MOLENDINAR, QLD · ARUNDEL, QLD · TESBURY, VIC · MARGATE, QLD · MACGREGOR, QLD · CAMP HILL, QLD

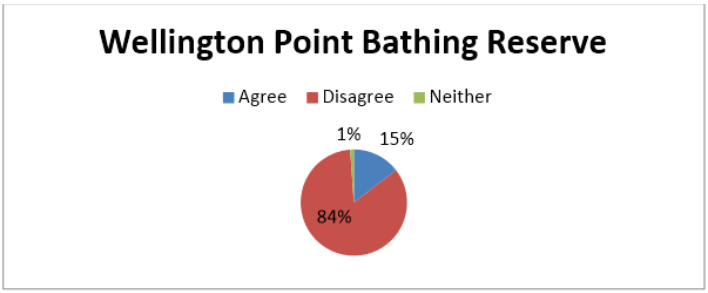
Only two of the 89 respondents elected not to identify their location.

Data Review

The submission required the respondent to either agree or disagree with the proposed Local Law amendment. In this case the amendment included:

1. Establishing a bathing reserve at Wellington Point; and
2. The restrictions that will be applied to the bathing area within the reserve.

The majority of respondents disagreed with the amendment.



In reviewing the response it was apparent that there was some confusion in the community over:

- the intention of the Local Laws (believing it was to ban water sports from Wellington Point);
- the relationship between a bathing reserve and a bathing area; and
- the times the restrictions applied.

The intention of the Local Law Amendments

The Local Law amendments provide Council the ability to regulate what areas within Wellington Point Beach that watercraft, both motorised and non-motorised can utilise. Watercraft are not banned from Wellington Point, there are restrictions imposed, however these restrictions apply only when lifeguards are on patrol and flags are placed on the beach to signal the bathing area.

Facts and Circumstances	Council Response
I think that Wellington Point beach should be for all persons to use for all forms of water sports and not be restricted to bathers only; we all have the right to use the beach.	*Watercrafts are still allowed to use Wellington Point beach the restrictions only apply when the lifeguard flags are in place on the beach to signify a bathing area. Even when the bathing area is marked watercraft can still use the area there are distance restrictions from the bathing area that apply at those times*
The coast and waterways should be a shared place enjoyed by everyone.	*The dual use of Wellington Point will continue under the proposal. The restrictions apply only to the bathing area not the bathing reserve and only at times when the lifeguard patrol is in place. Non-motorised watercraft are required to keep 10m from the edge of the bathing area at times the beach is patrolled at all other times they retain full use of the whole beach*

	area.
There aren't many good spots like this. Kitesurfers, windsurfers should have the right to use the area too.	*The dual use of Wellington Point will continue under the proposal. The restrictions apply only to the bathing area not the bathing reserve and only at times when the lifeguard patrol is in place. Kitesurfers and Windsurfers are required to keep 10m from the edge of the bathing area at times the beach is patrolled at all other times they retain full use of the whole beach area.*

The relationship between a bathing reserve and bathing area

A bathing reserve is part of the seashore, adjacent land under the sea and sea placed under the control of the local government by virtue of gazettal under the Local Government Act 2009.

A bathing area is an area marked out by an authorised person with a bathing reserve and is marked out by the placement of 2 patrol flags at different points adjacent to the foreshore.

The restrictions imposed in the local law amendments apply from the edge of the bathing area not the bathing reserve. The community feedback demonstrates that they believed that the restrictions apply from the edge of the bathing reserve.

Facts and Circumstances	Council Response
Restricting non-motorised craft is incorrect; we often visit the place with our SUP and never had an issue with the people bathing so sending us 300 or 400 meters away is discrimination.	*The dimensions of the bathing reserve do not determine where motorised and non-motorised craft can be. The 60m and 10m restrictions apply from the edge of the bathing area which is only in place on days the beach is patrolled and is considerably smaller than the bathing reserve.*
The large gazetted swimming area completely blocks off the Eastern side of the reserve meaning windsurfers such as myself and kitesurfers will not be able to launch there.	*The dimensions of the bathing reserve do not determine where motorised and non-motorised craft can be. The 60m and 10m restrictions apply from the edge of the bathing area which is only in place on days the beach is patrolled and is considerably smaller than the bathing reserve.*
I do not accept that 300 meters offshore needs to be quarantined this is just plain stupid.	*The whole reserve is not restricted to bathers only. The bathing area contained within the reserve is restricted for only bathers, watercraft can be in the bathing reserve as long as they keep the requisite distance from the bathing area.*
The 300m frontage is excessive for only bathers to use. The 400m extent into deep water is excessive, nobody swims this far out, and combined with murky water it would be difficult for a lifeguard to spot someone in trouble. There are also bull sharks.	*The dimensions of the bathing reserve do not determine where motorised and non-motorised craft can be. The 60m and 10m restrictions apply from the edge of the bathing area which is only in place on days the beach is patrolled and is considerably smaller than the bathing reserve. Subject to State Interest Checking Council will be considering as a first step reducing the seaward boundary from 400m to*

	200m, it may then be reduced further depending on usage.
The area can be shared. I agree with a designated swim area but do not agree with the whole beach not being able to be used by paddle craft.	*The whole reserve is not restricted to bathers only. The bathing area contained within the reserve is restricted for only bathers, watercraft can be in the bathing reserve as long as they keep the requisite distance from the bathing area.*
I disagree with the amendment as the use of this area is of vital importance for wind driven personal watercraft and should not be restricted to bathers only.	*The whole reserve is not restricted to bathers only. The bathing area contained within the reserve is restricted for only bathers, watercraft can be in the bathing reserve as long as they keep the requisite distance from the bathing area.*

The times the restrictions apply

The restrictions apply only at times the bathing area is marked out by the placement of 2 patrol flags, at all other times there are no restrictions and watercraft are free to take advantage of the whole of Wellington Point beach.

Facts and Circumstances	Council Response
Windsurfers have used the area for decades, at ALL seasons of the year, not just summer.	*The only time the restrictions apply is when the beach is under the patrol of the lifeguards. Council's current agreement with SLSQ involves patrols on weekends and during school holidays. During these times watercraft can be in the bathing reserve as long as they keep the requisite distance from the bathing area.*
Windsurfing, Kitesurfing at this point provides the vital injection of time on the water and exercise to get through a busy working week, please do not take this away from us.	*No restrictions apply on weekdays except during school holidays.*

A clarification was added to the Yoursay page to assist visitors with understanding the amendment and an on-site meeting was held at the Wellington Point Bathing Reserve with representatives of the following organisations:

- Kiteboarding Australia
- Kitesurfing Association Queensland
- Moreton Bay Boys Windsurfing
- Windsurfing Queensland

At the conclusion of the meeting the organisations were in support of the bathing reserve but requested Council consider their proposals when defining the bathing area.

A full list of public comments are available in Appendix 1.

Recommendation

Council commenced its application to the State for gazettal of the bathing reserve at Wellington Point by resolution dated 3 June 2015.

The community consultation revealed that the community is not concerned with the bathing reserve, their concerns centre around the bathing area's location within the reserve and its impact on their use of the area for water sports.

It is widely acknowledged that Wellington Point Beach is a dual purpose area and the proposed restrictions which see the distance from the edge of the bathing area being reduced for both motorised and non-motorised aquatic equipment will see this practice continue.

It is therefore recommended that Council proceed with amendments to *Subordinate Local Law No. 7 (Bathing Reserves) 2015* and *Subordinate Local Law No. 4 (Local Government Controlled Areas, Facilities and Roads) 2015*.

Appendix 1 - Commentary

Agree Responses

Comments
Both motorised and non-motorised equipment is a safety hazard to bathers
Safer
Have seen too many near misses with swimmers and jet ski uses coming into the swimming area
This is a brilliant idea for the safety of all users of the beach area.
As regular goes I actually enjoy having kite surfers & wind surfers around.
It will make it much safer for everyone
Kids need a beach to swim at , without having to worry about motor boats and Jet Ski
Safety for all users
On the understanding that surf skis and kayaks will still be able to use the beach, as long as they are 10m outside the flags. I'm a kayaker and believe this is definitely workable for all.
Now it's been clarified that non-motorised craft are allowed within the bathing reserve but not less than 10m from the flagged bathing area, I think it's a great idea. As an ex-kite surfer and now mum of young kids, I've seen both sides of this discussion. Providing a safe swimming area, excluding motorised craft yet still allowing non-motorised craft reasonable access is a wonderful solution. I hope other kitesurfing read this proposal properly as there was a lot of misinformation and overblown reactions. I believe this is a great compromise to benefit everyone.

Disagree Responses

Comments
There are so many people who enjoy kitesurfing at this spot and wind surfing they do not cause any harm to anybody bathing also if this happens you could have small business struggling in this area due to the amount of people who are no longer using the facilities
The area is a popular swimming place for families and this will make it safer and more attractive as a day trip destination.
This is the safest area of to Point to launch kayaks and stand-up paddle boards, especially for children. Outside of this zone with create too much interaction with motorised craft, which I believe is too dangerous for kids.
I disagree with this due to it leaving no safe area to set up and launch watercraft , also not allowing the use of the western side will cause the need for many rescues and incidents due the being blown out to sea in a westerly wind if equipment fails as it regularly does, also it will negatively impact the local businesses losing revenue from the large amount of ocean users excluded
With respect to wind sports there are seldomly any swimming people in the water when there is enough wind to operate wind craft. There are many more spectators watching the water sports than swimming. During two thirds high to low tide I have never seen anyone walk through the mud to go for a swim, during these times you will see numerous water sportsmen walk through the mud to the

Comments
water. There are many water sports users that will be unable to use Wellington Point if this proposal is approved with minimum benefit in increasing number of swimmers at the point.
Whilst this area is popular for bathing it is also a popular area for watercraft also that are mainly non-motorised. The area proposed for water craft on the eastern side is. It an acceptable area as it poses many risks in entering and exiting the water. The area proposed for water craft is also an area that is heavily populated with motorised boat traffic on the eastern side posing increased risks for paddle sports. I am also part of Brissup club who currently use this beach for events, these events are always done respectfully with use mainly being to the western part of the beach to allow for swimming out the front of the current lifeguard facilities. We have laws to protect swimmers from motorised craft already so they should not be an issue and paddle sports are becoming more popular and should be allowed to use all areas respectfully.
Due to multiple weather conditions having to line up, the Eastern side of Wellington Point is rarely appropriate for the use of the non-motorised equipment. The use of this equipment is generally used when bathers don't want to use the water as conditions are miserable. I know of people who travel up an hour and a half to use this area as it is one of only two places in Greater Brisbane that this equipment can be used when the wind is coming from the west.
Windsurfing and kitesurfing from the beach at Wellington Point is an iconic attraction for the area attracting spectators and sailors alike. Restricting access to this area would reduce the recreational value of the Wellington Point Reserve significantly.
As a frequent visitor to Wellington Point I regularly see this popular beach used for wind sports and dog walking, I rarely see people swimming. I believe this lack of beach use for swimming activities is not due to the lack of specific swimming zone or lack of lifeguard, I believe people simply do not wish to swim at wellington point. The seabed is muddy, there are extremely sharp shells and rocks mixed in with this mud and the water isn't clear or inviting! The beach is already well utilized as a wind sport and dog walking location. If you did want to make an improvement to Wellington point I would suggest changing some of the trailer only parking to parking that cars without trailers can access, as on busy summer days the demand for parking for beach goers outweighs the supply!
This area has long been a windsurfing (sailboarding) location. I have been windsurfing there since the mid-1990's For a Northerly or Westerly wind that side of Wellington point is the best to sail from. People from as far as the Gold Coast come up to windsurf at that location... For that wind direction there arguably isn't a better spot to sail from easy Redcliffe to Southport. There is a local group of sailors regularly meeting up there on good days and it's a very social event. I'm also unsure why this has recently come to pass as the tides are only perfect for swimming on certain weekends so putting this rule in for a small time when there would be swimmers is not very sensible. The windsurfing community has long been able to live with swimmers in harmony and I believe can continue to do so without these zones.
Hundreds of non-powered craft such as windsurfers, kitesurfers, kayaks and stand up paddle boarders etc use this beach to launch. It's a huge friendly community! Not that many people swim, there's usually only 5-10 swimmers maximum all very close to the beach. I've never once heard of an issue between swimmers and non-powered craft at Wellington point or anywhere in the bay for that matter!? The swimmers stay in the shallows and the non-powered craft head out to sea. Why would you ruin a perfectly good place that everyone enjoys?! I moved to the Redlands mainly to practice my windsurfing from this beach! You are proposing to ruin a perfectly good venue for no apparent reason!? I beg you please do not pass this unusual, detrimental, pointless law!
The western side of the sand bank at Wellington Point is a popular windsurfing spot due to its unique conditions. This is due to the bank at low tide offering very flat water even when the wind is blowing hard from the prevailing NE or SE, It is famous around Australia in windsurfing circles as one of the great places to windsurf for over 30 years. These proposed amendments will end that activity for no good reason as bathers and windsurfers have co-existed in this place for 30 years with no problems
This is a well know spot around the globe for Windsurfing & Kitesurfing attracting tourism to this region. There is limited car spaces making it an issue for parking

Comments
I believe all beaches belong to us, and not just for some. Restricting non-motorized craft is incorrect, we often visit the place with our SUP and never had an issue with the people bathing so sending us 300 or 400 metres away is discrimination, SUP or kayaks are not dangerous is very easy to manoeuvre and having an accident with someone else is very rare because it hard to get high speed and lose control. Instead of prohibiting you should be encouraging people to visit the place and do exercise. I do agree with motorized craft to have limited access and also this limitation should be in Raby bay people on jet skis have no respect for people in the water and they launch from the beach on high speed even when kids bathing. Thanks.
Many locals enjoy this area to launch paddle boards and kayaks should continue to do so. It is visitors who bath in the area and that's what the lifeguard is there fir
As an active paddleboarder in this area I currently enjoy the opportunity of paddle boarding safely with bathers at this beach and have done for a number of years. The use of the area for one should not preclude its use by the other. Most times, in my experience, we have been able to share this area with respect of each user's needs in a safe and friendly way. Your proposal would in effect deny SUPs the right share this facility. Shouldn't we be trying to be more inclusive of all our ratepayers, especially as bathing and SUPing activities often go hand in hand. With different wind conditions we have limited areas where SUP can launch from. The current circumstances allow for both to safely co-exist...why can this not continue to be the case?
Non-motorised watercraft are safe, with almost no bystander injuries reported. No need for the restriction. Agree with the restriction on motorised craft.
Stand up paddling is a safe sport and most children learn to stand in the shallows and that should be within the flags
More people do aquatics sports than swimming. Is not good for swimming .as it has sharp rocks and mud.
Swimmers and nonmotorised equipment can exist safely and respectfully together as they do in many other areas of the state.
Myself and number of gents whom I paddle with frequent the areas of Wellington Point and King Island and rarely see anyone in the water swimming. What a ridiculous idea. The area is a safe place for individuals to exercise on aquatic equipment. Shut it down and watch the economy of the area drop. Whoever devised this idea needs a good slap. Thought Australia was a free country?
The major reason is that the eastern side has the most protected ground area. When people are learning how to paddle, they tend to fall off a lot. Beginners tend/prefer to learn in shallow protected water in standing depth of water. If they are forced to do so on the eastern side as per your proposal then people will be more prone to cut there feet on the rocks and maybe worse. One final point is that paddling is a family sport. Adults tend to go paddling with young kids at the same time. This is only safe to do so on the eastern side. Just to be clear, the western side is suitable for young/beginners with a far lower chance of injury due to rocks/obstacles on the bottom. The eastern side is strewn with oyster covered rocks and will definitely result in injuries to the public.
The area has been used successfully for many years by water sports people for. The fact the kite boarders not windsurfers are causing problems means they need to be looked at. Wellington point also has had the only reported cases of serious jellyfish stings in the bay and it is not a good location for swimming.
I use my SUP with my 2 children age 5 &4. We cannot go into deep water as they cannot swim very well due to their age. I want them to enjoy the experience & not be frightened by being so far from shore. We go very slow, away from others & is non-motorised. I do not see why this type of family water equipment is planned to be banned. I totally understand motorised equipment as this comes with a high risk assessment. But non-motorised, going slow & getting kids active & outside, would be a big disappointment. I used to live in the Redlands, so still enjoy spending our weekends there enjoying your beautiful city.

Comments
The large gazetted swimming area completely blocks off the Eastern side of the reserve meaning windsurfers such as myself and kitesurfers will not be able to launch there. Currently we launch away from the lower end of the beach which is commonly where bathers go for a swim. It would be a shame if this were to go through as the reserve is a huge asset to the windsurfing and kitesurfing community. Currently we respect the bathers and lifeguards and i have not heard of any complications. A group of us goes down there almost every weekend with far more windsurfers and kiter then swimmers down there on windy days. This is enjoyed by spectators, and is an iconic part of Wellington Point Reserve. If the gazetted area were to be made smaller so that we could launch at the end of the beach next to the rock wall that would work for us, as we just need a way to get into the water. For me and my mates it is our favourite spot so i ask if you can please take this into consideration. Cheers Harry
We can not use the EASTERN side of the Wellington point sand spit during northerly winds as there is insufficient water depth even at high tide to ensure safe sailing Hence the statement that users can enjoy this area is totally wrong and shows ignorance in what they are proposing. Maybe somebody should ask a sailer how things work at Wellington point and how the large tides affect where we can sail and launch. I have windsurfed and paddle Boarded from the western side of Wellington Point for approx 13 years and have been aware of the ever increasing number of people visiting the point and I welcome the life guards when they patrol. I am part of a small number of sailors using the point and we are very aware of the people swimming and as a group realise that safety of all is paramount and we understand that should an accident ever occur we would banned immediately. To my knowledge there has never been an incident at Wellington Point between WINDSURFERS and swimmers. Most of the sailing activity for WINDSURFERS occurs well offshore on the Western side of the point towards Manly side. During northerly winds we do use the Bank at low tide from the island to midway for flat water but due to tidal restrictions and the depth we CAN NOT come close to the beach thus avoiding conflict with swimmers. I restate there is no conflict with swimmers in the water Presently I spend in excess of 15hrs a week at the point sailing /waiting for wind and paddle boarding and I can tell you that swimmers come down for the high tides and swim close to the beach, very few brave the mud weed sharp rock stone fish irikangi jelly fish all listed on the councils signs as being present at the bottom of the tide . Hence I do not accept that 300 hundred meters offshore needs to be quarantined this is just plain stupid. Make the area smaller and open up access to the sand bank ie allow launch and access to the water from the concrete steps to the concrete ramp swimmers can be flagged to stay west of this line. Also move the flags (life Saver) further west than where he presently resides in front of the toilets near the tree this will again give access for sailors to leave and enter the water under sail if tide permits. Historically WINDSURFERS have been part of Wellington Point since the 70s successfully co existing with all water users and presently there are not many of us with left with about 15-sailors on average accessing this totally unique launch point each windy weekend. Finally Wellington Point is truly unique for Windsurfing in theRredlands it provides safe access in all wind conditions from either side to ban us from the Western side of the Point is unthinkable the proposal needs to be amended users need to be consulted Council needs to understand what the facility is used for and by whom and what limiting factors apply. I am happy to meet and discuss with Council at any time and fill them in on the impact proposal would have on a resident such as myself and my sailing compatriots.
I am an avid windsurfer and have been sailing at Wellington Point reserve since 1991. I was in the RAAF at Amberley and would drive to "Wello" as it was Brisbane's prime windsurfing spot. When I got out of the RAAF in 2001 I moved my family to the Redlands for family lifestyle and secretly to be close to the best windsurfing spot in Brisbane. Unfortunately due to my partners work commitments we moved to Brighton in June last year. I have sailed all over North Brisbane from Shorncliffe to Bribie Island and "Wello" is still my spot of choice. I prefer to drive the 40 minutes to Wello to sail rather than sail at Brighton - 2 minutes from my house. It will be an absolute travesty if windsurfing on the Western side of the point is restricted.
wellington point has always been a meca for many forms of water sport ,for some of the sports it is the only place you can enjoy your particular sport safely and with easy beach access. As a swimming beach it would be the worst beach in the Redlands with the muddy bottom ,stone fish ,jelly fish, Bull sharks,on a low tide its lovely to watch people killing hundreds of soldier crabs for fun moving and throwing rocks which then get left on the beach so when covered with water you can stub your toe or trip. People come to wellington point to watch these water sports ,spend money on local food etc. and take in the spectacle that wellington point and King Island has to offer.

Comments
This area should be for everyone to enjoy. Sups, kite surfing, wind surfing, kayaking, swimming. Doesn't matter what hobby you enjoy as long as your out doors and having fun is what counts. If you turn it into a bathing area you will see a big loss for local businesses and a very negative impact from majority of community.
I disagree with the amendment as the use of this area is of vital importance for wind driven personal watercraft and should not be restricted to bathers only. Winsurfing, Kitesurfing etc at this point provides the vital injection of time on the water and exercise to get through a busy working week, please do not take this away from us.
It need to be left the way it is cause nature
We use Wellington point for sailing and kitesurfing. We support local business with our dining.
1. Wellington point is the only location within a 100km radius suitable for kite/windsurfing in a westerly wind direction. People from all over Brisbane, Redland bay, and Gold Coast kite/windsurf at Wellington Point in a Westerly wind. 2. I've been coming to Welllington Point for over 10 years and have only witnessed people swimming a handful of times. I don't believe that adding a lifeguard is going to increase the use of this area as a bathing location. 3. Bathers and kite/windsurfers tend to naturally de-conflict as it's unpleasant to swim when it's really windy.
for me an my 72 year old father to continue our healthy activities we have done there for over 30 years (windsurfed mainly)Going there and seeing the community has kept him and many others out of hospital and care. I hope to be as healthy at their age.
Limit space for recreational water sport(kite surfing)
It is the only place in the redlands where windsurfing can be done on several wind directions, mainly northerly and westerly. On a westerly direction it is the only place to windsurf safely for the whole area from the gold coast to the sunshine coast. It has been the most popular windsurfing spot for many years for people from Logan city council, Redlands, Brisbane and even the Gold coast. To lose it would be a major setback for the sport.
I disagree on the basis that this is a multi-use area used by many hobbyists for different recreational purposes. For example, it is the only spot on this area of coastline that can be safely used for kitesurfing (now an Olympic sport) in a westerly or northerly wind direction. There are simply very few other options that can be safely used for this sport when the wind is in this direction. There are however multiple other options for bathing, such as Raby Bay, Wynnum, etc. Which see much more bathing use, as they have better conditions for this activity (WP is muddy and not ideal for bathing). I am regularly in the area and see very few people making use of the bathing opportunities here. Also, for sports like kite surfing and windsurfing, they are usually undertaken during periods of strong wind when people don't want to bathe - so conflict is minimal. I currently believe that the area can be multi-use, which adds to the interest and vibrancy of the area and increases the number of people that use the local facilities and provide economic input to the local small businesses.
Why should this beach be any different to all the beaches around SEQ? I believe this beach does have the right to being patrolled with flags as the weekend masses do warrant the protection, but the area that people swim is limited to >30m from the beach. All the sports and recreational activities you are looking to ban haven't harmed anyone in years. Giving the rights to whats everyone's to a few is not just wrong its unlawful!
I am a fellow Kiteboarding and take pride in kiting amongst the wello point spit. It is with sad results to know that this might not be accessible for the sport we love.
There aren't many good spots like this. Kitesurfers, windsurfer should have their right to use the area too.
I am a kitesurfer and there are very limited number of spots you can kite in and near Brisbane and Wellington is one of them.

Comments
My family and I enjoy using our paddle board in this area. We often use it when there are minimal other people smimming on the beach, are always respectful of their space/keeping a safe distance and it works well.
I PaddleBoard and Kayak and Wellington Point is my chosen place for my recreational sports, I use the "swimming side" when the wind is up on the Jetty side and vice versa. In all the years of paddle boarding or kayaking I have never had an issue even when it's busy, I can not see any basis for this amendment.
The western side of the sandbar provides some of the best kiteboarding conditions in Brisbane. I believe kiteboarders, windsurfers and bathers can safely share the area.
This is not the best place for swimming as there are a lot of sharks including sharp rocks and shells, and lots of mud. Many visitors come there to walk across to King Island at low tide and to watch the sunset. It's a waste of resources and money to do the bathing reserve.
You cutting our sport off at the knees. 99.99 present of people live it. How about a safe lounch area and some guideline for safety? A blanket rule like this will just make us walk out to to the low tide mark and you will loose you opertunity to engage the sporting community. Good luck policing a bunch of extream sportsmen.
The coast and waterways should be a shared place enjoyed by everyone.
Wellington Point is one of the only places that is usable for board riders in most wind directions. It is the most popular location for kite boarding and windsurfing during winter westerly wind. This is because the western side of the wellington point is the safest place to participate in wind powered sports during westerly winds, in all of south east queensland. The proposed reserves will make this area unusable during these winds and riders are likely to utilise considerably riskier locations to sailboard and kiteboard. Generally, at times when there are strong winds that are favourable for kiteboarding and windsurfing , the number of swimmers is often greatly reduced due to the uncomfortable conditions. Therefore in terms of managing the use of the waters it is somewhat self-managing. Kiteboarding and windsurfing is extremely popular and increasingly so, restricting access to this unique location for these activities is extremely detrimental to the sport.
Wellington Point is a renowned windsurfing destination across the east coast of Australia. There are very few locations that offer the conditions it offers for windsurfing. By contrast, there are infinite places available for bathing. I have regularly traveled to Wellington Point for windsurfing from NSW over many years and supported local tourism in the area. If the area proposed is closed for bathing it will halt windsurfing and kitesurfing tourism. I will certainly never go there again and I will be one of many.
Public places should be open for all to enjoy equally. This is a perfect spot for many water sports such as wind surfing and kite surfing. We should not restrict use of ideal places like this. Of course bathers should be able to swim in peice, and a small exclusion zone should be sufficient so long as ample space is still available for other water sports
I use this are for my water sports
I think that Wellington point beach should be for all persons to use for all forms of water sports and not be restricted to bathers only ,we all have the right into use the beach
The 300m frontage is excessive for only bathers to use. There are simply not enough bathers at Wellington Point to warrant this frontage. Windsurfers have used the area for decades, at ALL seasons of the year, not just Summer. There is sufficient room for bathers and windsurfers. Please consider allowing a frontage of say 150m extending South of the sandbar and allot this to windsurfers. The 400m extent into deep water is excessive; nobody swims this far out, and combined with the murky water it would be difficult for a lifeguard to spot someone in trouble. There are also bull-sharks in this location.

Comments
Go for a swim there at low tide. Ask yourself. What the hell am i doing in this mud? Surely theres a better location to learn about the force and to train to beat the empire then this muddy cesspool. Its a waste of resources no one wants to swim there that cant allready. Its fine that someone doesnt like kitesurfers but its not okay to waste tax payers money having to employ lifeguards etc for the sake of some bloke who doesnt like kitesurfers. Theres other ways to go about this then making it a bathing zone.
I am a local kitesurfer and have used Wellington Point for over 15 years on a regular basis when the wind permits. Over that time period I am not aware of any incidents involving non-motorised aquatic equipment and bathers. Kitesurfing is a thrilling, exciting and safe spectator sport, numerous local photographers have been known take advantage of this aspect of the sport and I am sure their publications have promoted the Wellington Point reserve over the years. This would, I am sure, have contributed to significant tourist/visitors dollars over the years coming into the local area. For kitesurfers, forcing them to use the eastern side boat ramp area is not practical due to the limited space and obstructions. In certain wind directions it would be extremely dangerous, if not impossible, to use as an area to enter and exit the water. As a group of sports enthusiasts we respect other water users at all times. Those who do pose a potential risk, mainly visitors unfamiliar with the area, are usually advised by local sportsman/women about their behaviour and the risks posed to others in the area.
Unsafe area for swimming , making it a 'bathing reserve' does not change that !
Our family regularly goes to Wellington point with friends and the ability to introduce you do children to watersports would be affected by a swimming only amendment.
I regularly windsurf on the western side of the bank (between mainland and King Island) and note the following: - most swimmers are in the water around high tide only and within 50 m from the high water mark of the mainland (not the bank) - I can't recall seeing swimmers 400 m from the high water mark of the mainland - I have seen sharks (appeared to be bull sharks) within the proposed bathing reserve, it would be difficult to complete shark monitoring given distance from shore and water clarity - windsurfers appear to avoid swimmers and I don't recall safety concerns between windsurfers and bathers at Wellington Point to date - a large portion of the proposed bathing reserve represents a prime windsurfing gybing and launching area - the western side of the bank is one of the few places in the area which is suitable for windsurfing in a westerly wind
Despite the fact that people do swim here, its not a safe place for swimmers even if regulated. There are sharp rocks under foot, stingers in the water, limited water visibility, and lots of bull sharks regularly spotted in waist deep water. No life Guard can spot a shark in brown water. By designating this as a swimming reserve, the council is in effect stating this is a safe place to swim. Good luck with the law suites once someone is hurt or killed. As this area is the main and most popular launch spot for wind surfing in Brisbane it will mean the activity will be severely hampered. Windsurfers and swimmers have co-existed in this location with no accidents for many years, and this action is just not good for either group.
The proposed bathing reserve area is too large and adversely impacts other users. It prevents safe access to the water for other users of this popular area. There are limited places to safely launch recreational non powered craft such as Windsurfers, Standup paddle boards, Kiteboards etc in this part of Moreton bay and the geography of this location is unique as it provides protected access for is a variety of wind directions. This area has been used by Windsurfers and other watercraft users for several decades. It is unlikely that swimmers/bathers would use the entire proposed area. This amendment will deny access to many current users, while benefiting very few.
Wellington point is an iconic location for Windsurfing. It has been an extremely popular for many years, and one of only a few safe locations for sailors to participate in our sport in a westerly wind. The swimming reserve seems to be overly large for an area that is quite honestly not an attractive area to swim. If the area were reduced and still allowing sailors to safely transit through the area either on foot or at a slow safe speed, the resulting interaction between any swimmers and sailors should be a safe one. Please reconsider this proposal.

Comments
I use that area for my board sport . Its not very good for swimming with dangerous,sharp rocks lurking beneath .
Wellington point is not adapted for swimmers. Bullsharks, Stonefishes, cones, oysters, rocks, and mud make it dangerous for swimmers. At low tide, the water is barely reachable. It will forbid the access to the area for wind enthusiasts , that are the only ones that can actually enjoy those waters, while providing a very welcome entertainment for tourists.
The proposal would severely restrict access to one of the best kiteboarding sites in SEQ (at least at high tide).
All people deserve to use the point for what they want to. Don't punish everyone for a minority.
The proposed amendment does not take into account the impact on the windsurfing community which has been using this location since the 1980s. The proposed bathing reserve would effectively make the site unusable for windsurfing purposes, particularly when the wind is from the West (winter) and Northeast (spring and summer). Windsurfing has been practised safely at this site for the last 40 years with no adverse interaction with swimmers. Given the low popularity of the site with swimmers (it being a muddy beach with murky water) this is an unnecessary initiative that stands only to harm a traditional use of the site while providing little additional benefit to members of the wider community.
Wellington Point, or "Wello", as it is widely and affectionately known, is no less than an iconic location in south east Queensland for the sport of windsurfing. More recently, kiteboarders have adopted the location too and now share the area with windsurfers for their activities. To my knowledge, there has never been a serious incident involving these non-powered watercraft at this location--either with swimmers or with one another. The proposed amendment will adversely and needlessly affect the access to and use of this area by non-powered watercraft--principally windsurfers and kiteboarders--while at the same time providing little enhancement to the area. For swimmers, this area is of very low utility, with water reaching the sandy beach part only a couple of hours either side of high tide. The rest of the time, the water's edge is only accessible by wading through a muddy and rock strewn intertidal zone. Very few people swim here, even when the wind is low and the tide is in and it is not being used by windsurfers or kiteboarders. Even when accessible at the sand's edge, the water is usually murky and unattractive. On the other hand, windsurfers have used Wellington point ever since the sport emerged in the 1970s and 1980s, because it is one of a very few ideal locations in Morton Bay for this activity due to its unique topography and exposure to clean winds from a range of different directions (from south East swinging all the way through East and North to south West). I myself have regularly windsurfed here since I moved to Brisbane in the early 1990s. A number of people who, like me, live further away usually choose to drive to Wellington Point over other locations such as Redcliffe, Victoria point, or Wynnum/Manly, even when these locations are the same distance or closer to home, because Wellington Point is such a unique place for windsurfing. All that this amendment will succeed in doing is to destroy the enjoyment of a healthy, non-polluting water-based activity, without providing anything of much use at all to the swimming public. I respectfully urge Council to reconsider the amendment and to investigate ways, perhaps engaging the help of the windsports community (e.g. through the relevant associations, Windsurfing Qld. and Kitesurfing Qld.) , to consolidate this area as a special place where windsurfers and kiteboarders can continue to practice their activities in safety. I'm sure that there are far more innovative ways to manage risk than simply placing what amounts in practice to a ban on these sports at this location. There are many beaches for swimming that are far better than Wello, but few and far between places better for windsports in SEQ. Thanks for your consideration.

Comments
The current proposal is to restrictive to other water sports that use this area. The area in question is habited by marine animals such as Stingrays, blue Jelly fish, at times small bull sharks and could even have possible Stone fish. Currently there are signs warning people of these risks. Have you had legal opinion to your responsibility when you put flags up and say if is ok to swim here? As part of the windsurfing community who has sailed safety at wellington for 33 years it would destroy this great location for my sport. To my knowledge there has never been any instance between a windsurfer and the public. The kite surfing is a separate sport and should be considered differently to windsurfing as they do large aerial manoeuvres and have long strings attached to there board. Paddle boarders, kayaks also use this bay and pose no risk to swimmers. Totally understand prohibited power water craft. Why would you not just have an area at high tide to a 100m where the sand stops for a reserve if you persist with this proposal. The proposal takes areas that no one will ever swim in and should not due the risks from marine life. Majority of the time the windsurfers are only present when it is windy and swimmers are not as the conditions become choppy and water becomes murky which then hides submerged risks that not even your lifesaver present can see. You should be putting more permanent warning signs up discouraging people from swimming in a Marine park and warning of possible marine dangers.
The amendment will unfairly impact current users (windsurfers and kiteboarders) of this area .
As a person who regularly visits Wellington point (1-2 times a week, sometimes more) with both my family and to undertake windsurfing I am concenred about putting in place restrictions that would limit on water activities such as sailing just to try and promote another on water activity of swimming. Have you actually ever tried to swim at Wello at anything other than high tide. No one does it, so why try and lock up an area for such a limited use. Any perceived conflict between swimmers and other on water activities such as Sailing is not only limited by the tides but also the wind. As soon as there is any bit of a breeze any swimmers, at high tide, disappear. It seems like a sledgehammer to crack a nut. I know there have been many other submissions with detailed answers so I won't repeat the details here but I hope you take into consideration all the negative impacts you would have in making such a big change.
The area can be shared. I agree with a designated swim area but do not agree with the whole beach not being able to be used by paddle craft. Enogerra reservoir has both and works effectively
A detailed summary with our reasons and suggestions has been emailed to Cr Wendy Boglary today.

Comments
The proposed area at Wellington Point is a very important area for our sport of windsurfing. The area provides a unique combination of relatively flat water and is open enough for the wind to be unaffected by landscape or buildings. This combined with easy beach access for carrying equipment and nearby parking makes Wellington Point one of best windsurfing places in the Brisbane area. In fact, areas that have the above features are surprisingly rare and are under threat. More particularly, access to these areas are under threat. Many members of our club have enjoyed these areas for decades without a single incident with a member of the public (to my knowledge). Our members would like to express that the proposed Bathing Reserve would impact our community quiet severely and totally unnecessarily.
Every Sailor in Australia knows about this area that makes brisbane great.

[25]

Queensland Government Gazette

LOCAL GOVERNMENT

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VOL. 381] FRIDAY 10 MAY 2019 [NO. 6

Local Government Act 2009
Local Government Regulation 2012

REDLAND CITY COUNCIL (CONTROL OF BATHING RESERVE) NOTICE (NO. 1) 2019

Short title

1. This Notice may be cited as the *Redland City Council (Control of Bathing Reserve) Notice (No. 1) 2019*.

Commencement

2. This Notice commences on the day it is published in the Gazette.

Control of bathing reserves

3. Under section 62 of the *Local Government Regulation 2012*—
   (a) the part of the seashore,
   (b) the land under the sea adjacent to that part of the seashore and seawards for a distance not more than 1km beyond low-water mark at ordinary spring tides,
   (c) the sea above that part of the seashore and land,
   as delineated on Plan Number LG 159 is placed under the management and control of the Redland City Council as a bathing reserve.

Inspection

4. New Plan Number LG 159 may be inspected at the State office of the Department of Local Government, Racing and Multicultural Affairs and at the public office of the Redland City Council.

ENDNOTES

1. Made by the Governor in Council on 2 May 2019.
2. Published in the Gazette on 10 May 2019.
3. Not required to be laid before the Legislative Assembly.
4. The administering agency is the Department of Local Government, Racing and Multicultural Affairs.

Local Government Act 2009

SUNSHINE COAST REGIONAL COUNCIL (MAKING OF AMENDMENT SUBORDINATE LOCAL LAW) NOTICE (NO. 1) 2019

Title

1. This notice may be cited as the *Sunshine Coast Regional Council (Making of Amendment Subordinate Local Law) Notice (No. 1) 2019*.

Commencement

2. This notice commences on the date it is published in the Gazette.

Making of subordinate local law

3. The Sunshine Coast Regional Council made, by resolution on 30 April 2019, *Amendment Subordinate Local Law No. 1 (Miscellaneous) 2019*.

Subordinate local laws amended

4. *Amendment Subordinate Local Law No. 1 (Miscellaneous) 2019* amends the following subordinate local laws:
   - *Subordinate Local Law No. 1 (Administration) 2016*,
   - *Subordinate Local Law No. 2 (Animal Management) 2011*,
   - *Subordinate Local Law No. 3 (Community Health and Environmental Management) 2011*.

BRISBANE
10 May 2019

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12.5 SOLE SUPPLIER - SPECIALIST LITIGATION SUPPLIERS

Objective Reference:

Authorising Officer: **Andrew Ross, General Counsel**

Responsible Officer: **Andrew Ross, General Counsel**

Report Author: **Peter Cardiff, Service Manager Legal Services**

Attachments: **Nil**

PURPOSE

The purpose of this report is to seek resolution from Council to enter into a contractual relationship with certain specialist service providers for use in court proceedings without first inviting written quotes or tenders for a period of 24 months, pursuant to section 235 of the *Local Government Regulation 2012*.

Section 235 provides a number of exceptions to inviting written quotes or tenders in relation to medium-sized ($15,000 or more but less than $200,000) and large-sized ($200,000 or more in a financial year) contractual arrangements. The proposed arrangement falls within the medium-sized transactions.

The relevant exceptions in section 235 are where Council resolves that it is satisfied that because of the specialised nature of the services that are sought, it would be impractical or disadvantageous for Council to invite quotes or tenders (s.235(b)).

BACKGROUND

Redland City Council (Council) is regularly involved in court proceedings and in many of these it will need to engage legal counsel and expert witnesses. Typically such specialists are not on Local Buy.

Current Situation

Council currently has access to solicitors and a range of consultants via Local Buy but often needs to engage litigation specialists on short notice having regard to their areas of expertise. At present there is no pre-approved service provider list for barristers and decisions often need to be on the run to engage a barrister to represent Council. Depending on the nature of the case there may only be a limited number of suitably experience counsel and ideally it would be preferable to engage counsel who is familiar with issues in the Redland Local Government area. This can mean that there is only a handful to choose from and when their availability is checked the choice may be very limited. Similarly, the choice of an expert witnesses in a particular field may also be limited, e.g. coastal hazards or visual amenity.

ISSUES

There are two issues to consider in relation to this resolution:

1. The specialist nature of the service providers in question and the limited choice available.
2. The need to move quickly and secure the best available experts.

There is often a limited number of specialists in the field available to represent Council.

STRATEGIC IMPLICATIONS

Legislative Requirements

In accordance with section 235(b) of *Local Government Regulation 2012*, a local government may enter into a medium-sized contractual arrangement or large-sized contractual arrangement without first inviting written quotes or tenders if:

b) the local government resolves that, because of the specialised or confidential nature of the services that are sought, it would be impractical or disadvantageous for the local government to invite written quotes or tenders.

Risk Management

If Council does not act quickly to secure the services of the preferred specialist it may end up with a less preferred service provider.

Financial

There will be no impact on budget allocations.

People

There is minimal impact on existing staff.

Environmental

There are no environmental impacts.

Social

There are no social impacts.

Alignment with Council's Policy and Plans

This is an operational issue and is consistent with Council's current policies and plans.

CONSULTATION

Consulted	Consultation Date	Comments/Actions
Procurement Transformation Manager, Trish Thomson	April - May	Supported

OPTIONS

Option One

That Council resolve as follows:

1. That it is satisfied that due to the specialised nature of the services it would be impractical or disadvantageous to seek quotes or tenders for the relevant services.
2. To enter into medium sized contractual arrangements with litigation specialists and their respective organisation without first inviting written quotes pursuant to section 235(b) of the *Local Government Regulation 2012*.
3. To delegate authority to the Chief Executive Officer under s.257(1)(b) of the *Local Government Act 2009* to make, vary and discharge all related documentation.

Option Two

That Council resolves to do nothing.

OFFICER'S RECOMMENDATION

That Council resolve as follows:

1. **That it is satisfied that due to the specialised nature of the services it would be impractical or disadvantageous to seek quotes or tenders for the relevant services.**
2. **To enter into medium sized contractual arrangements with litigation specialists and their respective organisation without first inviting written quotes pursuant to section 235(b) of the *Local Government Regulation 2012.***
3. **To delegate authority to the Chief Executive Officer under s.257(1)(b) of the *Local Government Act 2009* to make, vary and discharge all related documentation.**

13 REPORTS FROM COMMUNITY & CUSTOMER SERVICES

13.1 DECISIONS MADE UNDER DELEGATED AUTHORITY FOR CATEGORY 1, 2 AND 3 DEVELOPMENT APPLICATIONS

Objective Reference:

Authorising Officer: **Louise Rusan, General Manager Community & Customer Services**

Responsible Officer: **David Jeanes, Group Manager City Planning & Assessment**

Report Author: **Jill Driscoll, Group Support Officer**

Attachments: **1. Decisions made under delegated authority 12.5.2019 to 25.5.20** ⇩

PURPOSE

The purpose of this report is for Council to note that the decisions listed below were made under delegated authority for Category 1, 2 and 3 development applications only.

This information is provided for public interest.

BACKGROUND

At the General Meeting of 21 June 2017, Council resolved that development assessments be classified into the following four categories:

- Category 1 – minor code and referral agency assessments;
- Category 2 – moderately complex code and impact assessments;
- Category 3 – complex code and impact assessments; and
- Category 4 – major assessments (not included in this report)

The applications detailed in this report have been assessed under:-

Category 1 - Minor code assessable applications, concurrence agency referral, minor operational works and minor compliance works; minor change requests and extension to currency period where the original application was Category 1 procedural delegations for limited and standard planning certificates.

Delegation Level: Chief Executive Officer, General Manager, Group Managers, Service Managers, Team Leaders and Principal Planners as identified in the officer's instrument of delegation.

Category 2 - In addition to Category 1, moderately complex code assessable applications, including operational works and compliance works and impact assessable applications without objecting submissions; other change requests and variation requests where the original application was Category 1, 2, 3 or 4*. Procedural delegations including approval of works on and off maintenance, release of bonds and full planning certificates.

**Provided the requests do not affect the reason(s) for the call in by the Councillor (or that there is agreement from the Councillor that it can be dealt with under delegation).*

Delegation Level: Chief Executive Officer, General Manager, Group Managers and Service Managers as identified in the officer's instrument of delegation.

Category 3 - In addition to Category 1 and 2, applications for code or impact assessment with a higher level of complexity. They may have minor level aspects outside a stated policy position that are subject to discretionary provisions of the planning scheme. Impact applications may involve submissions objecting to the proposal readily addressable by reasonable and relevant conditions. Assessing superseded planning scheme requests and approving a plan of subdivision.

Delegation Level**:** Chief Executive Officer, General Manager and Group Managers as identified in the officer's instrument of delegation.

OFFICER'S RECOMMENDATION

That Council resolves to note this report.

Decisions Made Under Delegated Authority 12.05.2019 to 18.05.2019

CATEGORY1

Application Id	Application Full Details	Applicant	Associated Property Address	Primary Category	Decision Date	Negotiated Decision Date	Decision Description	Division
CAR19/0156	Design and Siting - Dwelling House	Building Code Approval Group Pty Ltd	32 King Island Drive Wellington Point QLD 4160	Referral Agency Response - Planning	14/05/2019	NA	Approved	1
CAR19/0159	Design and Siting - Dwelling	The Certifier Pty Ltd	50-52 Duncan Street Wellington Point QLD 4160	Referral Agency Response - Planning	13/05/2019	NA	Approved	1
RAL18/0088.02	Change to Development Approval - RAL18/0088 Reconfiguring a Lot (Standard Format) 1 into 2 Lots	Survey Mark	4 Owen Street Wellington Point QLD 4610	Minor Change	17/05/2019	NA	Approved	1
CAR19/0052	Design and Siting - Carport	Strickland Certification Pty Ltd	1 Homer Street Cleveland QLD 4163	Referral Agency Response - Planning	15/05/2019	NA	Approved	2
CAR19/0152	Design and Siting - Carport	Pronto Building Approvals	25 Bollard Court Cleveland QLD 4163	Referral Agency Response - Planning	16/05/2019	NA	Approved	2
RAL19/0023	Rearranging Boundaries - 2 into 2 Lots	Baird & Hayes	87 Tramican Street Point Lookout QLD 4183	Code	15/05/2019	NA	Development Permit	2
CAR19/0138	Schedule 6 Exempt Material Change of Use Class 1- Dwelling and Carport	Buildon Certification	54-56 Ocean Street Cleveland QLD 4163	Referral Agency Response - Planning	16/05/2019	NA	Approved	3
CAR19/0155	Design and Siting - Dwelling House	Building Code Approval Group Pty Ltd	26 Yaroomba Close Thornlands QLD 4164	Referral Agency Response - Planning	14/05/2019	NA	Approved	3

Decisions Made Under Delegated Authority 12.05.2019 to 18.05.2019

CATEGORY1

Application Id	Application Full Details	Applicant	Associated Property Address	Primary Category	Decision Date	Negotiated Decision Date	Decision Description	Division
CAR19/0157	Design and Siting - Additions	The Certifier Pty Ltd	5 Blue Water Avenue Thornlands QLD 4164	Referral Agency Response - Planning	17/05/2019	NA	Approved	3
CAR19/0106	Design and Siting - Dwelling House	Impact Homes Pty Ltd	78B Bunker Road Victoria Point	Referral Agency Response - Planning	17/05/2019	NA	Approved	4
RAL19/0020	Standard Format - 1 into 2	Ian Davis Surveys Pty Ltd	1 Vicki Place Victoria Point QLD 4165	Code	13/05/2019	NA	Development Permit	4
CAR19/0136	Design & Siting - Carport	Applied Building Approvals	27-35 Lovell Parade Lamb Island QLD 4184	Referral Agency Response - Planning	16/05/2019	NA	Approved	5
CAR19/0147	Design and Siting - Dwelling House	James Robert Thenberg & Elizabeth Anne Fry As Trustee	29 Michael Street Macleay Island QLD 4184	Referral Agency Response - Planning	13/05/2019	NA	Approved	5
CAR19/0146	Design and Siting - Gazebo	Mr Joseph A S Clekovic, Miss Maggie T Henderson	9 Valleygreen Close Redland Bay QLD 4165	Referral Agency Response - Planning	13/05/2019	NA	Approved	6
CAR19/0144	Design and Siting - Dwelling houses x 46	Place Design Group Pty Ltd	35-41 Wrightson Road Thornlands QLD 4164	Referral Agency Response - Planning	13/05/2019	NA	Approved	7
CAR19/0160	Design and Siting - Carport	The Certifier Pty Ltd	18 Sallows Street Alexandra Hills QLD 4161	Referral Agency Response - Planning	14/05/2019	NA	Approved	7
CAR19/0108	Design and Siting - Carport	KP Building Approvals Pty Ltd	7 Nadia Court Capalaba	Referral Agency Response - Planning	13/05/2019	NA	Refused	9

Decisions Made Under Delegated Authority 12.05.2019 to 18.05.2019

CATEGORY1

Application Id	Application Full Details	Applicant	Associated Property Address	Primary Category	Decision Date	Negotiated Decision Date	Decision Description	Division
CAR19/0158	Design and Siting - Patio	Platinum Building Approvals	11 McTaggart Street Capalaba	Referral Agency Response - Planning	17/05/2019	NA	Approved	9
CAR19/0164	Design and Siting - Dwelling House	Dixon Homes Pty Ltd (Sherwood)	51 Willard Road Capalaba	Referral Agency Response - Planning	17/05/2019	NA	Approved	9
RAL19/0006	Standard Format - 2 into 5 lots (2 stages)	East Coast Surveys Pty Ltd	45 Ney Road Capalaba	Code	15/05/2019	NA	Development Permit	9
CAR19/0151	Design and Siting - BOS Dwelling House	Professional Certification Group Pty Ltd	16 Fisher Road Thorneside QLD 4158	Referral Agency Response - Planning	15/05/2019	NA	Approved	10
RAL19/0011	Reconfiguring a Lot - Standard Format - 1 into 2 Lots	Bruno M SIMONETTO	16-18 Maud Street Birkdale QLD 4159	Code	15/05/2019	NA	Development Permit	10

Decisions Made Under Delegated Authority 12.05.2019 to 18.05.2019

CATEGORY2

Application Id	Application Full Details	Applicant	Associated Property Address	Primary Category	Decision Date	Negotiated Decision Date	Decision Description	Division
MCU19/0024	Change to Development Approval - C1351 Educational Facility	Redlands Combined Independent College Inc	Redlands College 36-44 Anson Road Wellington Point	Minor Change	13/05/2019	NA	Approved	1
OPW19/0031	Operational Works – 1 into 2 lots	Rodney Albert YOUNG	59 Hardy Road Wellington Point QLD 4160	Code	17/05/2019	NA	Development Permit	1
MCU18/0104.02	Change to Development Approval - MCU18/0104 Refreshment Establishment - Combined MCU and OPW	Leda Developments Pty Ltd	Victoria Point Shopping Centre 2-34 Bunker Road Victoria Point	Minor Change	17/05/2019	NA	Approved	4
MCU19/0004	Tourist park	The Trustee For The Shpank Unit Trust	196-206 Mount View Road Mount Cotton QLD 4165	Code	13/05/2019	NA	Development Permit	6

Decisions Made Under Delegated Authority 19.05.2019 to 25.05.2019

CATEGORY1

Application Id	Application Full Details	Applicant	Associated Property Address	Primary Category	Decision Date	Negotiated Decision Date	Decision Description	Division
CAR19/0172	Design and Siting - Domestic Outbuilding	Begbie Bentham Pty Ltd	6-8 Sleath Street Ormiston QLD 4160	Referral Agency Response - Planning	23/05/2019	NA	Approved	1
CAR19/0095	Design and Siting - Shed	Strickland Certification Pty Ltd	9 Sunshine Drive Cleveland QLD 4163	Referral Agency Response - Planning	24/05/2019	NA	Approved	2
CAR19/0149	Amenity and Aesthetics - Secondary Dwelling	Cornerstone Building Certification	43 Cumming Parade Point Lookout QLD 4183	Referral Agency Response - Planning	20/05/2019	NA	Approved	2
CAR19/0177	Design and Siting - Carport	KP Building Approvals Pty Ltd	120 Passage Street Cleveland QLD 4163	Referral Agency Response - Planning	21/05/2019	NA	Approved	2
DBW19/0011	Private Swimming Pool	Building Approvals and Advice	17 Voyagers Court Cleveland QLD 4163	Code	21/05/2019	NA	Development Permit	2
CAR19/0157	Design and Siting - Additions	The Certifier Pty Ltd	5 Blue Water Avenue Thornlands QLD 4164	Referral Agency Response - Planning	20/05/2019	NA	Approved	3
MCU17/0116.01	Change to Development Approval - MCU17/0116 Dual Occupancy	The Certifier Pty Ltd	351 Bloomfield Street Cleveland QLD 4163	Code	21/05/2019	NA	Approved	3
CAR19/0106	Design and Siting - Dwelling	Impact Homes Pty Ltd	78B Bunker Road Victoria Point QLD 4165	Referral Agency Response - Planning	20/05/2019	NA	Approved	4

Decisions Made Under Delegated Authority 19.05.2019 to 25.05.2019

CATEGORY1

Application Id	Application Full Details	Applicant	Associated Property Address	Primary Category	Decision Date	Negotiated Decision Date	Decision Description	Division
CAR19/0148	Design & Siting & BOS - Carport/Shed	Applied Building Approvals	1 Wilson Lane Victoria Point QLD 4165	Referral Agency Response - Planning	20/05/2019	NA	Approved	4
CAR19/0165	Design and Siting - Patio	Fastrack Building Certification	12 Hatchman Street Victoria Point QLD 4165	Referral Agency Response - Planning	20/05/2019	NA	Approved	4
CAR19/0169	Design and Siting - Dwelling House	Building Code Approval Group Pty Ltd	33-35 Egret Drive Victoria Point QLD 4165	Referral Agency Response - Planning	23/05/2019	NA	Approved	4
CAR18/0325	Amenity and Aesthetics - Dwelling House <60m²	Kenneth Ronald HANNAM	12 Pookanah Street Russell Island QLD 4184	Referral Agency Response - Planning	20/05/2019	NA	Approved	5
CAR19/0166	Design and Siting - Patio	Bartley Burns Certifiers & Planners	40 Lowe Circuit Redland Bay QLD 4165	Referral Agency Response - Planning	24/05/2019	NA	Approved	5
MCU19/0037	Dwelling house	Approveit Building Certification Pty Ltd	41 Blue Bay Crescent Perulpa Island QLD 4184	Code	20/05/2019	NA	Development Permit	5
CAR19/0179	Design and Siting - Carport	The Certifier Pty Ltd	3 Beverley Court Redland Bay QLD 4165	Referral Agency Response - Planning	23/05/2019	NA	Approved	6
CAR19/0130	Design and Siting - Carport	Fastrack Building Certification	10 Brompton Street Alexandra Hills QLD 4161	Referral Agency Response - Planning	22/05/2019	NA	Approved	7
DBW17/0044.01	Minor Change – Domestic Outbuildings	Consult Planning	519-521 Redland Bay Road Capalaba	Code	24/05/2019	NA	Approved	7

Decisions Made Under Delegated Authority 19.05.2019 to 25.05.2019

CATEGORY1

Application Id	Application Full Details	Applicant	Associated Property Address	Primary Category	Decision Date	Negotiated Decision Date	Decision Description	Division
RAL19/0025	Reconfiguration of lots	JDA Consultants	31 and 31A Banks Street Capalaba	Code	22/05/2019	NA	Approved	9
CAR18/0346	Design and Siting - Shed	Bartley Burns Certifiers & Planners	6 Frank Street Thorneside QLD 4158	Referral Agency Response - Planning	23/05/2019	NA	Approved	10
CAR19/0170	Design and Siting - Additions	Bartley Burns Certifiers & Planners	53 Murray Street Birkdale QLD 4159	Referral Agency Response - Planning	21/05/2019	NA	Approved	10

Decisions Made Under Delegated Authority 19.05.2019 to 25.05.2019

CATEGORY2

Application Id	Application Full Details	Applicant	Associated Property Address	Primary Category	Decision Date	Negotiated Decision Date	Decision Description	Division
OPW19/0025	Driveway Crossover	Professional Certification Group Pty Ltd	31B Coburg Street East Cleveland QLD 4163	Code	22/05/2019	NA	Development Permit	2
OPW19/0014	Driveway Crossover	Escape Homes And Developments Pty Ltd	67 Queen Street Redland Bay QLD 4165	Code	21/05/2019	NA	Development Permit	5
OPW19/0052	Operational Works - Excavation & Fill	Harridan Pty Ltd (Loganholme)	84-86 Kinross Road Thornlands QLD 4164	Code	21/05/2019	NA	Development Permit	7
OPW19/0036	Operational Works - Driveway Crossover	June Domingo BALBARAIS	37 Leon Street Thorneside QLD 4158	Code	22/05/2019	NA	Development Permit	10
OPW19/0048	Operational Works - 1 into 2 lots	Christine WHITE	42 Clive Road Birkdale QLD 4159	Code	24/05/2019	NA	Development Permit	10
OPW19/0048	Operational Works - 1 into 2 lots	Peter Samuel WHITE	42 Clive Road Birkdale QLD 4159	Code	24/05/2019	NA	Development Permit	10

13.2 LIST OF DEVELOPMENT AND PLANNING RELATED COURT MATTERS AS AT 3 JUNE 2019

Objective Reference:

Authorising Officer: **Louise Rusan, General Manager Community & Customer Services**

Responsible Officer: **David Jeanes, Group Manager City Planning & Assessment**

Report Author: **Christy Englezakis, Senior Appeals Planner**

Attachments: **Nil**

PURPOSE

The purpose of this report is for Council to note the current development and planning related appeals and other related matters/proceedings.

BACKGROUND

Information on appeals may be found as follows:

1. Planning and Environment Court

a) Information on current appeals and declarations with the Planning and Environment Court involving Redland City Council can be found at the District Court web site using the "Search civil files (eCourts) Party Search" service: http://www.courts.qld.gov.au/services/search-for-a-court-file/search-civil-files-ecourts

b) Judgments of the Planning and Environment Court can be viewed via the Supreme Court of Queensland Library web site under the Planning and Environment Court link: http://www.sclqld.org.au/qjudgment/

2. Court of Appeal

Information on the process and how to search for a copy of Court of Appeal documents can be found at the Supreme Court (Court of Appeal) website: http://www.courts.qld.gov.au/courts/court-of-appeal/the-appeal-process

3. Department of State Development, Manufacturing, Infrastructure and Planning (DSDMIP)

The DSDMIP provides a Database of Appeals that may be searched for past appeals and declarations heard by the Planning and Environment Court. https://planning.dsdmip.qld.gov.au/planning/spa-system/dispute-resolution-under-spa/planning-and-environment-court/planning-and-environment-court-appeals-database

The database contains:

a) A consolidated list of all appeals and declarations lodged in the Planning and Environment Courts across Queensland of which the Chief Executive has been notified.

b) Information about the appeal or declaration, including the appeal number, name and year, the site address and local government.

4. Department of Housing and Public Works (DHPW)

Information on the process and remit of development tribunals can be found at the DHPW website: http://www.hpw.qld.gov.au/construction/BuildingPlumbing/DisputeResolution/Pages/default.aspx

PLANNING & ENVIRONMENT COURT APPEALS

1.	**File Number:**	CA11075/17 (MCU013296)
Appellants:		**Lipoma Pty Ltd**
		Lanrex Pty Ltd
		Victoria Point Lakeside Pty Ltd
Co-respondent (Applicant)		**Nerinda Pty Ltd**
Proposed Development:		Preliminary Approval for Material Change of Use for Mixed Use Development and Development Permit for Reconfiguring a Lot (1 into 2 lots) 128-144 Boundary Road, Thornlands (Lot 3 on SP117065)
Appeal Details:		Submitter appeal against Council approval
Current Status:		A directions hearing was held on 1 August 2018. A further directions hearing was held on 5 October 2018 to confirm the matters to be determined by the Court. The matter was heard before the Court over four days, commencing 4 March 2019. The Court has reserved its decision.

2.	**File Number:**	Appeal 4515 of 2017 (ROL006084)
Applicant:		**Australian Innovation Centre Pty Ltd**
Application Details:		Reconfiguring a Lot (1 into 22 lots and park) at 289-301 Redland Bay Road, Thornlands (Lot 5 on RP14839)
Appeal Details:		Deemed refusal appeal
Current Status:		Appeal filed 23 November 2017. Mediation was held on 6 March 2018. A review was held on 27 February 2019. A further mediation was held on 11 April 2019. A review was held on 17 April 2019. The appeal has been adjourned for mention on 28 June 2019.

3.	**File Number:**	Appeal 894 of 2018 (MCU013921)
Applicant:		**Palacio Property Group Pty Ltd**
Proposed Development:		Infrastructure conversion application (relating to the Development Permit for a Material Change of Use for Multiple Dwellings (22 units)) 4-8 Rachow Street, Thornlands (Lot 5 on SP149013)
Appeal Details:		Appeal against Council refusal
Current Status:		Appeal filed 9 March 2018. A without prejudice meeting was held on 17 May 2018. A settlement offer was presented to Council on 10 October 2018. Council resolved to decline the offer. Mediation was held on 3 December 2018. A further without prejudice mediation was held on 26 March 2019. Council declined a further settlement offer on 3 April 2019. A review was held on 9 May 2019. A further review was held on 17 May 2019. Council resolved to settle the appeal on 22 May 2019.

4.	**File Number:**	Appeal 1506 of 2018 (MCU17/0149)
Applicant:		**Barro Group Pty Ltd**
Proposed Development:		Request to Extend the Currency Period (relating to the Development Permit for a Material Change of Use for Extractive Industry and Environmentally Relevant Activities 8 (Chemical Storage), 16 (Extractive and Screening Activities) and 21 (Motor Vehicle Workshop Operation)) 1513 and 1515 – 1521 Mount Cotton Road and 163-177 and 195 Gramzow Road, Mount Cotton (Lot 162 on S31962, Lot 238 on SP218968, Lot 370 on S311071, Lot 1 on RP108970, Lot 17 on RP108970, Lot 1 on SP272090, Lot 2 on SP272091, Lot 3 on SP272092 and the land comprising part of Greenhide (California) Creek located between Lot 162 on S31962 and Lot 238 on SP218968, which is the property of the State).
Appeal Details:		Appeal against Council refusal
Current Status:		Appeal filed on 24 April 2018. A without prejudice meeting was held on 29 October 2018. A pre-call over review was held on 20 February 2019. A further review was held on 21 February 2019. The Appellant made a minor change application to the Minister on 15 March 2019. The Appellant also made an amendment application to the Department of Environment and Science (DES) on 18 March 2019, seeking changes to the Environmental Authority. A further review was held on 21 March 2019. On 5 April 2019, Council provided a response notice to the Minister and submitted a request to the Department of Environment and Science that the environmental authority be amended in accordance with expert advice. The Minister has not yet made a decision on the minor change application. The DES approved the amendment application on 12 April 2019. A review was held on 15 May 2019. A further review is set down for 21 June 2019.

5.	**File Number:**	Appeal 2171 of 2018 (ROL006209)
Applicant:		**Lorette Margaret Wigan**
Proposed Development:		Reconfiguring a Lot for 1 into 29 lots and road 84-122 Taylor Road, Thornlands (Lot 1 on RP123222)
Appeal Details:		Appeal against Council decision to issue Preliminary Approval
Current Status:		Appeal filed on 13 June 2018. Mediation was held on 29 June 2018. A second mediation was held on 2 October 2018. A third mediation was held on 22 October 2018. A fourth mediation was held on 8 April 2019. A further review was held on 12 April 2019. A further review is scheduled for 19 July 2019.

6.	**File Number:**	Appeal 135 of 2018 (MCU013917)
Applicant:		**Maureen Joan Chapman**
Proposed Development:		Material Change of Use for a Dwelling House 42 Magnolia Street, Russell Island (Lots 77, 78, 104 & 105 on RP129012)
Appeal Details:		Appeal against Council refusal
Current Status:		Appeal filed on 21 September 2018. The Appellant filed an application in pending proceedings on 10 May 2019, for orders to progress the appeal. A without prejudice mediation is scheduled for 20 June 2019. A review was held on 30 May 2019. A further review is scheduled for 19 July 2019.

7.	**File Number:**	Appeal 4270 of 2018 (MCU013936)
Applicant:		**Landmark Homes**
Proposed Development:		Material Change of Use for a Dwelling House 10 Water Street, Cleveland (Lot 57 on RP1691)
Appeal Details:		Appeal against Council refusal
Current Status:		Appeal filed on 29 November 2018. A without prejudice meeting was held on 21 February 2019. A directions hearing was held on 27 February 2019, at which the court made orders requiring the parties' experts to produce a joint expert report by 3 April 2019. A directions hearing was held on 12 April 2019. A review was held on 29 May 2019. A further review is scheduled for 5 June 2019.

8.	**File Number:**	Appeal 1452 of 2019 (ENF007717)
Applicant:		**John Bonett**
Enforcement Action:		Unlawful Use of Premises 45 Arthur Street and 47 – 49 Arthur Street, Macleay Island (Lot 76 RP124837 and Lot 77 SP162705)
Appeal Details:		Appeal against Council enforcement notice
Current Status:		Appeal filed on 26 April 2019.

APPEALS TO THE QUEENSLAND COURT OF APPEAL

9.	**File Number:**	Appeal 8114 of 2018 (MCU012812)/ (QPEC Appeal 3641 of 2015)
Appellant:		**Redland City Council**
Respondent (applicant):		**King of Gifts Pty Ltd and HTC Consulting Pty Ltd**
Proposed Development:		Material Change of Use for Service Station (including car wash) and Drive Through Restaurant 604-612 Redland Bay Road, Alexandra Hills
Appeal Details:		Appeal against the decision of the Planning and Environment Court to allow the appeal and approve the development.
Current Status:		Appeal filed by Council on 30 July 2018. Council's outline of argument was filed on 28 August 2018. The appellant's outline of argument was filed on 20 September 2018. The matter was heard before the Court on 12 March 2019. The Court has reserved its decision.

DEVELOPMENT TRIBUNAL APPEALS AND OTHER MATTERS

No current matters.

OFFICER'S RECOMMENDATION

That Council resolves to note this report.

13.3 MCU17/0090 (61 UNITS) - 147-205 ROCKY PASSAGE ROAD, REDLAND BAY

Objective Reference:

Authorising Officer: **Louise Rusan, General Manager Community & Customer Services**

Responsible Officer: **David Jeanes, Group Manager City Planning & Assessment**

Report Author: **Eskinder Ukubamichael, Senior Planner**

Attachments:

1. **Proposal Plans** ⇩
2. **Engineering Services Report** ⇩
3. **Conceptual Stormwater Plan** ⇩
4. **Traffic Impact Assessment** ⇩
5. **Traffic Letter** ⇩
6. **Landslide Susceptibility Report** ⇩
7. **Solid Waste Management Plan** ⇩
8. **SARA Response (under separate cover)**
9. **Zone Map** ⇩
10. **Overlay Map** ⇩

PURPOSE

Council has received an application seeking a Development Permit for a Material Change of Use (Impact Assessment) for Tourist Accommodation (X61) on an allotment zoned Conservation and Environmental Protection, on land at 147-205 Rocky Passage Road, Redland Bay (Lot 3 on RP 153333).

The owner of the property is New Land Tourism Pty Ltd and the applicant is Arnold Development Consultants.

The proposed Tourist Accommodation use is impact assessable as per the tables of assessment in sections 4.3.4 and 4.6.4 of the Conservation and Environmental Protection Zones respectively.

The application was made in accordance with the *Planning Act 2016*. Public notification of the application took place and six (6) submissions were received and these submissions were considered as part of the assessment of the application. The application has been assessed against the relevant sections of the Redlands Planning Scheme (RPS) and other relevant benchmarks.

Key issues with the application are summarised below:

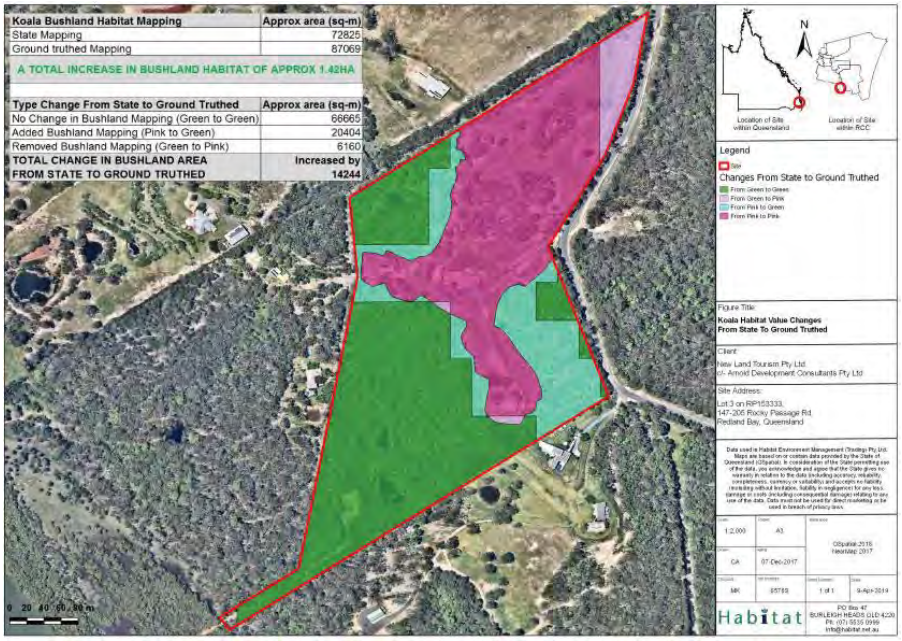
- Koala Habitat
- Low-key tourist accommodation
- Environmental impacts
- Bushfire hazard
- Setbacks
- Car parking and traffic
- Water and wastewater services

The development does not comply with the relevant benchmark in relation to its impacts on koala habitat. The balance of the issues described above have been addressed in the report. It is recommended that the application be granted a **preliminary approval**, subject to conditions.

PLANNING HISTORY

As part of this application, the applicant lodged a request to reclassify part of the koala habitat from Bushland Habitat to Rehabilitation Habitat (green to pink) and from Rehabilitation Habitat to Bushland Habitat (pink to green), as reflected in Figure 1, under Schedule 11, Part 4 of the *Planning Regulation 2017*. The request was partially approved by Council resolution on 8 April 2019 as follows:

- High Value Rehabilitation to High Value Bushland Habitat; and
- High Value Bushland Habitat to Medium Value Rehabilitation Habitat, with the exception of the southernmost area and the north-easternmost area proposed to change, which must remain as High Value Bushland Habitat.



- *Figure 1. Reclassification request koala habitat map*

ISSUES

Development Proposal & Site Description

Proposal

The proposal is for tourist accommodation, comprising 61 units. The proposal envisages establishing an integrated eco-resort focused on health (therapies and learning), nature walks, relaxation and meditation – utilising the unique environmental characteristics of the premises, as well as its attractive rural location. The proposed development is comprised of the following principal components:

- Resort main building which includes indoor recreational and dining facilities with a gross floor area (GFA) of 2065m²;
- A swimming pool, water features, pond, and a number of landscaped gardens; and
- Tourist accommodation units spread out over 19 buildings with the following details:

Type of Building	Units per building	No. of units	Bedroom per unit
Type 1 Resort suites X 2	8	16	2 bedrooms
Type 2 4 Plex X 2	4	8	2 bedrooms

Type of Building	Units per building	No. of units	Bedroom per unit
Type 3 Detached dwelling X 6	1	6	3 bedrooms
Type 3B Detached dwelling X 3	1	3	3 bedrooms
Type 4 4 Plex X 3	4	12	2 bedrooms
Type 5 Luxury resort suites X 4	4	16	2 bedrooms
Total		**61**	**Total Bedrooms 131**

The proposal has a total GFA of approximately 4,980m² which is roughly 3.4% of the site. The facility will be operated by up to 30 full-time staff roughly divided over two shifts. Entry to the site is proposed to be gained via a new driveway and exit will be from the existing driveway off Rocky Passage Road. A total of 77 car parking spaces are proposed to be provided over the site as follows:

- On-ground - 54 spaces.
- Basement (of central facility) - 23 spaces.

At full occupancy, the facilities could provide overnight accommodation for 262 people. The proposed facilities represent approximately 222.59 Equivalent Persons (EP) for water consumption. The Site Based Management Plan that has been prepared by Biome, Water and Environmental Consultants (dated August 2017) indicates that the anticipated sewage load expected from the site is 285.90 EP.

Site & Locality

The subject site has a total area of 14.62ha. The site has approximately 540m of road frontage to Rocky Passage Road and has approximately 20m of frontage to the Logan River to the south west.

Currently the site is improved by two existing dwellings with a collection of ancillary sheds and garage structures. The primary dwelling house is located centrally within the allotment and a smaller dwelling (secondary dwelling) located approximately 150m to the south of the main dwelling. An ancillary pool area and tennis courts lie immediately west of the primary dwelling. There are two rural dams in the northern part of the lot (close to Rocky Passage Road frontage), and two additional dams lie within the vegetated, south west, part of the property. There are several high-points located in the centre of the subject site, including one in the north-west corner, one in the north-east corner, and on in the south-west corner with grades ranging between 10% to 40%. The subject site contains a number of gullies, several of which drain to the existing dams.

Access to the subject lot is via a concrete driveway directly from Rocky Passage Road. This access lies at the crest of a hill.

Vegetation on the majority of the site consists of open eucalypt forest regrowth, with areas that have been slashed previously, and a number of mature trees scattered throughout the site. A significant percentage of the site has been cleared and is maintained as turf/lawn surrounding the former main dwelling house and along the top ridgeline between the existing dwellings.

Development surrounding the subject site consists of:

- Rural and rural residential land to the north west, west and south;
- Rocky Passage Road - bounding the eastern boundary of the premises;
- A large covenant area located to the east of the site;

- Logan River is located approximately 190m west of the main portion of the site, with the site having an access handle providing direct access to the river; and
- Directly across the Logan River (to the west approximately 550m) there are existing aquaculture uses.

In the broader context, the accessibility (approximate travel time) of the subject site is as follows:

- 15 minutes to regional retail centre at Victoria Point;
- 20 minutes to the Cleveland Town Centre;
- 35 minutes to the Brisbane CBD;
- 45 minutes to the Brisbane International Airport;
- 35 minutes to Gold Coast theme parks; and
- 1 hour to the Gold Coast International Airport.

APPLICATION ASSESSMENT

Planning Act 2016

The application has been made in accordance with the *Planning Act 2016* Development Assessment Rules and constitutes an application for Material Change of Use under the Redlands Planning Scheme subject to impact assessment.

Assessment framework

In accordance with section 45 of the *Planning Act 2016*:

> *(5) An **impact assessment** is an assessment that—*
>
> *(a) must be carried out—*
>
> *(i) against the assessment benchmarks in a categorising instrument for the development; and*
>
> *(ii) having regard to any matters prescribed by regulation for this subparagraph; and*
>
> *(b) may be carried out against, or having regard to, any other relevant matter, other than a person's personal circumstances, financial or otherwise.*
>
> *Examples of another relevant matter—*
>
> - *a planning need*
> - *the current relevance of the assessment benchmarks in the light of changed circumstances*
> - *whether assessment benchmarks or other prescribed matters were based on material errors*
>
> *(6) An assessment carried out against a statutory instrument, or another document applied, adopted or incorporated (with or without changes) in a statutory instrument, must be carried out against the statutory instrument or document as in effect when the application was properly made.*
>
> *(7) However, if the statutory instrument or other document is amended or replaced before the assessment manager decides the application, the assessment manager may give the weight that the assessment manager considers is appropriate, in the circumstances, to the amendment or replacement.*

Section 31 of the *Planning Regulation 2017* relevantly identifies that:

> *(1) For section 45(5)(a)(ii) of the Act, the impact assessment must be carried out having regard to—*
>
> *(a) the matters stated in schedules 9 and 10 for the development; and*
>
> *(d) if the prescribed assessment manager is a person other than the chief executive—*

(i) the regional plan for a region; and

(ii) the State Planning Policy, to the extent the State Planning Policy is not identified in the planning scheme as being appropriately integrated in the planning scheme; and

(f) any development approval for, and any lawful use of, the premises or adjacent premises; and

(g) the common material.

Decision making framework

Section 60 of the *Planning Act 2016* relevantly states that:

(3) To the extent the application involves development that requires impact assessment, and subject to section 62, the assessment manager, after carrying out the assessment, must decide—

(a) to approve all or part of the application; or

(b) to approve all or part of the application, but impose development conditions on the approval; or

(c) to refuse the application.

(5) The assessment manager may give a preliminary approval for all or part of the development application, even though the development application sought a development permit.

(6) If an assessment manager approves only part of a development application, the rest is taken to be refused.

Minor Change

The original application involved 64 tourist accommodation units. Amended plans were provided in response to Council's information request, which reduced the number of units to 61. The location of buildings has changed and the total number of buildings decreased from 30 to 20. The change is considered to be a minor change under Schedule 2 of the *Planning Act 2016* as it does not result in substantially different development, and responds to a matter raised in an information request. Therefore there is no effect on the assessment stages identified in accordance within the *Planning Act 2016* Development Assessment Rules.

SEQ Regional Plan

The site is located within the Regional Landscape & Rural Production Area (RLRPA) of SEQ Regional Plan 2017 (Shaping SEQ). The intent of the RLRPA under Shaping SEQ is described as follows:

"RLRPA is a large and important part of SEQ, surrounding the Urban Footprint and Rural Living Area. It provides important values that help sustain the region socially, culturally, economically and environmentally. The intent of the RLRPA is to:

- *protect the values of this land from encroachment by urban and rural residential development;*
- *protect natural assets and regional landscapes, and ensure their sustainable use and management; and*
- *support development and economic growth of rural communities and industries.*

The RLRPA is to be protected from inappropriate development, particularly urban and rural residential development."

The provisions of the RLRPA limit further fragmentation of land holdings and restrict various forms of urban activity. The provisions support rural communities and the diversification of rural economies by allowing a range of development including activities such as those associated with primary production and land management, certain **types of tourism activity**, community facilities, sport and recreation activity, and limited industrial, commercial and retail activity.

Under the *Planning Regulation 2017*, tourist activity means –

(a) nature-based tourism; or

(b) a resort complex; or

(c) a tourist attraction; or

(d) a tourist park; or

(e) tourist accommodation, or accommodation for employees, that is ancillary to a use stated in paragraphs (a) to (d); or

(f) a commercial use that is ancillary to a use stated in paragraphs (a) to (d).

Considering the intent of the RLRPA, tourism activity, of the scale proposed, is not an inappropriate development. The proposed development is generally consistent with the goals, elements and strategies of the South East Queensland Regional Plan 2017 (Shaping SEQ).

State Policy and Regulations

State Policy / Regulation	Applicability to Application
State Planning Policy 2017 (SPP)	The following SPP assessment benchmarks are applicable for the subject development. <u>Planning for economic growth</u> *Tourism* *The delivery of sustainable tourism development is facilitated where it:* • *is complementary to and compatible with other land uses, including sensitive land uses* • *promotes the protection or enhancement of the character, landscape and visual amenity, and the economic, social, cultural and environmental values of the natural and built assets associated with the tourism development.* The proposed tourist accommodation is compatible with the surrounding land uses in that impacts such as noise, lighting, emissions and traffic impacts are consistent with a rural environment and the development is designed in a way to protect the amenity of adjoining residential dwellings. The proposal complements the surrounding uses by creating opportunity for employment in the locality and enables enjoyment of the scenic qualities of the locality. The proposed development protects the rural character, landscaping and visual amenity of the area by limiting the extent of the development to the predominantly cleared parts of the lot with a limited site coverage across the site. The development has a similar visual impact as the existing structures as seen from the road. The proposed development capitalises on the character, visual amenity and environmental values of the area. The applicant has indicated that the intent of the resort is to utilise the unique environmental characteristics of the premises and the rural location to promote a 'resort lifestyle' that provides luxury and security within an environmentally sensitive, contemporary design. The architectural design has been heavily influenced by the environmental features of the site, specifically the natural ridgeline and proposed building locations in cleared areas. The proposal incorporates design elements reflective of the local area, including traditional pavilion roofing and flexible indoor/outdoor living spaces set amongst landscaped areas and within the context of considerable retained on-site vegetation. <u>Planning for environment and heritage</u>

	Biodiversity The State interest for biodiversity states that: *"Matters of environmental significance are valued and protected, and the health and resilience of biodiversity is maintained or enhanced to support ecological processes."* The site contains the following Matters of State Environmental Significance (MSES): • MSES – Wildlife Habitat • MSES – Regulated vegetation category X • MSES – Regulated vegetation essential habitat • MSES – regulated vegetation wetland • MSES – regulated vegetation intersecting a watercourse • MSES – High ecological significance wetlands The assessment benchmarks are as follows: 1) *Development is located in areas to avoid significant impacts on matters of national environmental significance and considers the requirements of the Environment Protection and Biodiversity Conservation Act 1999.* 2) *Matters of state environmental significance are identified and development is located in areas that avoid adverse impacts; where adverse impacts cannot be reasonably avoided, they are minimised.* 3) *Matters of local environmental significance are identified and development is located in areas that avoid adverse impacts; where adverse impacts cannot be reasonably avoided, they are minimised.* 4) *Ecological processes and connectivity is maintained or enhanced by avoiding fragmentation of matters of environmental significance.* 5) *Viable koala populations in South East Queensland are protected by conserving and enhancing koala habitat extent and condition*. The proposal is considered to meet the above benchmarks as follows: • An advice will form part of the decision for matters related to the *Environment Protection and Biodiversity Conservation Act 1999.* • The subject site contains matters of state and local environmental significance. The regulated vegetation mapping shows vegetation categories used to determine clearing requirements. At the time of lodgement the entire site was identified as Category X (non-remnant) vegetation. Category X areas are not subject to clearing requirements. The development is clear of the other MSES outlined above. • The local environmental significance is addressed under the environmental impacts section of the report. • There is a large area over the site where vegetation remains intact. The areas that are currently cleared of vegetation are co-located with the existing dwelling and associated uses on the site. The proposal capitalises on this by proposing in the cleared part of the lot. • The majority of development is limited to the already cleared part of the site. The proposal includes open design between habitable structures within the development footprint, negating the need for extensive fencing internal to the development. This optimises the unimpeded movement of fauna through the development footprint. • The subject site falls within the Priority Koala Assessable Development Area in the *Planning Regulation 2017*. Impact on koala habitat is addressed further in the report. *Coastal environment* The development is located out of the coastal management district and the erosion prone area as shown below.

	 *Water quality* A Stormwater Management Plan was conducted by ADG dated August 2017. A detention area of 794m² is proposed to be provided over 4 bio retention areas. The report states that 195m² of treatment area is proposed to meet the Water Sensitive Urban Design reduction levels in gross pollutants, suspended solids, nitrogen and phosphorus. The building footprint including all the proposed hardstand areas will result in site coverage of 8.4% of the site. This does not include the proposed onsite effluent discharge area which will be located in the north eastern area of the subject site. The applicant supplied outputs from a MUSIC model which demonstrate that the proposed stormwater treatment devices meet the required percentage water quality objectives required by the State Planning Policy – Water Quality. <u>Planning for safety and resilience to hazards</u> *Natural hazards, risk and resilience* A bushfire hazard management report has been prepared and detail is provided under the bushfire assessment section of the report.
Regional Plan	The proposal is assessable development as per Schedule 10, part 16, division 2, subdivision 1, number 24 of the *Planning Regulation 2017* as the proposal involves an ancillary commercial or retail activity (indoor recreational & dining facilities) with a gross floor area of more than 250m². The proposal has demonstrated that the indoor recreational and dining facilities will remain ancillary by providing an economic report as detailed in the low-key tourist accommodation section of the report. The proposal was assessed by the State Assessment and Referral Agency (SARA) as a concurrence agency and the State has approved the development subject to conditions including restricting the indoor recreational and dining facilities to remain ancillary to the proposed use.
Koala Habitat Area	The subject site falls within the Priority Koala Assessable Development Area of the Koala Regulation. As the application is for tourist accommodation this does not fall under the definition of Urban Activity and therefore it is not prohibited. The development will be required to meet the assessment benchmarks outlined in Schedule 11, Part 6 of the *Planning Regulation 2017*. Assessment of the benchmarks is outlined in the Koala Habitat Area section of the report below.

Koala Habitat Area

The subject site falls within the *Priority Koala Assessable Development Area* and has three different designations applicable (Figure 2). A small portion of the site is mapped as *Low Value Rehabilitation* (towards the north eastern boundary), the middle section of the site is mapped as *High Value Rehabilitation* and the rest of the site is mapped as *High Value Bushland.* The development is required to meet the benchmarks which are outlined in Schedule 11, Part 2, Item 6 of the *Planning Regulation 2017 states that:*

- *the development does not involve clearing non-juvenile koala habitat trees in a bushland habitat area;*

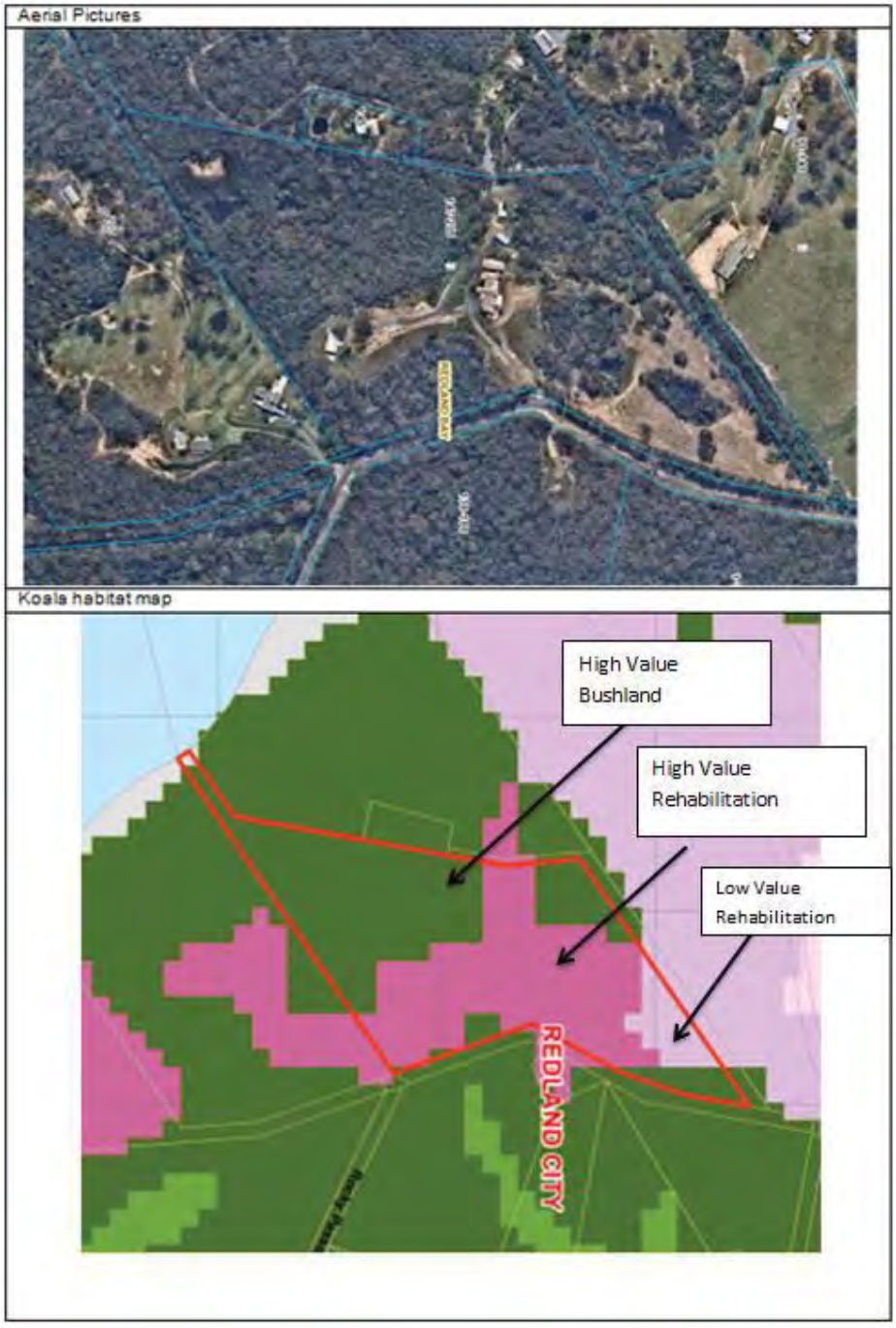


Figure 2. Aerial and koala habitat map

Clearing of non-juvenile koala habitat trees (NJKHTs) cannot occur in areas which are designated as Bushland Habitat. The development as proposed will result in clearing of NJKHTs in areas which are designated as Bushland Habitat, due to earthwork edge effects and services (onsite waste treatment) in the north-east corner of the site (figure 2 and 4). Figure 3 and 4 show NJKHTs that will be affected for provision of onsite waste water treatment. It is considered that conditioning the development to avoid these NJKHTs would not be possible, considering that a decrease in on site treatment system will result in a reduction in the number of units that could be accommodated on the subject site.

The development (including any building structures, pathways other services) has been designed so as not to result in removal/damage of NJKHT in the rest of areas of high value bushland. A 10 metre wide perimeter is proposed to locate the development outside striking distance of any NJKHT that are in poor health or condition and other factors such as setbacks for bushfire and to minimise construction edge effects.

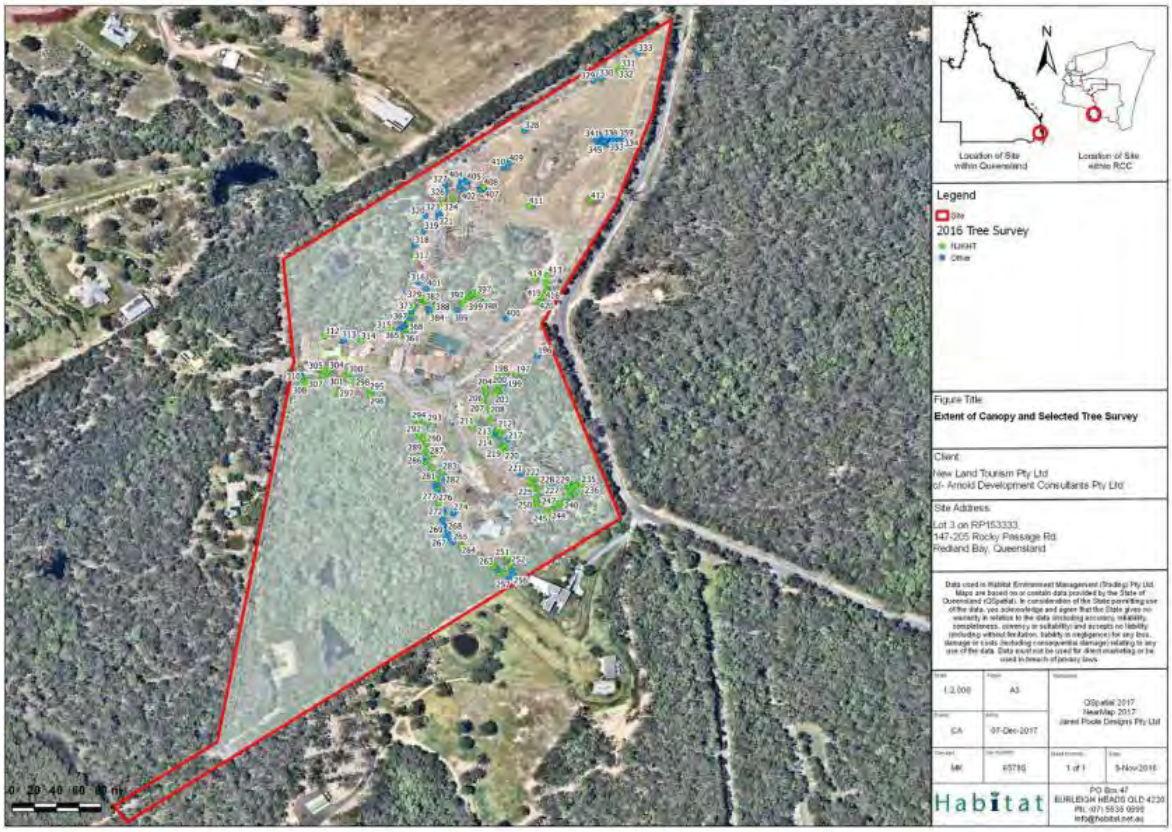


Figure 3. Tree plot plan

Figure 4. Development footprint with 10m buffer

The majority of the development is located entirely within the area designated High Value Rehabilitation. Development within this designation must meet assessment benchmarks of Schedule 11, Part 2, Item 6, which states:

(b) the development avoids clearing non-juvenile koala habitat trees in an area that is—
(i) a high value rehabilitation habitat area; or

(ii) a medium value rehabilitation habitat area;

(c) if the clearing of non-juvenile koala habitat trees can not be avoided in an area stated in paragraph (b)—
(i) the amount of clearing is minimised; and

(ii)any significant residual impact of the clearing is offset;

The proposal needs to be considered in the context of the zone to determine if any clearing on the subject site is "unavoidable" and "minimised". The proposal for Tourist Accommodation is a consistent use within the Environmental Protection Zone, however the intent of the zone is to deliver this style of development with a "light touch" on the landscape. Overall Outcome (4.6.7 (2) (b) and (c)) of the Environmental Protection Zone describes the expected characteristics of a development in terms of environment, built form and density as follows:

(b) Uses and Other Development

(i) Provide for a range of low-key uses and other development that –

a. provide for a lifestyle choice that protects, maintains and positively contributes to environmental values;

b. are based on appreciation of the natural environment where for the purpose of education or scientific study;

c. encourage enjoyment of the natural environment including recreational and tourism uses that contribute to the public and private landscape network;

d. provide opportunities for working from home in a bushland setting;

e. are low-key and have a very low impact on environmental values;

f. cover only a small proportion of the land;

g. are less intensive than those in rural or industrial areas and provide economic opportunities, such as small-scale enterprises and, service and cottage industries.

(c) Built Form and Density

(i) The scale of uses and other development minimise adverse impacts on environmental values and the landscape setting by –

a. using a low impact built form that reduces impacts on the land;

b. limiting building height to maintain a low-rise appearance that sits among rather than dominates the landscape setting;

c. using areas within the lot or premises that are already cleared or degraded;

d. limiting and containing the footprint of the development.

(ii) Buildings incorporate a mix of materials and colours that complement the landscape setting.

A site meeting was held with the applicant, the applicant's arborist and Council officers to ground truth the location of structures in relation to existing vegetation and:

- to determine what measures could be taken to minimise vegetation clearing;
- to establish if areas already cleared could be utilised;
- to minimise the footprint of the development.

A number of changes were made to the original proposal and the current footprint (figure 4) now ensures that vegetation clearing is limited to unavoidable clearing and is minimised as follows:

- The development footprint capitalises on the most cleared part of the lot within the High Value Rehabilitation. The development has allowed approximately 5,000m² area to be left intact to the northern part of the central facility;
- Decrease the areas within the proposed development accessible by vehicle to minimise the development footprint. Both the northern and southern precincts of the development are only accessible by golf cart;
- The proposal is designed in such a way that all buildings and infrastructures are clear of the ground truthed canopy extent for a minimum distance of 10m to ensure that NJKHTs outside of the development footprint are protected from being directly or indirectly impacted to by the development.

The final plan only results in the removal of vegetation which is unavoidable and minimised. This is because the vegetation removal will be limited to those areas of the site where buildings, parking/manoeuvring areas and wastewater disposal are located (figure 3 and 4). The locations of the structures, accessways, parking areas and associated facilities have been carefully selected to limit the amount of clearing to what is considered unavoidable, whilst still providing the outcome envisaged by the planning scheme. The number of NJKHTs to be removed is 64. The scale of the use is considered to comply with the overall outcome of the zone, as the total area of land occupied by the development is limited to reduce adverse impacts on environmental values and the landscape setting. The proposal is a low-key use as discussed further within the Low-key tourism accommodation and Environment sections of the report.

Those NJKHTs that are subject to unavoidable clearing will be counterbalanced under the *Environmental Offsets Act 2014*. An environmental offset will be provided to facilitate a net gain in the existing koala bushland habitat at the rear and middle of the property. There is sufficient area to plant approximately 150+ trees, which will provide a net increase in koala habitat over what presently exists. All replacement plants are to be trees (not shrubs) and advanced plant stock comprised of species recognised as koala habitat species. The replacement planting will provide food, shelter and movement opportunities for koalas. It is recommended that a condition would require this in the event that a development permit is granted for the proposal.

During the construction phase, vegetation clearing will be undertaken as sequential clearing and under guidance of a koala spotter. It is recommended that a condition would require this in the event that a development permit is granted for the proposal. Open design between habitable structures within the development footprint, negates the need for extensive fencing internal to the development. This optimises the unimpeded movement of fauna through the development footprint. While the primary function of the waste water treatment area will be for the irrigation of treated effluent, the area provides a secondary function of retaining the open grassy area which will still be suitable for fauna movement.

Redlands Planning Scheme

The application has been assessed under the Redlands Planning Scheme version 7.1 (RPS).

The application is subject to impact assessment. In this regard, the application is subject to assessment against the entire planning scheme. However it is recognised that the following codes are relevant to the application:

- Conservation Zone
- Environmental Protection Zone

- Tourist Accommodation Code
- Access and Parking Code
- Erosion Prevention and Sediment Control Code
- Excavation and Fill Code
- Infrastructure Works Code
- Landscape Code
- Stormwater Management Code
- Acid Sulfate Soils Overlay Code
- Bushfire Hazard Overlay Code
- Bushland Habitat Overlay Code
- Flood Prone, Storm Tide and Drainage Constrained Land Overlay Code
- Landslide Hazard Overlay Code
- Waterways Wetlands and Moreton Bay Overlay Code.

The subject site is zoned Conservation and Environmental Protection zones and Tourist Accommodation is not an inconsistent form of development in these zones. The buildings are located on the Environmental Protection zoned part of the lot with part of internal roads and car parks being located partially in the Conservation part of the lot. The proposed development has been assessed against the relevant codes and is considered to comply. The most relevant parts of this assessment are discussed below.

Low-key tourism accommodation

Tourist Accommodation is not an inconsistent form of development in Conservation Zone Code (CZC) and Environmental Protection Zone code (EPZC). Specific Outcomes S2.2 (1) (b) of CZC and S2.2 (1) (a) of EPZC states for uses to promote tourism activities and **low-key tourism accommodation** that is complementary to and has a direct connection with the environmental values such as cabins, cottages, eco-tourism and bed and breakfast.

Redlands Planning Scheme (RPS) does not specifically define "low-key". Collins English Dictionary definition of low-key is as follows:

> *mean that it is on a small scale rather than involving a lot of activity or being made to seem impressive or important.*

It is considered that low-key in this context has a strong correlation to expanse of development footprint, prominence of built form, impact on amenity (lighting, noise, air quality) and scale of the use.

Footprint - The total foot print of the development is approximately 35,306m² which is approximately 24%. Specific Outcomes S3.1 (1) of the EPZC states that all buildings, structures, car parking, accessways, service facilities, private open space, onsite waste disposal, storage, and associated tree clearing is limited to reduce adverse impacts on environmental values and the landscape setting. The buildings, driveway and the majority of the car parking spaces are confined to the already cleared sections of the site. The onsite waste disposal area is located in grassed sections of the site with some vegetation surrounding where an existing dam is located. The proposal has demonstrated utilising the most cleared part of the lot and maximised retention of native vegetation. The proposals impact on environmental value of the site is discussed further in the environmental section of the report. It is considered that the proposal meets Specific Outcome S3.1 (1) of the EPZC.

Built form - The height of the proposed structures is a maximum of 9.5m and limited to two (2) storey. Specific Outcomes S3.2 (1) of the EPZC states that buildings and structures –

(a) maintain a low rise appearance;

(b) are not visually prominent from external areas.

Low rise is defined under the RPS to be a building that is 1 to 2 storey in height. The proposal has a low rise appearance as it is of two storey buildings. The majority of the buildings are screened by existing vegetation except the central facility that has a maximum height of 9.4m. The proposed central facility has similar bulk to the existing dwelling house and retains the present streetscape view as seen from Rocky Passage Road (figure 5).

Figure 5. Existing dwelling house and proposed central facility from Rocky Passage Road.

Impact on amenity – The proposal is for a tourist accommodation and is a consistent use in the locality. Impacts of lighting, noise, air quality to adjoining uses will be able to comply with conditions should a development permit be granted. Noise generating activities would likely happen in the main building which is a fair distance from neighbouring properties and the existing trees would provide a buffer to adjoining residential uses. Noise impact from mechanical plant will not be an issue due to the distance and vegetative buffers, and is also covered by the *Environmental Protection Act 1994 (EPA)* should council receive complaints. The only noise concern may be related to garbage services and a condition relating to garbage servicing times would form part of development permit should this be granted. The traffic impact on the locality from the development is discussed within the car parking and traffic section of the report.

Scale of the use - The proposal is for a tourist accommodation comprised of 61 units with a communal facility with a GFA of 2,065m² that provides indoor recreational and two dining facilities (restaurants). This will be a key matter in determining:

- that the development is low-key and meets the S2.2 (1) (a) of the EPZC states for uses to promote tourism activities and low-key tourism accommodation that is complementary to and has a direct connection with the environmental values such as cabins, cottages, eco-tourism and bed and breakfast; and
- that the communal facility of the proposed scale is justifiable and remain ancillary to the Tourist Accommodation use.

The applicant has submitted an Economic Need Assessment report to address the above matters. The economic report has determined, for the purpose of the study, the catchment for the development by considering the following factors:

- The proposed scale and facilities available onsite;
- The distribution of competitive supply; and
- The location of existing tourist nodes and tourist related activity drivers (beaches, shopping, tours, experience etc).

Based on these factors the defined catchment comprises the Redland Local Government Area (LGA) and the suburb of Carbrook (within the Logan LGA). The defined catchment has been compared to the broader South East Queensland (SEQ) region to analyse visitor and tourism market trends. The SEQ region comprises Brisbane (that includes Redlands LGA), Gold Coast and Sunshine Coast tourism regions as defined by Tourism Research Australia (TRA). The study period was between 2007/08 to 2016/17.

The following was established as a result of the study:

- the number of visitors (day and night stay) within the defined catchment has grown at an average annual growth rate (AAGR) of 3% over the ten year period, while SEQ has grown of by 3.4%;
- the number of visitor nights within the defined catchment has declined at an average rate of -0.6% per annum, while SEQ has grown of by 2.2%. This equates to 22 million additional visitor nights than 2007/08. The predominant driver of this growth over the past ten years has been an increase in international visitor arrivals and the length of stay for this sub-market, in particular the Asian market;
- While the significant increase in international visitors in SEQ is attributable to the Asian submarket, it is more specifically Chinese visitors that have been the predominant demand driver supporting this growth. China was the largest single country source market for international visitors in SEQ in 2016/17, at over 15% of total international nights. Comparatively, they represent less than 2% of nights in the defined catchment;
- The lack of visitor growth within the defined catchment, including specifically Chinese lead international visitor growth, is not considered reflective of actual market demand and opportunity. The visitor/tourism market within the catchment has been constrained due to other reasons;
- In general, accommodation is either private (rented houses/apartments) or commercial accommodation (hotels, motels and serviced apartments). The proportion of visitor nights attributed to commercial accommodation throughout the SEQ region has been 58%, compared to 30% in the defined catchment;
- These anomalies are related and considered to be the result of a constrained market, in terms of tourism infrastructure and services which includes a limited scale and mix of hotel, motel and serviced apartment supply in the defined catchment. The limited scale and mix of commercial accommodation within the defined catchment has two effects on visitation within the region, which are:
    - Visitors to the region are more likely to rely on other commercial accommodation options including non-serviced rented houses/apartments (for example Airbnb, Stayz and the like) as opposed to traditional hotels, motels and serviced apartments; and
    - Potential visitors choose not to visit the region as there is a lack of attractive accommodation options for markets that typically prefer hotel and resort accommodation (for example Chinese visitors).

- According to the TRA International Visitors Survey (IVS), over the past ten years, 85% of all Chinese visitors to SEQ have stayed in hotels, motels and serviced apartments. The lack of suitable supply that aligns with these growth markets is limiting the real tourism market potential of the defined catchment;
- If the defined catchment area experienced the same rate of growth as the broader SEQ region over the past ten years, there would have been approximately an additional 344,000 visitor nights or a total of 1.9 million visitor nights in 2016/17. It is important to note that this latent demand/market potential is based on growth rates for the broad SEQ region, which represents a significantly larger baseline number of visitor nights than the defined catchment area. Therefore, using these growth rates for the catchment to estimate the market potential is conservative;
- TRA produce visitor night forecasts at a state level as well as capital city level. For Queensland, the 'Brisbane' forecasts include both the Brisbane and Gold Coast tourism regions. Collectively these regions provide the best benchmark for visitor growth rates in SEQ and have been used to forecast visitor growth within the defined catchment;
- The forecasts are based on the following key assumptions:
    - That there is existing latent demand in the market of approximately 344,000 visitor nights in 2016/17;
    - That the defined catchment has the opportunity to attract/achieve similar growth rates as the broader SEQ region; and
    - That sufficient and appropriate commercial accommodation supply, which is relevant to key market segments (i.e. Chinese visitors), will be delivered.
- The forecast indicates that over the next nine years to 2026/27, there will be an average of 82,000 additional visitors per annum. This represents an AAGR of 3% throughout the forecast period, which is consistent with visitor forecast rates for the SEQ region. By 2026/27 there is potential for total visitor nights within the defined catchment to reach 2.8 million;
- There are currently 22 short stay accommodation providers within the defined catchment that offer between 2 rooms and 52 rooms. Much of the supply within the defined catchment is small-scale bed and breakfast establishments, with an average size of 14 rooms per provider across the identified supply. Of the total existing supply, only 11 are classed as hotel, motel and serviced apartments within the catchment, which collectively offer 300 rooms;
- As shown in Table 1 below there is currently a lack of high-quality accommodation supply within the defined catchment and no 4 or 5-star hotels. This is an important observation to make as Chinese visitors have a higher preference for luxury hotel and resort accommodation;
- In addition to the existing tourism accommodation supply, there are three planned/proposed establishments identified as possible future supply within the defined catchment (Table 2);
- The report concludes that, the likelihood of "The Lakes, Carbrook" proceeding, based on the current development plan is considered extremely unlikely. The scale of this project (1,528 tourist units, a convention centre, childcare centre and ancillary retail) is unprecedented in Australia and is more than double the scale of the current largest hotel in the country (Hyatt Regency Sydney at 667 rooms). The development site is not considered suitable for the scale of facility proposed and is not supported by the demand analysis and forecasts presented in this report. It is also noted that the developer that lodged the development application has recently sold the site. Due to the above, the report did not consider this approval as future supply in this assessment report.

Name of Establishment	Address	Suburb	Type	Star Rating	Rooms
Mt Cotton Retreat	355 West Mount Cotton Road	Mount Cotton	Bed and Breakfast	4.0	14
Bay Air Motel	218 Middle Street	Cleveland	Motel	3.0	18
Manta Lodge & Scuba Centre	132 Dickson Way	Point Lookout	Hostel	2.0	17
Redland Bay Motel	31-35 Peel Street	Redland	Motel	3.0	12
Seminara Apartments	356-358 Victoria Parade	Coochiemudlo	Serviced Apartments	4.0	15
Cleveland Visitors Villas Motel	214 - 216 Bloomfield St	Cleveland	Motel	3.5	8
Bella Vista of Raby Bay	4 Voyagers Court	Cleveland	Bed and Breakfast	3.0	2
Cleveland Motor Inn	37 Freeth Street East	Cleveland	Motel	3.0	16
The Friendly Chat B&B	137 Mooroondu Road	Thorneside	Bed and Breakfast	n.a.	2
Sanctuary by Sirromet	830-938 Mount Cotton Rd	Mount Cotton	Glamping	3.0	18
The Boathouse Bed And Breakfast	39 Attunga Street	Macleay Island	Bed and Breakfast	n.a.	4
Yarrandabbi Dreaming B&B Resort	10-14 Weeroona Ave	Macleay Island	Bed and Breakfast	n.a.	4
Curious Cottages	28 Blue Waters Cres	Macleay Island	Bed and Breakfast	n.a.	2
Lamb Island Bed & Breakfast	143 Lucas Dr	Lamb Island	Bed and Breakfast	n.a.	2
Alexandra Hills Hotel Suites	Cnr McDonald Road & Finucane Rd	Alexandra Hills	Hotel	3.5	52
Pacific Resort Cleveland	128 Middle Street	Cleveland	Hotel	3.0	39
Coochie Island Beach Resort	10-16 Dawn Street	Coochiemudlo	Serviced Apartments	3.0	13
Allure Stradbroke Resort	43 - 57 East Coast Road	Point Lookout	Serviced Apartments	4.0	82
The Islander Holiday Resort	41 East Coast Road	Point Lookout	Serviced Apartments	3.0	17
Anchorage on Straddie Beachfront Island Resort	112 Dickson Way	Point Lookout	Hotel	3.0	28
Seabreeze Guesthouse	6 Donohue St	Point Lookout	Bed and Breakfast	n.a.	2
Straddie Views B&B	26 Cumming Parade	Point Lookout	Bed and Breakfast	n.a.	2
Total					**369**

Table 1. Existing accommodation supply.

Project Title	Project Address	Location	Project Stage	Completion Date	Rooms
Moreton Bay Eco Resort	56 Tenanne St	Russell Island	Development Approval	2021	88
Dickson Way Tourist facility	124 Dickson Way	Point Lookout	Development Application	2019	11
The Lakes	4-48 & 50-74 Riedel Rd	Carbrook	Development Approved	2032	1,528

Source; Cordells Connect, Redland City Council PD Online

Table 2. Planned accommodation supply.

- The report estimated the demand for hotel, motel and serviced apartment accommodation. These estimates are based on a range of observed utilisation and market performance indicators, with the related assumptions outlined below:
  - The proportion of visitor nights attributed to commercial accommodation will conservatively remaining at the current catchment average of 30%;
  - The proportion of commercial nights attributed to hotels, motel and serviced accommodation will be 42% reflecting the average for the SEQ region;
  - Accommodation occupancy rates remain at 73%; and
  - The average number of persons per room will remain at 1.7.

- Based on these assumptions, it is estimated that there is currently demand for 670 rooms in the catchment. By 2026/27 it is estimated that this demand will increase to 812 rooms. Taking into consideration the existing supply of 300 hotel, motel and serviced apartment rooms within the catchment, the current gap is estimated at 370 rooms in 2018. The estimated market gap is expected to decline slightly to 2021 assuming the delivery of the Moreton Bay Eco Resort by then. By 2026 the estimated market gap or undersupply is expected to be more than 424 rooms within the catchment (Table 3).

	2018	2021	2026
Total Projected Visitor Night Demand	303,585	327,975	367,835
Total Room Demand	670	724	812
Existing Supply	300	388	388
Current Gap	-370	-336	-424

Source: MacroPlan Dimasi

Table 3. Short term accommodation gap.

- The report mentions the Redland City Tourism Strategy and Action Plan 2015-2020 that acknowledges tourist visitation from Asian travellers as a result of increasing wealth in countries such as China;
- According to Tourism Australia, in the year ending June 2017, 69% of international visitors (or 5.4 million visitors) to Australia engaged in some form of nature-based activity (eco-tourism). The top international nature-based markets in 2016/17 were China (17%), the United Kingdom (10%), New Zealand (10%) and the USA (9%);
- Tourism Australia defines nature-based and eco-tourism as:

  "Nature-based tourism forms a significant component of Australia's visitor economy, ranking among top travel motivators for international visitors to the country. Nature-based tourism is leisure travel undertaken largely or solely for the purpose of enjoying natural attractions and engaging in a variety of nature-based activities – from scuba diving and bushwalking to simply going to the beach."

- In the study period, visitors who have participated in some form are nature-based activity accounted for an average of 89% of all commercial accommodation nights within the defined catchment.
- The analysis presented throughout this report demonstrates that the defined catchment is under-provisioned in terms of tourism accommodation, with an emphasis on the undersupply of hotel and resort accommodation. As a result, visitor growth in the defined catchment has been negatively impacted and has not kept pace with the broader SEQ region.

In summary, the development foot print and built form are considered to meet the relevant Specific Outcomes of the EPZC. The scale of the use is considered acceptable for the proposal as it is an eco-tourism development as identified above. The size of the communal facility is to cater for Chinese visitors who have a higher preference for luxury hotel and resort accommodation as demonstrated in the Economic Report. In light of these matters it is considered that the proposal is Low-key and meets Specific Outcomes S2.2 (1) (b) of CZC and S2.2 (1) (a) of EPZC, which permits uses to promote tourism activities and low-key tourism accommodation that is complementary to and has a direct connection with the environmental values.

Environment

Specific Outcome S1.1 of the Environmental Protection Zone (EPZ) code states uses and other development maintain, enhance and protect environmental values by:

(a) re-vegetating degraded and cleared areas;
(b) retaining and increasing native animal movement through the premises;
(c) retaining as many native plants as possible;
(d) preventing the introduction of non-native plants or animals into the premises;
(e) controlling stormwater run-off and water quality;
(f) maintaining overland drainage systems and waterways in their natural state;
(g) minimising the need for excavation and fill;
(h) reducing erosion and sediment run-off.

The proposal has demonstrated avoiding clearing of non-juvenile koala habitat trees (NJKHT) in areas designated as high value bushland with the exception of the north-east corner as described in the Koala Habitat section of the report. The proposal minimises and avoids in areas designated as rehabilitation on the Koala habitat area mapping of the subject site. The areas of compliance and areas where it is recommended that preliminary approval are required have been outlined below in turn.

The proposal demonstrates partial compliance with the specific outcome as follows:

- Landscaping will be conditioned, should a development permit be granted, for replanting of screening shrubs and trees, bushfire resistant planting closer to buildings. These plantings will serve as screening of the development as well as revegetation of the subject site;
- Whilst the primary function for the area along the north east boundary will be for the irrigation of treated effluent, the area provides a secondary function of retaining the open grassy area which will still be suitable for fauna movement;
- The NJKHTs that will be removed from the rehabilitation habitat area under the Planning Regulation as part of the proposed development will be offset, in the event that a development permit is granted. The location of planting would be determined as part the further landscaping approval;
- The proposal has demonstrated that clearing on the subject site is minimised and limited to unavoidable clearing;
- The proposal has demonstrated that water quality on the subject site is achieved and overland drainage systems and waterways are left in their natural state;
- The footprint of the development complies with Specific Outcome S3.1(1) as described in the low-key section of the report; and
- Erosion and sediment control will be conditioned should a development permit be granted.

It is recommended that a preliminary approval is granted to comply with the specific outcome as follows:

- The proposed development did not demonstrate that that all Koala habitat (from high value bushland) has been retained and protected from direct and indirect impacts during construction, in particular in the area in which the onsite waste water treatment is located;
- A preliminary approval is recommended for a redesign of the development that retains and protects the NJKHTs in areas which are in the area designated as Bushland Habitat in the north-east corner of the site that will be impacted due to earthworks edge effects and location of services (onsite waste treatment).

Bushfire

The proposal includes a Bushfire Management Report. The report considered the following:

- The State Planning Policy (SPP) July 2017, which shows location of Very High and High Bushfire intensity and potential impact buffer (shown below Figure 6);
- The Bushfire Hazard Overlay of the RPS, which shows Medium Bushfire Hazard (shown below Figure 6);
- Australian Standard AS 3959-2009 – Construction of Buildings in Bushfire-prone areas (Standards Australia, 2009);
- The national Construction Code; and
- International fire safety engineering guidelines.

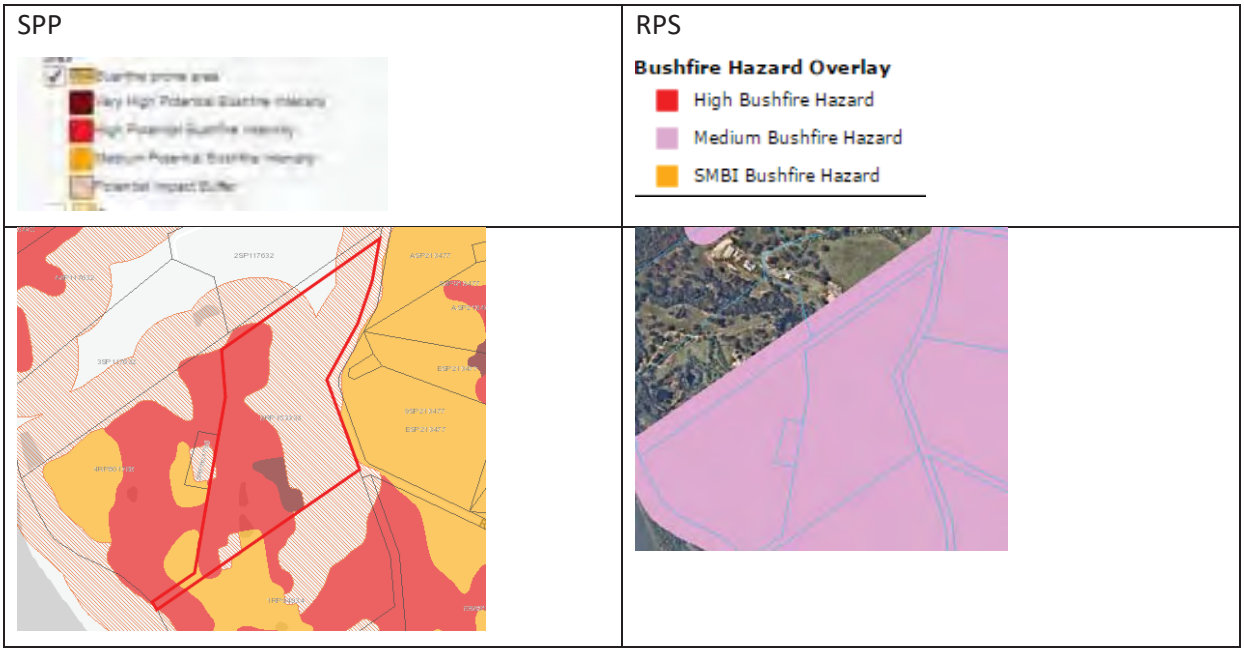


Figure 6. bushfire mapping.

AS 3959-2009 applies to those areas where a State or Council map identifies an area as a bushfire prone area, requiring calculation of Bushfire Attack Level (BAL) in accordance with the methodology outlined in the standard. The following was considered to determine the BAL (figure 7) for the subject development:

- Assessment of vegetation communities within and surrounding the proposed development;
- Assessment of slope;
- Assessment of distance to the vegetation;
- Predominant wind direction; and
- Combining scores to identify the severity of bushfire hazard.

AS 3959-2009 prescribes the particular construction details required for buildings depending on the calculated BAL. The detailed requirements relating to construction methods and materials are typically dealt with as part of building design and enabled via private certification in accordance with the Building Code of Australia.

Figure 7. Bushfire Attack Level (BAL).

Access

Access roads have been designed in a manner that provides safe and effective access and egress for emergency vehicles in the event of a bushfire. A fire trail is proposed throughout the development site.

Water supply

The proposed facilities include an adequate water supply to ensure that any bushfire emergency can be dealt with quickly by the relevant fire team.

Vegetation Management

The proposed development is designed to ensure all habitable buildings are a minimum distance of 10m from the canopy extent. This allows a fire trail around the development. The bushfire report includes a vegetation management plan that needs to be implemented for the life of the development.

Setbacks

P3.3 (1) (b) of EPZC seeks for *buildings and structures to be setback:*

> *(a) for a lot or premises less than 2 hectares - a minimum of 10 metres from all boundaries; or*
>
> *(b) for a lot or premises greaterthan 2 hectares -*
>
> > *(i) a minimum of 20 metres from all boundaries; or*
> >
> > *(ii) a minimum of 10 metres from all boundaries if screened by planted landscaping;*

The proposal includes Setbacks of:

- 71.7m from Rocky Passage Road
- 45.1m from south eastern boundary
- 10m from northern boundary
- 14.9m from western boundary

The proposal will be conditioned, in the event a development permit is granted, to provide landscaping along the north and western boundaries within the vicinity of the proposed structures.

Car parking and traffic

Car parking

Specific outcome S1 of the access and parking code states that uses and other development provide off-street vehicle parking that -

(a) is clearly defined, safe and easily accessible;

(b) takes into consideration -

(i) the type and size of development;

(ii) expected resident, employee and customer movements;

(iii) the location of the use;

(iv) the capacity of the existing road network to accommodate on-street parking;

(v) access to public transport;

The proposal complies with the specific outcome by adopting the design elements in acceptable outcomes P1 (1) (a), as follows:

- 61 guest parking spaces;
- 16 manager and staff spaces;
- the car parking design complies with Australian Standard 2890.1.

Traffic

The proposal includes a total of 77 car parking spaces. The communal facility (gym, restaurants) are intended to operate ancillary to the accommodation use. The proposal will be conditioned to ensure it operates as ancillary in the event a development permit is granted.

Rock Passage Road is a two-lane rural road and has a pavement width of approximately 6-6.5m. The speed limit along Rocky Passage Road is generally 60 Km/Hr, however there is a 40 Km/Hr speed zone adjacent to the existing site access. The proposal includes a traffic impact report that provided a traffic count that indicated that Rocky Passage Road is currently carrying up to 40 vehicles per day. The proposal will generate 26 vehicle movements per hour during peak traffic periods, which equates to 200 vehicle movements per day. Rocky Passage Road is a Local Street and in accordance with *RPS, Schedule 6 – Movement Network, Table 2 – Road design criteria a local street is suitable for a maximum 1000 vehicle movements per day*. While the additional vehicle movements per a day is higher than the existing vehicle movements on Rocky Passage Road, total vehicle movements will be well less than 500 vehicle movements per day (half of the road capacity).

Water and wastewater services

Water Service

Specific Outcome S5.3 (1) states that *uses and other development are provided with –*

(a) reticulated water; or

(b) where the premises is not connected or able to be serviced by reticulated water, an adequate supply of potable water.

The nearest reticulated water main is located 3.2Km away at the intersection of Serpentine Creek Road and Scenic Road. After discussion with Redland Water, it is understood that the approved Shoreline development to the north of the site has been allocated the entirety of the existing spare capacity in the water network. It is further understood that this development will upgrade the existing network in the future at which stage spare capacity could supply the subject development.

If agreement is not reached by the subject developer and Shoreline or the timing is not suitable, the development will be supplied with potable water by water trucks. It is proposed that the reservoir will be sized so as to be capable of storing a volume equivalent to three PDs (peak day demand). This is equal to 204kL. The site would then be supplied from this reservoir via a local pressurised potable water network. Pressures in this local network are to be boosted to compliant levels by a private pump.

Wastewater

Specific Outcome S5.3 (1) states that *uses and other development are provided with:*

(a) reticulated sewerage; or

(b) where not able to be connected to a reticulated sewerage system, wastewater -

(i) is treated and disposed of on-site subject to site, soil and locational constraints;

(ii) reduces the potential for -

a. contaminating groundwater, surface water or wetland environments;

b. risks to reticulated water supply and public health;

The subject site is not serviced by reticulated sewer. A site based on site waste management plan was submitted by the applicant. The report showed compliance with S5.3 (1) as follows:

- a Peak Dry Weather Flow to be approximately 286EP, therefore it will require an assessment for an Environmentally Relevant Activity (ERA). The ERA will be assessed by an Environmental Authority (EA) being Department of Environment and Science (DES);
- an effluent disposable area of 1.6ha is required to service the development through an irrigation system;
- a 200kl wet weather storage basin is required to ensure 100% treated effluent reuse.
- details of minimum treated effluent quality required for the onsite disposal activity;
- effluent treatment area setback and have flood immunity;
- control measures to minimise environmental impacts to an acceptable level;
- environmental impact assessment criteria in accordance with legislative requirements to measure the level of impact;
- action criteria to respond to non-conformance and emergency incidents;
- treated effluent release limits;
- monitoring frequency; and
- reporting procedures.

INFRASTRUCTURE CHARGES

Should a development permit be granted for the proposed development it would be is subject to infrastructure charges in accordance with the State Planning Regulatory Provisions (adopted charges). The total charge applicable to this development is:

Total charge: $519,287.00

This charge has been calculated as follows in accordance with Council's Adopted Infrastructure Charges Resolution (No. 2.3) August 2016.

Residential Component	
9 X 3 bedroom Tourist Accommodation X $11,763.80 (no sewer)	$105,874.20
52 X 1-2 bedroom Tourist Accommodation X $8,402.70 (no sewer)	$436,940.40
Demand Credit	
1 X existing lot X $23,527.60 (no sewer)	$23,527.60
Total Council Charge:	**$519,287.00**

Offsets

There are no offsets that apply under Chapter 4 Part 2 of the *Planning Act 2016*.

Refunds

There are no refunds that apply under Chapter 4 Part 2 of the *Planning Act 2016*.

STATE REFERRALS

State Assessment & Referral Agency (SARA)

SARA provided a referral agency response dated 25/02/2019 in regards to tourist activity in SEQ regional landscape and rural production area. The Department approved the proposed development subject to referral agency conditions to ensure that the proposed central facilities remain ancillary to the approved use of the site for tourist activity. The Department's referral response, including conditions, will be attached to Council's Decision Notice.

PUBLIC CONSULTATION

The proposed development is impact assessable and required public notification. The application was publicly notified for 15 business days from 21/06/2018 to 12/07/2018. A notice of compliance for public notification was received on 13/07/2018.

Submissions

There were six (6) properly made submissions received during the notification period. The matters raised within these submissions are outlined below:

1. Scale, height and setback

- The proposal is not in keeping with the intent of the zoning in providing for a low-key use and scale of development, and does not promote low-key eco-tourism as it is proposed at an excessive and incongruous scale;
- Object to two storey buildings and proposed height;

- The building setbacks proposed for the eastern and northern boundary do not provide for adequate setbacks to minimize impacts on the adjoining properties and providing adequate environmental corridors for wildlife. The current building setbacks are poor and should be increased to reduce likely adverse impacts on nearby properties;
- There will be a significant loss of privacy and amenity for our front and rear outdoor living areas which our young family highly utilize and enjoy all year round, especially with the buildings located within close proximity and their overall excessive heights;
- A development of such scale will require connection to reticulated water and waste.

Officer's Comment

- The proposal has demonstrated that it is a low-key eco-tourism as described in the low-key tourist accommodation section of the report. The proposed buildings are low-rise as defined by the RPS. There are existing two storey dwellings on the locality;
- The proposal complies with the setback requirements of the RPS as outlined in the setback section of the report. Existing vegetation and landscaping will screen the proposed buildings from adjoining neighbours;
- The proposal includes an option for potable water to be delivered and on site waste management that management complies with the requirement of the RPS.

2. Impact on environmental values

- The scale and density of the units proposed in this area would create a much more significant barrier to movement of fauna due to the substantial increase in structures and buildings, artificial light sources, and increased vehicle traffic.

Officer's Comment

The proposal has included an ecologic report that demonstrated:

- Protection and long term management and enhancement of the environmental values of the site;
- The majority of the development is located on the already cleared part of the lot. The onsite treatment area will be grasses and would not inhibit fauna movement.
- Minimal adverse impacts on environmental and scenic values.

3. Traffic

- The road is narrow with no pedestrian path. The proposal will increase traffic movement and would worsen safety issues;
- Council will need to ensure that appropriate upgrades and works are undertaken to the existing road network such that any likely traffic impacts can be managed accordingly.

Officer's Comment

The number of vehicle movements is much less than the road capacity of Rocky Passage Road. The proposal would not warrant upgrade to the existing Road. The proposal complies as described in the car parking and traffic section of the report.

4. Electricity supply and internet

- The power supply for properties to the west crosses the proposed development site. Any alteration to this power supply must not cause significant interruptions during construction and should there be a need for changes to the power supply (e.g. underground), it must not result in any impact or cost to adjoining neighbours;

- Internet service in the locality drops out 4-5 time a day. The existing lines do not support additional units of the development.

Officer's Comment

- Power supply and its impact on adjoining neighbours will be a matter to be addressed by electricity supplier and the developer;
- Internet connection and level of service is not under the jurisdiction of Council.

5. Noise and light impacts

- The proposal will introduce a substantial increase in noise to the area due to the significant increase in the number of resort persons, vehicle traffic, and associated recreational activities affecting the existing quiet ambience and amenity of this immediate area and surrounding environment.

Officer's Comment

- Noise generating activities would likely happen in the main building which is a fair distance from neighbouring properties and the existing trees would provide a buffer to adjoining residential uses. Mechanical plant is not of concern again due to the distance and vegetative buffers, and is also covered by the EPA should council receive complaints. The only noise concern may be related to garbage services and a condition relating to garbage servicing times will form part of decision notice, should a development permit be granted.

6. Stormwater and landscaping

- The driveway to properties to the west crosses two natural watercourses draining the subject development. The development needs to ensure that the planned earthworks and effluent discharge will not impact the access on the internal driveways.
- The landscaping and vegetation adjacent to the driveway to properties to the west needs to be implemented and maintained taking into consideration bushfire risk as well as environmental and aesthetic appeal.

Officer's Comment

- The proposal includes a stormwater management report that complies with the requirements of the planning scheme.
- Landscaping will be conditioned, in the event that a development permit is granted, for replanting of screening shrubs and trees that are bushfire resistant closer to buildings.

7. Waste treatment

- Impact in times of failure of onsite waste treatment, in particular overflow of waste and stench.

Officer's Comment

The proposal will require an assessment for an Environmentally Relevant Activity (ERA). The ERA will be assessed by an Environmental Authority (EA) by the Department of Environment and Science (DES).

DEEMED APPROVAL

The approval of this application has not been issued under Section 64 of the *Planning Act 2016*.

CONCLUSION

The application has been assessed against the relevant planning instruments. Issues in relation to low-key tourism accommodation, bushfire, setbacks, car parking, traffic and services have been addressed in the assessment report and are considered to comply with relevant planning instruments.

The development is required to meet the benchmarks in Schedule 11, Part 2, Item 6 of the *Planning Regulation 2017*. Clearing of non-juvenile koala habitat trees (NJKHTs) cannot occur in areas which are designated as Bushland Habitat. The development as proposed would result in clearing of NJKHTs in areas that are designated as Bushland Habitat and therefore does not comply with *Planning Regulation 2017*.

STRATEGIC IMPLICATIONS

Legislative Requirements

In accordance with the *Planning Act 2016* this development application has been assessed against the Redlands Planning Scheme V7.1 and other relevant planning instruments.

Risk Management

The standard development application risks apply. In accordance with the *Planning Act 2016* the applicant may appeal to the Planning and Environment Court against a condition of approval or against a decision to refuse.

Financial

The applicant can appeal to the Planning and Environment Court against this decision of Council. Such proceedings would incur legal and Court costs.

People

There are no implications for staff.

Environmental

Environmental implications are detailed within the assessment in the 'Issues' section of this report.

Social

Social implications are detailed within the assessment in the 'Issues' section of this report.

Alignment with Council's Policy and Plans

The assessment and officer's recommendation align with Council's policies and plans as described within the 'Issues' section of this report.

CONSULTATION

The assessment manager has consulted with other internal assessment teams. Advice has been received from relevant officers and forms part of the assessment of the application. A copy of the original proposal was provided to the local Councillor on 17 October 2017.

Consulted	Consultation Date	Comments/Actions
Divisional Councillor	17/10/2017	Application called in for a decision by Council.

OPTIONS

Option One

The Council resolves to issue a preliminary approval for the Material Change of Use application for a Tourist Accommodation (X61) on land described as Lot 3 on RP153333 and situated at 147-205 Rocky Passage Road, Redland Bay, subject to the following conditions:

1. Design the development in a way that retains and protects the Non Juvenile Koala Trees in areas which are in the area designated as Bushland Habitat in the north-east corner of the site, that will be impacted due to earthworks edge effects and location of services (onsite waste treatment), in accordance with Schedule 11, Part 2, Item 6 of the Planning Regulation 2017.

Option Two

That Council resolves to issue a development permit subject to conditions.

Option Three

That Council resolves to refuse the application.

OFFICER'S RECOMMENDATION

The Council resolves to issue a preliminary approval for the Material Change of Use application for a Tourist Accommodation (X61) on land described as Lot 3 on RP153333 and situated at 147-205 Rocky Passage Road, Redland Bay, subject to the following conditions:

1. **Design the development in a way that retains and protects the Non Juvenile Koala Trees in areas which are in the area designated as Bushland Habitat in the north-east corner of the site, that will be impacted due to earthworks edge effects and location of services (onsite waste treatment), in accordance with Schedule 11, Part 2, Item 6 of the Planning Regulation 2017.**

LOCATION PLAN

ISSUE	DATE	DESCRIPTION
A-A	15.11.18	PROJECT REDESIGN IN RESPONSE TO INFORMATION REQUEST

JAREDPOOLEDESIGN
LEVEL 1 33 ELKHORN AVENUE, SURFERS PARADISE, Q. 4217 AUSTRALIA
PO BOX 42, ISLE OF CAPRI, Q. 4217 AUSTRALIA
TEL. 07 5527 5300 EMAIL INFO@JPD.COM.AU WEB JPD.COM.AU

NORTH

PROJECT
A PROPOSED NEW ECO DEVELOPMENT
AT
REDLAND BAY QUEENSLAND QLD
FOR
NEW LAND TOURISM PTY LTD

DRAWING - LOCATION PLAN
DRAWING No. BP783/1.01
ISSUE A-A

POOLE

AREA SUMMARY:

BUILDING TYPE		NUMBER OF	TOTAL AREA
TYPE 1		2	
GROUND FLOOR	428 m2		
FIRST FLOOR	428 m2		
TOTAL	856 m2		1712 m2
TYPE 2		2	
GROUND FLOOR	295 m2		
FIRST FLOOR	298 m2		
TOTAL	593 m2		1186 m2
TYPE 3		6	
GROUND FLOOR	118 m2		
FIRST FLOOR	72 m2		
TOTAL	190 m2		1140m2
TYPE 3B		3	
GROUND FLOOR	115 m2		
FIRST FLOOR	70 m2		
TOTAL	185 m2		555 m2
TYPE 4		3	
GROUND FLOOR	239 m2		
FIRST FLOOR	238 m2		
TOTAL	477 m2		1431 m2
TYPE 5		4	
GROUND FLOOR	220 m2		
FIRST FLOOR	220 m2		
TOTAL	440 m2		1760 m2
CENTRAL FACILITIES		1	
BASEMENT [EXCLUDED FROM GFA]	0 m2		
GROUND FLOOR [EXCLUDING UNROOF AREA AND PORTE COCHERE]	1035 m2		
FIRST FLOOR	1030 m2		
TOTAL	2065 m2		2065 m2
GFA TOTAL			9849m2

DEVELOPMENT SUMMARY

ISSUE	DATE	DESCRIPTION
A-A	16.11.18	PROJECT REDESIGN IN RESPONSE TO INFORMATION REQUEST
A-B	22.01.19	TYPE 6 ADDED
		MASTER PLAN AMENDED
A-C	31.01.19	SUMMARIES UPDATED AS PER NEW PLANS FOR TYPE 1 AND 3
A-E	26.02.19	TYPE 1 AMENDED BACK TO ORIGINAL PLAN 12 CAR SPACES ADDED

JAREDPOOLEDESIGN
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PROJECT
A PROPOSED NEW ECO DEVELOPMENT
AT
REDLAND BAY QUEENSLAND QLD
FOR
NEW LAND TOURISM PTY LTD

DRAWING - DEVELOPMENT SUMMARY
DRAWING No. BP783/1.02
ISSUE A-E

POOLE

DEVELOPMENT STATISTICS

CURRENT SITE AREA	146,200 m2	
TYPE 1 AREA	872m2	
TYPE 2 AREA	617m2	
TYPE 3 AREA	726m2	
TYPE 3B AREA	348m2	
TYPE 4 AREA	484m2	
TYPE 5 AREA	876m2	
COMMUNAL FACILITES AREA	1057m2	
SITE COVER	4980m2	
SITE COVER PERCENTAGE	3.4 %	(4,980m2 / 146,200m2)

CAR PARKING SCHEDULE

CARPARKING SPACE PROVIDED 77 (23 CENTRAL FACILITY BASEMENT)
(AS PER TRAFFIC ENGINEERS)

BIN COLLECTION

ON DAY OF BIN COLLECTION BINS WILL BE MOVED BY SITE MANAGER TO BIN COLLECTION LOCATION

PRODUCT SUMMARY

TYPE 1 RESORT SUITES
TYPE 2 4 PLEX
TYPE 3 DETACHED DWELLING
TYPE 3B DETACHED DWELLING
TYPE 4 4 PLEX
TYPE 5 LUXURY RESORT SUITES

YEILD SUMMARY

YEILD	No. OF ACCOMMODATION BUILDINGS	No. OF UNITS/BUILDING	No. OF BEDROOMS/UNIT	TOTAL YIELD (ROOMS)
TYPE 1	2	8	2 BEDROOMS	32
TYPE 2	2	4	2 BEDROOMS	16
TYPE 3	6	1	3 BEDROOMS	18
TYPE 3B	3	1	3 BEDROOMS	9
TYPE 4	3	4	2 BEDROOMS	24
TYPE 5	4	4	2 BEDROOMS	32
TOTAL	20			131

CONCEPT MASTER PLAN

SCALE 1:2000 @ A3

ISSUE	DATE	DESCRIPTION
A-A	16.11.18	PROJECT REDESIGN IN RESPONSE TO INFORMATION REQUEST
A-B	22.01.19	TYPE 6 ADDED
		MASTER PLAN AMENDED
A-C	31.01.19	TYPE 1 AMENDED AND SUMMARIES UPDATED AS PER NEW PLANS FOR TYPE 1 AND 3
A-D	08.02.19	TYPE 3 AMENDED BACK AND TYPE 6 REPLACED BY AMENDED TYPE 3 (3B)
A-E	26.02.19	TYPE 1 AMENDED BACK TO ORIGINAL PLAN 12 CAR SPACES ADDED

JAREDPOOLEDESIGN
LEVEL 1 33 ELKHORN AVENUE, SURFERS PARADISE, Q. 4217 AUSTRALIA
PO BOX 42, ISLE OF CAPRI, Q. 4217 AUSTRALIA
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NORTH

PROJECT
A PROPOSED NEW ECO DEVELOPMENT
AT
REDLAND BAY QUEENSLAND QLD
FOR
NEW LAND TOURISM PTY LTD

DRAWING - CONCEPT MASTER PLAN
DRAWING No. BP783/4.1
ISSUE A-E

POOLE

SCALE:

- THE PROPOSAL OF RESIDENTIAL CHARACTER, GENERALLY OF ONE OR TWO LEVELS.
- RESIDENTIAL HEIGHT OF NOMINALLY 8.5M, EXCEPT ELEMENTS DUE TO SLOPING GROUND
- THE CENTRAL FACILITIES BUILDING REPLACES THE EXISTING HOUSE AT PRESENT LOCATION

IMPACT:

- THE PROPOSED DEVELOPMENT HAS A SITE COVER OF 3%
- THE PROPOSAL HAS A VERY SMALL FOOTPRINT, CONSIDERED ECO TOURISM
- OUTCOME WAS BY A PROCESS OF A "DESIGN BY SOLUTION" APPROACH WITH ACKNOWLEDGEMENT TO OPPORTUNITY AND CONSTRAINTS OVERLOOKING ADJACENT PROPERTIES AND PRIVACY CAN BE MAINTAINED.

DENSITY:

- THE PROPOSAL IS OF LOW DENSITY
- POPULATION IS UNDER CURRENT PLANNING CRITERIA AT 9 PEOPLE /HECTARE
- THE DENSITY IS NOT EXCESSIVE

ARCHITECTURAL THEME:

- THE PROPOSAL CONSISTS AND INCORPORATES MORE TRADITIONAL CONSTRUCTION METHODS, WITHOUT THE "NOOSA STYLE" OF BUILDING ON STILTS. DUE TO OPPORTUNITIES AND CONSTRAINTS IMPOSED BY SPECIALIST CONSULTANTS HAS RESULTED IN THE DEVELOPMENT INTO CLUSTERS TO ENSURE COMPLIANCE TO LANDFORM, LANDSCAPE RETENTION, WATER AND BUSHFIRE MANAGEMENT CRITERIA.
- THE PROPOSAL IS NOT SPREAD-OUT, BUT CONCENTRATED AS TO REDUCE IMPACT.
- THE PROPOSAL IS STILL ECO TOURISM AND HAS EDG INCLUDED IN THE DESIGN APPROACH

BUILDING SETBACKS:

- THE PROPOSAL PROVIDES ADEQUATE SETBACKS TO ADJOINING PROPERTIES, TOGETHER WITH SUFFICIENT CORRIDORS FOR WILDLIFE.
- NORTHERN AREAS OF THE SITE ARE UNSUITABLE FOR BUILDING LOCATIONS DUE TO WATER MANAGEMENT CONTROLS
- THE SET BACKS ARE GREATER THAN THE STANDARDS REQUIRED

URBAN DESIGN REVEIW

SCALE @A3

ISSUE	DATE	DESCRIPTION
A-A	16.11.18	PROJECT REDESIGN IN RESPONSE TO INFORMATION REQUEST

JAREDPOOLEDESIGN
LEVEL 1 33 ELKHORN AVENUE, SURFERS PARADISE, Q. 4217 AUSTRALIA
PO BOX 42, ISLE OF CAPRI, Q. 4217 AUSTRALIA
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PROJECT
A PROPOSED NEW ECO DEVELOPMENT
AT
REDLAND BAY QUEENSLAND QLD
FOR
NEW LAND TOURISM PTY LTD

DRAWING - URBAN DESIGN REVEIW
DRAWING No. BP783/4.2
ISSUE A-A

POOLE

AERIAL VEIW (FROM RIVER)

SCALE 1:1806.1 @ 877 @ A3

ISSUE	DATE	DESCRIPTION
A-A	19.11.18	PROJECT REDESIGN IN RESPONSE TO INFORMATION REQUEST
A-B	18.12.19	TYPE 3 AMENDED BACK AND TYPE 4 REPLACED BY AMENDED TYPE 3 DUAL

JAREDPOOLEDESIGN
LEVEL 7 33 ELKHORN AVENUE, SURFERS PARADISE, QL 4217 AUSTRALIA
PO BOX 42, ISLE OF CAPRI, Q 4217 AUSTRALIA
TEL: 07 5527 5100 EMAIL: INFO@JPD.COM.AU WEB: JPD.COM.AU

PROJECT
A PROPOSED NEW ECO DEVELOPMENT
AT
REDLAND BAY QUEENSLAND QLD
FOR
NEW LAND TOURISM PTY LTD

DRAWING - AERIAL VEIW (FROM RIVER)
DRAWING No. BP783/4.6
ISSUE A-D

POOLE

AERIAL VEIW (FROM ROCKY PASSAGE)

SCALE 1:1724 @ A1

ISSUE	DATE	DESCRIPTION
A-C	13.11.18	PROJECT REDESIGN IN RESPONSE TO INFORMATION REQUEST
A-D	9.10.19	TYPE 3 AMENDED BACK AND TYPE 4 REPLACED BY AMENDED TYPE 3 (1B)

JAREDPOOLEDESIGN
LEVEL 7 33 ELKHORN AVENUE, SURFERS PARADISE, QL 4217 AUSTRALIA
PO BOX 42, OLD SIM CAIRNS, Q 4217 AUSTRALIA
TEL 07 5527 5100 EMAIL INFO@JPD.COM.AU WEB JPD.COM.AU

PROJECT
A PROPOSED NEW ECO DEVELOPMENT
AT
REDLAND BAY QUEENSLAND QLD
FOR
NEW LAND TOURISM PTY LTD

DRAWING - AERIAL VEIW FROM ROCKY PASSAGE1
DRAWING No. BP783/4.7
ISSUE A-D

POOLE

ISSUE	DATE	DESCRIPTION
A-A	16.11.18	PROJECT REDESIGN IN RESPONSE TO INFORMATION REQUEST
A-C	31.01.19	TYPE 1 NEW PLAN AND FACADE
A-E	26.02.19	TYPE 1 AMENDED BACK TO ORIGINAL PLAN 12 CAR SPACES ADDED

JAREDPOOLEDESIGN

LEVEL 1 33 ELKHORN AVENUE, SURFERS PARADISE, Q. 4217 AUSTRALIA
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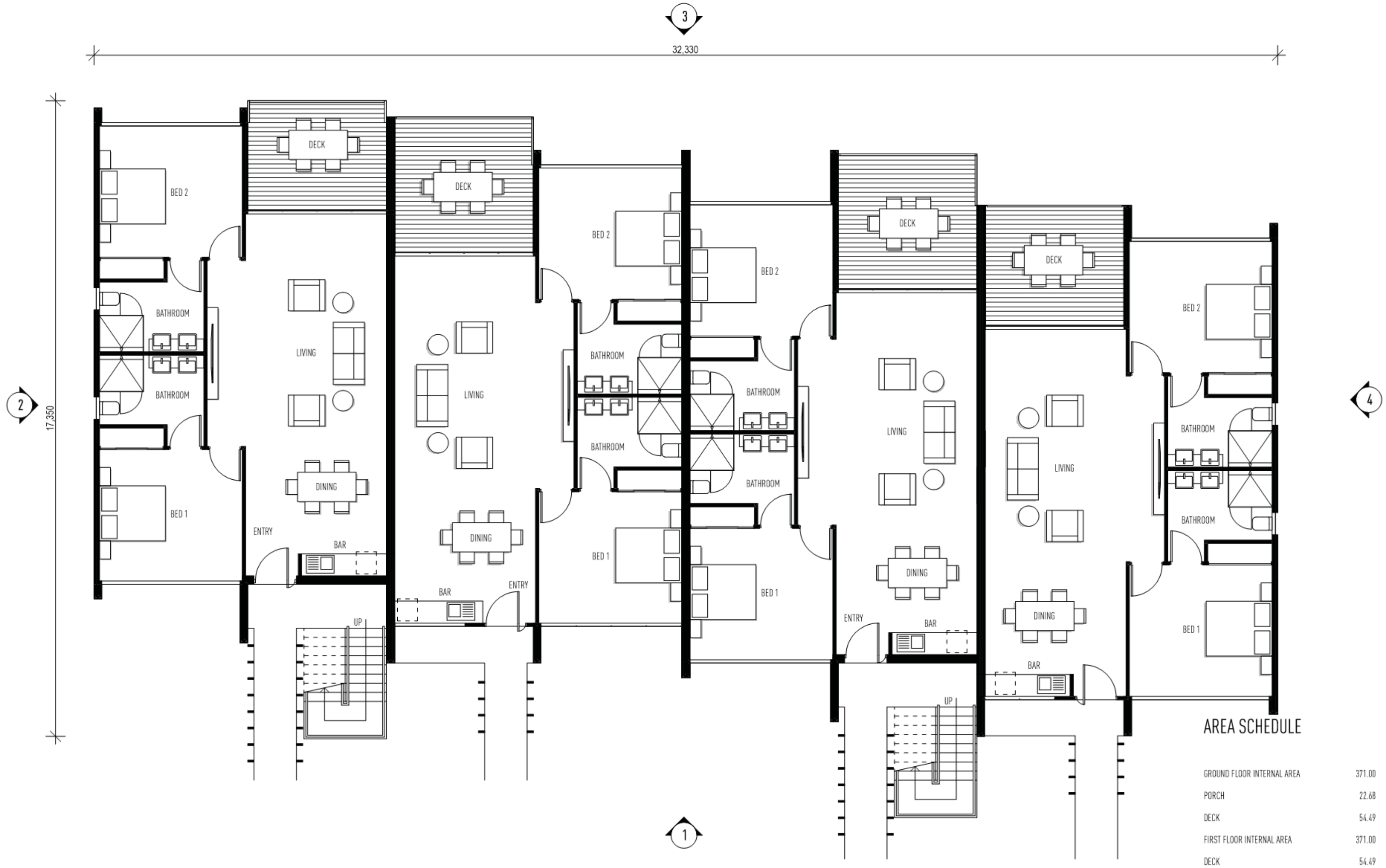
TEL 07 5527 5300 EMAIL INFO@JPD.COM.AU WEB JPD.COM.AU

PROJECT
A PROPOSED NEW ECO DEVELOPMENT
AT
REDLAND BAY QUEENSLAND QLD
FOR
NEW LAND TOURISM PTY LTD

DRAWING - TYPE 1 RESORT SUITES
DRAWING No. BP783/5.1
ISSUE A-E

POOLE



AREA SCHEDULE

GROUND FLOOR INTERNAL AREA	371.00
PORCH	22.68
DECK	54.49
FIRST FLOOR INTERNAL AREA	371.00
DECK	54.49
COMMON STAIR	22.68
	896.34 m²

TYPE 1 (RESORT SUITES) - GROUND FLOOR PLAN

SCALE 1:100, 1:1 @ A3

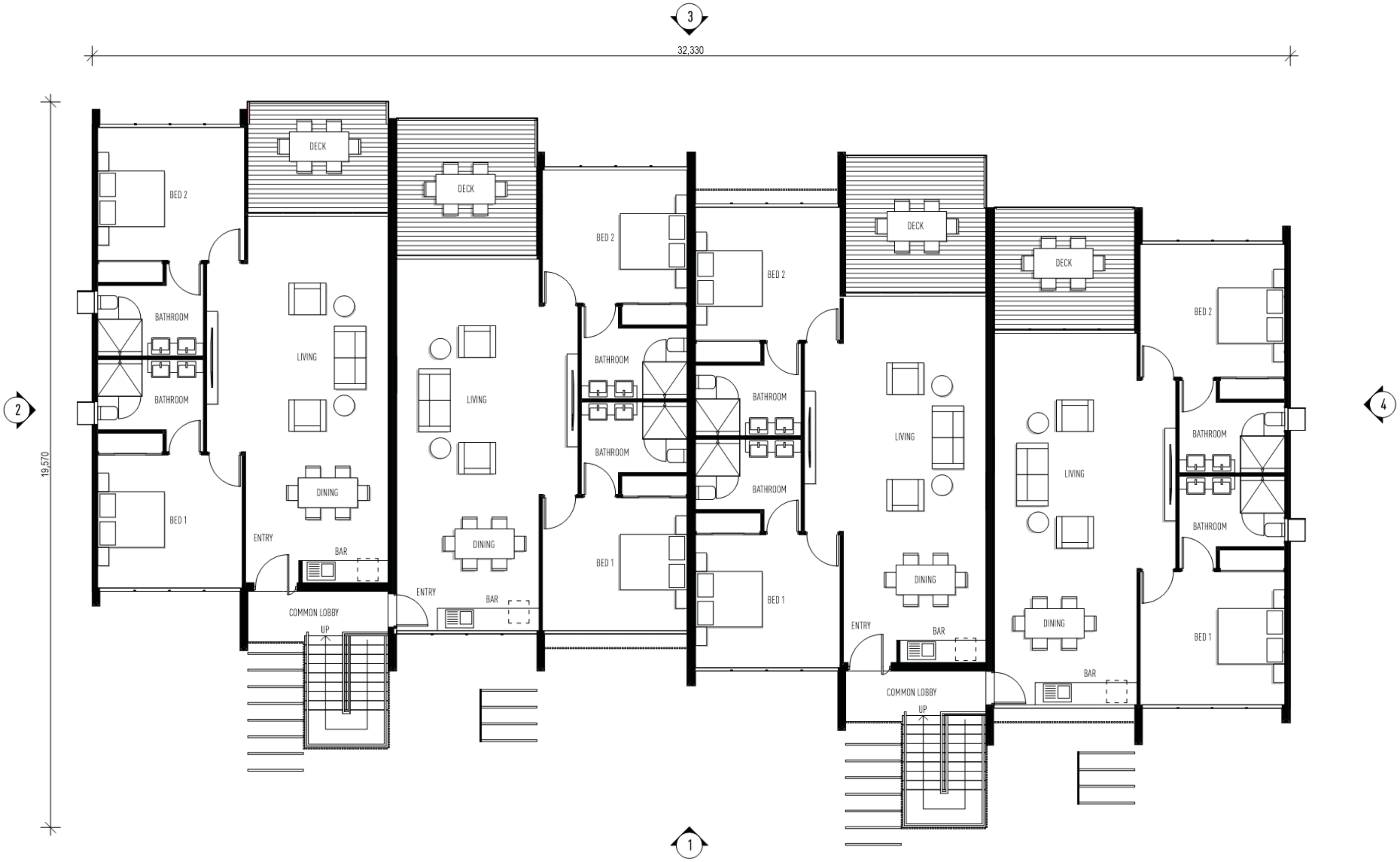
ISSUE	DATE	DESCRIPTION
A-A	14.11.18	PROJECT REDESIGN IN RESPONSE TO INFORMATION REQUEST
A-C	31.01.19	TYPE 1 NEW PLAN AND FACADE
A-E	26.02.19	TYPE 1 AMENDED BACK TO ORIGINAL PLAN 12 CAR SPACES ADDED

JAREDPOOLEDESIGN
LEVEL 1 33 ELKHORN AVENUE, SURFERS PARADISE, Q. 4217 AUSTRALIA
PO BOX 42, ISLE OF CAPRI, Q. 4217 AUSTRALIA
TEL 07 5527 5300 EMAIL INFO@JPD.COM.AU WEB JPD.COM.AU

PROJECT
A PROPOSED NEW ECO DEVELOPMENT
AT
REDLAND BAY QUEENSLAND QLD
FOR
NEW LAND TOURISM PTY LTD

DRAWING - TYPE 1 (RESORT SUITES) - GROUND FLOOR PLAN
DRAWING No. BP783/5.2
ISSUE A-E

POOLE



TYPE 1 (RESORT SUITES) - FIRST FLOOR PLAN

SCALE 1:100 @ A3

ISSUE	DATE	DESCRIPTION
A-A	15.11.18	PROJECT REDESIGN IN RESPONSE TO INFORMATION REQUEST
A-C	31.01.19	TYPE 1 NEW PLAN AND FACADE
A-E	26.02.19	TYPE 1 AMENDED BACK TO ORIGINAL PLAN 12 CAR SPACES ADDED

JAREDPOOLEDESIGN

LEVEL 1 33 ELKHORN AVENUE, SURFERS PARADISE, Q. 4217 AUSTRALIA
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PROJECT
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REDLAND BAY QUEENSLAND QLD
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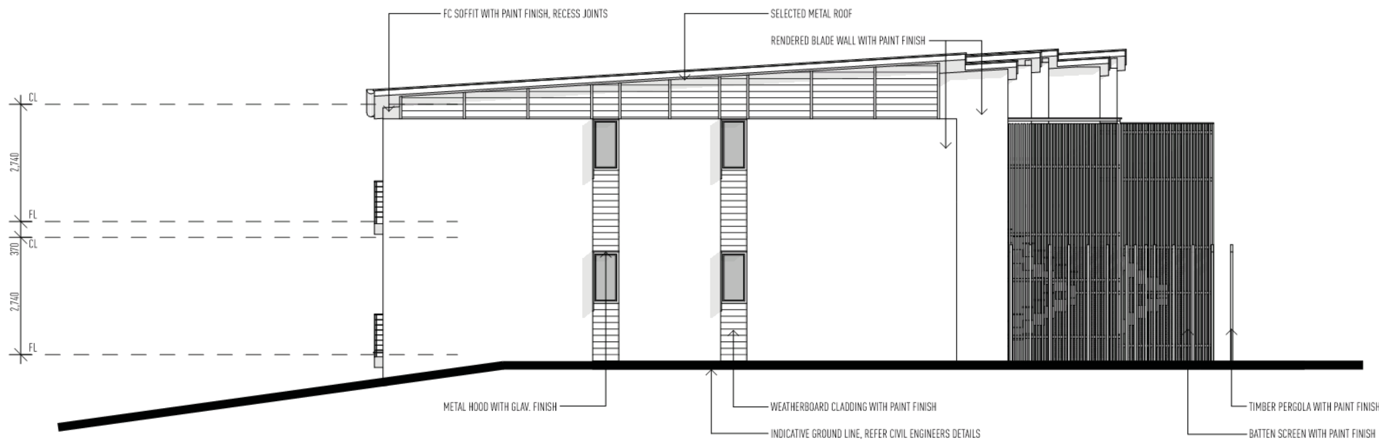
NEW LAND TOURISM PTY LTD

DRAWING - TYPE 1 (RESORT SUITES) - FIRST FLOOR PLAN
DRAWING No. BP783/5.3
ISSUE A-E

POOLE

ELEVATION 1
1:100



ELEVATION 2
1:100

TYPE 1 (RESORT SUITES) - ELEVATIONS

SCALE 1:100 @ A3

ISSUE	DATE	DESCRIPTION
A-A	16.11.18	PROJECT REDESIGN IN RESPONSE TO INFORMATION REQUEST
A-C	31.01.19	TYPE 1 NEW PLAN AND FACADE
A-E	26.02.19	TYPE 1 AMENDED BACK TO ORIGINAL PLAN 12 CAR SPACES ADDED

JAREDPOOLEDESIGN
LEVEL 1 33 ELKHORN AVENUE, SURFERS PARADISE, Q. 4217 AUSTRALIA
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PROJECT
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REDLAND BAY QUEENSLAND QLD
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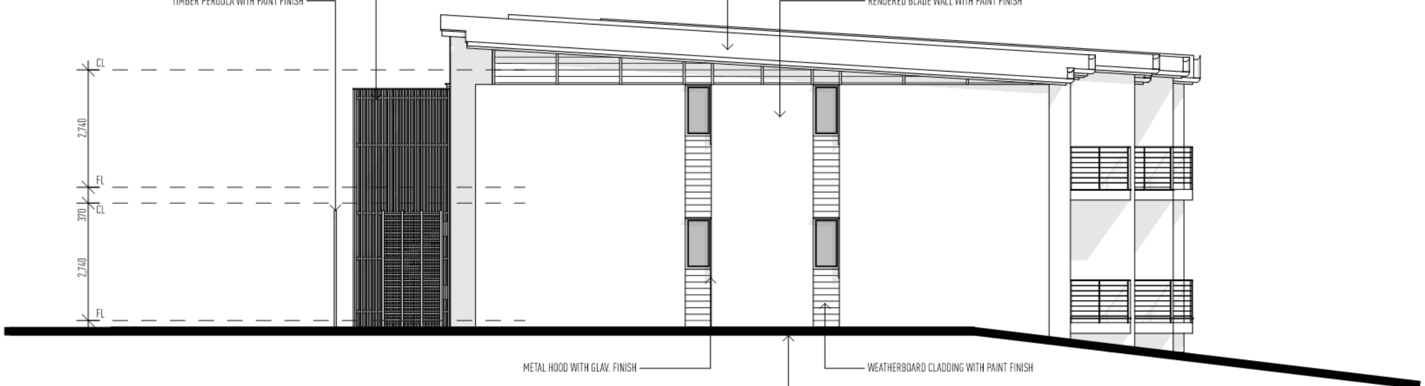
NEW LAND TOURISM PTY LTD

DRAWING - TYPE 1 (RESORT SUITES) - ELEVATIONS
DRAWING No. BP783/5.4
ISSUE A-E

POOLE

ELEVATION 3
1:100



ELEVATION 4
1:100

TYPE 1 (RESORT SUITES) - ELEVATIONS

SCALE 1:100 @ A3

ISSUE	DATE	DESCRIPTION
A-A	14.11.18	PROJECT REDESIGN IN RESPONSE TO INFORMATION REQUEST
A-C	31.01.19	TYPE 1 NEW PLAN AND FACADE
A-E	26.02.19	TYPE 1 AMENDED BACK TO ORIGINAL PLAN 12 CAR SPACES ADDED

JAREDPOOLEDESIGN
LEVEL 1 33 ELKHORN AVENUE, SURFERS PARADISE, Q. 4217 AUSTRALIA
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PROJECT
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DRAWING - TYPE 1 (RESORT SUITES) - ELEVATIONS
DRAWING No. BP783/5.5
ISSUE A-E

POOLE

ISSUE	DATE	DESCRIPTION
A-A	16.11.18	PROJECT REVISION IN RESPONSE TO INFORMATION REQUEST

JAREDPOOLEDESIGN
LEVEL 1 35 ELKHORN AVENUE, SURFERS PARADISE, QL 4217 AUSTRALIA
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PROJECT
A PROPOSED NEW ECO DEVELOPMENT
AT
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NEW LAND TOURISM PTY LTD

DRAWING - TYPE 2
DRAWING No. BP783/6.1
ISSUE A-A

POOLE

AREA SCHEDULE

LOBBY	52.18
GROUND FLOOR LIVING	232.25
GROUND FLOOR PATIO	7.06
GROUND FLOOR DECK	47.29
FIRST FLOOR LIVING	232.25
FIRST FLOOR DECK	54.35
	625.38 m²

TYPE 2 (4 PLEX) - GROUND FLOOR PLAN

SCALE 1:100 @ A3

ISSUE	DATE	DESCRIPTION
A-A	16.11.18	PROJECT REDESIGN IN RESPONSE TO INFORMATION REQUEST

JAREDPOOLEDESIGN
LEVEL 1 33 ELKHORN AVENUE, SURFERS PARADISE, Q. 4217 AUSTRALIA
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PROJECT
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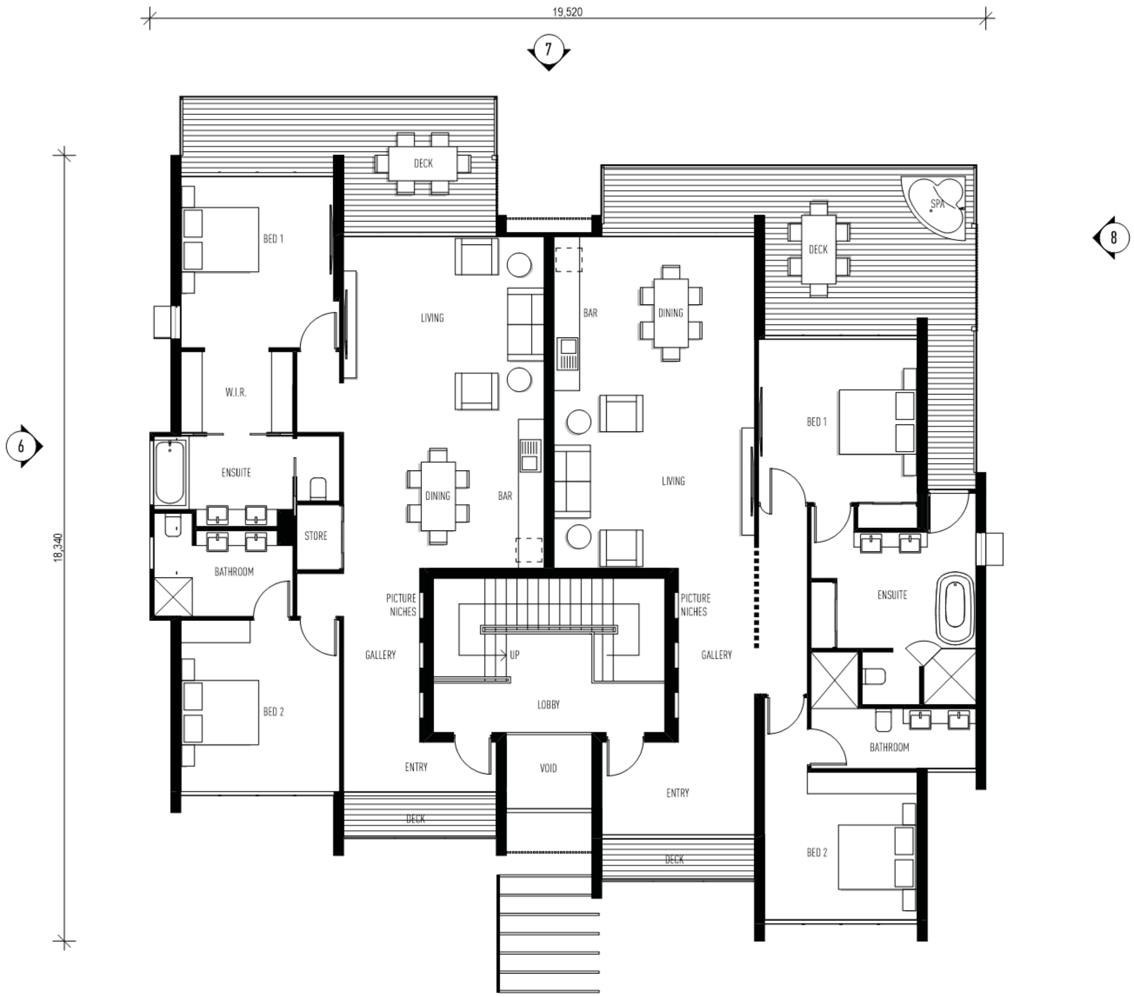
DRAWING - TYPE 2 (4 PLEX) - GROUND FLOOR PLAN
DRAWING No. BP783/6.2
ISSUE A-A

POOLE



TYPE 2 (4 PLEX) - FIRST FLOOR PLAN

SCALE 1:100 @ A3

ISSUE	DATE	DESCRIPTION
A-A	16.11.18	PROJECT REDESIGN IN RESPONSE TO INFORMATION REQUEST

JAREDPOOLEDESIGN
LEVEL 1 33 ELKHORN AVENUE, SURFERS PARADISE, Q. 4217 AUSTRALIA
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PROJECT
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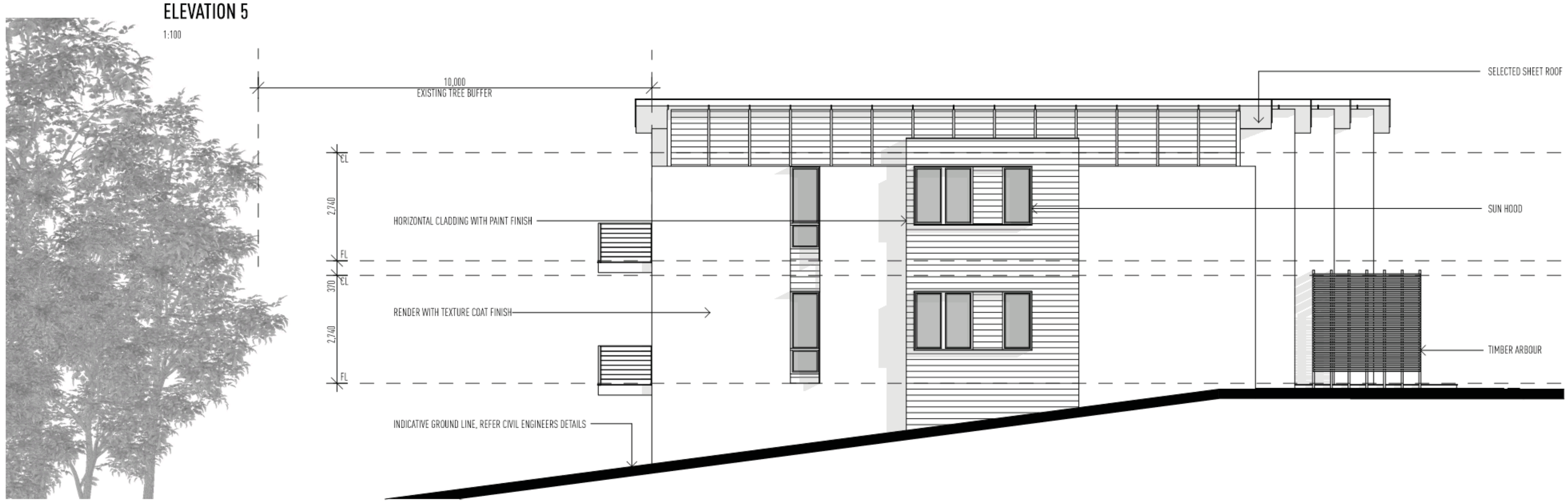
NEW LAND TOURISM PTY LTD

DRAWING - TYPE 2 (4 PLEX) - FIRST FLOOR PLAN
DRAWING No. BP783/6.3
ISSUE A-A

POOLE

ELEVATION 5

1:100



ELEVATION 6

1:100

TYPE 2 (4 PLEX) - ELEVATIONS

SCALE 1:100 @ A3

ISSUE	DATE	DESCRIPTION
A-A	15.11.18	PROJECT REDESIGN IN RESPONSE TO INFORMATION REQUEST

JAREDPOOLEDESIGN

LEVEL 1 33 ELKHORN AVENUE, SURFERS PARADISE, Q. 4217 AUSTRALIA
PO BOX 42, ISLE OF CAPRI, Q. 4217 AUSTRALIA
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PROJECT
A PROPOSED NEW ECO DEVELOPMENT
AT
REDLAND BAY QUEENSLAND QLD
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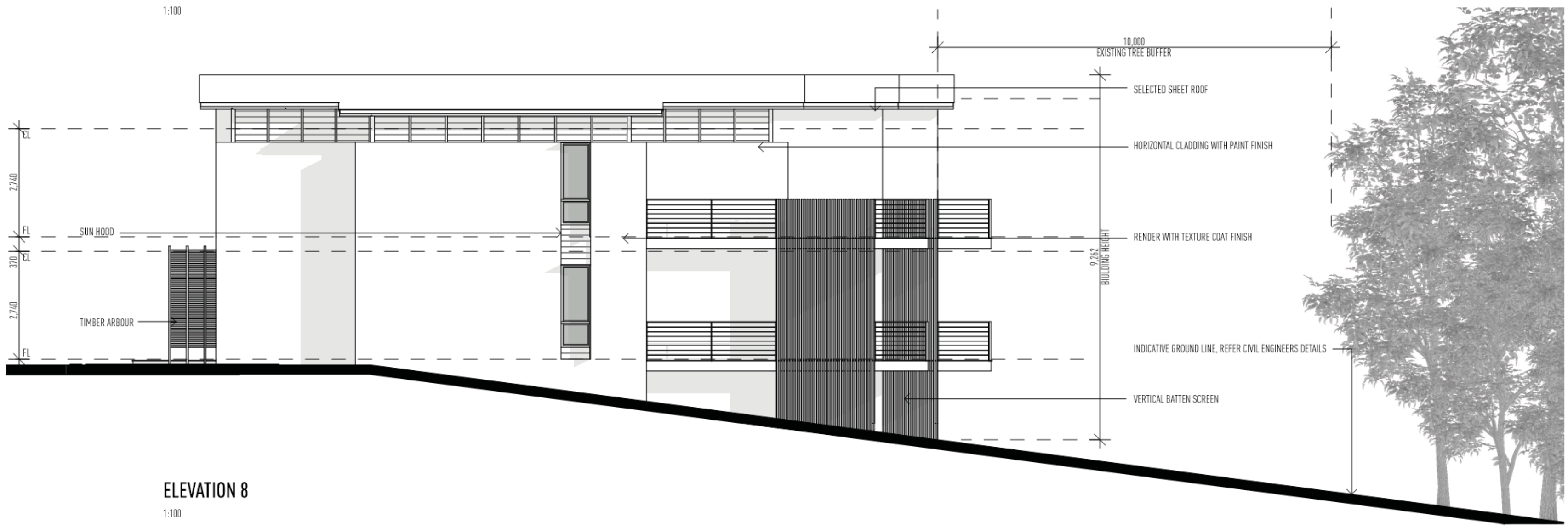
DRAWING - TYPE 2 (4 PLEX) - ELEVATIONS
DRAWING No. BP783/6.4
ISSUE A-A

POOLE

ELEVATION 7
1:100



ELEVATION 8
1:100

TYPE 2 (4 PLEX) - ELEVATIONS

SCALE 1:100 @ A3

ISSUE	DATE	DESCRIPTION
A-A	15.11.18	PROJECT REDESIGN IN RESPONSE TO INFORMATION REQUEST

JAREDPOOLEDESIGN
LEVEL 1 33 ELKHORN AVENUE, SURFERS PARADISE, Q. 4217 AUSTRALIA
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PROJECT
A PROPOSED NEW ECO DEVELOPMENT
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DRAWING - TYPE 2 (4 PLEX) - ELEVATIONS
DRAWING No. BP783/6.5
ISSUE A-A

POOLE

ISSUE	DATE	DESCRIPTION
A	19.11.18	PRELIMINARY DESIGN IN RESPONSE TO INFORMATION REQUEST
B	31.01.19	TYPE 3 NEW PLAN AND FACADE

JAREDPOOLEDESIGN
LEVEL 7 33 ELKHORN AVENUE, SURFERS PARADISE, QL 4217 AUSTRALIA
PO BOX 42, OLD SPIT CAPRI, Q 4217 AUSTRALIA
TEL: 07 5527 5300 EMAIL: INFO@JPD.COM.AU WEB: JPD.COM.AU

PROJECT
A PROPOSED NEW ECO DEVELOPMENT
AT
REDLAND BAY QUEENSLAND QLD
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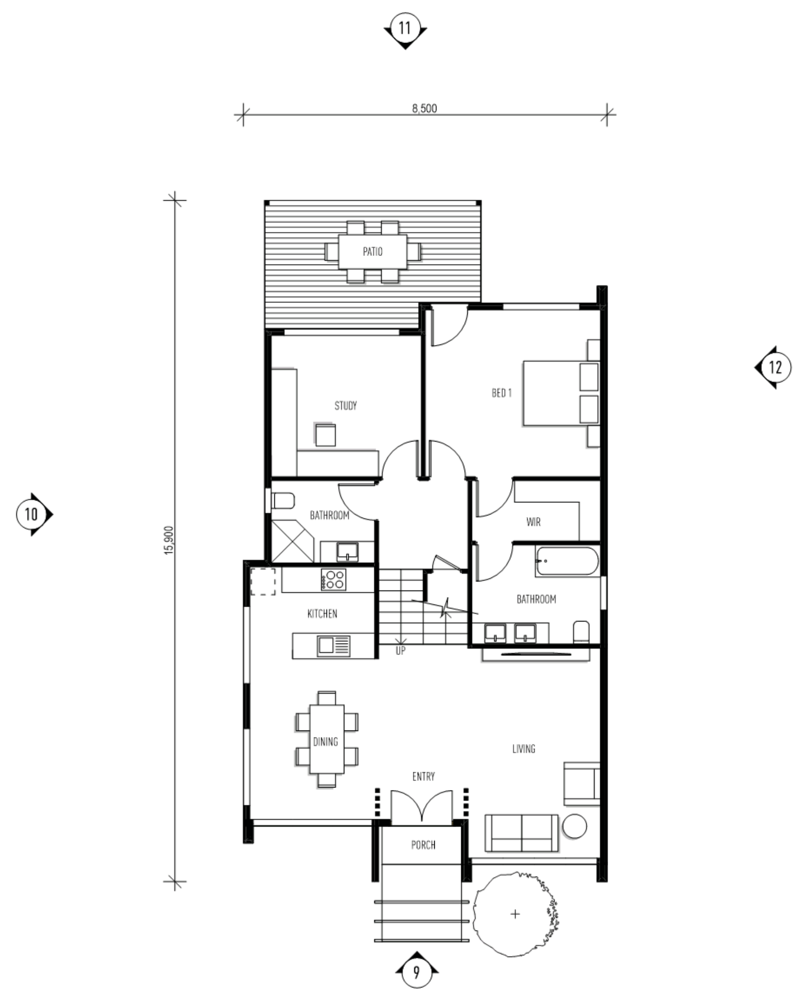
NEW LAND TOURISM PTY LTD

DRAWING - TYPE 3
DRAWING No.: BP783/7.1
ISSUE: A-C

POOLE



AREA SCHEDULE

LIVING	101.84
PATIO	14.28
PORCH	1.89
FIRST FLOOR LIVING	57.95
BALCONY	14.28
	190.24 m²

TYPE 3 (DETACHED DWELLING) - GROUND FLOOR PLAN

SCALE 1:100, 1:1 @ A3

ISSUE	DATE	DESCRIPTION
A-A	16.11.18	PRELIMINARY REDESIGN IN RESPONSE TO INFORMATION REQUEST
A-C	31.01.19	TYPE 3 NEW PLAN AND FACADE

JAREDPOOLEDESIGN
LEVEL 1 33 ELKHORN AVENUE, SURFERS PARADISE, Q. 4217 AUSTRALIA
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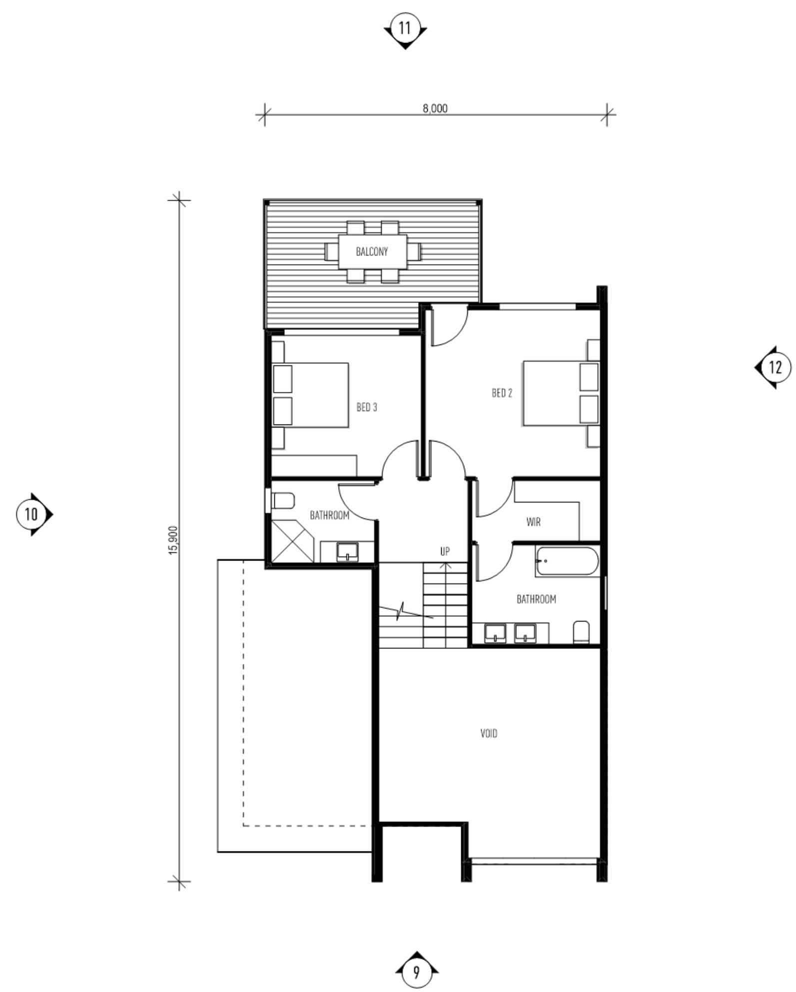
DRAWING - TYPE 3 (DETACHED DWELLING) - GROUND FLOOR PLAN
DRAWING No. BP783/7.2
ISSUE A-C

POOLE



TYPE 3 (DETACHED DWELLING) - FIRST FLOOR PLAN

SCALE 1:100 @ A3

ISSUE	DATE	DESCRIPTION
A-A	15.11.18	PROJECT REDESIGN IN RESPONSE TO INFORMATION REQUEST
A-C	31.01.19	TYPE 3 NEW PLAN AND FACADE

JAREDPOOLEDESIGN
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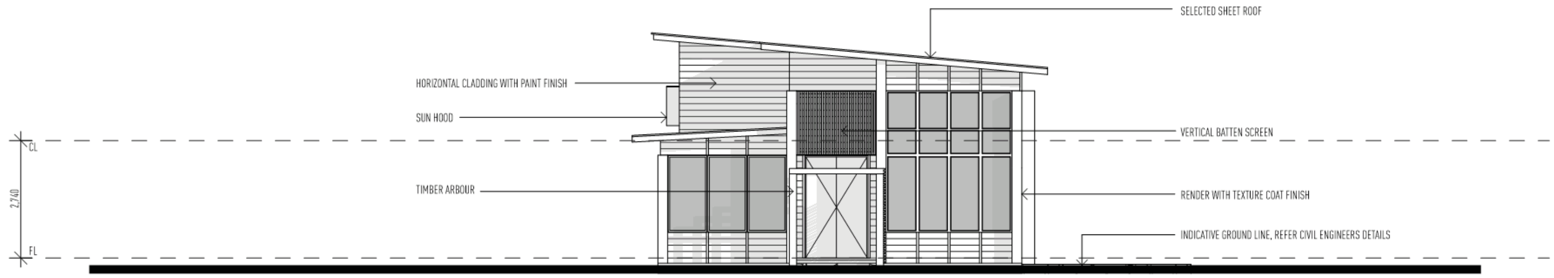
DRAWING - TYPE 3 (DETACHED DWELLING) - FIRST FLOOR PLAN
DRAWING No. BP783/7.3
ISSUE A-C

POOLE



ELEVATION 9
1:100

ELEVATION 10
1:100

TYPE 3 (DETACHED DWELLING) - ELEVATION

SCALE 1:100 @ A3

ISSUE	DATE	DESCRIPTION
A-A	15.11.18	PROJECT REDESIGN IN RESPONSE TO INFORMATION REQUEST
A-C	31.01.19	TYPE 3 NEW PLAN AND FACADE

JAREDPOOLEDESIGN
LEVEL 1 33 ELKHORN AVENUE, SURFERS PARADISE, Q. 4217 AUSTRALIA
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PROJECT
A PROPOSED NEW ECO DEVELOPMENT
AT
REDLAND BAY QUEENSLAND QLD
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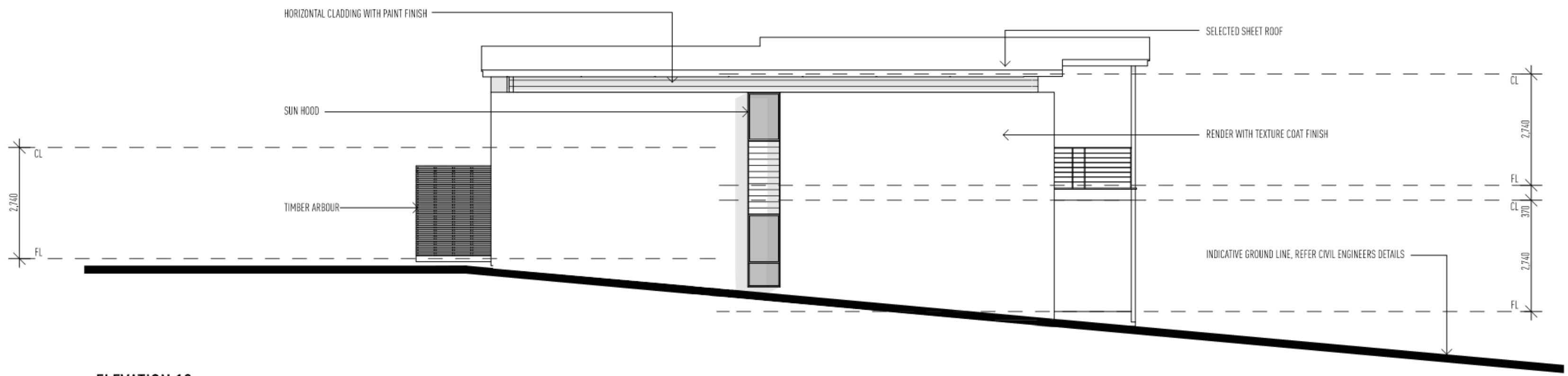
NEW LAND TOURISM PTY LTD

DRAWING - TYPE 3 (DETACHED DWELLING) - ELEVATION
DRAWING No. BP783/7.4
ISSUE A-C

POOLE

ELEVATION 11
1:100



ELEVATION 12
1:100

TYPE 3 (DETACHED DWELLING) - ELEVATIONS

SCALE 1:100 @ A3

ISSUE	DATE	DESCRIPTION
A-A	16.11.18	PROJECT REDESIGN IN RESPONSE TO INFORMATION REQUEST
A-C	31.01.19	TYPE 3 NEW PLAN AND FACADE

JAREDPOOLEDESIGN
LEVEL 1 33 ELKHORN AVENUE, SURFERS PARADISE, Q. 4217 AUSTRALIA
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NEW LAND TOURISM PTY LTD

DRAWING - TYPE 3 (DETACHED DWELLING) - ELEVATIONS
DRAWING No. BP783/7.5
ISSUE A-C

POOLE

ISSUE	DATE	DESCRIPTION
A-A	15.11.18	PROJECT REDESIGN IN RESPONSE TO INFORMATION REQUEST
A-D	08.02.19	AMENDED TYPE 3

JAREDPOOLEDESIGN
LEVEL 1 33 ELKHORN AVENUE, SURFERS PARADISE, Q. 4217 AUSTRALIA
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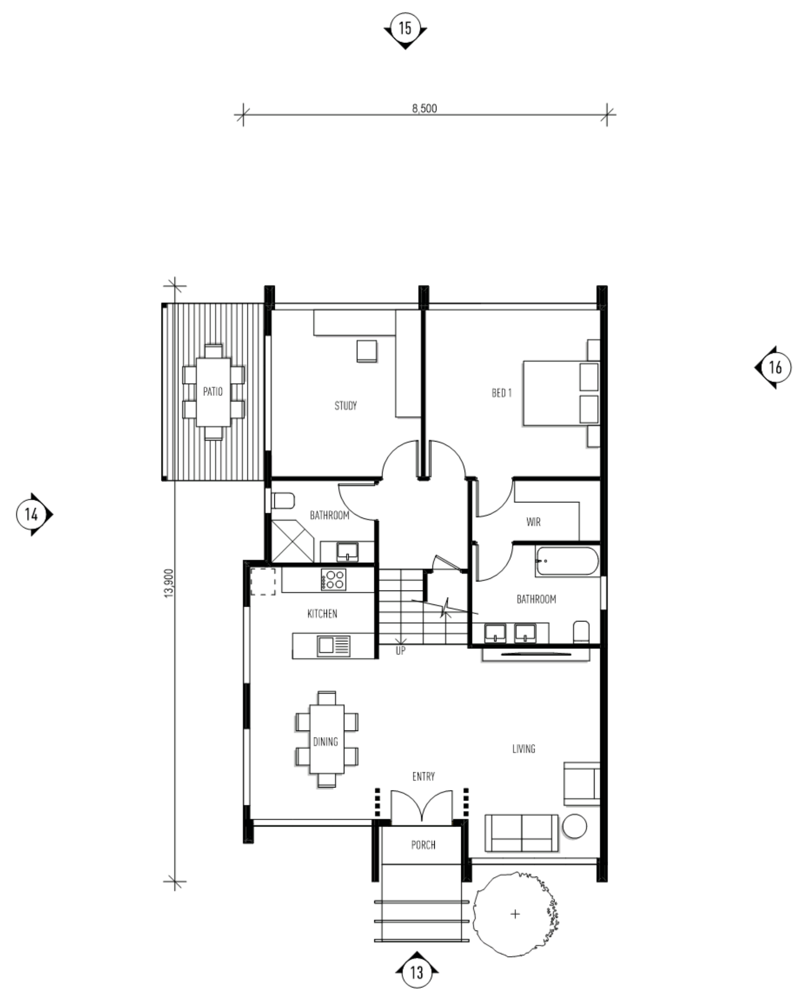
PROJECT
A PROPOSED NEW ECO DEVELOPMENT
AT
REDLAND BAY QUEENSLAND QLD
FOR
NEW LAND TOURISM PTY LTD

DRAWING - TYPE 3B
DRAWING No.
BP783/8.1
ISSUE
A-D

POOLE



AREA SCHEDULE

LIVING	104.00
PATIO	9.94
PORCH	1.89
FIRST FLOOR LIVING	60.11
BALCONY	9.94
	185.88 m²

TYPE 3B (DETACHED DWELLING) - GROUND FLOOR PLAN

SCALE 1:100, 1:1 @ A3

ISSUE	DATE	DESCRIPTION
A-A	15.11.18	PROJECT REDESIGN IN RESPONSE TO INFORMATION REQUEST
A-D	08.02.19	AMENDED TYPE 3

JAREDPOOLEDESIGN
LEVEL 1 33 ELKHORN AVENUE, SURFERS PARADISE, Q. 4217 AUSTRALIA
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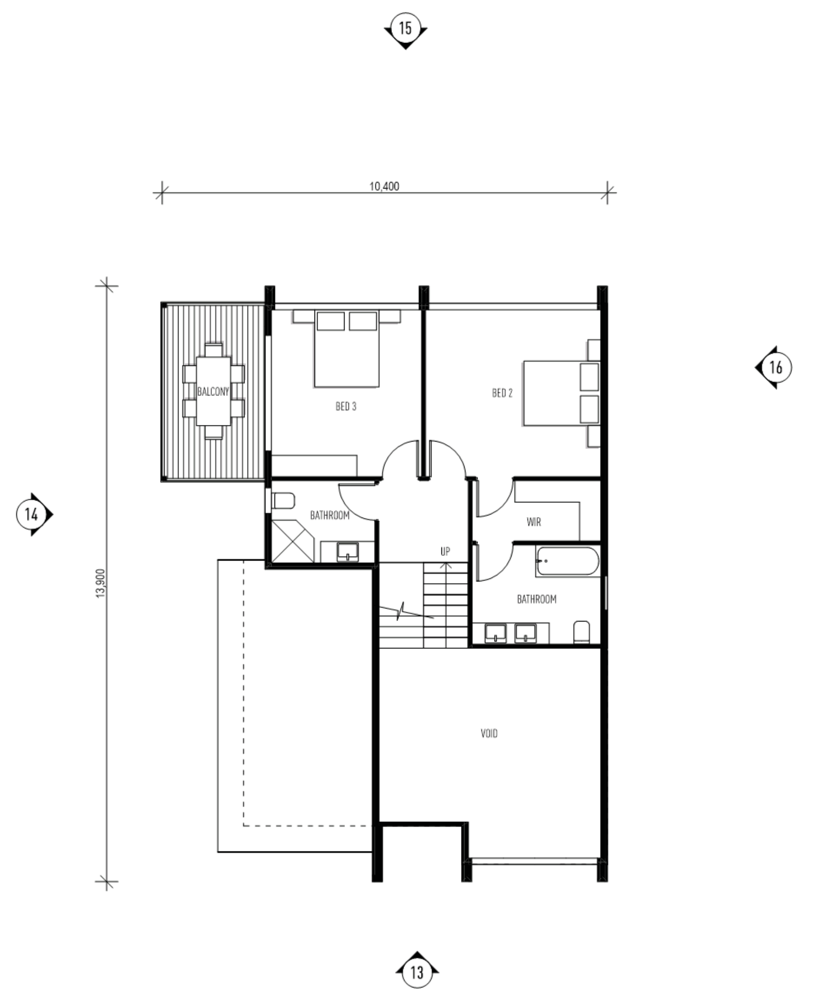
DRAWING - TYPE 3B (DETACHED DWELLING) - GROUND FLOOR PLAN
DRAWING No. BP783/8.2
ISSUE A-D

POOLE



TYPE 3B (DETACHED DWELLING) - FIRST FLOOR PLAN

SCALE 1:100 @ A3

ISSUE	DATE	DESCRIPTION
A-A	15.11.18	PROJECT REDESIGN IN RESPONSE TO INFORMATION REQUEST
A-D	09.02.19	AMENDED TYPE 3

JAREDPOOLEDESIGN
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PROJECT
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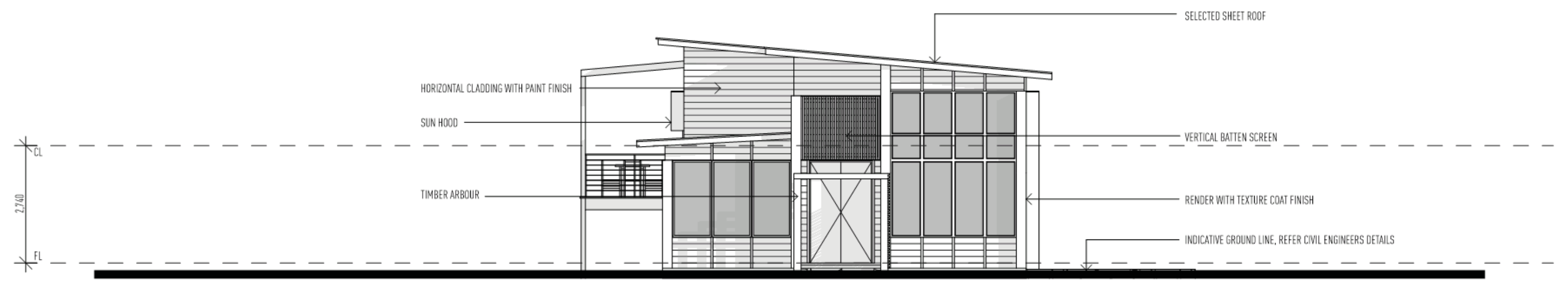
DRAWING - TYPE 3B (DETACHED DWELLING) - FIRST FLOOR PLAN
DRAWING No. BP783/8.3
ISSUE A-D

POOLE



ELEVATION 13
1:100

ELEVATION 14
1:100

TYPE 3B (DETACHED DWELLING) - ELEVATION

SCALE 1:100 @ A3

ISSUE	DATE	DESCRIPTION
A-A	15.11.18	PROJECT REDESIGN IN RESPONSE TO INFORMATION REQUEST
A-D	08.02.19	AMENDED TYPE 3

JAREDPOOLEDESIGN
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PROJECT
A PROPOSED NEW ECO DEVELOPMENT
AT
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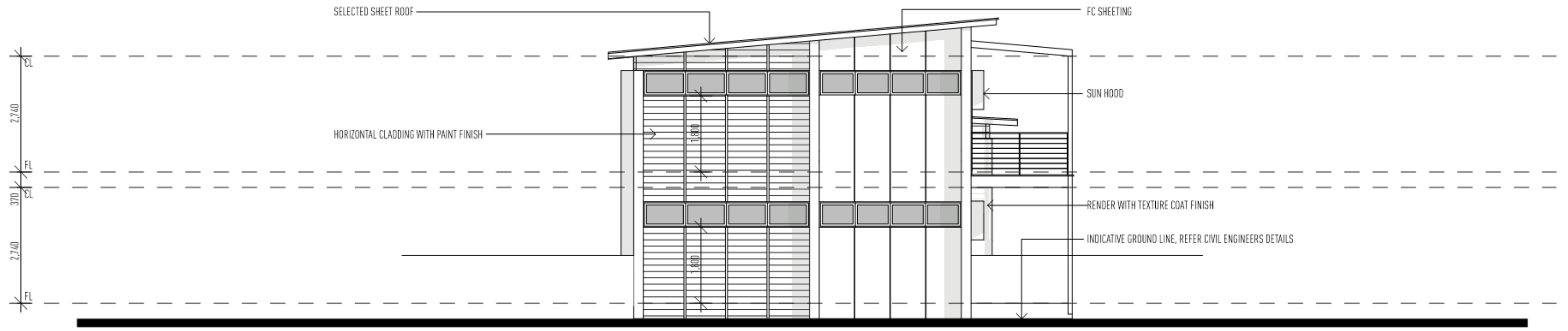
NEW LAND TOURISM PTY LTD

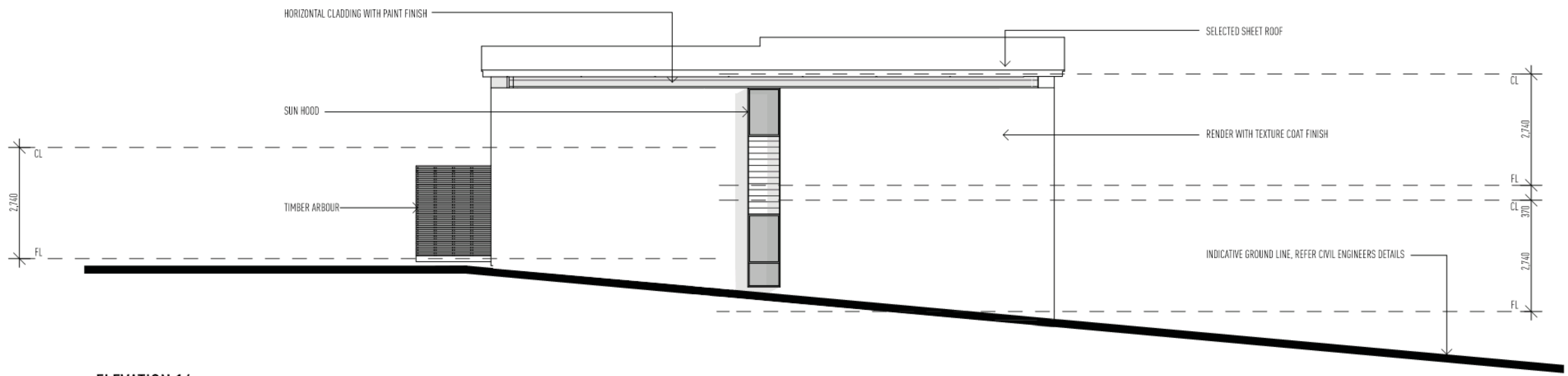
DRAWING - TYPE 3B (DETACHED DWELLING) - ELEVATION
DRAWING No. BP783/8.4
ISSUE A-D

POOLE



ELEVATION 15

1:100



ELEVATION 16

1:100

TYPE 3B (DETACHED DWELLING) - ELEVATION

SCALE 1:100 @ A3

ISSUE	DATE	DESCRIPTION
A-A	16.11.18	PROJECT REDESIGN IN RESPONSE TO INFORMATION REQUEST
A-D	19.02.19	AMENDED TYPE 3

JAREDPOOLEDESIGN
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PROJECT
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DRAWING - TYPE 3B (DETACHED DWELLING) - ELEVATION
DRAWING No. BP783/8.5
ISSUE A-D

POOLE

SECTION A

1:400

TYPE 3B (DETACHED DWELLING) - SITE SECTION

SCALE 1:400 @ A3

ISSUE	DATE	DESCRIPTION
A-A	15.11.18	PROJECT REDESIGN IN RESPONSE TO INFORMATION REQUEST
A-D	09.02.19	AMENDED TYPE 3

JAREDPOOLEDESIGN

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DRAWING - TYPE 3B (DETACHED DWELLING) - SITE SECTION
DRAWING No. BP783/8.6
ISSUE A-D

POOLE

ISSUE	DATE	DESCRIPTION
A-A	16.11.18	PROJECT REDESIGN IN RESPONSE TO INFORMATION REQUEST

JAREDPOOLEDESIGN
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PROJECT
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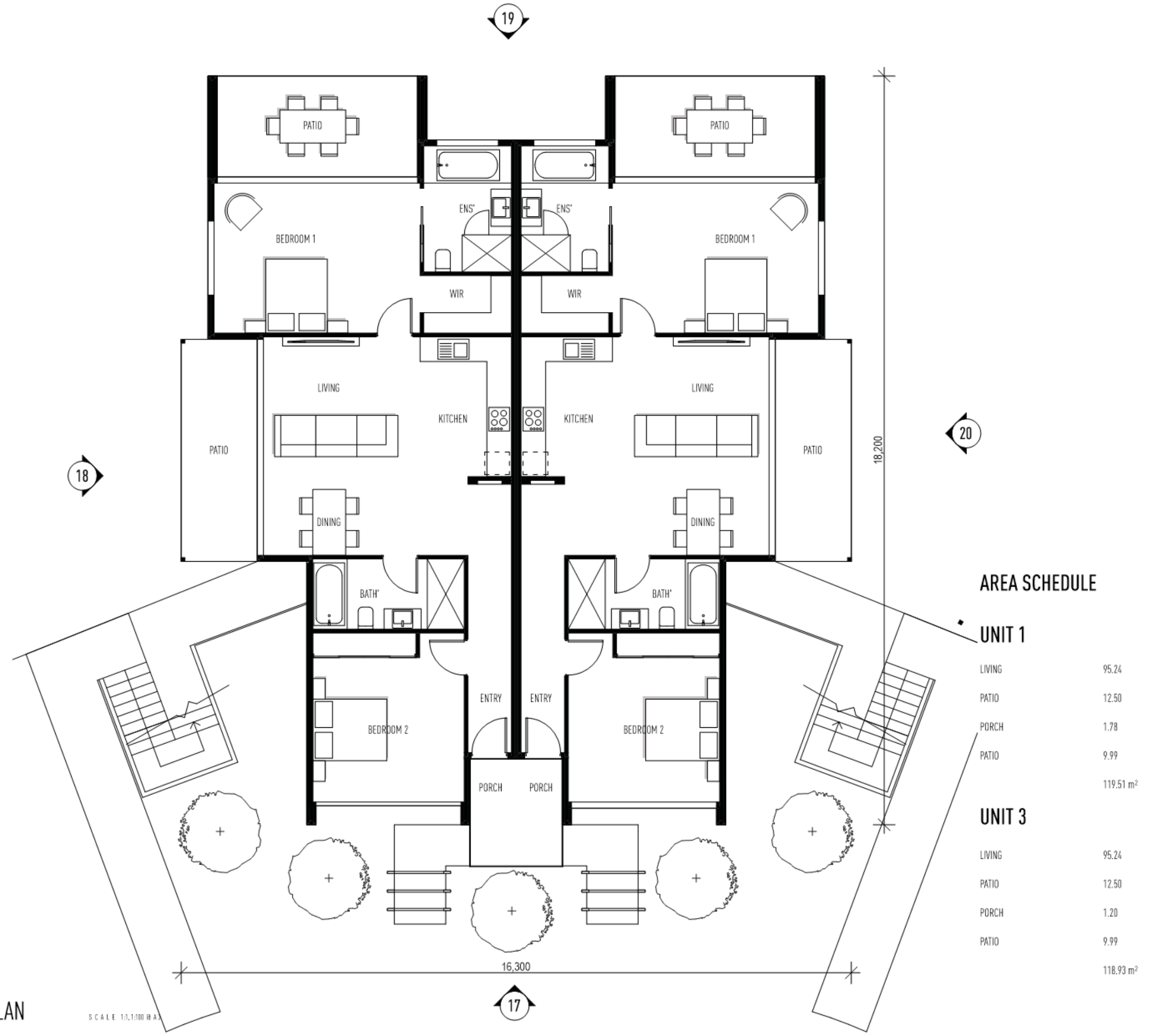
DRAWING - TYPE 4
DRAWING No. BP783/9.1
ISSUE A-A

POOLE



TYPE 4 (4 PLEX) - GROUND FLOOR PLAN

AREA SCHEDULE

UNIT 1		**UNIT 2**	
LIVING	95.24	LIVING	94.57
PATIO	12.50	PATIO	12.50
PORCH	1.78	PORCH	1.78
PATIO	9.99	PATIO	9.99
	119.51 m²		118.84 m²
UNIT 3		**UNIT 4**	
LIVING	95.24	LIVING	94.57
PATIO	12.50	PATIO	12.50
PORCH	1.20	PORCH	1.26
PATIO	9.99	PATIO	9.99
	118.93 m²		118.32 m²
		TOTAL	476.88 m²

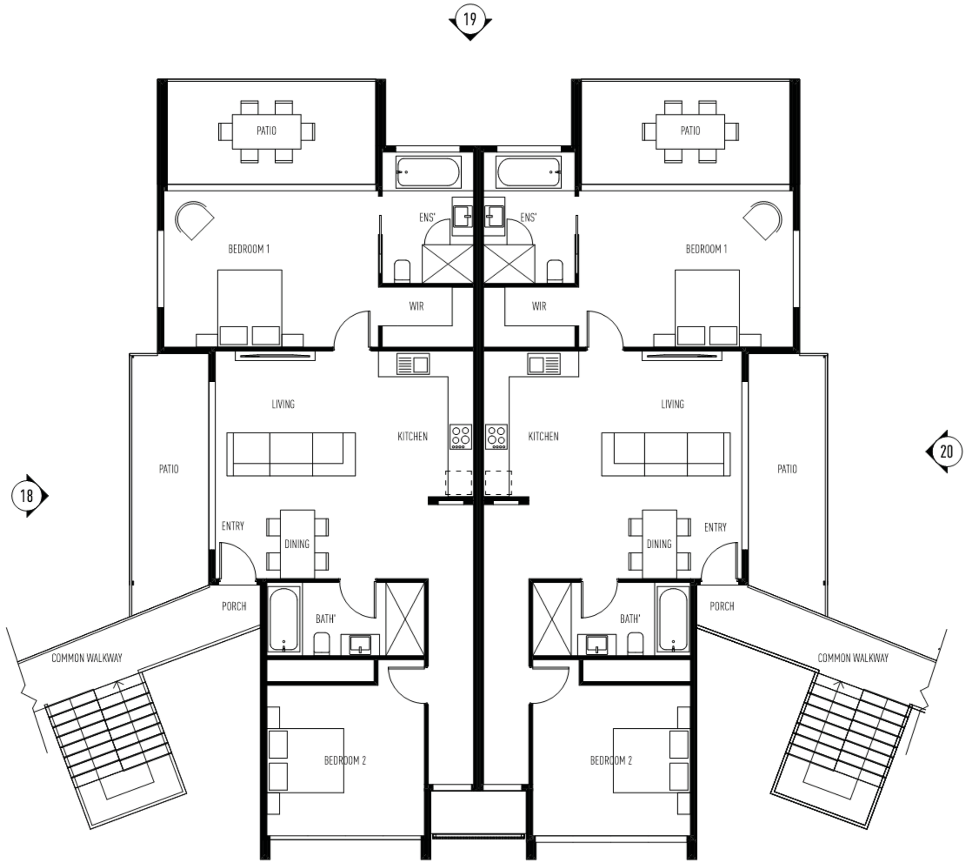
ISSUE	DATE	DESCRIPTION
A-A	16.11.18	PROJECT REDESIGN IN RESPONSE TO INFORMATION REQUEST

JAREDPOOLEDESIGN
LEVEL 1 33 ELKHORN AVENUE, SURFERS PARADISE, Q. 4217 AUSTRALIA
PO BOX 42, ISLE OF CAPRI, Q. 4217 AUSTRALIA
TEL 07 5527 5300 EMAIL INFO@JPD.COM.AU WEB JPD.COM.AU

PROJECT
A PROPOSED NEW ECO DEVELOPMENT
AT
REDLAND BAY QUEENSLAND QLD
FOR
NEW LAND TOURISM PTY LTD

DRAWING - TYPE 4 (4 PLEX) - GROUND FLOOR PLAN
DRAWING No. BP783/9.2
ISSUE A-A

POOLE



17

TYPE 4 (4 PLEX) - FIRST FLOOR PLAN

SCALE 1:100 @ A3

ISSUE	DATE	DESCRIPTION
A-A	15.11.18	PROJECT REDESIGN IN RESPONSE TO INFORMATION REQUEST

JAREDPOOLEDESIGN

LEVEL 1 33 ELKHORN AVENUE, SURFERS PARADISE, Q. 4217 AUSTRALIA
PO BOX 42, ISLE OF CAPRI, Q. 4217 AUSTRALIA
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PROJECT
A PROPOSED NEW ECO DEVELOPMENT
AT
REDLAND BAY QUEENSLAND QLD
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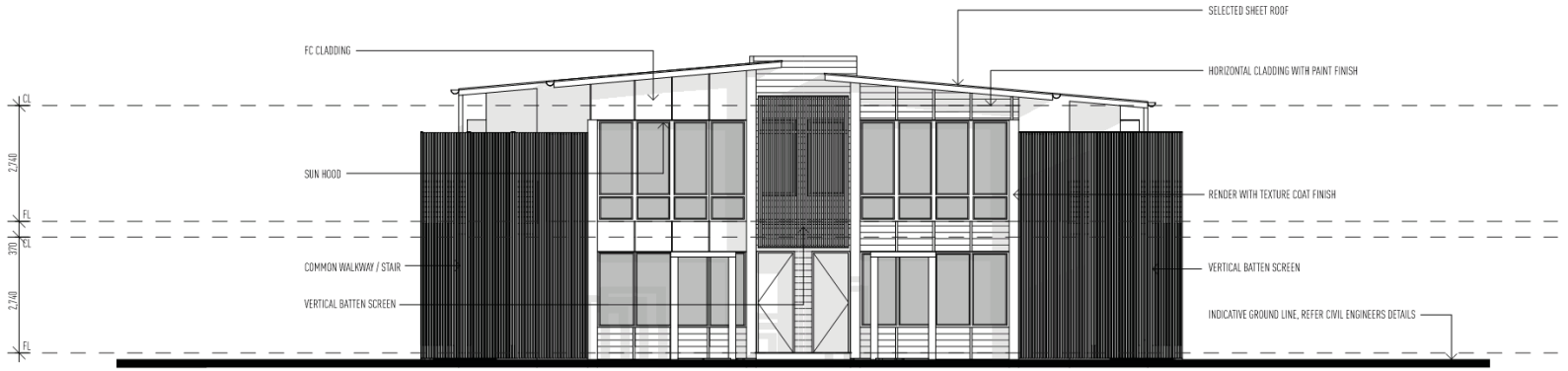
NEW LAND TOURISM PTY LTD

DRAWING - TYPE 4 (4 PLEX) - FIRST FLOOR PLAN
DRAWING No. BP783/9.3
ISSUE A-A

POOLE



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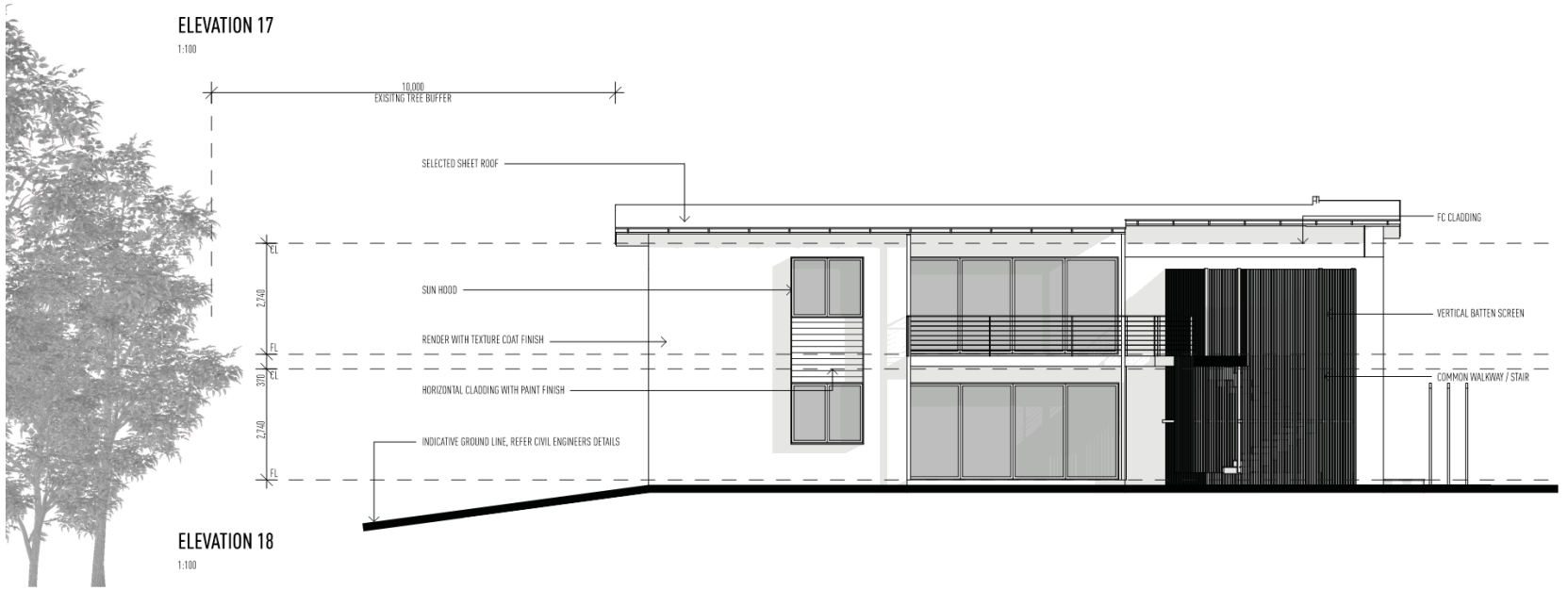

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TYPE 4 (4 PLEX) - ELEVATION

SCALE 1:100 @ A3

ISSUE	DATE	DESCRIPTION
A-A	15.11.18	PROJECT REVISION IN RESPONSE TO INFORMATION REQUEST

JAREDPOOLEDESIGN
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TEL 07 5527 5300 EMAIL INFO@JPD.COM.AU WEB JPD.COM.AU

PROJECT
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FOR
NEW LAND TOURISM PTY LTD

DRAWING - TYPE 4 (4 PLEX) - ELEVATION
DRAWING No. BP783/9.4
ISSUE A-A

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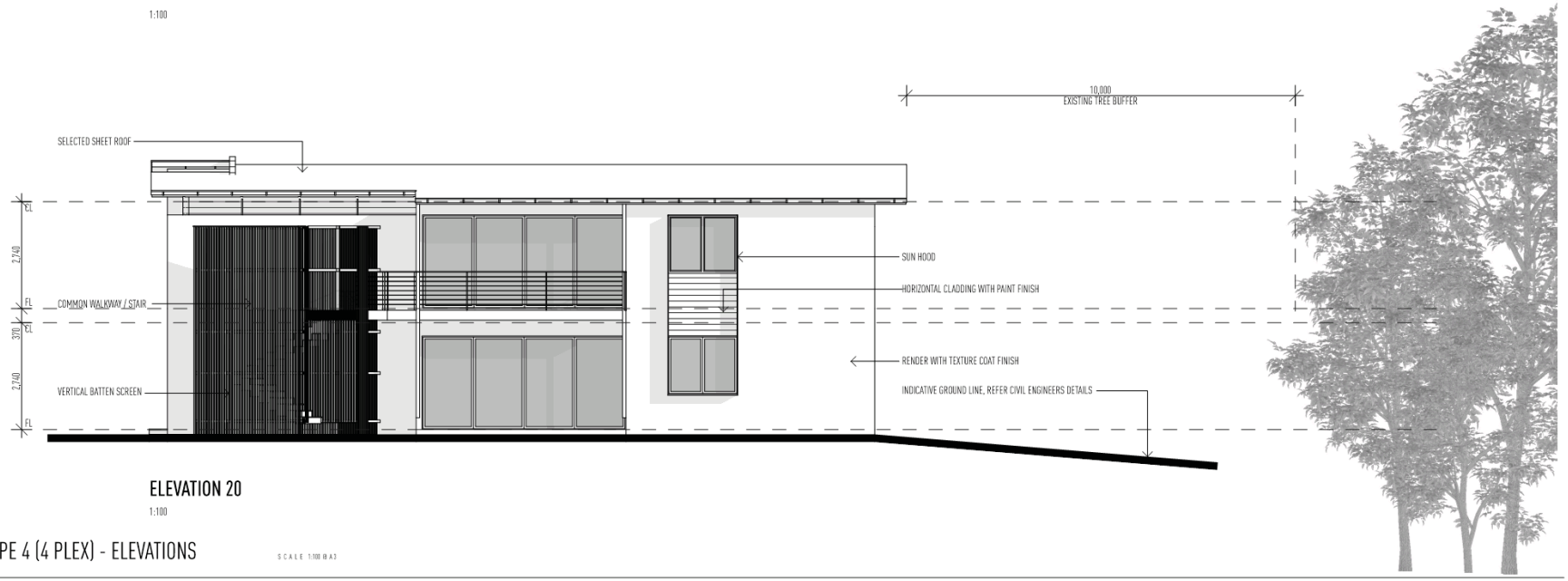

ELEVATION 20

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TYPE 4 (4 PLEX) - ELEVATIONS

SCALE 1:100 @ A3

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DRAWING - TYPE 4 (4 PLEX) - ELEVATIONS
DRAWING No. BP783/9.5
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PROJECT
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DRAWING - TYPE 5 (LUXURY RESORT SUITES)
DRAWING No. BP783/10.1
ISSUE A-A

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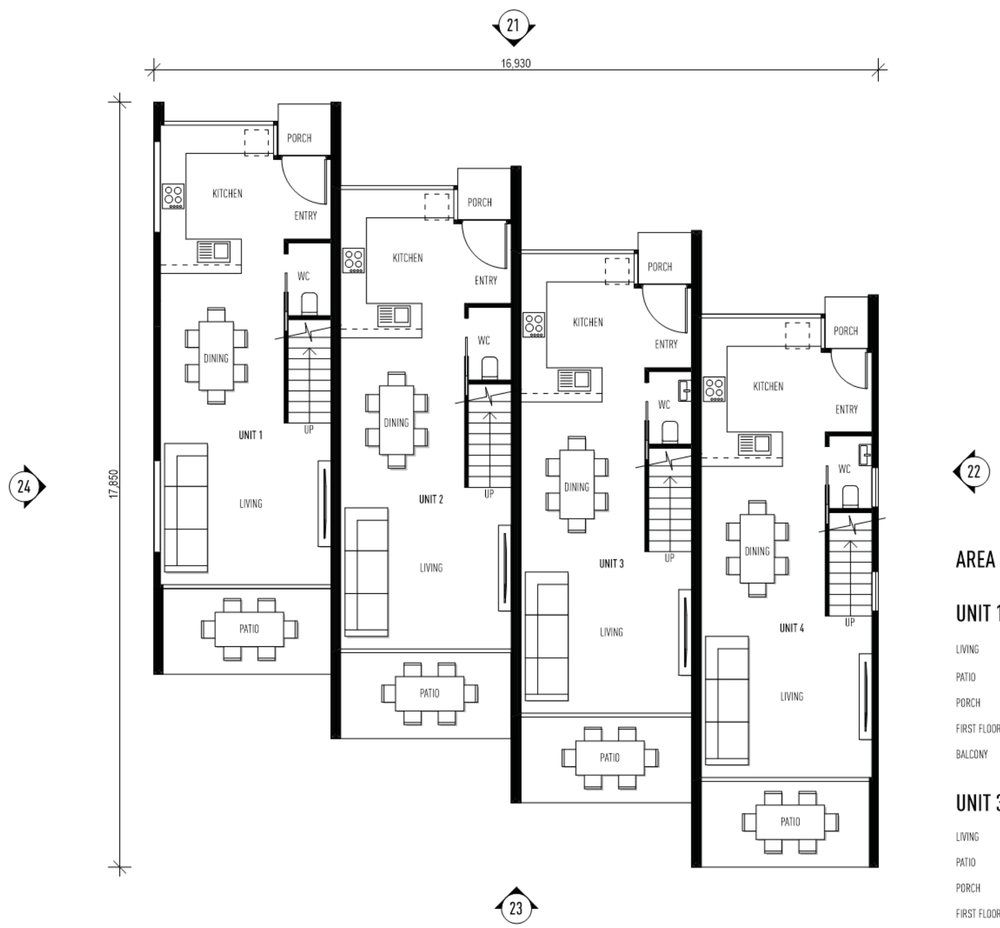

AREA SCHEDULE

UNIT 1

LIVING	45.68
PATIO	8.50
PORCH	1.00
FIRST FLOOR LIVING	46.68
BALCONY	8.50
	110.36 m²

UNIT 2

LIVING	45.21
PATIO	8.60
PORCH	1.00
FIRST FLOOR LIVING	46.21
BALCONY	8.60
	109.62 m²

UNIT 3

LIVING	45.21
PATIO	8.60
PORCH	1.00
FIRST FLOOR LIVING	46.21
BALCONY	8.60
	109.62 m²

UNIT 4

LIVING	45.60
PATIO	8.67
PORCH	0.81
FIRST FLOOR LIVING	46.42
BALCONY	8.67
	110.17 m²

TOTAL 439.77 m²

TYPE 5 (LUXURY RESORT SUITES) - GROUND FLOOR PLAN

SCALE 1:100 @ A3

ISSUE	DATE	DESCRIPTION
A-A	16.11.18	PROJECT REDESIGN IN RESPONSE TO INFORMATION REQUEST

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FOR
NEW LAND TOURISM PTY LTD

DRAWING - TYPE 5 (LUXURY RESORT SUITES) - GROUND FLOOR PLAN
DRAWING No. BP783/10.2
ISSUE A-A

POOLE

TYPE 5 (LUXURY RESORT SUITES) - FIRST FLOOR PLAN

SCALE 1:100 @ A3

ISSUE	DATE	DESCRIPTION
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REDLAND BAY QUEENSLAND QLD
FOR
NEW LAND TOURISM PTY LTD

DRAWING - TYPE 5 (LUXURY RESORT SUITES) - FIRST FLOOR PLAN
DRAWING No. BP783/10.3
ISSUE A-A

POOLE

ELEVATION 21
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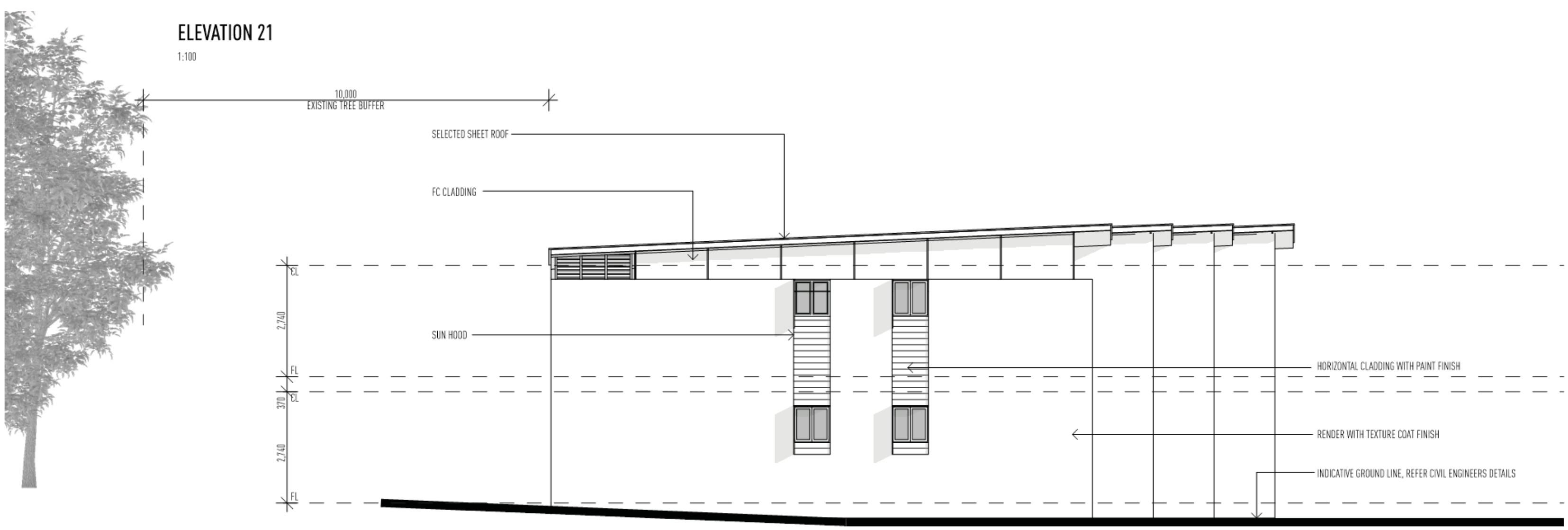

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TYPE 5 (LUXURY RESORT SUITES) - ELEVATIONS

SCALE 1:100 @ A3

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PO BOX 42, ISLE OF CAPRI, Q. 4217 AUSTRALIA
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DRAWING - TYPE 5 (LUXURY RESORT SUITES) - ELEVATIONS
DRAWING No. BP783/10.4
ISSUE A-A

POOLE

ELEVATION 23
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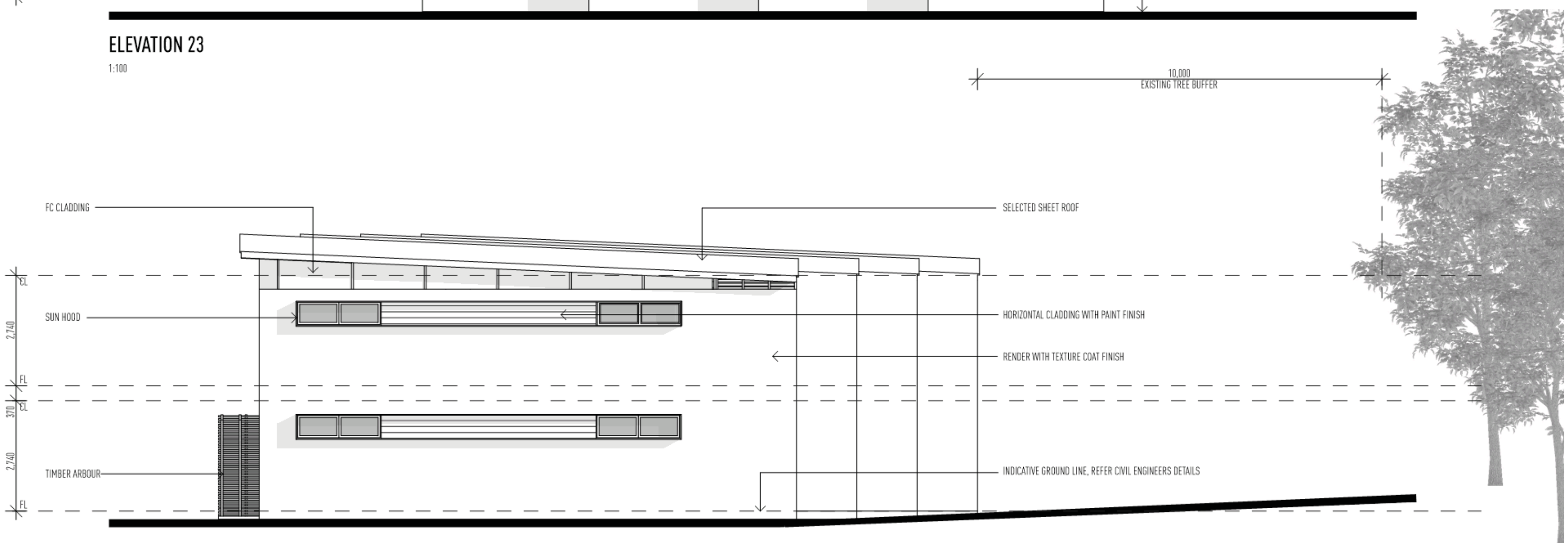

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TYPE 5 (LUXURY RESORT SUITES) - ELEVATIONS

SCALE 1:100 @ A3

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PROJECT
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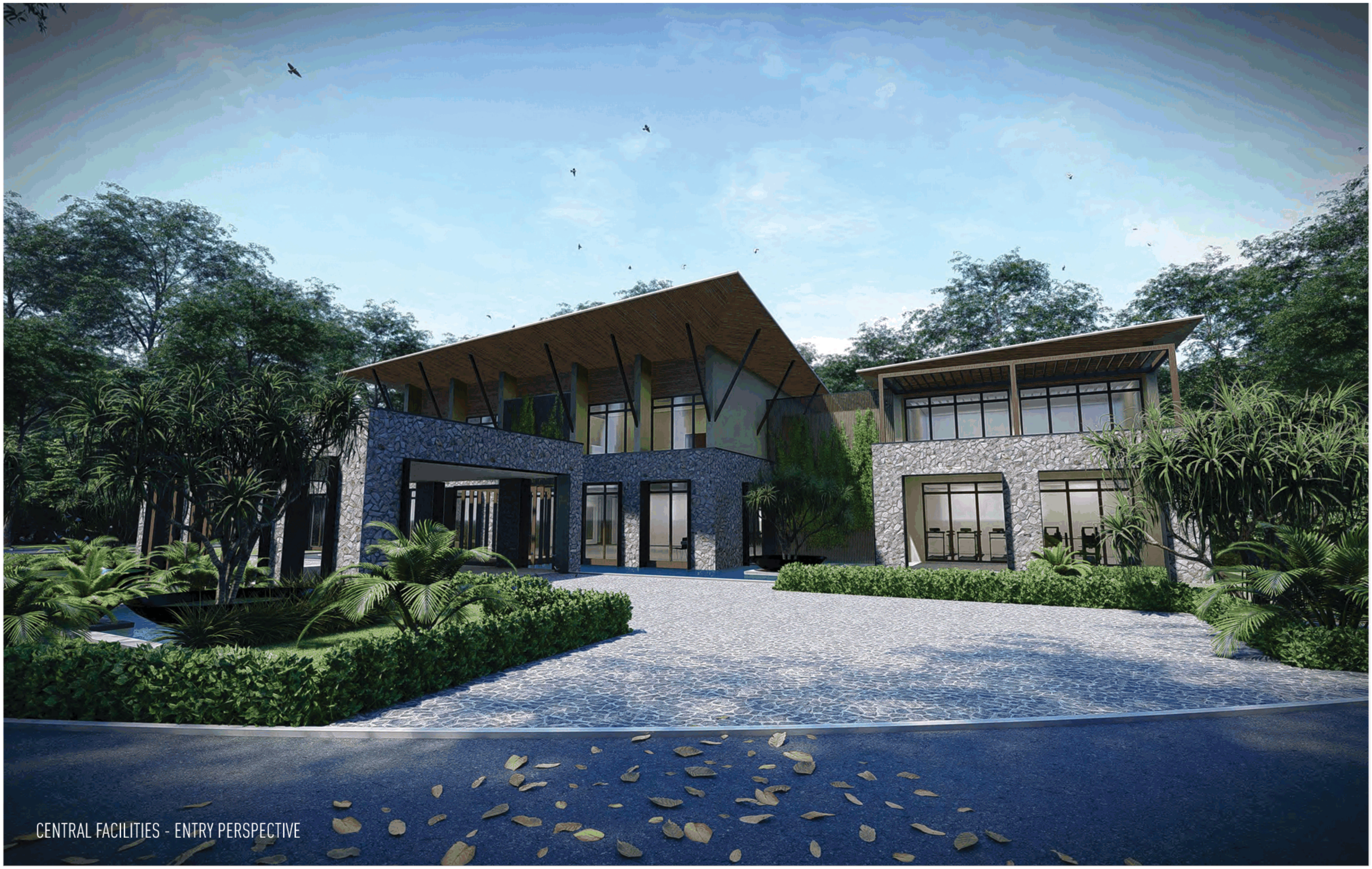
NEW LAND TOURISM PTY LTD

DRAWING - TYPE 5 (LUXURY RESORT SUITES) - ELEVATIONS
DRAWING No. BP783/10.5
ISSUE A-A

POOLE



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PROJECT
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DRAWING - CENTRAL FACILITIES PERSPECTIVE
DRAWING No. BP783/11.1
ISSUE A-A

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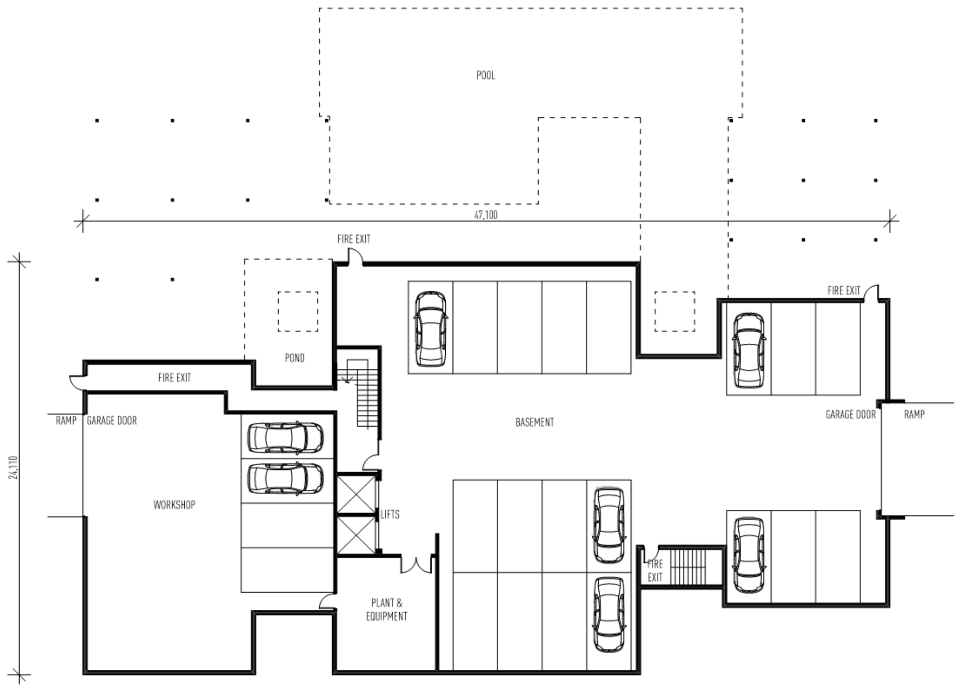

CENTRAL FACILITIES - BASEMENT

SCALE 1:250 @ A3

ISSUE	DATE	DESCRIPTION
A-A	16.11.18	PROJECT REDESIGN IN RESPONSE TO INFORMATION REQUEST

JAREDPOOLEDESIGN
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PO BOX 42, ISLE OF CAPRI, Q. 4217 AUSTRALIA
TEL 07 5527 5300 EMAIL INFO@JPD.COM.AU WEB JPD.COM.AU

PROJECT
A PROPOSED NEW ECO DEVELOPMENT
AT
REDLAND BAY QUEENSLAND QLD
FOR
NEW LAND TOURISM PTY LTD

DRAWING - CENTRAL FACILITIES - BASEMENT
DRAWING No. BP783/11.2
ISSUE A-A

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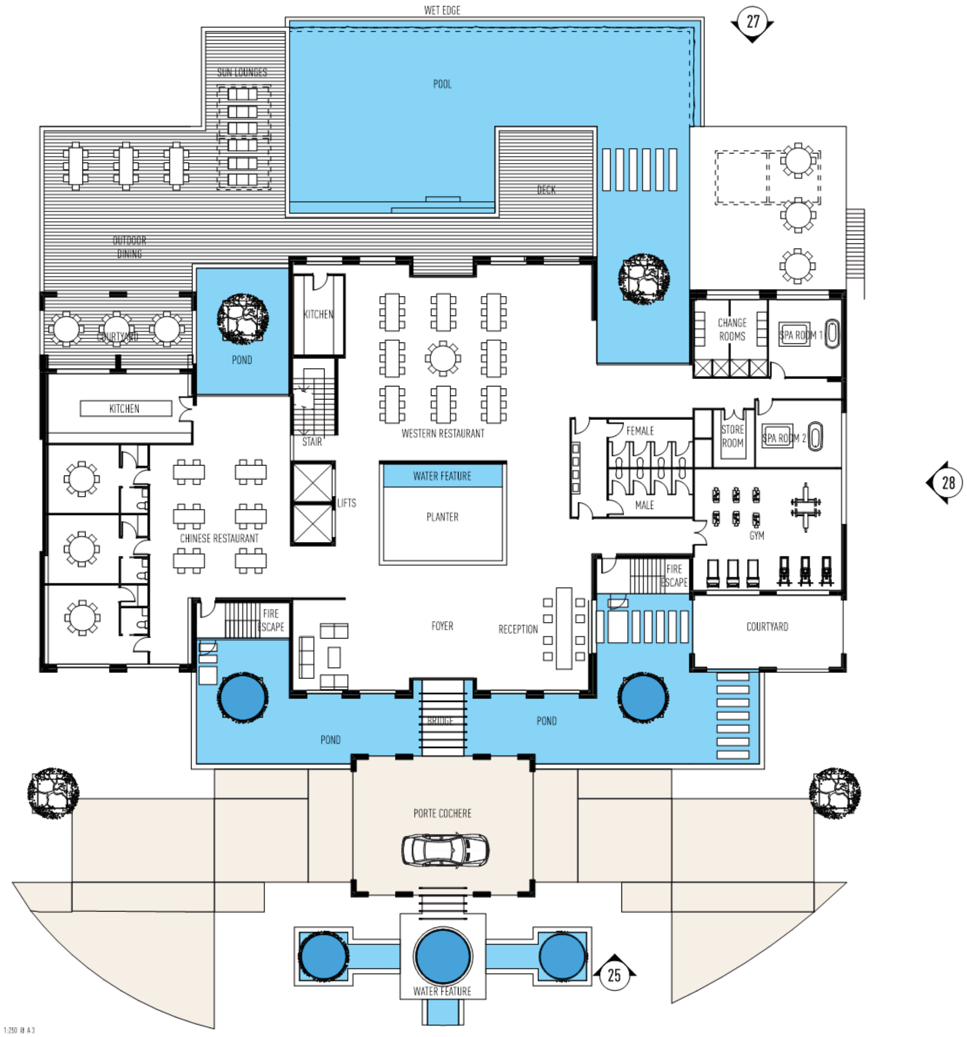

AREA SCHEDULE

BASEMENT	921
GROUND FLOOR	946
OUTDOOR DECK	371
POOL	329
COURTYARD	42
PORTE COCHERE	70
FIRST FLOOR	907
BALCONY	83
TOTAL	3669 m²

CENTRAL FACILITIES - GROUND FLOOR

SCALE 1:250 @ A3

ISSUE	DATE	DESCRIPTION
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DRAWING - CENTRAL FACILITIES - GROUND FLOOR
DRAWING No. BP783/11.3
ISSUE A-A

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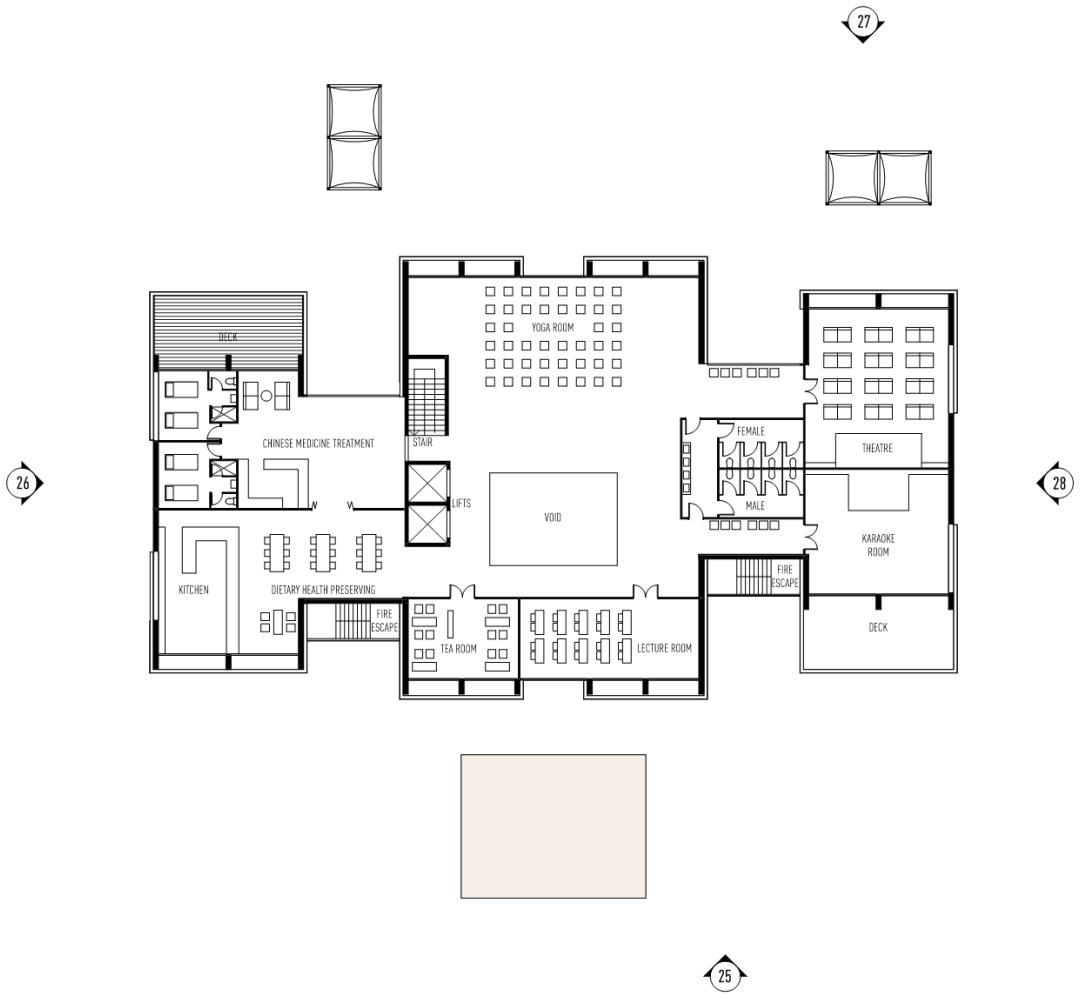

CENTRAL FACILITY - FIRST FLOOR

SCALE 1:250 @ A3

ISSUE	DATE	DESCRIPTION
A-A	15.11.18	PROJECT REDESIGN IN RESPONSE TO INFORMATION REQUEST

JAREDPOOLEDESIGN
LEVEL 7 33 ELKHORN AVENUE, SURFERS PARADISE, QLD, 4217 AUSTRALIA
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TEL: 07 5527 5300 EMAIL: INFO@JPD.COM.AU WEB: JPD.COM.AU

PROJECT
A PROPOSED NEW ECO DEVELOPMENT
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DRAWING - CENTRAL FACILITY - FIRST FLOOR
DRAWING No. BP783/11.4
ISSUE A-A

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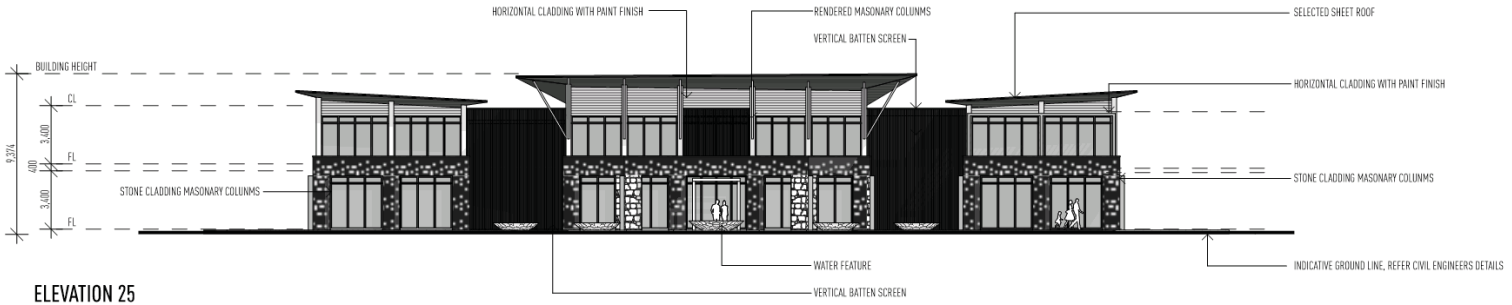

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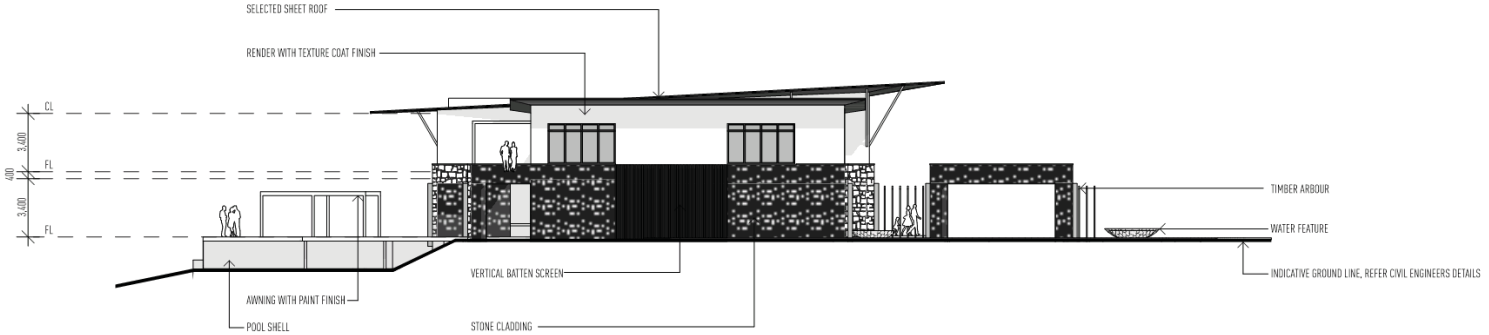

ELEVATION 26

1:100

CENTRAL FACILITY - ELEVATIONS

SCALE 1:250 @ A3

ISSUE	DATE	DESCRIPTION
A-A	13.11.18	PROJECT REDESIGN IN RESPONSE TO INFORMATION REQUEST

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LEVEL 1 33 ELKHORN AVENUE, SURFERS PARADISE, QLD, 4217 AUSTRALIA
PO BOX 42, OLD SPIT CAPRI, QLD, 4217 AUSTRALIA
TEL 07 5527 5300 EMAIL INFO@JPD.COM.AU WEB JPD.COM.AU

PROJECT
A PROPOSED NEW ECO DEVELOPMENT
AT
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FOR
NEW LAND TOURISM PTY LTD

DRAWING - CENTRAL FACILITY - ELEVATIONS
DRAWING No. BP783/11.5
ISSUE A-A

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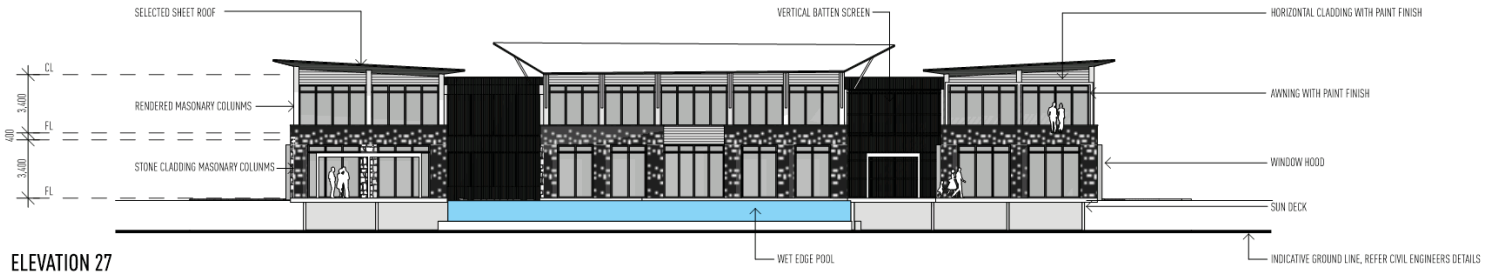

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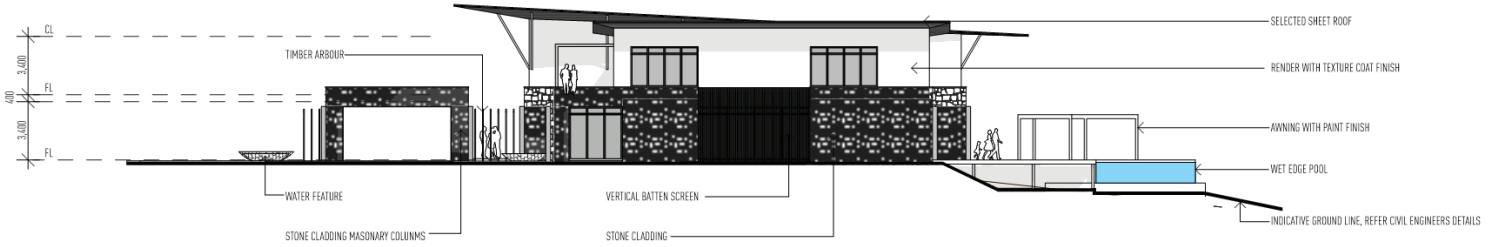

ELEVATION 28

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CENTRAL FACILITY - ELEVATIONS

SCALE 1:250 @ A3

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A-A	13.11.18	PROJECT REDESIGN IN RESPONSE TO INFORMATION REQUEST

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LEVEL 1 33 ELKHORN AVENUE, SURFERS PARADISE, Q. 4217 AUSTRALIA
PO BOX 42, OLD SPCMPO, Q. 4217 AUSTRALIA
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DRAWING - CENTRAL FACILITY - ELEVATIONS
DRAWING No. BP783/11.6
ISSUE A-A

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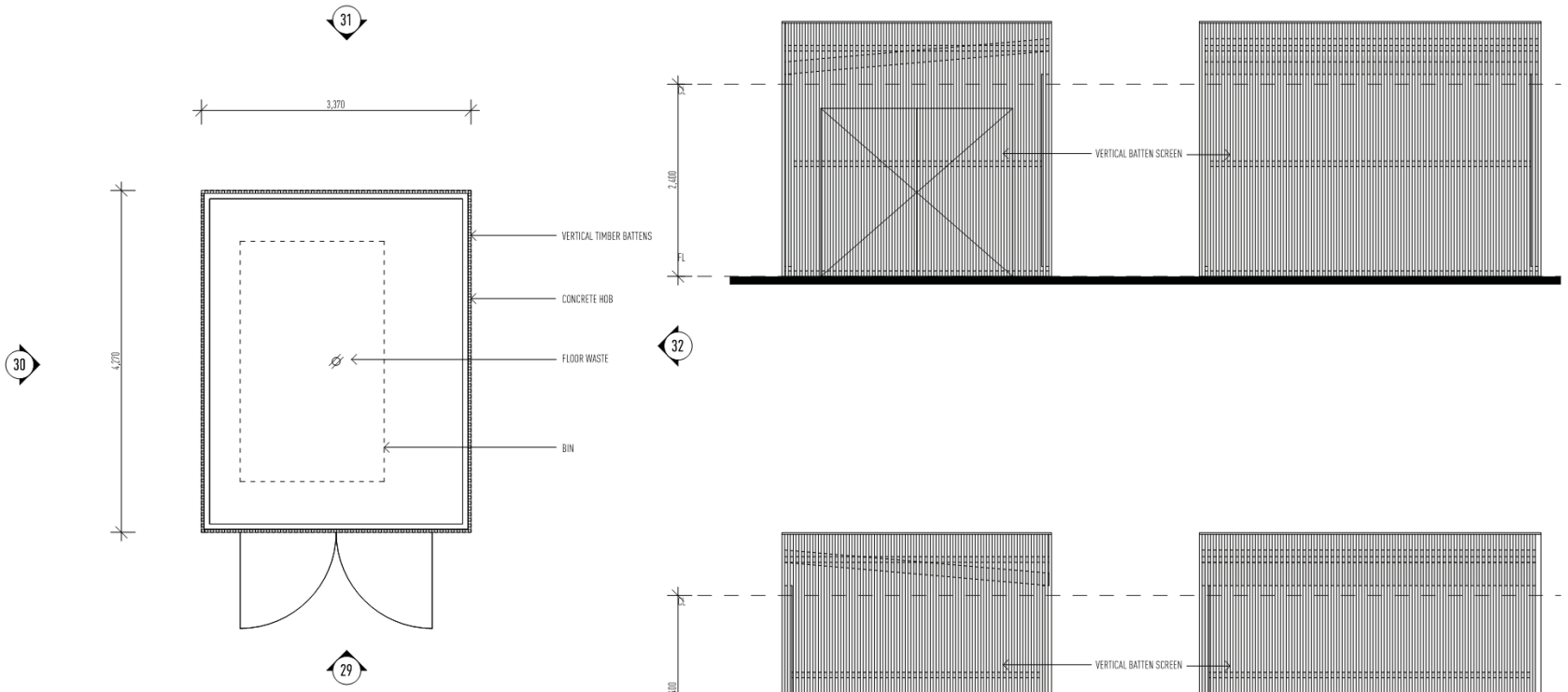

TYPICAL BIN STORE

SCALE 1:50 @ A3

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PO BOX 42, OLD SOUTH COAST MAIL CENTRE, QLD, 4217 AUSTRALIA
TEL 07 5527 5300 EMAIL INFO@JPD.COM.AU WEB JPD.COM.AU

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DRAWING - TYPICAL BIN STORE
DRAWING No. BP783/12.1
ISSUE A-A

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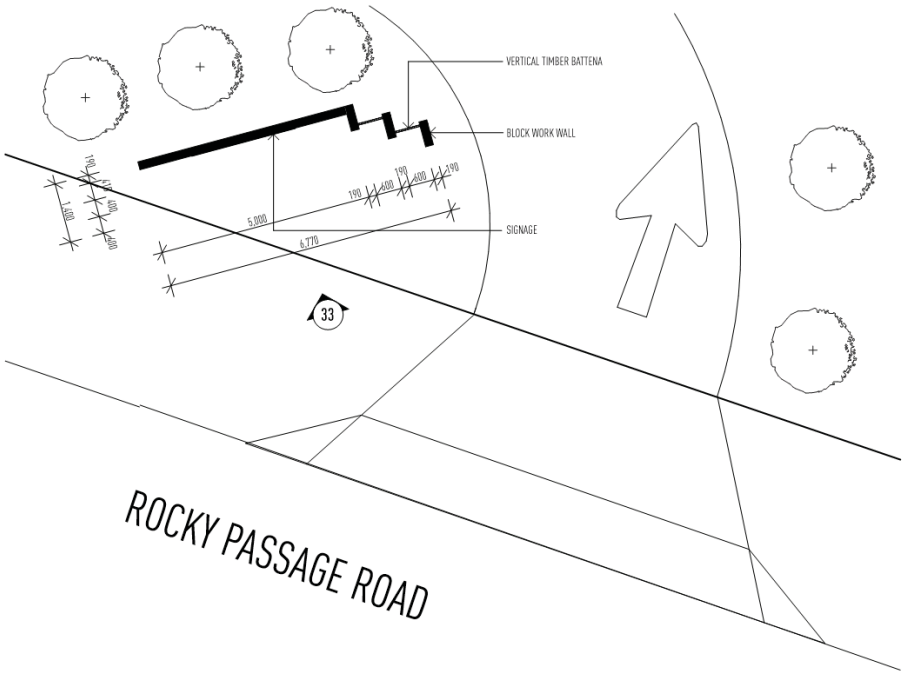

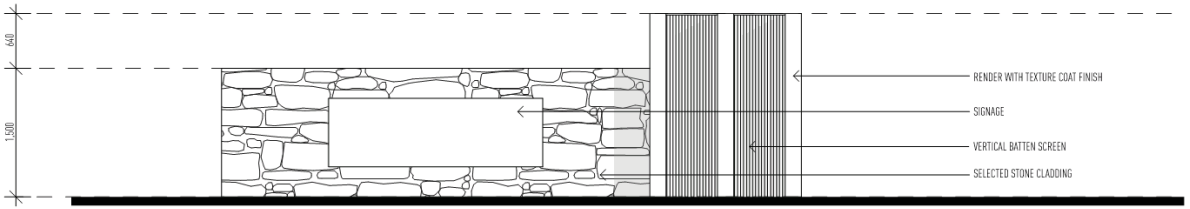

ENTRY STATEMENT

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ISSUE	DATE	DESCRIPTION
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DRAWING - ENTRY STATEMENT
DRAWING No. BP783/12.2
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MATERIALS AND FINISHES

SCALE @ A2

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DRAWING - MATERIALS AND FINISHES
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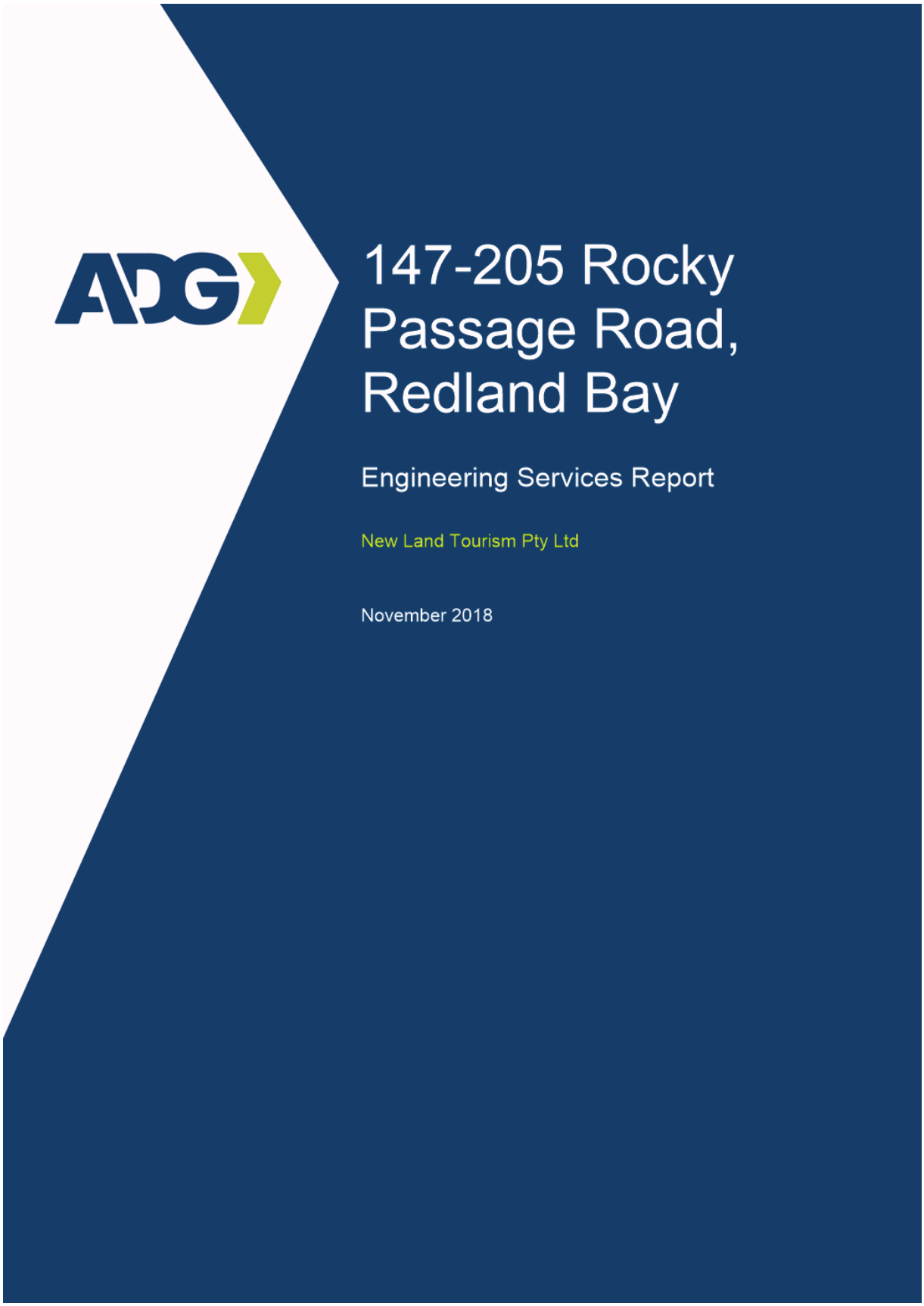

ADG
147-205 Rocky Passage Road, Redland Bay
Engineering Services Report
New Land Tourism Pty Ltd
November 2018

Document Verification

Job Title 147-205 Rocky Passage Road, Redland Bay

Job Number 18547

Document Title Engineering Services Report

Document Control

Date	Document	Revision No.	Author	Reviewer
17.05.2017	Engineering Services Report	00	M Brown	M Lepelaar
31.08.2017	Engineering Services Report - Revised Site Layout	01	M Brown	M Lepelaar
07.06.2018	Engineering Services Report – RFI Response	02	M Brown	M Lepelaar
05.11.2018	Engineering Services Report - Revised Site Layout	03	M Brown	M Lepelaar

Approval for Issue

Name	Signature	Date
Matthew Brown		05.11.2018
Michael Lepelaar		05.11.2018

Contents

Tables

Figures

Appendices

1 INTRODUCTION

1.1 GENERAL

ADG Engineers (Aust.) Pty Ltd was engaged by New Land Tourism Pty Ltd to prepare an Engineering Services Report (ESR) suitable for submission to Redland City Council (RCC) as additional information in support of a Development Application for a new proposed Eco Development located at 147-205 Rocky Passage Road, Redland Bay.

The purpose of this ESR is to provide advice on the development proposal as detailed in the Jared Poole Design architectural drawings located in **Appendix A** and the preliminary civil services sketch drawings created by ADG Engineers located in **Appendix E**. The works described herein are subject to further approvals and cover works required to service the proposed development with regard to earthworks, roadworks, stormwater drainage, sewerage and water supply, electrical and communications services.

The required infrastructure will be subject to the conditions attached to the Development Approval to be provided by Redland City Council (RCC) and any nominated referral agencies.

1.2 BACKGROUND INFORMATION

This report was compiled using information from the following sources:

- RCC As-constructed data;
- Site Layout Plans by Jared Poole Design;
- 'Dial Before You Dig' (DBYD) As-constructed information; and
- Detailed survey plan prepared by Arnold Development Consultants (QLD).

2 THE SITE

2.1 LOCATION

The subject site is located at 147-205 Rocky Passage Road, Redland Bay within the RCC local government area and thus will be assessed by RCC officers.

Figure 1 displays the locality of the subject site. The site is bound by Rocky Passage Road to the east, Lot 1 on RP94934 to the south, Lots 4 & 5 on RP801795 to the west, EMT A on RP801795 and Lot 2 on SP117632 to the north. The site has access to the Logan River via a 20m wide strip in the property's south.

Figure 1 – Locality Map (As accessed from Google maps 20.01.2017)

2.2 PROPERTY DETAILS

The total site area is approximately 14.62ha and the existing land titles are provided in **Table 1**.

Table 1 – Property Detail

Property	Site Details
Title	Lot 3 on RP153333
Street Address	147-205 Rocky Passage Road, Redland Bay, QLD 4165
Total Site Area	14.62 ha

3 PLAN OF DEVELOPMENT

3.1 THE PROPOSAL

The proposed development as described in Jared Poole Design architectural drawings, dated June 2017, is for a proposed new eco development. As seen in **Table 2** this facility represents approximately 138.92 Equivalent Persons (EP) for water consumption. The proposed development is to be comprised of the following entities:

- Resort main building including indoor recreational facilities;
- 9 detached 3-bedroom villas;
- 52 attached 2-bedroom units across eleven buildings; and
- A swimming pool, pond, and a number of gardens.

Refer to the development drawings prepared by Jared Poole Design in **Appendix A** for further information regarding the proposed development.

Table 2 – Estimated Population for Water Consumption (As per Table A4 of the SEQ WS&S D&C Code)

Type of Use	Units	Quantity	Equivalent Tenements (ET)	Equivalent Population (EP)
Hotel (villas & residence interiors)	0.80 ET per Bedroom	131	30.13	81.35
Outdoor Recreation Facility (tennis court and pool)	1.06 ET per 100m^2	710 m^2	7.53	20.33
Indoor Recreation Facility (without showers)	0.06 ET per 100m^2	2,130 m^2	1.28	3.46
Refreshment Establishment (restaurants)	2.05 ET per 100m^2	610 m^2	12.51	33.78
Total			**51.45**	**138.92**

4 CHARACTERISTICS OF THE LAND & SURROUNDING AREA

4.1 DESCRIPTION

The subject site currently comprises of one freehold property (Lot 3 on RP153333). Under the RCC Planning Scheme the subject site is currently zoned as a 'Regional Landscape and Rural Production Area'.

4.2 DIMENSIONS

The total site area is 14.62ha and is shaped like a rhombus with indented sides, stretching approximately 900m from north to south, and approximately 220m from east to west. The site has approximately 540m of road frontage to Rocky Passage Road on the east side of the site and 20m of frontage to the Logan River to the south west. Aerial Photograph of the site is shown in **Figure 2**.

Figure 2 – Existing Site Condition (As Accessed from Google Maps 20.01.2017)

4.3 TOPOGRAPHY

The several high-points are located in the centre of the subject site, including one in the north-west corner, one in the north-east corner, and on in the south-west corner with grades ranging between 10% to 40%. The subject site contains a number of gullies, several of which drain to the existing dams.

Please refer to the survey information prepared by Arnold Development Consultants in **Appendix B** for further information.

4.4 FEATURES

The existing site features a predominately pervious area consisting of two existing dwellings with accompanying garage/shed structures. The main residence is located centrally in the allotment and a smaller cottage is located approximately 150m to the south of the main residence. There is a pool area and tennis court to the west of the main residence.

A concrete driveway connects Rocky Passage Road to a bitumen parking area at the front of the main residence.

For futher information regarding the existing features of the site please refer to the detailed survey provided by Arnold Development Consultants located in **Appendix B**.

4.5 ACCESSIBILITY

The main residence is accessed by a concrete driveway that connects to Rocky Passage Road which runs west into the centre of the allotment to a bitumen parking area. This bitumen extends south approximately 75m connecting to a cottage.

For futher information regarding the existing features of the site please refer to the detailed survey provided by Arnold Development Consultants in **Appendix B**.

4.6 EASEMENTS

No existing easements have been identified within the subject site. For further information refer to the detailed survey provided by Arnold Development Consultants in **Appendix B**.

5 EARTHWORKS

It is proposed to minimise earthworks required across the site as much as possible in order to achieve the proposed access requirements outlined in Section 6 and the drainage requirements outlined in the Stormwater Management Plan for the site dated August 2017. The main area of earthworks to occur on site is for the effluent disposal area. To ensure sufficiently flat slopes (<10%) for the disposal area and to improve the soil characteristics, cut and fill of existing material and importation of soil media better suited for effluent disposal will occur.

The remainder of the site earthworks are generally limited to that associated with creation of driveways and the main building pad. The smaller individual villas will largely be suspended over the existing topography.

Refer to ADG Drawings DA01, DA02 and DA03 (Preliminary Bulk Earthworks Layout and Sections) in **Appendix E** for further details of the proposed earthworks.

5.1 CONSTRUCTION CONTROLS

In all situations where earthworks are proposed, sediment and erosion control measures will be implemented in accordance with the following documents:

- I.E. Australia "Sediment and Erosion Control Guidelines".
- Redland Bay Land Planning Scheme
- Healthy Waterways: Erosion and Sediment Control - Factsheet 1 of 10
- International Erosion Control Association, Australasia: Erosion and Sediment Control Field Guide for Builders

A sediment and erosion control plan shall be provided as part of any future operational works applications. As a minimum, sediment and erosion control measures will be in accordance with the below details:

Pre-Construction

Sediment and erosion control measures will be developed as construction progresses through each stage. Prior to construction commencing the following sediment and erosion control measures will be implemented to minimise disturbance and ensure water quality is maintained.

- Diversion channels to redirect clean water from upstream catchments away from disturbed areas;
- Shakedown areas at the construction access to prevent vehicle transport of sediments off site.

During Construction

The following measures will be undertaken to mitigate water quality impacts during construction phase:

- Sediment fences to be erected at the base of all batters and stockpiles to prevent sediment transportation off site;
- Temporary sediment basins to be provided at the existing discharge point on the north east property boundary for duration of construction to capture any sediment conveyed within stormwater flows;
- Any water pumped from out of the sediment basins after a rain event will ensure that the sediment has settled prior to pumping;
- Grass filter strips to be placed along all road verges;
- Re-vegetation of all disturbed areas within two weeks of completion;
- Appropriate use of grass lined swales to treat flows prior to entry into the sediment basin.

5.2 ACID SULFATE SOILS

Acid Sulfate Soils are soils which contain iron sulphides generally found in low-lying coastal areas below 20m AHD. As shown in **Figure 3**, a review of the RCC Potential and Actual Acid Sulfate Soils Overlay Map has identified that the proposed development will be located above 20m AHD. ADG believe that due to these facts, the site has minimal chance of encountering Acid Sulfate Soils.

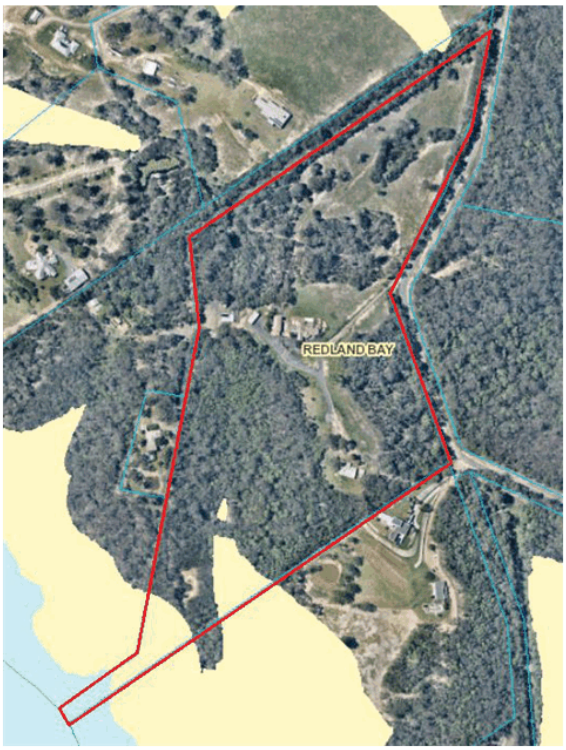


Figure 3– Acid Sulfate Soil Overlay Map

6 ROADWORKS

6.1 EXISTING INFRASTRUCTURE

The development has frontage to Rocky Passage Road, which is described as two-way sealed road without line-marking and 3.5m wide lanes. The road is crowned and has no shoulder. A barrier kerb commences on the east side of the road just south of the northern site boundary and continues south for approximately 315m. Around 50m of barrier kerb is located on the west side of the road in the immediate vicinity of the existing primary site access point. Where kerbing is not present table drains run parallel to the road within the road reserve.

6.2 PROPOSED INFRASTRUCTURE

The proposed development will be serviced by an internal sealed access driveway as seen in **Appendix A**. The internal driveway grades have been limited to 15.8% in order to comply with AS2890 for service vehicles and busses. The dwellings located on the northern and southern fingers of the development will not be provided with direct vehicular access, rather will be provided with access trails suitably graded to be accessed using a golf buggy or similar vehicle.

It is proposed that two new vehicle crossovers will be installed to accommodate the development's traffic demands and designated ingress and egress points to the site from Rocky Passage Road. The proposed development will result in an increase in the number of vehicles entering and exiting the site. A traffic impact assessment is being prepared by Skilld Traffic to further address the traffic aspects for the site.

7 WATER SUPPLY

7.1 EXISTING INFRASTRUCTURE

The nearest potable water supply main is located 3.20km to the north of the northern tip of the site, at the intersection of Serpentine Creek Road and Scenic Road. A site investigation has confirmed that the site currently uses rainwater tanks as a water supply. It is understood that the proposed Shoreline development to the north of the site has been allocated the entirety of the existing spare capacity in the water network. It is further understood that this development will upgrade the existing network in the future at which stage spare capacity could supply the proposed development.

7.2 PROPOSED INFRASTRUCTURE

Should an agreement be reached with the developer of the Shoreline site it would be possible to upgrade the existing water network as previously described in time to service the proposed development. Should no agreement be possible the proposed development is to be supplied via water trucks.

7.2.1 Site Supplied from Potable Network (Option 1)

In accordance with **Table 2**, the estimated population of the proposed development has been assumed to be 138.92 Equivalent Persons (EP). The resulting estimated water consumption for the site has been calculated based on Table 4.1 of the SEQ WS&S D&C Code and is shown in **Table 3**.

Table 3 – Estimated Water Consumption

Estimated Item	Demand	
	(kL/d)	(L/s)
Non-Revenue Water (NRW)	4.2	0.05
Average Day Demand (AD) (230L/EP/d)	32.0	0.37
Mean Day Max. Month (MDMM) (1.5 x AD)	47.9	0.55
Peak Day Demand (PD) (2 x AD)	63.9	0.74
Peak Hour Demand (PH) (4 x AD)	127.8	1.48

Assuming a site demand of 138.92 EP as per **Table 2** the proposed development will result in an Average Day (AD) flow of 0.42 L/s (including NRW). The subsequently calculated PD flow is 0.79 L/s and the calculated PH flow is 1.53 L/s (both including NRW).

Following telephone and email discussions with Council officer Matthew Ingerman (see **Appendix G**), the water network boundary pressure at water model Node ID: J10246 (at the intersection of Serpentine Creek Road and Scenic Road) is 59.8m AHD during a flow draw of 15.95 L/s. As the proposed development's PD flow is estimated well below 15.95 L/s, a pressure head of 59.8m AHD can be taken to be a very conservative estimate of pressures at this location. It is proposed to supply the site from this connection point using a DN110 PE100 low-flow main. The main is proposed to allow low-pressure flow from the existing Redland Bay reticulated water network as shown in **Appendix E**. The main will run south from the Serpentine Creek Road – Scenic Road intersection

for 1.8km along the west side of Serpentine Creek Road then turn south under the Rocky Passage Road intersection before following Rocky Passage Road for 1.4km to the site.

The maximum elevation along the proposed low-flow water main alignment is observed to be 33.5m AHD (based on Council Red-e-map information). The proposed low-flow water main is estimated to be 3,200m in length. Assuming a PE100 DN110 PN16 water main with an internal diameter of 89mm and a Hazen-Williams co-efficient of 110 losses within the pipe have been calculated to be 1.34m during PD flows and 4.29m during PH flows at the point of maximum elevation (33.5m AHD, 3000m along the pipe alignment). This results in pressures at the critical point on the proposed supply main of 24.96m (59.8 - 33.5 - 1.34 = 24.96) during PD flows and 22.01m (59.8- 33.5 – 4.29 = 22.01) during PH flows.

The elevation at the northern site boundary of the proposed development is 25m AHD. Assuming the same water main attributes losses at the end of the water main have been calculated to be 1.34m during PD flows and 4.58m during PH flows, resulting pressures within the proposed low-flow water main at the northern site boundary of 33.46m (59.8 - 25.0 - 1.34 = 33.46) during PD flows and 30.22m (59.8 - 25.0 - 4.58 = 30.22) during PH flows.

It can subsequently be seen that the proposed main is capable of supplying the Peak Day (PH) flow rate to the site. Pressures will be boosted by a private booster internal to the site to ensure adequate pressures throughout the proposed internal water reticulation network in accordance with the requirements of the SEQ Code (min 22m pressure).

With such a long length of water main proposed and a relatively low daily consumption it is important to consider the age of the water between the Council network and the consumer. Assuming a period of low consumption with a rate of 20.2 kL/d (50% AD +NRW), it will require approximately 23 hours 40 minutes for water to travel the 3.2km through the proposed DN110 (Internal Diameter 89mm) water main to the site.

A private ground level fire-fighting reservoir is proposed to be located on the site, the exact size of which is to be confirmed with the hydraulic consultant during the detailed design phase of the development. It is proposed that this reservoir will be topped-up from the low-flow water main, but will not be connected to the potable reticulation network within the site and will instead feed separate hydrant network. This means the reservoir will not detrimentally affect the quality of the potable water supply as a result of long-storage times before consumption. Flows from the on-site reservoir through the hydrant network will be serviced by a private booster pump station as required in order to provide sufficient fire-fighting pressures across the site in accordance with SEQ Code and Council requirements.

For more information on the proposed water infrastructure, refer to the conceptual layout of the proposed development in **Appendix E**.

7.2.1 Site Supplied by Water Trucks (Option 2)

As the site cannot connect to Councils reticulated water network under this scenario, the site would be serviced by an on-site potable water reservoir, supplied via water trucks. It is proposed that the reservoir will be sized so as to be capable of storing a volume equivalent to three PDs. This is equal to 204 kL. The site would then be supplied from this reservoir via a local pressurised potable water network. Pressures in this local network are to be boosted to compliant levels by a private pump.

8 SEWERAGE RETICULATION

8.1 EXISTING INFRASTRUCTURE

A site investigation has confirmed that there is no Council reticulated sewerage network in close proximity to the site, with the nearest Council owned reticulated sewer located approximately 5.5km to the north of the proposed site on Seabrae Drive. The existing dwelling is currently serviced by an on-site domestic wastewater system.

8.2 PROPOSED INFRASTRUCTURE

As the site cannot connect to Councils reticulated sewerage network, on-site sewerage treatment will be required for the site. A portion of the site has been identified for on-site effluent disposal. Previous investigations have identified that an effluent disposal area of approximately 2.0 ha would be required in conjunction with a 200kL wet weather storage basin for the proposed sewer load. Recent revisions to the site master plan due to environmental constraints have significantly reduced the previous area allocated for effluent disposal. The area of land remaining that will be suitable for on-site effluent disposal is approximately 1.5 ha. In times of high demand when effluent generation is above that which can be disposed of on site, the treated effluent will be pumped to on site storage tanks and removed from site by a licenced waste water removal company. Further details regarding the sizing of the effluent treatment and disposal system will be provided as part of future detailed design and ERA application.

9 STORMWATER DRAINAGE

9.1 EXISTING DRAINAGE

The detailed survey has identified that the only existing stormwater infrastructure currently in the vicinity of the site is the drainage infrastructure on Rocky Passage Road, including a drainage swale running parallel to the road and two stormwater culverts flowing west-east under the road - one towards the south of the site and one towards the north.

Please refer to the detailed survey provided by Arnold Development Consultants provided in **Appendix B** for further information regarding the existing stormwater infrastructure.

9.2 PROPOSED DRAINAGE

The drainage proposed within the development will comply with the following documents:

- RCC Stormwater Drainage Guidelines
- Queensland Urban Drainage Manual
- AS3500.3 Plumbing and Drainage-Stormwater Drainage

The Conceptual Stormwater Management Plan dated November 2018 prepared by this office identified the necessary stormwater management measures.

9.3 FLOODING CONSIDERATIONS

A review of the RCC flood mapping overlay has identified that the entirety of the area proposed for development within the subject site is free of a designated flood zone.

10 ELECTRICAL SUPPLY

A review of the survey plans and site investigation indicate that the development area is currently serviced via overhead electricity cabling that extends from power poles located within the property. These power poles run along the eastern side of Rocky Passage Road and pass east-west through the site from the approximate centre of the eastern border past the western boundary of the site. There is also power pole located approximately 80m west from the south-east corner of the site supplied from the overhead cables on Rocky Passage Road. These overhead cables carry both high and low voltage electrical cables.

The Electrical Consultant will determine the extent of the upgrading and connection works that will be required to facilitate the required electrical reticulation for the proposed development at detailed design/operational works stage.

Refer to the survey supplied by Arnold Development Consultants in **Appendix B** for further details on the existing electrical reticulation.

11 COMMUNICATIONS

From the DBYD data for the subject site, it has been identified that communication services are located within the vicinity of the subject site. Telstra has underground communication cables running along Rocky Passage Road, and along the road that runs along the north border of the development site. The cables extend approximately 150m west from the south-east corner of the allotment.

It has been identified that there is also an NBN communication cable that runs along Rocky Passage Road.

It is proposed that the telecommunications consultant will negotiate with the relevant carriers regarding the requirements of the proposed development telecommunications connection and the extent of any upgrading and possible relocation works to the system if necessary.

Refer to the DBYD information in **Appendix C** for further details on the existing communication reticulation.

12 GAS

No existing gas services have been identified within close proximity to the subject site.

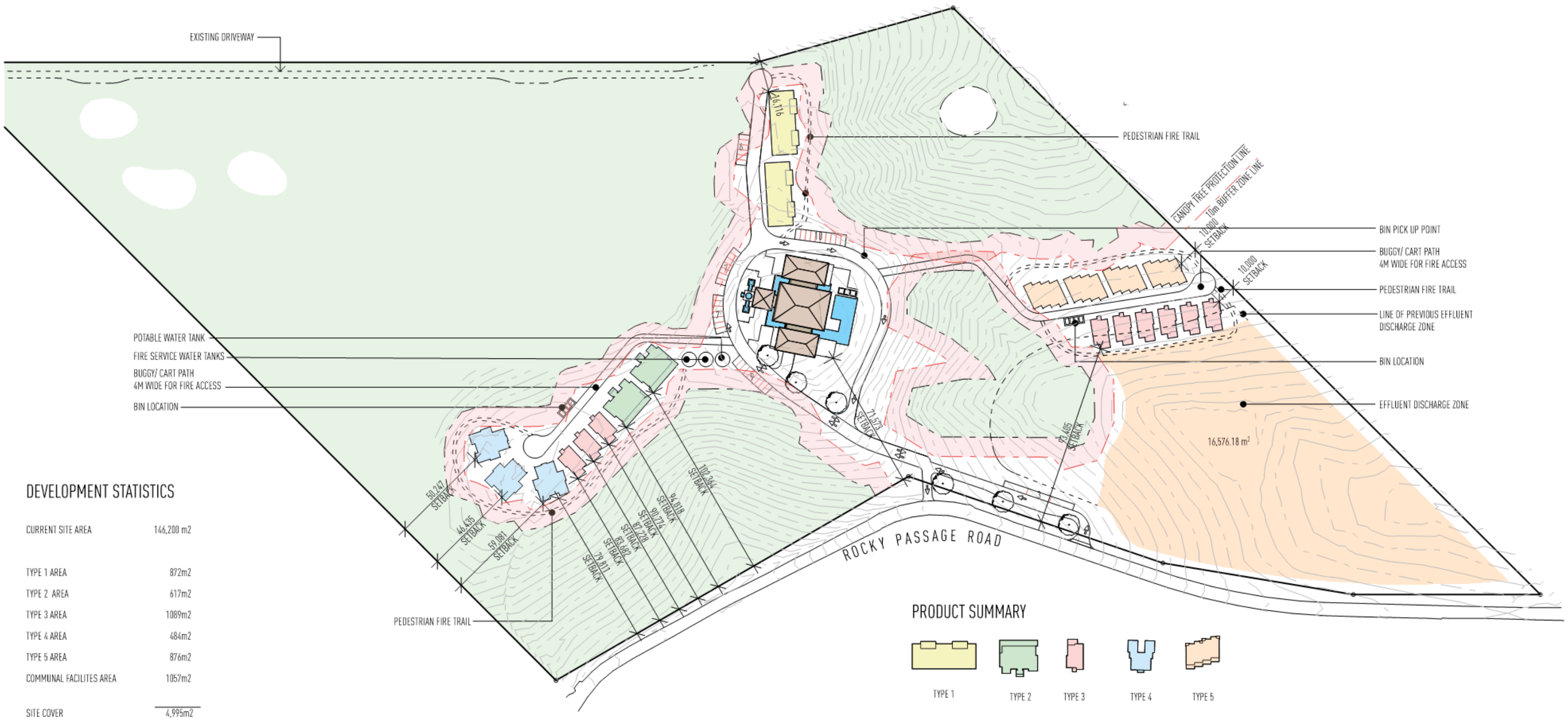
13 CONCLUSION

The information discussed in this report has been inferred from Redland City Council records and detailed survey data. Adequate services exist in the vicinity of the site to service the proposed development, with the exception of sewer, gas and water.

It is expected that:

- An on-site effluent treatment facility will be constructed within the development with sufficient capacity to service the wastewater needs of the proposed development;
- The site will be unserviced by reticulated gas; and
- The site will be provided with access to potable water through a proposed 3.2km long low flow main, private booster pump station and on-site reservoir.

Appendix A
Architectural Plans



DEVELOPMENT STATISTICS

CURRENT SITE AREA	146,200 m2	
TYPE 1 AREA	872m2	
TYPE 2 AREA	617m2	
TYPE 3 AREA	1089m2	
TYPE 4 AREA	484m2	
TYPE 5 AREA	876m2	
COMMUNAL FACILITES AREA	1057m2	
SITE COVER	4,995m2	
SITE COVER PERCENTAGE	3.4 %	(4,995m2 / 146,200m2)

CAR PARKING SCHEDULE

CARPARKING SPACE PROVIDED 80 (23 CENTRAL FACILITY BASEMENT)
(AS PER TRAFFIC ENGINEERS)

PRODUCT SUMMARY

TYPE 1
TYPE 2
TYPE 3
TYPE 4
TYPE 5

YEILD SUMMARY

YEILD	No. OF ACCOMMODATION BUILDINGS	No. OF UNITS/BUILDING	No. OF BEDROOMS/UNIT	TOTAL YIELD (ROOMS)
TYPE 1	2	8	2 BEDROOMS	32
TYPE 2	2	4	2 BEDROOMS	16
TYPE 3	9	1	3 BEDROOMS	27
TYPE 4	3	4	2 BEDROOMS	24
TYPE 5	4	4	2 BEDROOMS	32
TOTAL	20			131

CONCEPT MASTER PLAN

SCALE 1:2000 @ A3

JAREDPOOLEDESIGN
LEVEL 1 33 ELKHORN AVENUE, SURFERS PARADISE, Q. 4217 AUSTRALIA
PO BOX 42, ISLE OF CAPRI, Q. 4217 AUSTRALIA
TEL 07 5527 5300 EMAIL INFO@JPD.COM.AU WEB JPD.COM.AU

NORTH

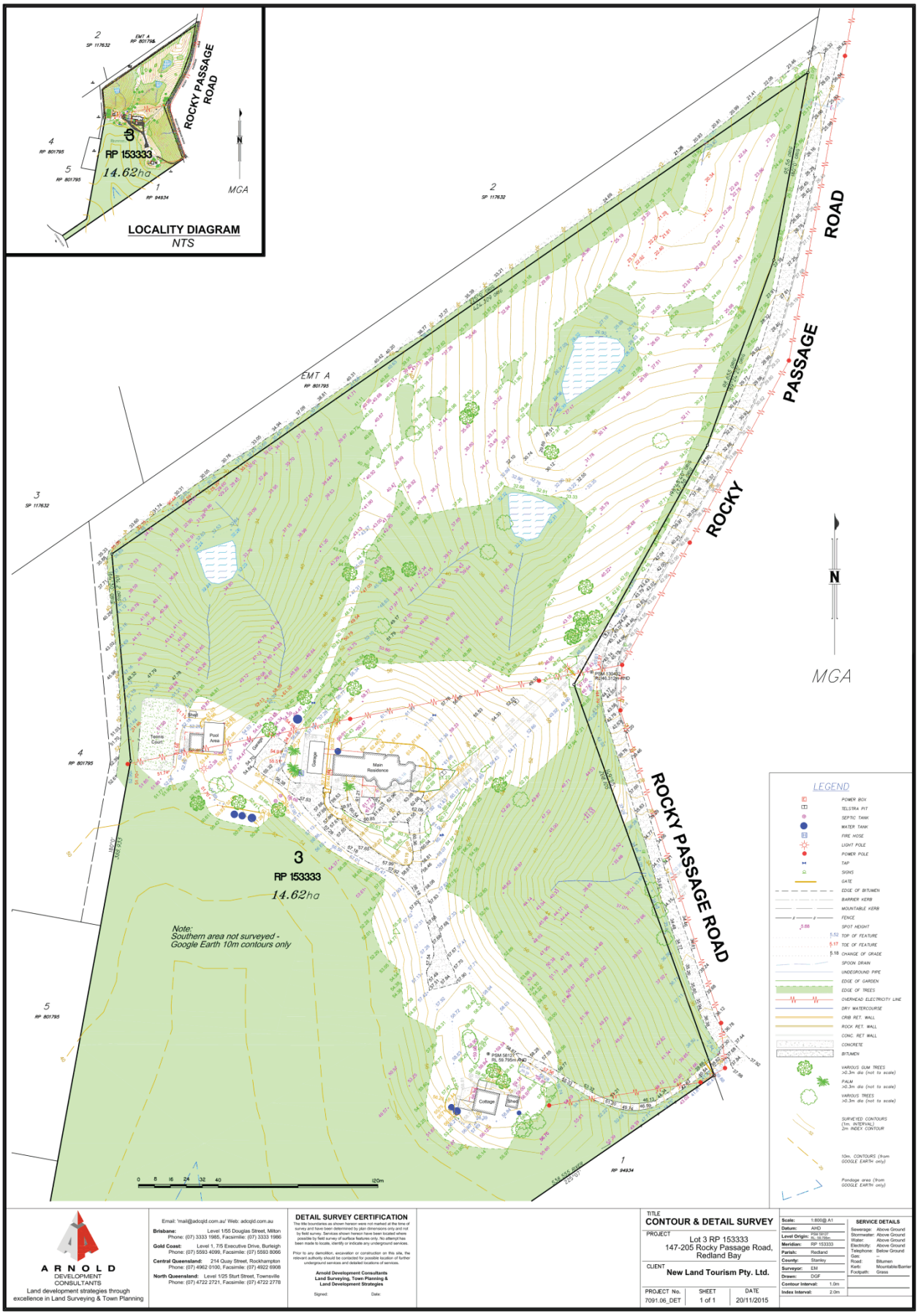
PROJECT
A PROPOSED NEW ECO DEVELOPMENT
AT
REDLAND BAY QUEENSLAND QLD
FOR
NEW LAND TOURISM PTY LTD

DRAWING - CONCEPT MASTER PLAN
DRAWING No. BP783/4.1
ISSUE F

POOLE

147-205 Rocky Passage Road, Redland Bay
ADG Ref: 18547 C R001 REV02 05.11.2018
November 2018

Appendix B
Arnold Development Consultants Detailed Survey


LOCALITY DIAGRAM
NTS
ROCKY PASSAGE ROAD
RP 153333
14.62ha
MGA
ROCKY PASSAGE ROAD
EMT A
RP 801795
3
RP 153333
14.62ha
Note:
Southern area not surveyed -
Google Earth 10m contours only
LEGEND
ARNOLD
DEVELOPMENT
CONSULTANTS
Land development strategies through excellence in Land Surveying & Town Planning
DETAIL SURVEY CERTIFICATION
CONTOUR & DETAIL SURVEY
Lot 3 RP 153333
147-205 Rocky Passage Road, Redland Bay
New Land Tourism Pty. Ltd.
PROJECT No. 7091.06_DET
SHEET 1 of 1
DATE 20/11/2015

147-205 Rocky Passage Road, Redland Bay
ADG Ref: 18547 C R001 REV02 05.11.2018
November 2018

Appendix C
DBYD Information

To:	Mr Chris Nicholson
Phone:	1300 657 402
Fax:	Not Supplied
Email:	studentgc@adgce.com

Dial before you dig Job #:	10897239
Sequence #	53911815
Issue Date:	06/29/2016
Location:	147-205 Rocky Passage Road,Redland Bay,QLD-4165

DIAL BEFORE YOU DIG www.1100.com.au

Some impact.

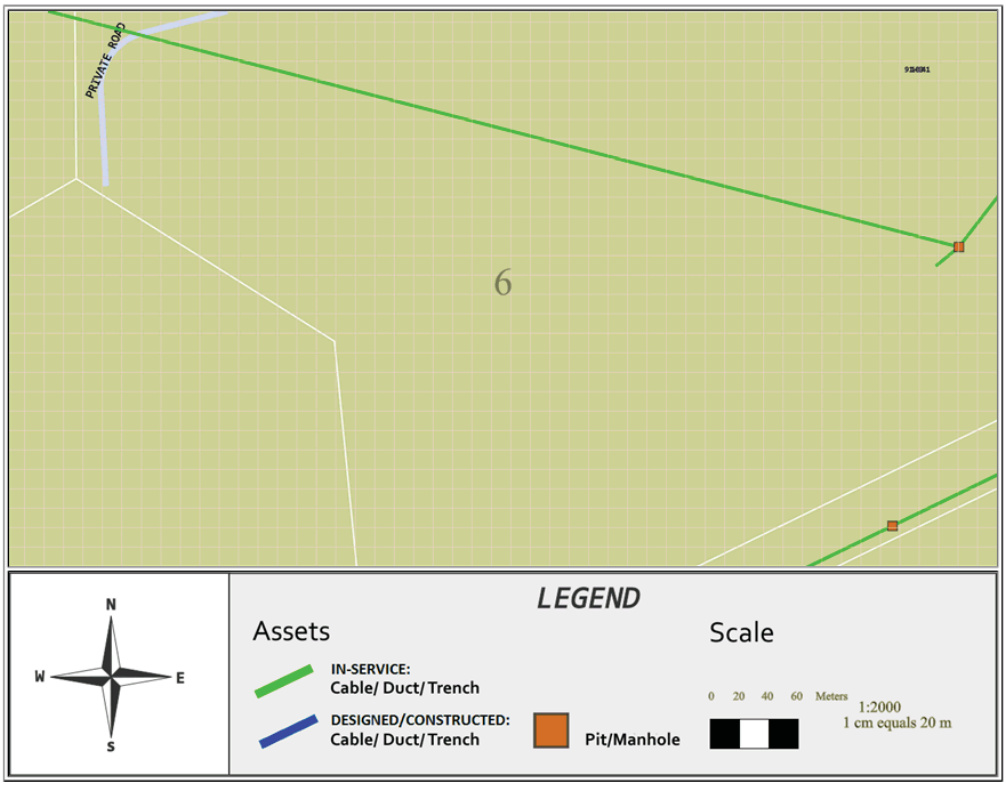
No onsite action required.

Location of Underground Telecommunications

We thank you for your enquiry. In relation to your enquiry at the above address:

- **nbn's** records indicate that there **MAY BE** underground fibre optic/telecommunications facility/facilities (owned or controlled by **nbn**) in the vicinity of the location identified above ("Location").
- **nbn** indicative plan/s are attached with this notice ("Indicative Plans").
- The Indicative Plan/s show general depth and alignment information only and are not an exact scale or accurate depiction of the location, depth and alignment of the fibre optic/telecommunications facilities shown on the Indicative Plan/s.
- In particular, the fact that the Indicative Plans show that a facility is installed in a straight line, or at uniform depth along its length cannot be relied upon as evidence that the facility is, in fact, installed in a straight line or at uniform depth.
- You should read the Indicative Plans in conjunction with this notice and in particular, the notes below.
- The information contained in the Indicative Plans is valid for 28 days from the date of issue set out above.You are expected to make your own inquiries and perform your own investigations (including engaging appropriately qualified plant locators at your cost to locate **nbn™** telecommunications facilities during any activities you carry out on site).

We thank you for your enquiry and appreciate your continued use of the Dial Before You Dig Service. If you are planning to excavate or require further information, please contact **nbn** on 1800 626 762. For any enquiries related to moving assets or Planning and Design activities, please email **nbn** at RelocationWorks@nbnco.com.au.



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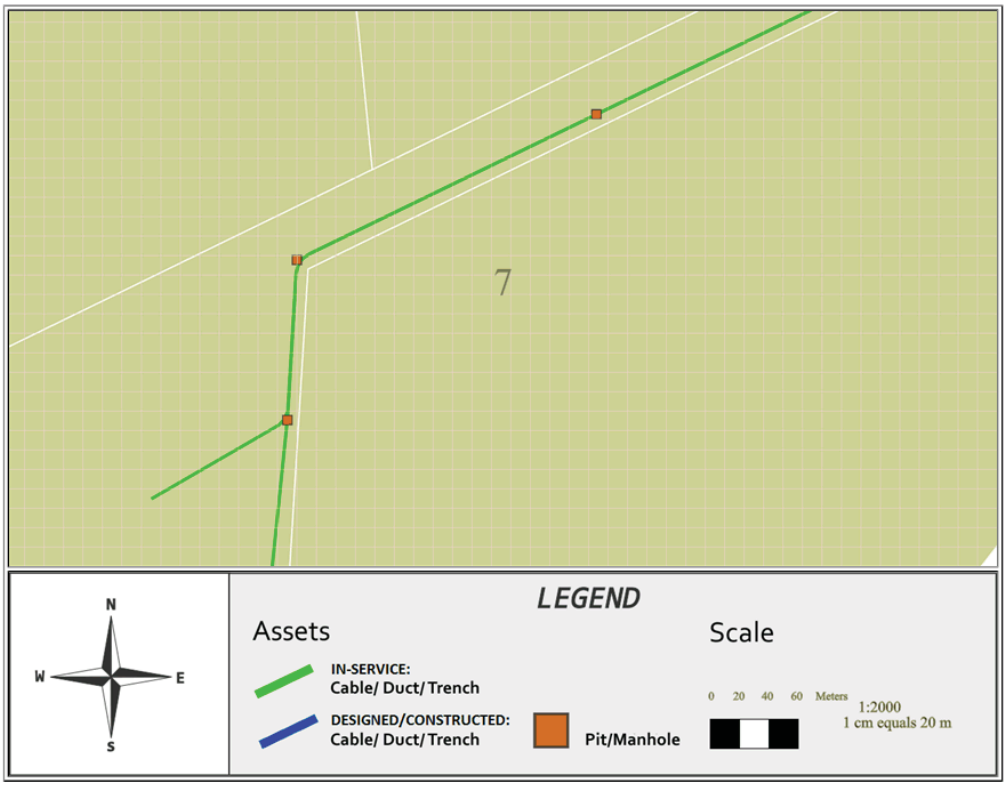

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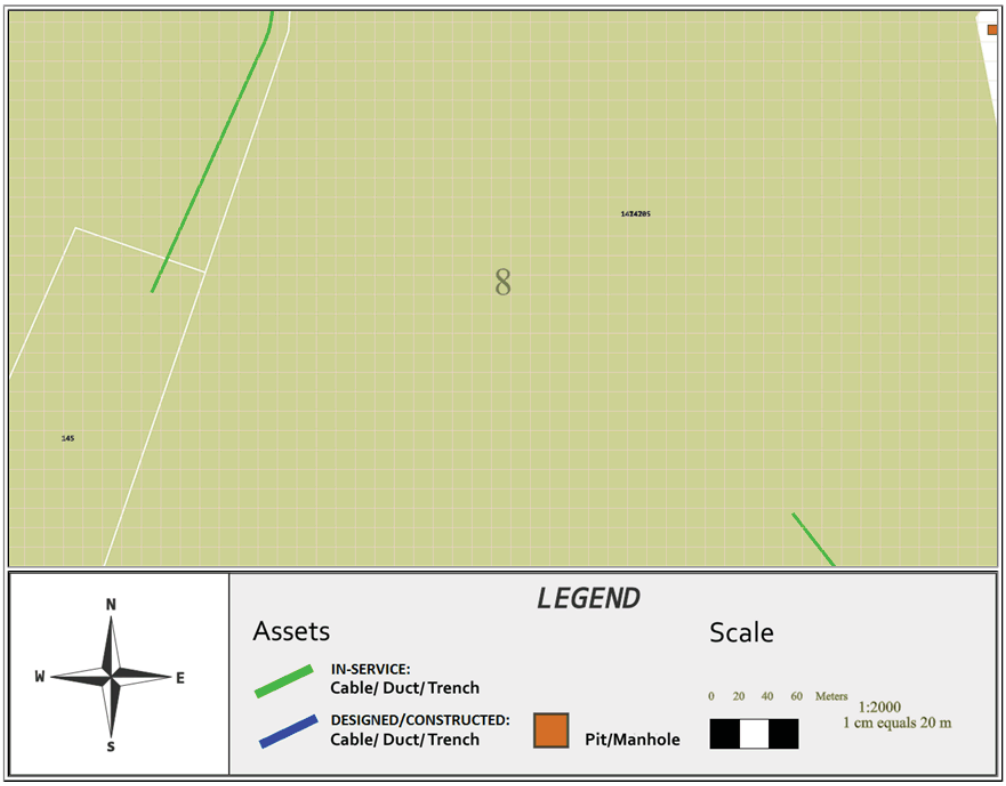

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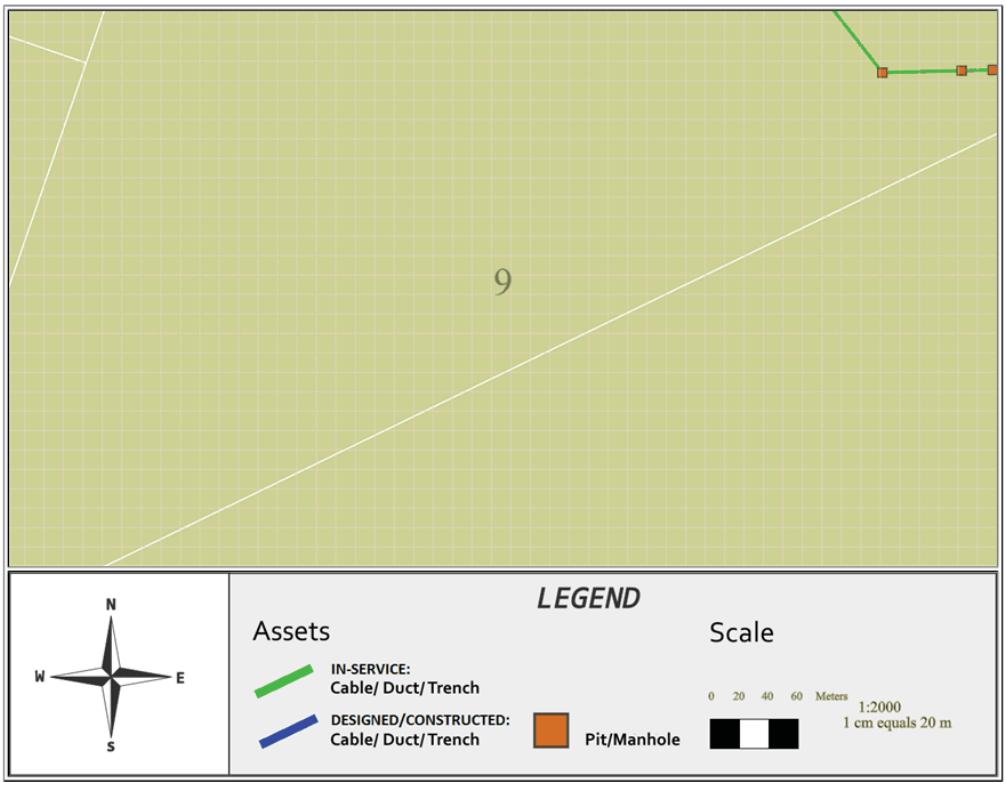

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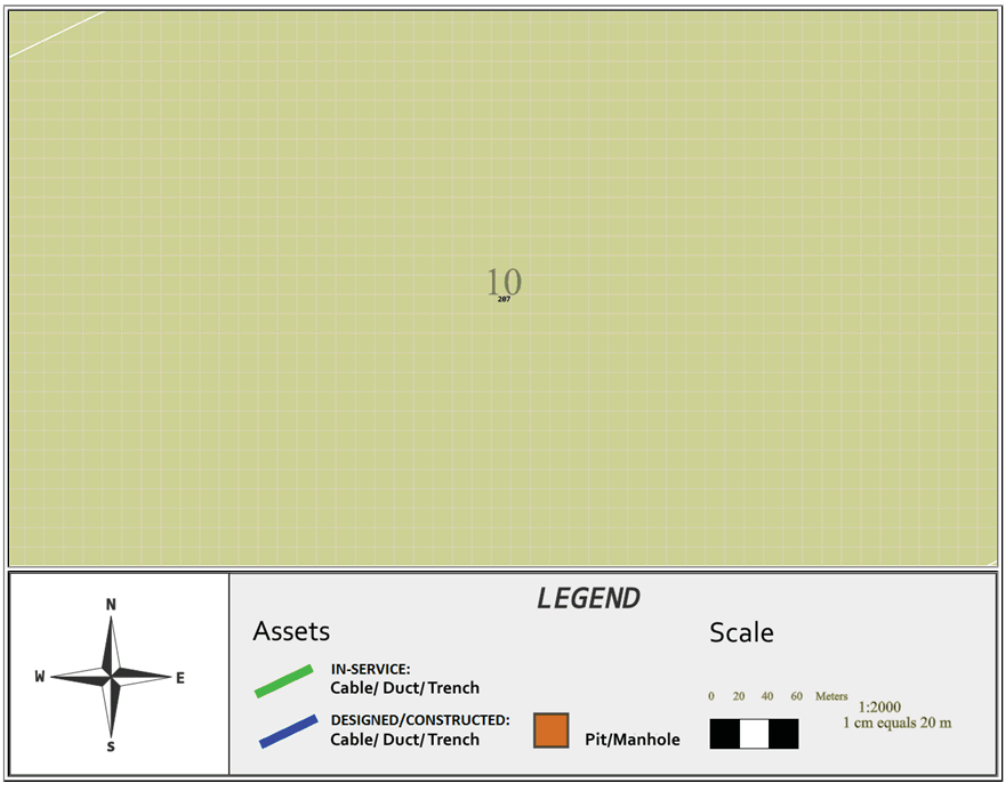

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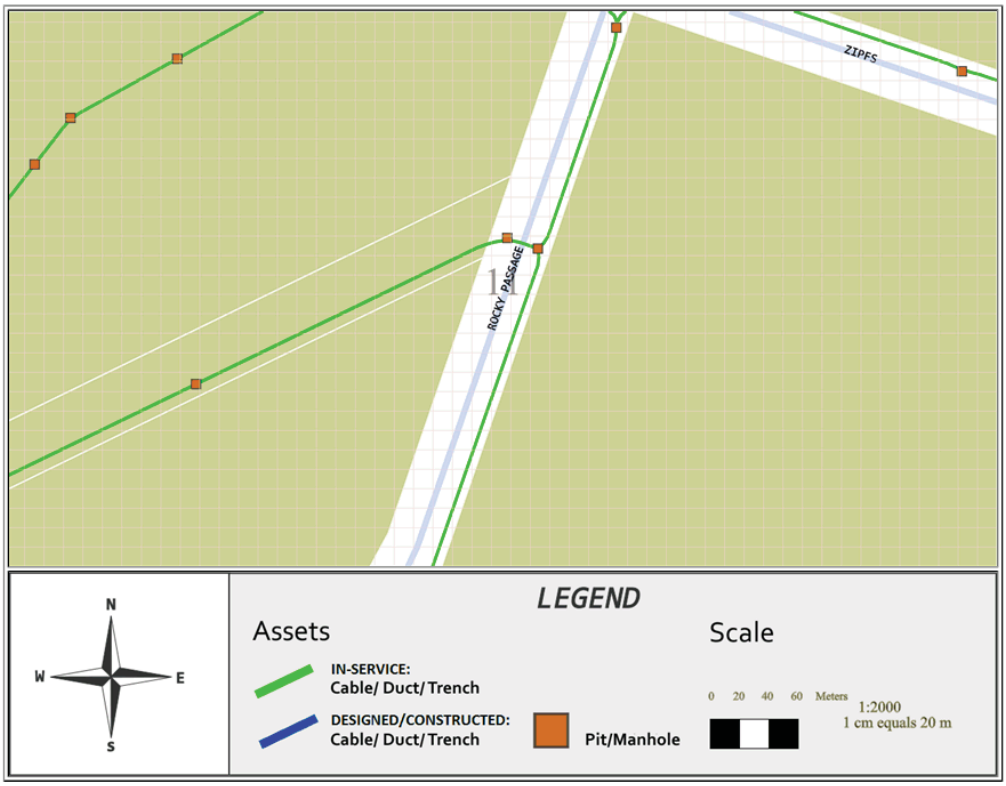

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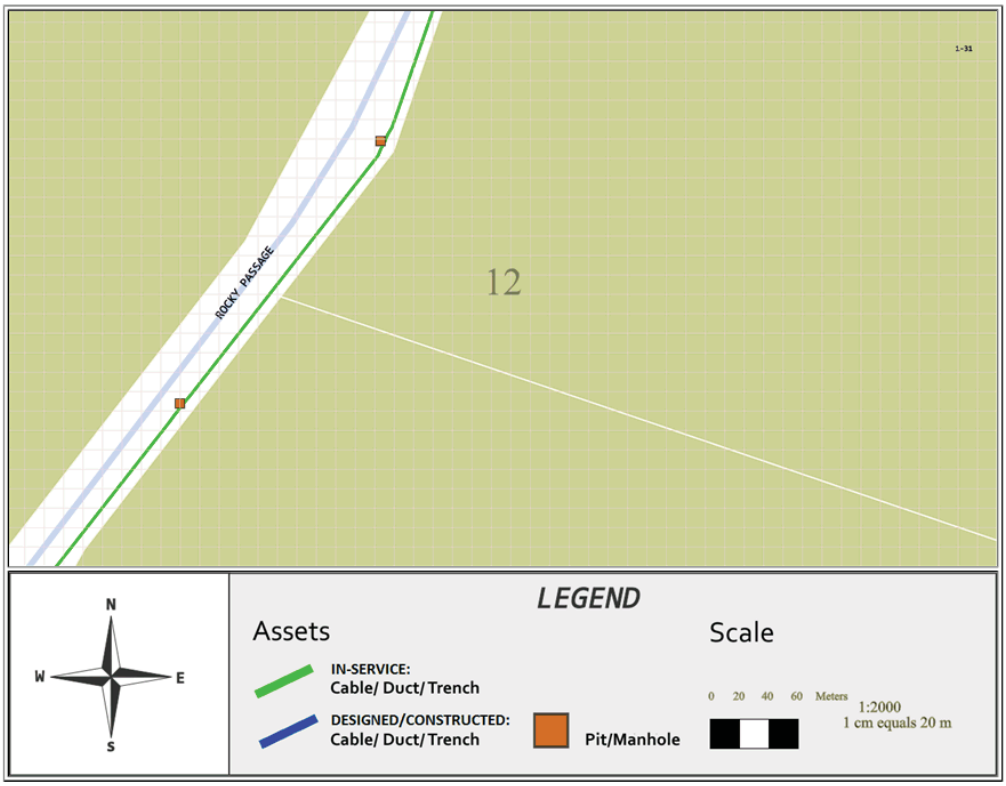

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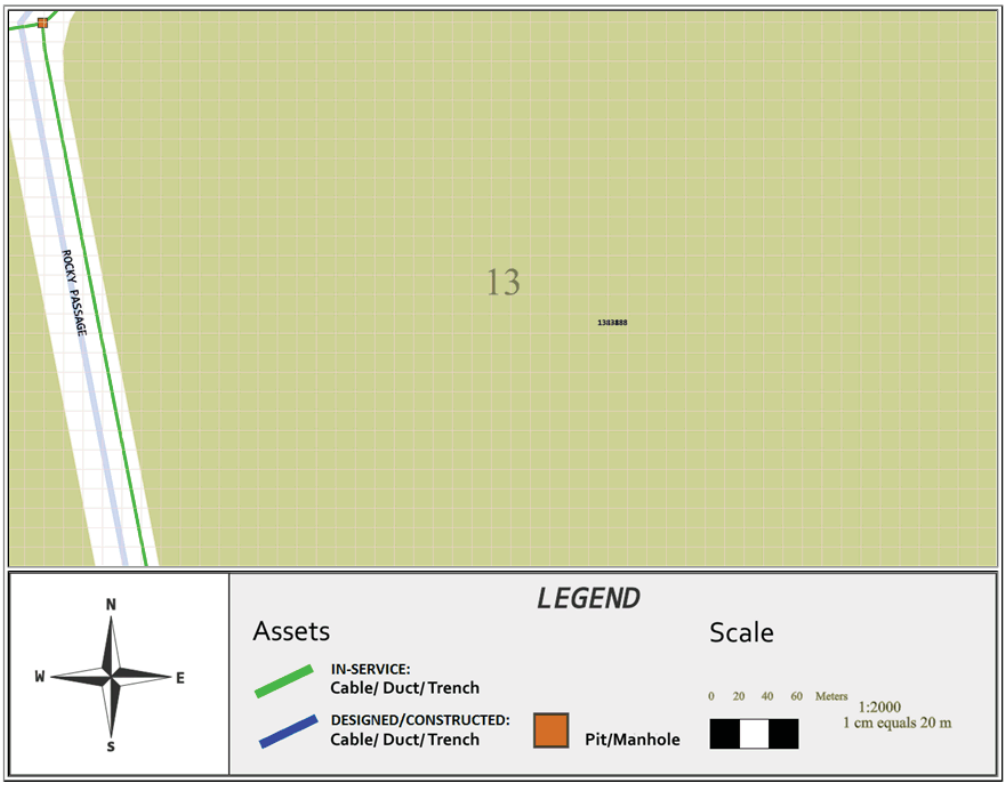

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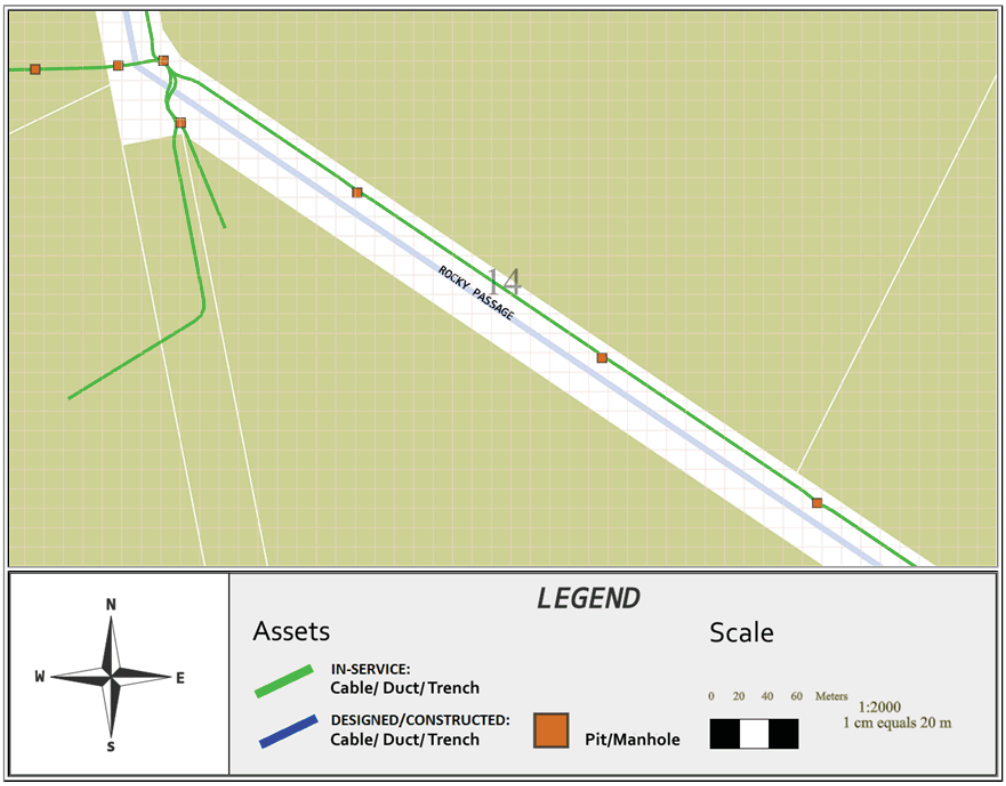

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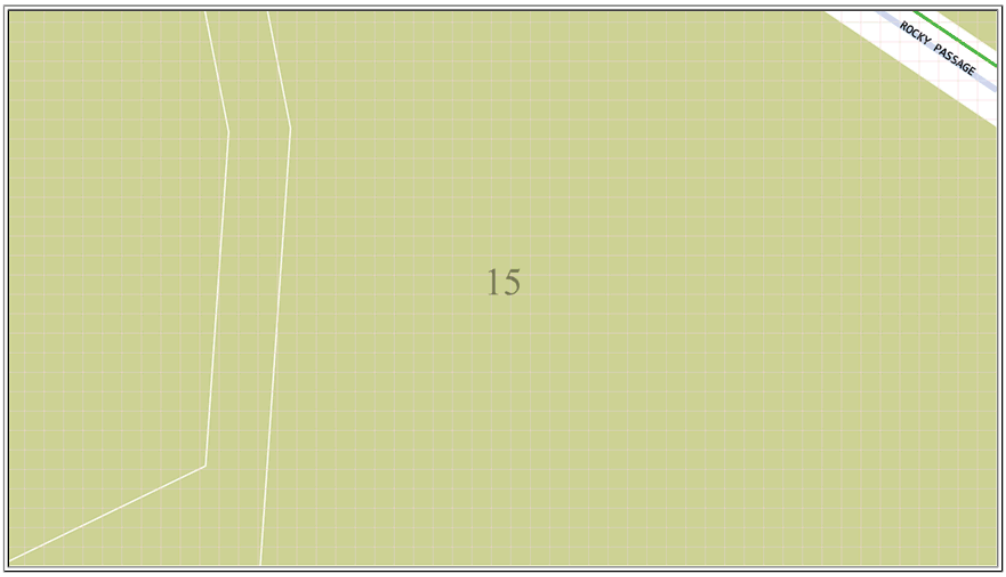

Referral Conditions

The following are conditions on which **nbn** provides you with the Indicative Plans. By receiving, accepting or relying upon the plans (including the Indicative Plans), you are agreeing to these conditions. These conditions are in addition to (and not in replacement of) any duties and obligations you have under applicable law.

1. **nbn** does not accept any responsibility for any inaccuracies of its plans including the Indicative Plans. You are expected to make your own inquiries and perform your own investigations (including engaging appropriately qualified plant locators at your cost to locate **nbn** telecommunications facilities during any activities you carry out on site).
2. You should not assume that **nbn** cables and assets follow straight lines or are installed at uniformed depths along their lengths, even if they are indicated on plans provided to you. Careful onsite investigations are essential to locate the exact position of cables.
3. In carrying out any works in the vicinity of **nbn** facilities, you must maintain the following minimum clearances:
    - 300mm when laying assets inline, horizontally or vertically
    - 500mm when operating vibrating equipment, for example: jackhammers or vibrating plates;and
    - 1000mm when operating mechanical excavators.
    - Adherence to clearances as directed by other asset owner's instructions
4. You are aware that there are inherent risks and dangers associated with carrying out work in the vicinity of underground facilities (such as **nbn** fibre optic,copper and coaxial cables, to **nbn** assets).Damage to underground electric cables may result in:

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- Injury from electric shock or severe burns, with the possibility of death.
- Interruption of the electricity supply to wide areas of the city.
- Damage to your excavating plant.
- Responsibility for the cost of repairs.

5. You must take all reasonable precautions to avoid damaging **nbn** facilities. These precautions may include ,but not limited to, the following:
    - All excavation sites should be examined for underground cables by careful hand excavation. Cable cover slabs if present must not be disturbed. Hand excavation needs to be undertaken with extreme care to minimise the likelihood of damage to the cable, for example, the blades of hand equipment should be aligned parallel to the line of the cable rather than digging across the cable.
    - If any undisclosed underground cables are located, notify **nbn** immediately.
    - All personnel must be properly briefed, particularly those associated with the use of earth-moving equipment, trenching, boring and pneumatic equipment.
    - The safety of the public and other workers must be ensured.
    - All excavations must be undertaken in accordance with all relevant legislation and regulations.
6. You will be responsible for all damage to **nbn** facilities that are connected whether directly, or indirectly with work you carry out (or work that is carried out for you or on your behalf) at the Location. This will include,without limitation, all losses expenses incurred by **nbn** as a result of any such damage.
7. You must immediately report any damage to **nbn™**network that you are/become aware of. Notification may be by telephone - 1800 626 762.
8. Except to the extent that liability may not be capable of lawful exclusion, **nbn** and its servants and agents and the related bodies corporate of **nbn** and their servants and agents shall be under no liability whatsoever to any person for any loss or damage (including indirect or consequential loss or damage) however caused (including, without limitation, breach of contract negligence and/or breach of statute) which may be suffered or incurred from or in connection with this information sheet or any Plans attached hereto. Except as expressly provided to the contrary in this information sheet or the attached Indicative Plans, all terms, conditions, warranties, undertakings or representations (whether expressed or implied) are excluded to the fullest extent permitted by law.

All works undertaken shall be in accordance with all relevant legislations, acts and regulations applicable to the particular state or territory of the Location. The following table lists all relevant documents that shall be considered and adhered to.

State/Territory	Documents
National	Work Health and Safety Act 2011
	Work Health and Safety Regulations 2011
	Safe Work Australia - Working in the Vicinity of Overhead and Underground Electric Lines (Draft)
	Occupational Health and Safety Act 1991
NSW	Electricity Supply Act 1995

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	Work Cover NSW - Work Near Underground Assets Guide
	Work Cover NSW - Excavation Work: Code of Practice
VIC	Electricity Safety Act 1998
	Electricity Safety (Network Asset) Regulations 1999
QLD	Electrical Safety Act 2002
	Code of Practice for Working Near Exposed Live Parts
SA	Electricity Act 1996
TAS	Tasmanian Electricity Supply Industry Act 1995
WA	Electricity Act 1945
	Electricity Regulations 1947
NT	Electricity Reform Act 2005
	Electricity Reform (Safety and Technical) Regulations 2005
ACT	Electricity Act 1971

Thank You,

Network Operations Centre - Assurance

Date: 06/29/2016

Level 11, 100 Arthur Street, North Sydney NSW 2060
© 2015 nbn co limited | ABN 86 136 533 741 Email info@nbn.com.au Web nbn.com.au

IT'S HOW WE CONNECT

DUTY OF CARE

TELSTRA CORPORATON ACN 051 775 556

IMPORTANT:

When working in the vicinity of telecommunications plant you have a "Duty of Care" that must be observed. Please read and understand all the information and disclaimers provided below.

Telstra network is complex and requires expert knowledge to interpret information, to identify and locate components, to pothole underground assets for validation and to safely work around assets without causing damage. If you are not an expert and/or qualified in these areas then you should not be attempting these activities. Telstra will seek compensation for damages caused to its property and losses caused to Telstra and its customers.

The 4 essential steps that must be undertaken to prevent damage to Telstra assets are listed below. Construction activities must not commence without first undertaking these steps.

(The following pages contain more detail on each step below and the contact details to seek further advice. AS5488-2013 is the Australian Standard for the Classification of Subsurface Utility Information.)

1 Dial Before You Dig -Telstra Plans :

- *The essential **first** step in preventing damage.*

You must have current Telstra plans via the DBYD process. Telstra advises that the accuracy of the information provided by Telstra conforms to Quality Level D as defined in AS5488-2013. This means the information is indicative only, not a precise location. **The actual location may differ substantially from that shown on the plans** - refer to steps 2 & 3 to determine actual location prior to commencing construction.

2 Telstra Accredited Plant Locator :

- *The essential **second** step in preventing damage.*

To be able to trace and identify individual subsurface cables and ducts requires access to Telstra pits and manholes. Only a Telstra Accredited Plant Locator (TAPL) is authorised to access Telstra network for locating purposes. A TAPL can interpret plans, validate visible assets and access pits and manholes to undertake electronic detection of underground assets prior to further validation. All Telstra assets must be located, validated and protected prior to commencing construction. If you are not authorised to do so, you should not be accessing Telstra network or locating Telstra network.

3 Validation :

- *The essential **third** step in preventing damage.*

All Telstra assets must be positively identified (i.e. validated), by physically sighting them. For underground assets this can be done by potholing by hand or using non-destructive vacuum extraction methods (Refer to 'validation' as defined in AS5488-2013 QL-A). Underground assets located by electronic detection alone i.e. step 2, are not deemed to be 'validated' and should not be used for construction purposes. Some TAPL's can assist with non-destructive potholing for validation purposes. If you cannot validate the Telstra network you should not proceed with construction. Telstra will seek compensation for damages caused to its property and losses caused to Telstra and its customers.

4 Protection :

- *The essential **fourth** step in preventing damage.*

Telstra assets must be protected to avoid damage from construction activities. Minimum working distances around Telstra network must be maintained. These distances are provided in this document. Telstra can also provide advice and assistance in regards to protection – refer to the following pages.

STEP 1 – Dial Before You Dig -Telstra Plans:

The actual location of Telstra assets may differ substantially from that shown on the plans. Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for the accuracy shown on the plans. Steps 2 and 3 must be undertaken to determine actual location of network.

- Telstra DBYD plans are not suitable for displaying Telstra network within a Telstra exchange site. For advice on Telstra network within a Telstra exchange site contact Telstra Plan Services.
- Telstra owns and retains the copyright in all plans and details provided in conjunction with the applicant's request. The applicant is authorised to use the plans and details only for the purpose indicated in the applicant's request. The applicant must not use the plans or details for any other purpose.
- Telstra plans or other details are provided only for the use of the applicant, its servants, agents or Telstra Accredited Plant Locators. The applicant may not give the plans or details to any parties other than these, and may not generate profit from commercialising the plans or details.
- Please contact Telstra Plan Services immediately should you locate Telstra assets not indicated on these plans.
- Telstra, its servants or agents shall not be liable for any loss or damage caused or occasioned by the use of plans and or details so supplied to the applicant, its servants and agents, and the applicant agrees to indemnify Telstra against any claim or demand for any such loss or damage.
- Please ensure Telstra plans and information provided remains on-site at all times throughout the inspection, location and construction phase of any works.
- Telstra plans are valid for 60 days after issue and should be replaced if required after the 60 days.

- **Emergency situations - receiving Telstra plans** Telstra's automated mapping system (TAMS) will provide a fast response for emergency situations (faster than an operator can provide manually via a phone call - see below for fast response requirements). Automated responses are normally available 24/7.

  To receive a fast automated response from Telstra your request must -

  - Be a web request lodged at DBYD (**www.1100.com.au**). The request will be then forwarded to Telstra.
  - Contain your current email address so you can receive the automated email response.
  - Be for the purposes of 'mechanical excavation' or other ground breaking DBYD activity. (Requests with activity types such as conveyancing, planning & design or other non-digging activities may not be responded to until the next business day).
  - Be for an area less than 350 metres in size to obtain a PDF map (over 350 metres will default to DWF due to size) this does not include congested CBD areas where only DWF may be supplied.
  - Be for an area less than 2500 metres in size to obtain a DWF map (CBD's less)

- **Data Extraction Fees.** In some instances a data extraction fee may be applicable for the supply of Telstra information. Typically a data extraction fee may apply to large projects or requests to be supplied in non-standard formats. For further details contact Telstra Plan Services.

- **Electronic plans - PDF and DWF maps** If you have received Telstra maps via email you will have received the maps as either a PDF file (for smaller areas) or DWF file (for larger area requests). All requests over approximately *350m or in congested CBD areas can only be supplied in DWF format. There are size limits on what can be provided. (* actual size depends on geographic location of requested area). If you are unable to launch any one of the softcopy files for viewing and printing, you may need to download and install one or more of the free viewing and printing products such as Adobe Acrobat Reader (for PDF files) or Autodesk Design Review (for DWF files) available from the internet

  - **Pdf files -** PDF is the default softcopy format for all requests for areas up to approx *350m in length. (*depends on geographic location of request). The PDF file is nominally formatted to A3 portrait sheet however it can be printed on any size sheet that your printer supports, e.g. either as the full sheet or selected areas to suit needs and legibility. (to print a selected area zoom up and print 'current view') If there are multiple layers of Telstra network you may receive up to 2 sheets in the single PDF file attachment supplied. There are three types or layers of network normally recorded - local network, mains cables or a combined layer of local and mains (usually displayed for rural or semi-rural areas). If mains cable network is present in addition to local cables (i.e. as separate layer in a particular area), the mains will be shown on a separate sheet. The mains cable information should be read in conjunction with the local cable information.

- **DWF files –** DWF is the default softcopy format for all requests for areas that are over 350m in length. Maximum length for a DWF automated response is approx 2500m - depending on geographic location of request (manually-processed plans may provide larger coverage). The DWF files differ from PDF in that DWF are vector files made up of layers that can be turned on or off and are not formatted to a specific sheet size. This makes them ideal for larger areas and for transmitting electronically.
  - ***How to view Telstra DWF files –***
    Telstra DWF files come with all layers turned on. You may need to turn individual layers on or off for viewing and printing clarity. Individual layer names are CC (main cable/conduit), DA (distribution area network) and sometimes a combined layer - CAC. Layer details can be viewed by either picking off the side menu or by selecting 'window' then 'layers' off the top menu bar. Use 'layers' to turn individual layers off or on (double click or right click on layer icon).
  - ***How to print Telstra DWF files –***
    DWF files can be printed on any size sheet – either their entirety or by selected areas of interest. Some DWF coverage areas are large and are not suited to printing legibly on a single A4 sheet - you may need several prints if you only have an A4 printer. Alternatively, an A3, A1 or larger printer could be used. To print, zoom in or out and then, by changing the 'print range' settings, you can print what is displayed on your screen to suit your paper size. If you only have a small printer, e.g. A4, you may need to zoom until the text is legible for printing (which is why you may need several prints). To print what is displayed on your screen the 'view' setting should be changed from 'full page' to 'current view'. The 'current sheet' setting should also be selected. You may need to print layers separately for clarity and legibility. (Details above on how to turn layers on or off)
  - ***How to change the background colour from white to black (when viewing) Telstra DWF files –***
    If using Autodesk Design Review the background colour can be changed by selecting 'Tools' then 'options' then 'sheet'. Tick the box 'override published paper colours' and select the colour required using the tab provided.

STEP 2 - Telstra Accredited Plant Locator (TAPL):

Utilising a TAPL is an essential part of the process to identify network and to trace subsurface network prior to validating. A TAPL can provide plan interpretation, identification and electronic detection. This will assist in determining the position of subsurface assets prior to potholing (validating). Some TAPL's can also assist in validating underground detected network. Electronic detection is only an indication of the existence of underground network and can be subject to interference from other services and local conditions. Electronic detection should not be used solely to determine location for construction purposes. The electronic (indicative) subsurface measurements must be proven by physically sighting the asset (see step 3 - Validation).

- All TAPL's locating Telstra network must be able to produce a current photo ID card issued by Telstra. A list of TAPL's is provided with the Telstra Dial Before You Dig plans.
- Telstra does not permit external parties (non-Telstra) to access or conduct work on our network. Only Telstra staff, Telstra contractors or locators whom are correctly accredited are authorised to work on or access our manholes, pits, ducts, cables etc. This is for safety as well as for legal reasons.

  It is a criminal offence under the *Criminal Code Act 1995* (Cth) to tamper or interfere with communication facilities owned by a carrier. Heavy penalties may apply for breach of this prohibition, and any damages suffered, or costs incurred by Telstra as a result of any such unauthorised works may be claimed against you.

- Optic fibre cable locations must be performed by a locator with Telstra optic fibre cable location accreditation. The locators with optic fibre cable location accreditation are indicated by a 'yes' in the column headed 'Fibre' in the lists of locators that are published with the Telstra DBYD plans. Telstra Accredited Plant Locators that are DBYD Certified Locators are also fibre accredited. Inspection of photo ID cards will confirm whether locators are just copper accredited or copper + fibre accredited.
- The details of any contract, agreement or retainer for site assistance to locate telecommunications plant shall be for you to decide and agree with the Telstra Accredited Plant Locator engaged. Telstra is not a party to any contract entered into between you and a Telstra Accredited Plant Locator.

- Payment for the site assistance will be your responsibility and payment details should be agreed before the engagement is confirmed.
- Telstra does not accept any liability or responsibility for the performance of or advice given by a Telstra Accredited Plant Locator. Accreditation is an initiative taken by Telstra towards the establishment and maintenance of competency standards. However, performance and the advice given will always depend on the nature of the individual engagement.
- Neither the Telstra Accredited Plant Locator nor any of its employees are an employee or agent for Telstra. Telstra is not liable for any damage or loss caused by the Telstra Accredited Plant Locator or its employees.

- **Electronically derived subsurface measurements can only be provided by Telstra Accredited Plant Locators that have *DBYD Locator Certification.**

  Telstra Accredited Plant Locators that have *DBYD Locator Certification can provide electronic subsurface measurements in A/W AS5488-2013 (e.g. electronic depth measurements and/or alignment measurements) - if all five of the following conditions are met –

  1. The subsurface depth/alignment measurements are confirmed in writing on a plan or site record.
  2. The plan or site record must include the name and the TAPL ID number of the locator providing the subsurface measurements.
  3. The quality level as defined by AS5488-2013 must be specified for each subsurface measurement.
  4. The source of each subsurface measurement must also be specified.
  5. Subsurface measurements that do not specify an AS5488-2013 quality level or the source of obtaining the subsurface measurement cannot be provided or displayed in any form anywhere.

  ***DBYD Locator Certification** is a locator competency certificate issued by Dial Before You Dig.*

  Some examples of conforming subsurface measurement information for plans or site records –

  e.g. **0.9m** cover SED (QL-B)

  e.g. **5.0m** alignment URO (QL-D)

  e.g. **0.45m** cover PV (QL-A)

  Legend – All subsurface measurements shown with - (QL-A) comply with AS5488-2013 QL-A
  (QL-B) comply with AS5488-2013 QL-B
  (QL-C) comply with AS5488-2013 QL-C
  (QL-D) comply with AS5488-2013 QL-D

  Abbreviations used – SED subsurface electronic detection
  PV potholed, validated
  URO utility records only

  Important note - *Telstra will seek compensation for damages caused to it its property and losses caused to Telstra and its customers if unvalidated subsurface measurements are used for construction and subsequently result in damage to Telstra assets. Only measurements conforming to AS5488-2013 (QL-A) are deemed by Telstra to be validated measurements suitable for construction purposes.*

- **Rural landowners** Where Telstra-owned cable crosses agricultural land, Telstra may provide on-site assistance with cable location. You must contact Telstra Plan Services to determine eligibility and to request the service. Please note:
  - If eligible, the location assistance must be approved and organised by Telstra. Telstra will not pay for a location that has not been approved and facilitated by Telstra (Telstra is not responsible for payment assistance when a customer engages a locator directly).
  - The exact location, including depth of cables, must be validated by potholing, which may not be covered by this service.
  - This service is nominally only available to assist private rural land owners.
  - This service nominally covers one hour on-site only. Any time required in addition to Telstra-funded time can be purchased directly from the assigned Telstra Accredited Plant Locator.
  - This service does not apply to previously located network at the same location (i.e. it is a once off).
  - This service does not apply to other carriers' cables (marked as 'OC' on Telstra plans).

  For further information including terms and conditions, please contact Telstra Plan Services - *Telstra.Plans@team.telstra.com*

STEP 3 – *Validation:

After utilising a Telstra Accredited Plant Locator and prior to commencing construction, any electronically detected underground network must be positively identified (validated) by physically sighting it. This can be done by careful hand digging or using non-destructive water jet methods to expose the network.

*Validation as defined in AS5488-2013 (QL-A).

Manual potholing needs to be undertaken with extreme care and by employing techniques least likely to damage cables. For example, align shovel blades and trowels parallel to the cable rather than digging across the cable. Some Telstra Accredited Plant Locators are able to provide or assist with non-destructive potholing methods to enable validation of underground cables and ducts.

If you cannot validate the underground network then you should not proceed with construction. Telstra will seek compensation for damages caused to its property and losses caused to Telstra and its customers.

Important note: *The construction of Telstra's network dates back over many years. Some of Telstra's pits and ducts were manufactured from asbestos-containing cement. You must take care in conducting any works in the vicinity of Telstra's pits and ducts. You must refrain from in any way disturbing or damaging Telstra's network infrastructure when conducting your works. We recommend that before you conduct any works in the vicinity of Telstra infrastructure that you ensure your processes and procedures eliminate any possibility of disturbing, damaging or interfering in any way with Telstra's infrastructure. Your processes and procedures should incorporate appropriate measures having regard to the nature of this risk. For further information -*

http://ucm.in.telstra.com.au/about/media/emergencies-incidents/asbestos/index.htm?ssSourceSiteId=consumer-advice

STEP 4 – Protection:

You must maintain the following minimum clearance distances between construction activity and the validated position of Telstra plant.

Jackhammers/Pneumatic Breakers	*Not within 1.0m of **actual validated location.***
Vibrating Plate or Wacker Packer Compactor	*Not within 0.5m of **actual validated location** of Telstra ducts.* *300mm compact clearance cover before compactor can be used across Telstra ducts.*
Boring Equipment (in-line, horizontal and vertical)	*Not within 2.0m of **actual validated location**.* *Constructor to hand dig or use non-destructive water jet method (pothole) and expose plant.*
Heavy Vehicle Traffic (over 3 tonnes)	*Not to be driven across Telstra ducts (or plant) with less than 600mm cover.* *Constructor to check actual depth via hand digging.*
Mechanical Excavators, Farm ploughing and Tree Removal	*Not within 1.0m of **actual validated location.*** *Constructor to hand dig or use non-destructive water jet method (pot-hole) and expose plant.*

- For blasting or controlled fire burning please contact Telstra Plan Services for advice.
- If conducting roadworks all existing Telstra pits and manholes should be a minimum of 1.2m in from the back of kerb after the completion of your work.

- All Telstra conduit should have the following minimum depth of cover after the completion of ground work:-
  - **Footway 450mm**
  - **Roadway 450mm at drain invert and 600mm at road centre crown**
- For clearance distances relating to Telstra pillars, cabinets and RIMs/RCMs please contact Telstra Plan Services.

- If Telstra plant is situated wholly or partly where you plan to work (i.e. in conflict), then Telstra's Network Integrity Group must be contacted to discuss possible engineering solutions.
  Please phone **1800 810 443** or email NetworkIntegrity@team.telstra.com

- You are not permitted to relocate or alter or repair any Telstra assets or network under any circumstances.

  It is a criminal offence under the *Criminal Code Act 1995* (Cth) to tamper or interfere with communication facilities owned by a carrier. Heavy penalties may apply for breach of this prohibition, and any damages suffered, or costs incurred by Telstra as a result of any such unauthorised works may be claimed against you.

  Only Telstra and its contractors may access and conduct works on Telstra's network (including its plant and assets). This requirement is to ensure that Telstra can protect the integrity of its network, avoid disruption to services and ensure that the relocation meets Telstra's requirements.

- If Telstra relocation or protection works are part of the agreed solution, then payment to Telstra for the cost of this work shall be the responsibility of the principal developer, constructor or person for whom the work is performed. The principal developer or constructor will be required to provide Telstra with the details of their proposed work showing how Telstra's plant is to be accommodated and these details must be approved by the Regional Network Integrity Manager prior to the commencement of site works.
  Please phone 1800 810 443 or email NetworkIntegrity@team.telstra.com
  Further information -
  https://www.telstra.com.au/consumer-advice/digging-construction/relocating-network-assets

  Damage to Telstra's network must be reported immediately -
  https://service.telstra.com.au/customer/general/forms/report-damage-to-telstra-equipment

- You will be held responsible for all plant damage that occurs or any impacts to Telstra's network as a result of your construction activities. This includes interfering with plant, conducting unauthorised modification works and interfering with Telstra's assets in a way that prevents Telstra from accessing or using its assets in the future.

- Telstra reserves all rights to recover compensation for loss or damage to its cable network or other property including consequential losses.

FURTHER INFORMATION:

NATURAL DISASTERS

Natural Disasters include (amongst other things) earthquakes, cyclones, floods and tsunamis.
In the case of such events, urgent requests for plans or information relating to the location of Telstra network can be made directly to Telstra Network Integrity Team Managers as follows:

NSW – John McInerney 0419 485 795

QLD – Glenn Swift 0419 660 147

VIC/TAS - David Povazan 0417 300 947

SA/NT - Mick Weaver 0419 828 703

WA - Angus Beresford-Peirse 0419 123 589

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TELSTRA PLAN SERVICES - for all Telstra Dial Before You Dig related enquiries

Email - Telstra.Plans@team.telstra.com

Phone - 1800 653 935 (general enquiries, business hours only)

*Telstra DBYD plan information -	Shalin	07 3455 2997
	Anthony	07 3455 2365
Advice on preventing damage -	Glen	07 3455 1011
	Lachlan	07 3455 3132
Accredited plant locator enquiries -	Mike	0477 377 036
	Taylor	0477 365 666
Road closures -	Megan	07 3455 0834
	Lachlan	07 3455 3132
Telstra easements -	Glen	07 3455 1011

**Please note - to make a Telstra plan enquiry the plans must be current (within 60 days of issue). If your plans have expired you will need to submit a new request via DBYD prior to contacting Telstra Plan Services.*

Information for new developments (developers, builders, home owners)
Telstra Smart Communities - https://www.telstra.com.au/smart-community

Asset relocations
Please phone 1800 810 443 or email NetworkIntegrity@team.telstra.com

https://www.telstra.com.au/consumer-advice/digging-construction/relocating-network-assets

Telstra offers free Cable Awareness Presentations, if you believe you or your company would benefit from this offer please contact Network Integrity on 1800 810 443 or NetworkIntegrity@team.telstra.com

PRIVACY NOTE

Your information has been provided to Telstra by DBYD to enable Telstra to respond to your DBYD request. Telstra keeps your information in accordance with its privacy statement entitled "Protecting Your Privacy" which can be obtained from Telstra either by calling 1800 039 059 or visiting our website at www.telstra.com.au/privacy

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LEGEND

IT'S HOW WE CONNECT

For more info contact a Telstra Accredited Locater or Telstra Plan Services 1800 653 935

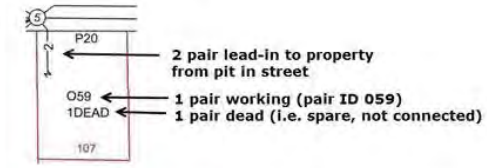
Exchange
(major cable present)

Footway access chamber
(can vary from 1-lid to 12-lid)

Pillar/cabinet
(above the ground / free standing)

Above ground complex equipment housing (eg RIM)
Please Note: This equipment is powered by 240V electricity.

OC **other carrier**



Single to multiple round conduit
Configurations 1, 2, 4, 9 respectively
P100 (Attached text denotes conduit type and size)

Multiple square conduit
Configurations 2, 4, 6 respectively
E85 (Attached text denotes conduit type and size)

Cable jointing pit
(number indicating pit type)

Elevated cable joint
(above ground joint on buried cable)

Telstra Plant in shared utility trench

Aerial Cable
(above ground)

Aerial Cable
(attached to joint use pole e.g. power)

Direct buried cable

Marker post installed

Buried transponder

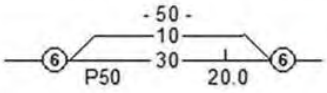
Marker, transponder

SMOF **Optical fibre cable direct buried**

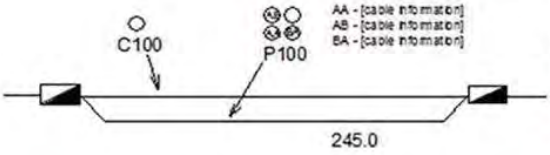
Some examples of conduit type and size:
A - Asbestos cement, P - PVC / plastic, C - Concrete, GI - Galvanised iron, E - Earthenware.
Conduit sizes *nominally* range from 20mm to 100mm.

P50	50mm PVC conduit
P100	100mm PVC conduit
A100	100mm asbestos cement conduit
E 85	85mm square earthenware conduit

Some examples of how to read Telstra plans:



One 50mm PVC conduit (P50) containing a 50-pair and a 10-pair cable between two 6-pits, 20.0m apart, with a direct buried 30-pair cable along the same route.



Two separate conduit runs between two footway access chambers (manholes) 245m apart. A nest of four 100mm PVC conduits (P100) containing assorted cables in three ducts (one being empty) and one empty 100mm concrete duct (C100) along the same route.

WARNING: Telstra plans and location information conform to Quality Level 'D' of the Australian Standard AS 5488 - Classification of Subsurface Utility Information. As such, Telstra supplied location information is indicative only. Spatial accuracy is not applicable to Quality Level D. Refer to AS 5488 for further details. Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy shown on the plans. FURTHER ON SITE INVESTIGATION IS REQUIRED TO VALIDATE THE EXACT LOCATION OF TELSTRA PLANT PRIOR TO COMMENCING CONSTRUCTION WORK. A plant location service is an essential part of the process to validate the exact location of Telstra assets and to ensure the asset is protected during construction works. The exact position of Telstra assets can only be validated by physically exposing it. Telstra will seek compensation for damages caused to its property and losses caused to Telstra and its customers.

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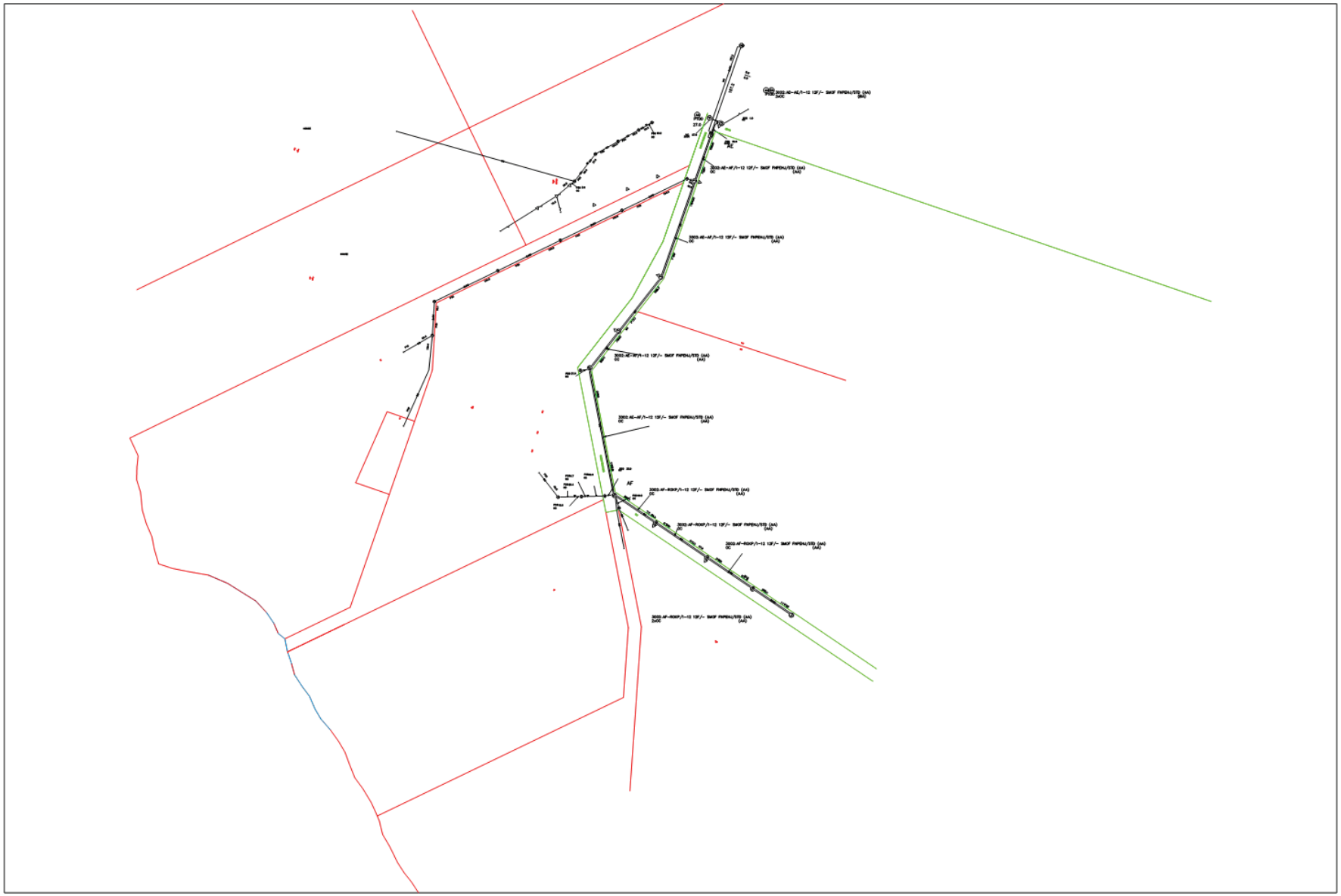


Appendix D
Codes

Division 1 - Acid Sulfate Soils Overlay

Levels of assessment for development affected by the Acid Sulfate Soils Overlay

(1) Sections 5.1.4 and 5.1.5 identify the level of assessment for development affected by the Acid Sulfate Soils Overlay, as follows -

(a) section 5.1.4 Acid Sulfate Soils Overlay- Table of Assessment for Making a Material Change of Use of Premises -
(i) column 1 identifies uses that are exempt, self-assessable or assessable;
(ii) column 2 identifies the level of assessment for the uses listed in column 1;
(iii) where the use is defined in Part 9 - Schedule 3 - Dictionary, Division 1 - Uses and is not listed in column 1 it is exempt;
(iv) where the use is not defined in Part 9 - Schedule 3 - Dictionary, Division 1 - Uses and is not listed in column 1 it is code assessable.

(b) section 5.1.5 Acid Sulfate Soils Overlay - Table of Assessment for Other Development not associated with a Material Change of Use of Premises -
(i) column 1 identifies other development that is exempt, self-assessable or assessable;
(ii) column 2 identifies the level of assessment for other development listed in column 1;
(iii) where the other development is not listed in column 1 it is exempt.

(2) Other overlays may alter the level of assessment identified in 1(a) and (b)[5.1].

Overall Outcomes of the Acid Sulfate Soils Overlay Code

(1) The overall outcomes are the purpose of the Acid Sulfate Soils Overlay Code.

(2) The overall outcomes sought for the Acid Sulfate Soils Overlay Code are the following -

(a) the presence and extent of acid sulfate soils (ASS) are identified and managed in conjunction with uses and other development;

(b) the natural and built environments, including infrastructure and human health, are protected from adverse effects associated with the release of acid and metal contaminants from ASS.

Acid Sulfate Soils Overlay

Specific Outcomes and Probable Solutions applicable to Assessable Development

Assessable Development				
Specific Outcomes		Probable Solutions		Applicant's Response
S1.	ASS Identification - (1) Filling or excavation on a lot or premises where the natural ground level is equal to or below 5 metres Australian Height Datum (AHD) as shown on this overlay map and involves - (a) excavating or otherwise removing **less than** 100m^3 of soil or sediment; or (b) filling of land with **less than** 500m^3 of material, where the average depth of the material is **less than** 500mm; or **(2)** Filling or excavation on a lot or premises where the natural ground level is between 5 and 20 metres AHD as shown on this overlay map and involves excavating or otherwise removing **less than** 100m^3 of soil or sediment from below the 5 metres AHD level; or **Note -** Compliance with S1.(1) or (2) achieves compliance with this Code. (3) Confirm the presence or otherwise of ASS; Where the presence of ASS is confirmed, identify the location, depth	**P1.**	(1) No probable solution identified; or (2) No probable solution identified; or (3) No probable solution identified; (4) No probable solution identified. **Note -** Where there is the likelihood of the presence or otherwise of ASS prepare, and submit an Acid Sulfate Soil Investigation Report.	**N/A**

Assessable Development				
Specific Outcomes		Probable Solutions		Applicant's Response
	and maximum actual and potential acidity of ASS likely to result from disturbance.			
S2.1.	ASS Management - (1) Uses and other development do not - (a) excavate or otherwise remove soil or sediment identified as containing ASS; (b) permanently or temporarily extract groundwater that results in the aeration of previously saturated ASS; (c) undertake filling that results in - (i) actual ASS being moved below the water-table; previously saturated ASS being aerated.	P2.1.	No probable solution identified.	**To be complied with at the construction phase**
S2.2	(1) Uses and other development are undertaken in a manner that ensures - (a) existing acidity is neutralised; (b) no generation of acid and metal contaminants; no release of surface or groundwater flows containing acid and metal contaminants into the environment.	P2.2	(1) No probable solution identified.	**To be complied with at the construction phase**

Division 5 - Development Near Underground Infrastructure

8.5.3 Overall Outcomes of the Development Near Underground Infrastructure Code

(1) The overall outcomes are the purpose of the Development Near Underground Infrastructure Code.

(2) The overall outcome sought for the Development Near Underground Infrastructure Code is the following -

(a) to ensure existing underground utility infrastructure is protected from damage resulting from development in proximity to that infrastructure.

(b) To ensure continued serviceability of the infrastructure;

(c) To ensure adequate access is available for inspecting and maintaining the infrastructure.

Assessable Development				
Specific Outcomes		**Probable Solutions**		**Applicant's Response**
S1.	General - (1) Uses and other development are located and designed to not interfere with or adversely affect the function of existing or proposed underground utility infrastructure.	**P1.**	(1) Uses and other development - (a) are not permitted within a dedicated underground utility infrastructure easement; (b) are compliant with *Australian Standard 3500.2:2003 National Plumbing and Drainage - Sanitary Plumbing and Drainage*, when in proximity to existing or proposed underground utility infrastructure; (c) are not carried out above or below ground within 2 metres horizontal distance of underground utility infrastructure pipes that are 300mm or greater in diameter; or (d) where underground utility	**To be complied with at the detailed design phase**

Assessable Development				
Specific Outcomes		Probable Solutions		Applicant's Response
			infrastructure pipes are less than 300mm in diameter - (i) for works below ground, achieve a minimum horizontal distance of 1.5 metres between the underground infrastructure and footings by - a. locating the footings at the required distance; or b. relocating the underground utility infrastructure to achieve the required distance; or c. redesigning existing footings to achieve the required distance; or (ii) for works above ground, such as walls and floors achieve a minimum 1 metre horizontal distance between the walls of the building and underground utility infrastructure. **Note -** Where utility infrastructure is required to be relocated, modified, altered or replaced it is done so at the full cost and expense of the development proponent. All such works are to be designed by an appropriately experienced RPEQ (Civil) and constructed to Council's satisfaction. Connection to live sewers will be completed by Council at the	

Assessable Development				
Specific Outcomes		Probable Solutions		Applicant's Response
			expense of the developer. (iii) where solution P1(1)(d)(i) is not achievable footings are extended to at least 300 mm below the zone of influence by either – a. piers or continuous footing with a minimum of 1 metre horizontal distance to the underground utility infrastructure; or b. where footing will be within 1 metre, but not closer than 600mm to underground infrastructure, the pipe is replaced with a pipe that achieves a minimum structural strength, and serviceability, such as K12 ductile iron internal lined with polyurethane and externally treated with a layer of zinc and coated with bitumen, that has a future life in excess of 50 years; c. no footings or piers are permitted to cross, be placed vertically above, or closer than 600mm horizontally to a sewer;	

Assessable Development				
Specific Outcomes		Probable Solutions		Applicant's Response
			Note - Refer to Diagram 1 – Zone of Influence.	
S2.	Access to Infrastructure - (1) For maintenance purposes, development retains access to underground infrastructure by way of vehicle, plant or equipment – (a) from the surface; (b) to any access cover or connection point.	**P2.**	(1) Areas surrounding any maintenance holes, pits or connection points are clear of fill or other obstructions, by - a minimum distance of 2.4 metres vertically; (b) a minimum distance of 1 metre horizontally from the outer edge of the access way; (a) maintaining a 2 metre x 2 metre clear area.	**To be complied with at the construction phase**

Erosion Prevention and Sediment

Division 6 - Erosion Prevention and Sediment Control

Overall Outcomes of the Erosion Prevention and Sediment Control Code

(1) The overall outcomes are the purpose of the Erosion Prevention and Sediment Control Code.

(2) The overall outcome sought for the Erosion Prevention and Sediment Control Code is the following -

(a) to ensure -

(i) prevention of erosion and land degradation associated with land development processes;

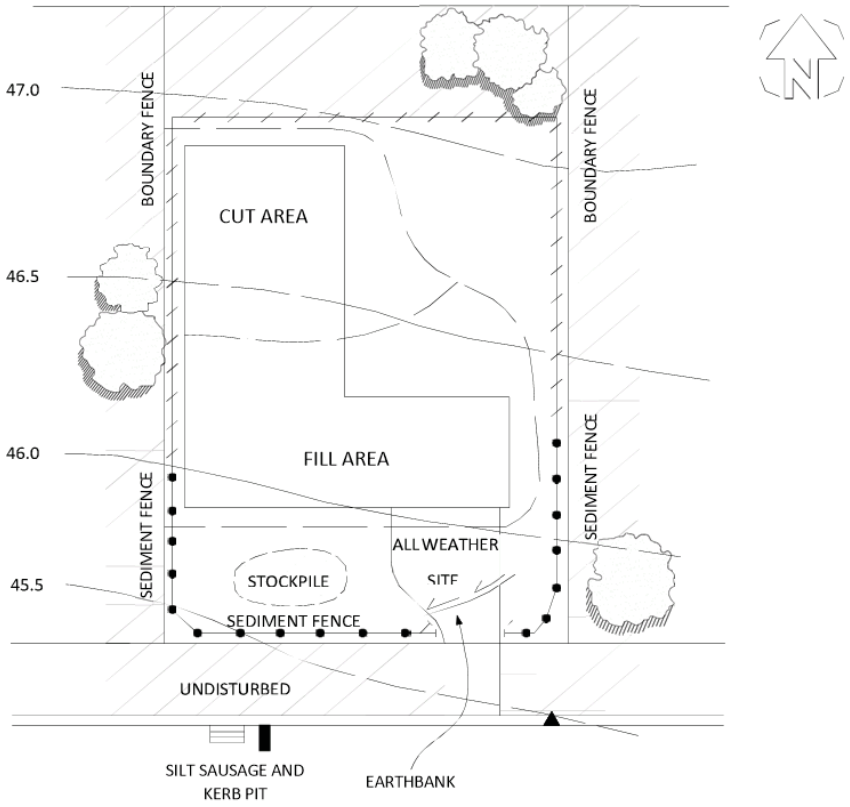
(ii) the quantity of sediments flowing from development sites into waterways and the stormwater drainage system is actively mitigated.

Specific Outcomes and Probable Solutions applicable to Assessable Development

Assessable Development				
Specific Outcomes		Probable Solutions		Applicant's Response
S1.	(1) The design, construction and operation of uses and other development limits the exposure of the soil surface to stormwater or wind; (2) The discharge of sediment laden stormwater from the lot or premises is controlled through the implementation of erosion and sedimentation control measures.	P1.	(1) Uses and other development are designed in a manner that minimises impacts of erosion by - (a) minimising the area and duration of disturbance and exposure; (b) retaining vegetation; (c) reducing the need for excavation or fill; (2) No probable solution identified.	**Landscape plans and Erosion & Sediment Control Plans to be completed at detailed design phase**

Assessable Development				
Specific Outcomes		Probable Solutions		Applicant's Response
			Note - Refer to Planning Scheme Policy 9 - Infrastructure Works for information regarding the design and implementation of sediment capturing measures.	

Diagram 1 - Example of Erosion Prevention and Sediment Control Mechanisms



Division 6 - Excavation and Fill

7.6.1 Compliance with the Excavation and Fill Code

(1) Development that is consistent with the following complies with the Excavation and Fill Code -

(a) acceptable solutions in section 7.6.4 where self-assessable development;or

(b) specific outcomes in section 7.6.5 where assessable development.

Note -

Planning Scheme Policy 9 - Infrastructure Works will assist in achieving specific outcomes within the Excavation and Fill Code.

7.6.2 Overall Outcomes of the Excavation and Fill Code

(1) The overall outcomes are the purpose of the Excavation and Fill Code.

(2) The overall outcome sought for the Excavation and Fill Code is the following -

(a) to ensure excavation and fill -

(i) does not adversely affect the character and amenity of the site and the surrounding area;

(ii) is minimised to protect environmental values, native plants and natural drainage systems;

(iii) protects the safety of people and property.

Excavation and Fill

7.6.5 Specific Outcomes and Probable Solutions applicable to Assessable Development

Assessable Development				
Specific Outcomes		**Probable Solutions**		**Applicant's Response**
S1.	(1) Excavation and fill - (a) does not reduce the amenity of adjoining properties through the - (i) loss of solar access or privacy; (ii) intrusion of negative visual or overbearing impacts; (iii) ensuring retaining walls or structures - a. are constructed of materials that are of a high quality appearance; b. incorporate landscaping or other features to assist reducing their visual bulk and length; c. do not dominate over, and are of an appropriate scale to buildings / structures and land uses in the locality; (b) is minimised by development being located and designed to - (i) prevent the unnecessary removal of native plants; (ii) protect existing and natural overland drainage systems; (iii) reduce erosion and sediment run-off; (c) protects the safety of people and property from -	**P1.**	(i) Excavation and fill - a. maintains the amenity of adjoining properties by - • for operational works - • not exceeding a combined depth of 750mm; • not exceeding an area of 1 hectare; or • for building work - complies with Table 1; • ensuring retaining walls or structures - • are setback at least half the height of the wall from any boundary of the site; • do not exceed 2.5 metres in height; • are stepped or terraced 0.75 metres for every 1.5 metres in height to incorporate landscaping; (ii) No probable solution identified (iii) No probable solution identified **Note -** The safety of people and property is protected by ensuring –	**Complies** **Excavation and fill proposed only to reduce grade across effluent disposal area below 10%, to create flat pad for proposed building, associated internal driveways and carparking. Refer to Engineering Services Report and Civil Engineering Drawings DA01 – DA03 by ADG for further details.**

Assessable Development				
Specific Outcomes		Probable Solutions		Applicant's Response
	(i) drainage impacts such as the ponding or concentration of run-off or alteration of existing drainage systems; (ii) impacts associated with unstable fill; (iii) sub-standard retaining structures by ensuring - a. construction materials are durable; b. the structural strength of the walls is sufficient to support the works. (2) On slopes in excess of 10% excavation and fill is minimised to the extent practicable by avoiding slab on ground construction methods in preference of post supported construction methods.		(iv) where involving gradients or embankments comply with the Schedule 5, Division 5 of the *Standard Building Regulation 1993*; (v)retaining walls or structures - a. are designed in accordance with Section 3 of *Australian Standard 4678:2002 - Earth Retaining Structures*; b. have a design life of not less than 60 years; c. for reconfiguration operational works do not include timber materials; (vi) ensuring compaction is carried out in accordance with – a. Australian Standard 3798:1996 - Guidelines on earthworks for commercial and residential developments; b. Australian Standard 2870:1996 - Residential slabs and footings - construction. (2) No probable solution identified	

Assessable Development				
Specific Outcomes		**Probable Solutions**		**Applicant's Response**
S2.	(1) Excavation and fill does not result in land or water contamination, or the harbourage of vermin. **Note -** - Where the development requires the 'disturbance of soil' within a fire ant 'restricted area', a Risk Management Plan is approved by Biosecurity Queensland within the Department of Agriculture, Fisheries and Forestry; - High risk soil disturbance activities include, but are not limited to - • excavation or fill of a minor or major scale; • import of fill onto a site; • export of fill or other materials, such as soil, gravel, mulch and plants; • export off or import onto a site of construction and demolition waste and materials, or greenwaste/timber/fuel containing soil.	**P2.**	(1) Excavation and fill prevent land or water contamination, or the harbourage of vermin by ensuring - the controlled use of clean, dry, solid, inert building material as per section 4 of *Australian Standard 3798:1996 - Guidelines on earthworks for commercial and residential developments*; (b) where the site contains contaminated material, the removal of contaminated material is disposed to an approved landfill under the conditions of a disposal permit issued under the *Environmental Protection Act 1994*. **Note -** To assist in achieving the specific outcome check with the Environmental Protection Agency if the lot or premises is on the Contaminated Land Register or Environmental Management Register.	**To be complied with at Construction phase.** **A sediment and Erosion Control strategy will be implemented during construction.**

Assessable Development				
Specific Outcomes		**Probable Solutions**		**Applicant's Response**
S3.	(1) Excavation and fill does not cause environmental nuisance due to - (a) hours of construction; (b) dust emissions; (c) truck movements. **Note -** To assist in achieving the specific outcome applicants will be required to demonstrate the site will be managed throughout the period of excavation or fill and will incorporate all necessary mechanisms to minimise environmental nuisance.	**P2.**	(1) Excavation and fill works minimise environmental nuisance by - (a) limiting hours of construction are Monday to Friday from 7.00am to 6.00pm and Saturday from 7.00am to 1.00pm; (b) ensuring areas of disturbance on site, including accessways, are watered to limit dust associated with construction and vehicle movements; (c) ensuring public roads are kept free of dust and any spoil from trucks.	**To be complied with at Construction phase.**

Note –

Excavation and fill works intended to be located completely or partly within the coastal management district (as defined by the South-east Queensland Regional Coastal Management Plan) and tidal waters will also require assessment from the Department of Environment and Heritage Protection.

Table 1 - Area and Depth of Excavation and Fill by Zone where associated with Building Works

Zone	Building Work		
	Within the footprint of the building	Outside the footprint of the building	
	Maximum Depth	Maximum Area	Maximum Depth
- Medium Density - including sub-areas MDR1, MDR2 and MDR3 - Urban Residential - excluding sub-areas UR2 and UR3; or	As per *Standard Building Regulation 1993*	(1) 600m^2; or (2) 60 percent of the site, whichever is the lesser	(1) 750mm
- Point Lookout Residential; - SMBI Residential - including sub-area SR1	As per *Standard Building Regulation 1993*	(1) 25m^2 for a dwelling house, or (2) 12m^2 per dwelling unit for other types of housing	(1) 1.2 metres where for internal driveway, car parking platform, private open space, BBQ areas and clothes drying areas, or (2) 750mm

Zone	Building Work		
	Within the footprint of the building	Outside the footprint of the building	
	Maximum Depth	Maximum Area	Maximum Depth
- Conservation - excluding sub-areas CN1 and CN2; - Environmental Protection; - Emerging Urban Community - including sub-area EUC1; - Investigation Zone; - Island Industry - sub-area IS1 - Local Centre - sub-area LC1; - Low Density Residential; - Park Residential; - Point Lookout Tourist - including all sub-areas; - Point Lookout Centre; - Rural Non-Urban - excluding sub-areas RN1 and RN2; - SMBI Centre - including sub-area SC1 - Urban Residential - including sub-area UR2 and UR3;	As per *Standard Building Regulation 1993*	(1) 100m^2	(1) 750mm

Zone	Building Work		
	Within the footprint of the building	Outside the footprint of the building	
	Maximum Depth	Maximum Area	Maximum Depth
- Major Centre - including all sub-areas; - District Centre; - Neighbourhood Centre - including all sub-areas; - Local Centre - excluding LC1; - General Industry - including sub-area GL1; - Commercial Industry - including sub-area CM1; - Marine Activity - including all sub-areas; - Community Purposes - including all sub-areas; - Open Space; - Rural Non-Urban - excluding sub-area RN3	As per *Standard Building Regulation 1993*	Determined on the merits of the proposal	
- Conservation - including sub-areas CN1 and CN2	Highly restricted and determined on the merits of the proposal		

Division 7 - Infrastructure Works

Overall Outcomes of the Infrastructure Works Code

(1) The overall outcomes are the purpose of the Infrastructure Works Code.

(2) The overall outcome sought for the Infrastructure Works Code is the following -

(a) to ensure utility, road, pedestrian and cycle infrastructure -

(i) is provided in a cost-effective, efficient and coordinated manner;

(ii) is integrated with existing systems and facilitates provision of future systems;

(iii) meets the local government's standards;

(iv) is designed to minimise whole-of-life costs;

(v) does not result in adverse impacts on environmental values;

(vi) maintains the safety of people and property.

Specific Outcomes and Probable Solutions applicable to Assessable Development

Infrastructure Works

Assessable Development				
Specific Outcomes		**Probable Solutions**		**Applicant's Response**
S1.	Utility Infrastructure - (1) Utility Infrastructure is designed, constructed and located in accordance with the local government's standards.	**P1.**	(1) Utility infrastructure is - (a) designed and constructed in accordance with the local government's standards; (b) located, co-located and aligned within the road reserve in accordance with Standard Drawings - (i) R-RSC-9 Public Utilities in Road Reserves - Typical Service Corridors and Alignments; (ii) R-RSC-10 Public Utilities in Road Reserves - Typical Service Conduit Sections; (iii) R-RSC-13 Water Service Conduits. **Note -** Refer to Planning Scheme Policy 9 - Infrastructure Works for the local government standards and Standard Drawings.	**To be complied with a detailed design phase.**

Assessable Development				
Specific Outcomes		**Probable Solutions**		**Applicant's Response**
S2.	Electrical Infrastructure - (1) Electrical infrastructure - (a) is consistent with the expected capacity of the use or other development; (b) upgrades existing networks where current capacity is insufficient for the needs of the use or other development; enhances opportunities for extension of below ground networks.	**P2.1.**	(1) Underground electrical reticulation infrastructure is provided - (a) along all internal public roads and any existing external public roads for the extent of the development, for reconfiguration that creates lots in the following zones - (i) Urban Residential Zone - excluding sub-area UR3; (ii) Medium Density Residential Zone; (iii) Low Density Residential Zone; (iv) Park Residential Zone; (v) Point Lookout Residential Zone; or (b) in centre zones, except SMBI Centre Zone and Local Centre Zone - sub-area LC1; or (c) in dedicated underground areas; or (d) where the use has a street frontage of greater than 50 metres and will result in 10 or more dwelling units; or (e) for uses of a commercial, industrial, or community nature; or (f) where not providing underground infrastructure and the use or other development requires works within the verge, conduits are installed to allow for future expansion of underground utility	**Electrical infrastructure will be provided to the development as required to supply the demand of the development**

Assessable Development				
Specific Outcomes		**Probable Solutions**		**Applicant's Response**
			infrastructure. **Note -** (a) Refer to Planning Scheme Policy 9 - Infrastructure Works, Maps 1 - 8 for Dedicated Underground Areas.	
S3.	Water Supply - (1) Water supply infrastructure - (a) is consistent with the expected capacity of the use or other development; upgrades existing networks where current capacity is insufficient for the needs of the use or other development.	**P3.**	(1) Uses and other development are - (a) connected to a reticulated water supply; or (b) where a reticulated system is not available rainwater harvesting supplements or provides the potable water supply; (c) provided with water meters, for billing purposes that are a type approved by Redland Water and Waste and installed in accordance with *Australian Standard 3500:1.2: 1998 - Section 12 - Installation of Water Meters*; (2) provided with fire hydrants in accordance with *Australian Standard 2419.1: 1996 - Fire Hydrant Installations.*	**Complies** **Refer to Engineering Services Report compiled by ADG Engineers**

Assessable Development				
Specific Outcomes		**Probable Solutions**		**Applicant's Response**
S4.	Sewerage Management - (1) Sewerage infrastructure - (a) is consistent with the expected capacity of the use or other development; (b) upgrades existing networks where current capacity is insufficient for the needs of the use or other development.	**P4.**	(1) Uses and other development are - (a) connected to a reticulated sewage system; or (b) in unsewered areas, wastewater is treated and disposed of on-site subject to the location, design and performance of treatment systems.	**Complies** **Refer to Site Management Plan compiled by Biome**
S5.	Communications - (1) Communications infrastructure - (a) is consistent with the expected capacity of the use or other development; (b) upgrades existing networks where current capacity is insufficient for the needs of the use or other development.	**P5.**	(1) Uses and reconfiguration that creates lots - (a) optimise opportunities for electronic communication by providing cabling suitable for a range of applications; (b) are supplied with underground telecommunication services.	**N/A** **No new lots proposed**
S6.	Street and Path Lighting - (1) Lighting infrastructure - (a) is consistent with the expected capacity of the use or other development; upgrades existing networks where current capacity is insufficient for the needs of the use or other development.	**P6.**	(1) Uses or reconfiguration that create new public or private roads, pedestrian and cycle paths, or public open space provide street and path lighting in accordance with *Australian Standard 1158 - Road Lighting.* **Note -** Various versions of *Australian Standard 1158 - Road Lighting* may apply depending	**N/A** **No street and path lighting proposed as part of development**

Assessable Development				
Specific Outcomes		**Probable Solutions**		**Applicant's Response**
			on the use and other development proposed.	
S7.	Road Provision and Design - (1) Uses or reconfiguration that create new public roads or require the upgrading of a public road reserve - (a) maintain or improve the safe and efficient operation of roads having regard to - (i) the functional classification of the road from which it gains access; (ii) the location and design of access points; (iii) facilitating links between the use or other development and other high activity nodes such as educational facilities, communal facilities, centres and open space; (iv) the potential for conflict between vehicles, pedestrians and cyclists; (v) the location, construction and maintenance of utility infrastructure; (vi) the location of activities within the site and their relationship with adjacent public roads; (vii) the nature and intensity of traffic generated by the use or other development; (ix) the number of vehicles likely to be attracted to the site at any one time, whether due to the	P7.	(1) Roads are upgraded or created in accordance with Part 9 - Schedule 6 - Movement Network and Road Design - (a) Table 1 - Functional Characteristics of Road Types and Map 1 - Movement Network; and for - (i) the mainland and NSI - Table 2 - Road Design; or (ii) for SMBI - Table 3 - SMBI Road Design; or (iii) for industrial development - Table 4 - Industrial Road Design Characteristics; (iv) for residential uses and residential reconfiguration, traffic volumes on individual roads are determined by assuming - a. ten vehicle movements per dwelling unit per day in all zones, except centre zones. b. six vehicle movements per dwelling unit per day in centre zones; (v) for trunk collector and higher order roads, the road width is sufficient to provide for indented bus bays, to allow for the movement of buses	**N/A. No external road upgrades anticipated**

Assessable Development				
Specific Outcomes		**Probable Solutions**		**Applicant's Response**
	use or other uses; the location, capacity and configuration of any existing or proposed car parking areas associated with the use; (x) if located in a centre zone, the predominantly pedestrian orientated nature of public spaces in that zone; (b) are provided with a road reserve and verge width sufficient to accommodate the - (i) safe and efficient movement of all users, including pedestrians and cyclists; (ii) on-street parking; (iii) street tree planting; (iv) utility infrastructure, including stormwater management and run-off from road surfaces; (c) facilitate safety by providing - (i) safe sight distances based on - a. road classification; b. target speed; c. expected access points; (ii) pedestrian and cyclist crossings at intersections or where required to access - a. high activity nodes; b. public transport; c. centres; (iii) an alignment that does not result in excessive speeds; (iv) a combination of speed reduction techniques to		unimpeded by parked vehicles and on-road cycle lanes; (b) where possible, the geometric design of the road facilitates stormwater management and run-off from road surfaces using water sensitive urban design (WSUD) principles, specifically those relating to low-impact street design and layout; road design and sight distance requirements achieve the following - (i) target speeds detailed in Part 9 - Schedule 6 - Movement Networks and Road Design - Table 2 - Road Design; (ii) sight distances for intersections comply with *AUSTROADS Chapter 5 - Geometric Road Design, S5.2.2*; (iii) sight distances for driveway access location comply with Part 9 - Schedule 1 - Access and Parking - Table 2 - Driveway Access Location; **Note -** Refer to - - Part 8 - Division 1 - Access and Parking Code; (vi) Planning Scheme Policy 9	

Assessable Development				
Specific Outcomes		Probable Solutions		Applicant's Response
	achieve desired speeds including - a. speed platforms; b. t-junction with splitter islands; c. modified intersections; d. roundabouts; or e. other speed control devices.		Infrastructure Works.	
S8.	Pedestrian and Cycle Path Provision - (1) Pedestrian and cycle path infrastructure is provided - to form an integrated component of the movement network and the open space system; (b) to encourage walking and cycling; (c) to add variety and visual interest; (d) to conserve street trees, vegetation and other significant features; (e) to allow equitable access to public areas and community facilities; (f) with adequate lighting where subject to high night time usage; (g) in locations where there is casual surveillance; (h) or widened at potential conflict points; (i) to incorporate - (i) street tree planting to enhance the streetscape;	P8.	(1) No probable solution identified.	N/A

Assessable Development				
Specific Outcomes		Probable Solutions		Applicant's Response
	(ii) directional signage that is visible under all conditions.			
S9.	Pedestrian and Cycle Path Design and Construction - (1) Pedestrian and cycle path infrastructure is designed and constructed to - (a) provide a stable, smooth surface, including across driveways, sections and joins; (b) be easily maintained; (c) a width and longitudinal gradient to cater for projected usage, including nearby - (i) high activity nodes; (ii) public transport; (iii) centres; (d) provide clear sight-lines for safe use; (e) be free of any obstructions such as fences, signage and bollards.	P9.	(1) Pedestrian and cycle path infrastructure is designed and constructed - (a) in accordance with in Part 9 - Schedule 6 - Movement Network and Road Design - Table 2 - Road Design; (b) to have sign posting, particularly where commuter and recreational paths, and incorporate pavement markings and line work in accordance with *AUSTROADS Part 14 - Bicycles, Section 9*; (c) to have navigational signs in accordance with the - *(i) Manual of Uniform Traffic Control Devices (MUTCD) Bicycle Directional Signage Guidelines;* *(ii) Australian Standard 1742.9: 2000 - Manual of Uniform*	**N/A**

Assessable Development				
Specific Outcomes		Probable Solutions		Applicant's Response
			Traffic Control Devices - Bicycle Facilities; (d) to be clearly delineated by pavement markings and warning signs when an on-road bicycle lane; (e) to incorporate - kerb ramps at all intersections and designated crossings; (ii) refuge islands on all roads with median strips; (iii) holding rails for cyclists at the intersection of trunk collector, sub-arterial and arterial roads that are positioned in accordance with - a. *Australian Standard 1742.9: 2000 - Manual of Uniform Traffic Control Devices - Bicycle Facilities*; b. *AUSTROADS Part 14 - Bicycles - Section 9*; (iv) marked bicycle lanes or storage boxes. **Note -** - Refer to Planning Scheme Policy 9 - Infrastructure Works for assistance in achieving specific outcomes; Cyclists can legally use footpaths, to be treated as a shared path, unless prohibited.	

Assessable Development				
Specific Outcomes		**Probable Solutions**		**Applicant's Response**
	Streetscape Works -			**N/A**
S10.	(1) For all uses and other development, redundant crossovers are removed and kerb, channel and footpaths are reinstated.	**P10.**	(1) Footpaths and kerb and channel are reinstated in accordance with Part 9 - Schedule 6 - Movement Network and Road Design - (a) Table 2 - Road Design; or (b) Table 3 - SMBI Road Design Characteristics; or (c) Table 4 - Industrial Road Design Characteristics.	
S11.	(1) Uses and reconfiguration that create lots - (a) contribute to the amenity of the locality; (b) provide shade for pedestrians; (c) reinforce pedestrian and cycle paths by - (i) street tree planting; (ii) street furniture; (iii) pavement treatments.	**P11.**	(1) No probable solution identified. **Note -** Refer to Part 8 - Division 8 - Landscape Code for further information regarding street trees.	

Assessable Development				
Specific Outcomes		**Probable Solutions**		**Applicant's Response**
S12.	Timing of Utility Infrastructure- (1) Uses and reconfiguration are staged to ensure that utility infrastructure is fully operational before a new area is released or prior to the use commencing. **Note -** Refer to Planning Scheme Policy 3 - Contributions and Security Bonding for further information regarding security bonds.	**P12.**	(1) All infrastructure is in place and operational - (a) as required by a condition of a development approval; or (b) prior to the local government sealing the plan of survey; or (c) having in place adequate security bonds to guarantee the completion of works and a period of on-maintenance.	**To be complied with at construction stage as required**

Division 13 – Landslide Hazard Overlay

Assessable Development		
Specific Outcomes	**Probable Solutions**	**Applicants Response**
Where proposed on a lot or premises shown on this overlay map (1) All uses and other development do not create or increase the landslide hazard risk to that land or adjoining through – (a) built form; (b) slope; (c) the extent of vegetation removal; (d) soil type and stability; (e) earthworks; (f) alteration of existing groundwater or surface water flow paths; (g) waste water disposal areas; environmental values.	(1) No probable solution identified. **Note -** (1) To assist in achieving S1, the proposed development is to be supported by a geotechnical report that has been undertaken in accordance with - (a) section 15.6.1, Planning Scheme Policy 15 – Landslide Hazard for Very High Hazard areas; (b) section 15.6.2, Planning Scheme Policy 15 – Landslide Hazard for High Hazard areas; (c) section 15.6.3, Planning Scheme Policy 15 – Landslide Hazard for Moderate Hazard areas.	**Complies** **Refer to Geotechnical report by Geotech Investigations Pty Ltd and Bulk Earthworks drawings by ADG Engineers**
Community Infrastructure (1) The community infrastructure is able to function effectively during and immediately after landslide events.	(1) The community infrastructure – (a) is not located in a Moderate, High or Very High Landslide Management Area as shown on this overlay map; or (b) where there are no alternative sites outside of the Landslide Hazard Management Area, is located within the Low Landslide Hazard Management Area. **Note -** Where community infrastructure cannot be located outside the Moderate, High or Very	**Complies** **Refer to site layout plan**

Assessable Development				
Specific Outcomes		Probable Solutions		Applicants Response
			High Landslide Hazard Management Areas, locating community infrastructure in these areas may be considered where - (1) the community infrastructure development - does not result (a) does not result in any new building work other than an addition to an existing building; (b) does not involve vegetation clearing; (c) does not alter ground levels or stormwater conditions; (2) the development includes measures that ensure - (a) the long term stability of the site; (b) access to the site will not be impeded by a landslide event; (c) the community infrastructure will not be adversely affected by landslides originating on sloping land above the site. To assist in achieving S2 refer to Planning Scheme Policy 15 – Landslide Hazard.	

147-205 Rocky Passage Road, Redland Bay
ADG Ref: 18547 C R001 REV02 05.11.2018
November 2018

Appendix E
ADG Preliminary Civil Drawings

PRELIMINARY
NOT FOR CONSTRUCTION

SCALE 1:500
AT ORIGINAL SIZE (A1)

Rev	Date	Description	By	Chk
03	12.11.18	PRELIMINARY - Issued for Information	DE	ML
02	07.06.18	PRELIMINARY - Issued for Information	LDV	ML
01	31.08.17	PRELIMINARY - Issued for Information	LDV	ML

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Client
AUSTRALIA & NZ LAND DEVELOPMENT

Project Name
PROPOSED ACCOMMODATION RESORT
147 ROCKY PASSAGE ROAD
REDLAND BAY QLD 4165

Title
PRELIMINARY BULK EARTHWORKS
LAYOUT PLAN
SHEET 1 OF 2

Discipline	Status
CIVIL	PRELIMINARY

Designed By	Checked By	Approved By
DE	ML	ML
Project No.	Drawn By	Scale at A1
18547	LDV	1:500

Drawing No. DA01 Revision 03

FULL SIZE ON ORIGINAL 0 10 20 30 40 50 60 70 80 90 100mm


PRELIMINARY
NOT FOR CONSTRUCTION
TRAIL 2
1 IN 2 BATTER
EXISTING DAM
TO REMAIN
CONTINUES ON DRG DA01
ROAD 3
ROAD 2
ROAD 1
1 IN 2 BATTER
ROAD 2
TRAIL 1
ROCKY PASSAGE ROAD
SCALE 1:500
AT ORIGINAL SIZE (A1)
00 12.11.18 PRELIMINARY - Issued for Information DE ML
00 07.06.18 PRELIMINARY - Issued for Information LDV ML
01 31.08.17 PRELIMINARY - Issued for Information LDV ML
Rev Date Description By Chk
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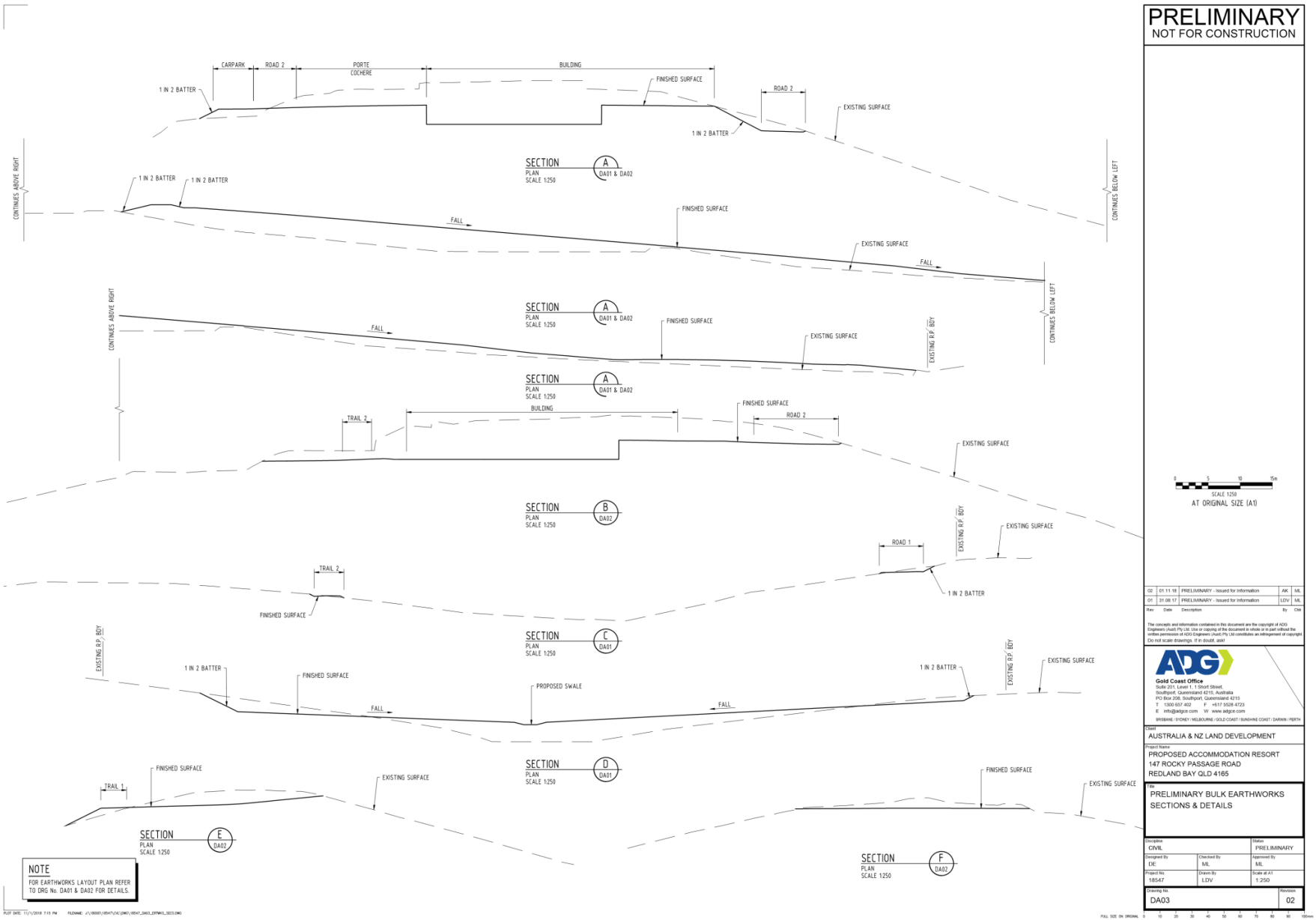
Client
AUSTRALIA & NZ LAND DEVELOPMENT
Project Name
PROPOSED ACCOMMODATION RESORT
147 ROCKY PASSAGE ROAD
REDLAND BAY QLD 4165
Title
PRELIMINARY BULK EARTHWORKS
LAYOUT PLAN
SHEET 2 OF 2
Discipline CIVIL
Status PRELIMINARY
Designed By DE
Checked By ML
Approved By ML
Project No. 18547
Drawn By LDV
Scale at A1 1:500
Drawing No. DA02
Revision 03



PRELIMINARY
NOT FOR CONSTRUCTION

SCALE 1:250
AT ORIGINAL SIZE (A1)

Rev	Date	Description	By	Chk
02	01.11.18	PRELIMINARY - Issued for Information	AK	ML
01	31.08.17	PRELIMINARY - Issued for Information	LDV	ML

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Client
AUSTRALIA & NZ LAND DEVELOPMENT

Project Name
PROPOSED ACCOMMODATION RESORT
147 ROCKY PASSAGE ROAD
REDLAND BAY QLD 4165

Title
PRELIMINARY BULK EARTHWORKS SECTIONS & DETAILS

Discipline		Status
CIVIL		PRELIMINARY
Designed By	Checked By	Approved By
DE	ML	ML
Project No.	Drawn By	Scale at A1
18547	LDV	1:250
Drawing No.		Revision
DA03		02

FULL SIZE ON ORIGINAL 0 10 20 30 40 50 60 70 80 90 100mm

PLOT DATE: 11/1/2018 7:15 PM FILENAME: J:\18000\18547\CIV\DWG\18547_DA03_EWKWS_SECS.DWG


LEGEND
FINISHED SURFACE CONTOURS
EXISTING SURFACE LEVEL
FINISHED SURFACE LEVEL
EXISTING EDGE OF BITUMEN
EXISTING NOMINAL KERB LINE
EXISTING VEGETATION LINE
PROPOSED NOMINAL KERB LINE
EXISTING STORMWATER DRAINAGE
EXISTING SEWER
EXISTING WATER
EXISTING OVERHEAD ELECTRICITY
EXISTING GAS
EXISTING TELECOMMUNICATIONS
PROPOSED BATTER
LIMIT OF WORKS
PROPOSED EASEMENTS
PROPOSED RETAINING WALL
PROPOSED STORMWATER DRAINAGE
PROPOSED ROOFWATER DRAINAGE
PROPOSED SEWER
PROPOSED WATER MAIN
PROPOSED ELECTRICITY
EXISTING ROAD
PROPOSED ASPHALT PAVEMENT
ROADWORKS CHAINAGE
41m² BIO RETENTION AREA
608m³ DETENTION ABOVE EXISTING DAM LEVEL
CONTROLLED OUTLET FROM DETENTION BASIN
16m² BIO RETENTION AREA
PROPOSED 33m² BIO RETENTION AREA
TRAIL
ROAD 1
ROCKY
PASSAGE
ROAD
CONTINUES ON DRG DA05
PRELIMINARY
NOT FOR CONSTRUCTION
SCALE 1:500
AT ORIGINAL SIZE (A1)
04 12.11.18 PRELIMINARY - Issued for Information DE ML
03 09.11.18 PRELIMINARY - Issued for Information AK ML
02 07.06.18 PRELIMINARY - Issued for Information DS ML
01 31.08.17 PRELIMINARY - Issued for Information LDV ML
Rev Date Description By Chk
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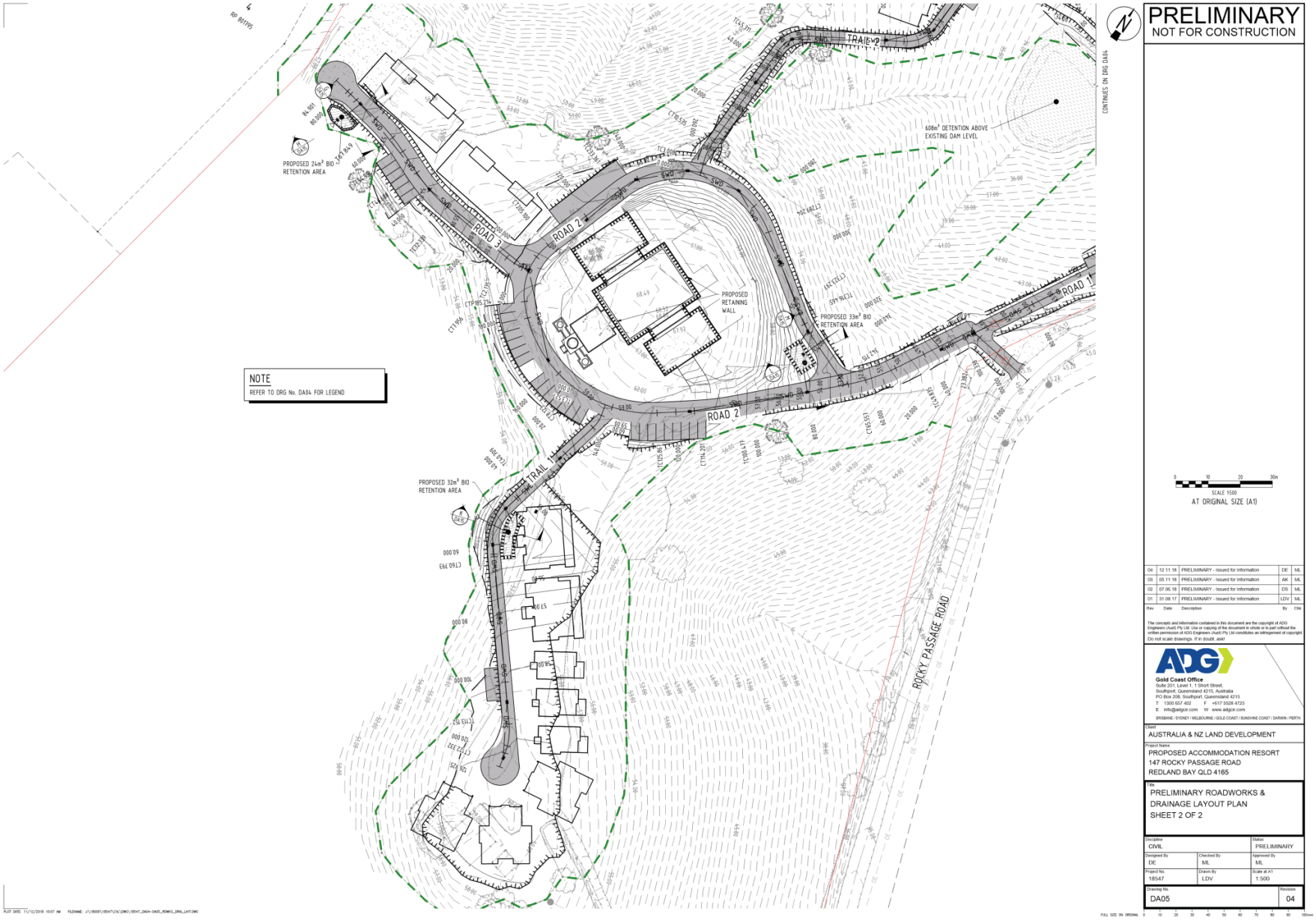
Client
AUSTRALIA & NZ LAND DEVELOPMENT
Project Name
PROPOSED ACCOMMODATION RESORT
147 ROCKY PASSAGE ROAD
REDLAND BAY QLD 4165
Title
PRELIMINARY ROADWORKS & DRAINAGE LAYOUT PLAN
SHEET 1 OF 2
Discipline CIVIL
Status PRELIMINARY
Designed By DE
Checked By ML
Approved By ML
Project No. 18547
Drawn By LDV
Scale at A1 1:500
Drawing No. DA04
Revision 04


PRELIMINARY
NOT FOR CONSTRUCTION
NOTE
REFER TO DRG No. DA04 FOR LEGEND
PROPOSED 24m² BIO RETENTION AREA
PROPOSED 32m² BIO RETENTION AREA
PROPOSED 33m² BIO RETENTION AREA
608m³ DETENTION ABOVE EXISTING DAM LEVEL
PROPOSED RETAINING WALL
ROAD 1
ROAD 2
ROAD 3
TRAIL
ROCKY PASSAGE ROAD
CONTINUES ON DRG DA04
SCALE 1:500
AT ORIGINAL SIZE (A1)
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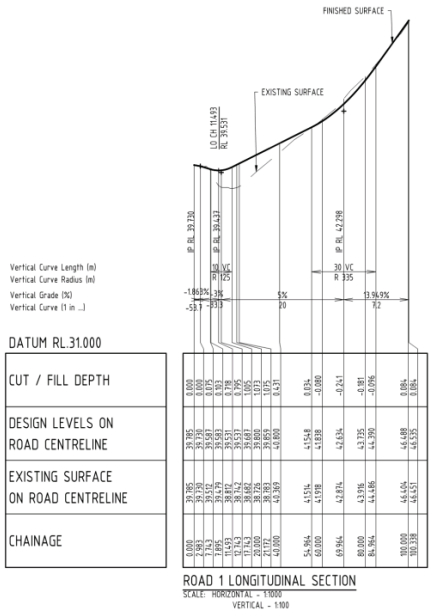
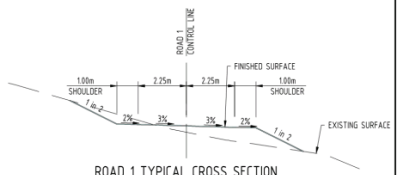
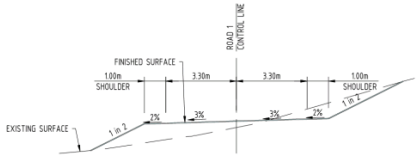
PROPOSED ACCOMMODATION RESORT
147 ROCKY PASSAGE ROAD
REDLAND BAY QLD 4165
PRELIMINARY ROADWORKS & DRAINAGE LAYOUT PLAN SHEET 2 OF 2
CIVIL
PRELIMINARY
DE
ML
18547
LDV
1:500
DA05
04



ROAD 1 LONGITUDINAL SECTION
SCALE: HORIZONTAL - 1:1000
VERTICAL - 1:100



ROAD 1 TYPICAL CROSS SECTION
CH 0.000 TO CH 181.000
4.5m PAVEMENT
SCALE: 1:100



ROAD 1 TYPICAL CROSS SECTION
CH 181.000 TO END
6.6m PAVEMENT
SCALE: 1:100

PRELIMINARY
NOT FOR CONSTRUCTION

SCALE 1:100
AT ORIGINAL SIZE (A1)
SCALE 150 VERTICAL
SCALE 1500 HORIZONTAL
AT ORIGINAL SIZE (A1)

Rev	Date	Description	By	Chk
02	05.11.18	PRELIMINARY - Issued for Information	AK	ML
01	31.08.17	PRELIMINARY - Issued for Information	LDV	ML

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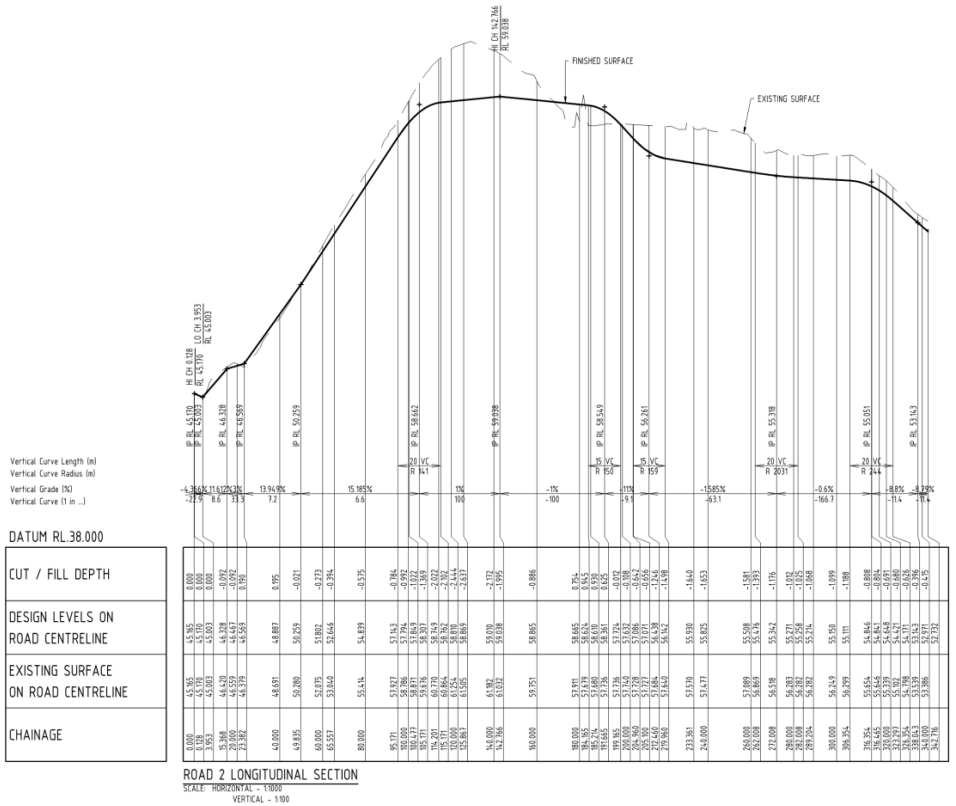
Project Name
PROPOSED ACCOMMODATION RESORT
147 ROCKY PASSAGE ROAD
REDLAND BAY QLD 4165

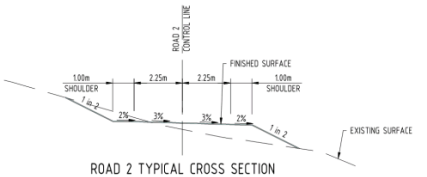
Title
ROAD 1
LONGITUDINAL & CROSS SECTIONS

Discipline		Status
CIVIL		PRELIMINARY
Designed By	Checked By	Approved By
DE	ML	ML
Project No.	Drawn By	Scale at A1
18547	LDV	AS SHOWN
Drawing No.		Revision
DA06		02

FULL SIZE ON ORIGINAL 0 10 20 30 40 50 60 70 80 90 100mm



ROAD 2 LONGITUDINAL SECTION
SCALE: HORIZONTAL - 1:1000
VERTICAL - 1:100



ROAD 2 TYPICAL CROSS SECTION
4.5m PAVEMENT
SCALE: 1:100

PRELIMINARY
NOT FOR CONSTRUCTION

SCALE 1:100
AT ORIGINAL SIZE (A1)

SCALE 1:100 VERTICAL
SCALE 1:1000 HORIZONTAL
AT ORIGINAL SIZE (A1)

Rev	Date	Description	By	Chk
02	05.11.18	PRELIMINARY - Issued for Information	AK	ML
01	31.08.17	PRELIMINARY - Issued for Information	LDV	ML

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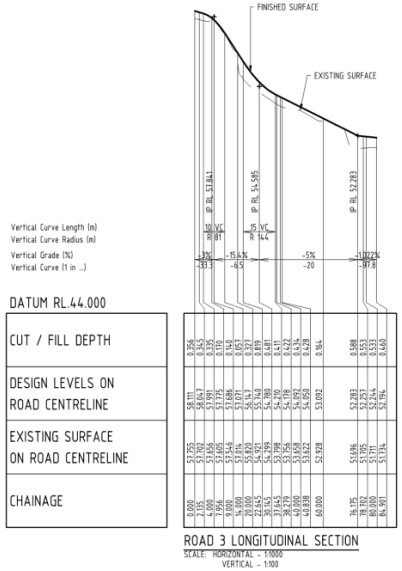
Project Name
PROPOSED ACCOMMODATION RESORT
147 ROCKY PASSAGE ROAD
REDLAND BAY QLD 4165

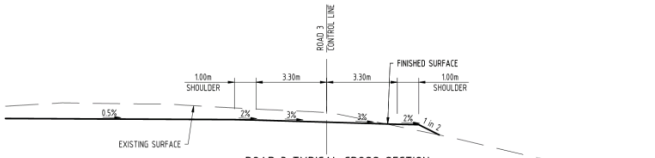
Title
ROAD 2
LONGITUDINAL & CROSS SECTIONS

Discipline: CIVIL		Status: PRELIMINARY
Designed By: DE	Checked By: ML	Approved By: ML
Project No: 18547	Drawn By: LDV	Scale at A1: AS SHOWN
Drawing No: DA07		Revision: 02

FULL SIZE ON ORIGINAL 0 10 20 30 40 50 60 70 80 90 100mm



ROAD 3 LONGITUDINAL SECTION
SCALE: HORIZONTAL - 1:1000
VERTICAL - 1:100



ROAD 3 TYPICAL CROSS SECTION
6.6m PAVEMENT
SCALE: 1:100

PRELIMINARY
NOT FOR CONSTRUCTION

SCALE 1:100
AT ORIGINAL SIZE (A1)

SCALE 1:100 VERTICAL
SCALE 1:1000 HORIZONTAL
AT ORIGINAL SIZE (A1)

Rev	Date	Description	By	Chk
02	05.11.18	PRELIMINARY - Issued for Information	AK	ML
01	31.08.17	PRELIMINARY - Issued for Information	LDV	ML

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Client
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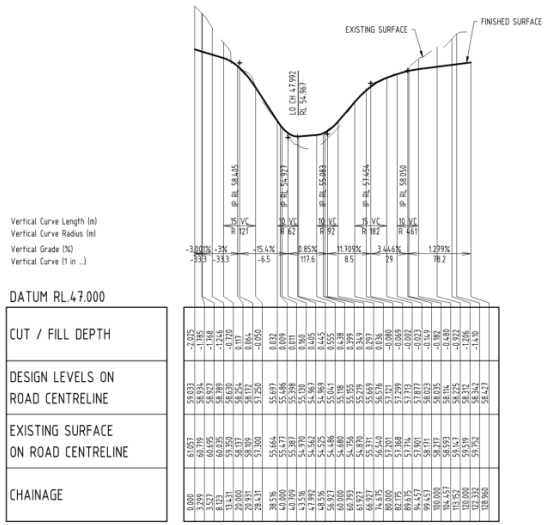
Project Name
PROPOSED ACCOMMODATION RESORT
147 ROCKY PASSAGE ROAD
REDLAND BAY QLD 4165

Title
ROAD 3
LONGITUDINAL & CROSS SECTIONS

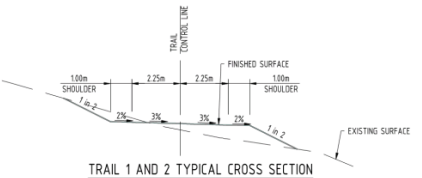
Discipline: CIVIL		Status: PRELIMINARY
Designed By: DE	Checked By: ML	Approved By: ML
Project No: 18547	Drawn By: LDV	Scale at A1: AS SHOWN
Drawing No: DA08		Revision: 02

FULL SIZE ON ORIGINAL 0 10 20 30 40 50 60 70 80 90 100mm

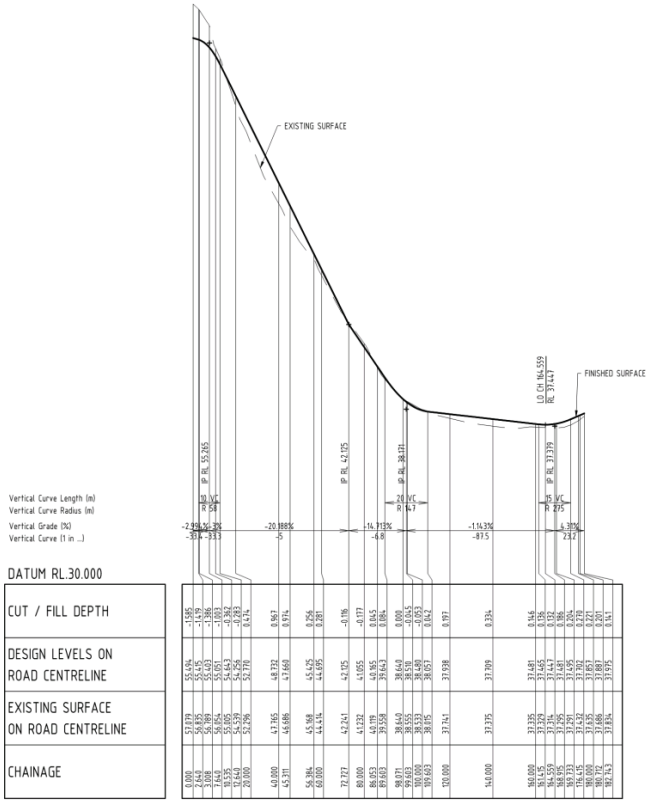
PLOT DATE: 11/5/2018 6:24 PM FILENAME: J:\18000\18547\CAD\DWG\18547_DA08_RD 3_LONG_XSEC.DWG



TRAIL 1 LONGITUDINAL SECTION
SCALE: HORIZONTAL - 1:1000
VERTICAL - 1:100



TRAIL 1 AND 2 TYPICAL CROSS SECTION
4.5m PAVEMENT
SCALE: 1:100



TRAIL 2 LONGITUDINAL SECTION
SCALE: HORIZONTAL - 1:1000
VERTICAL - 1:100

PRELIMINARY
NOT FOR CONSTRUCTION

SCALE 1:100
AT ORIGINAL SIZE (A1)

SCALE 1:100 VERTICAL
SCALE 1:1000 HORIZONTAL
AT ORIGINAL SIZE (A1)

Rev	Date	Description	By	Chk
02	05.11.18	PRELIMINARY - Issued for Information	AK	ML
01	31.08.17	PRELIMINARY - Issued for Information	LDV	ML

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Client
AUSTRALIA & NZ LAND DEVELOPMENT

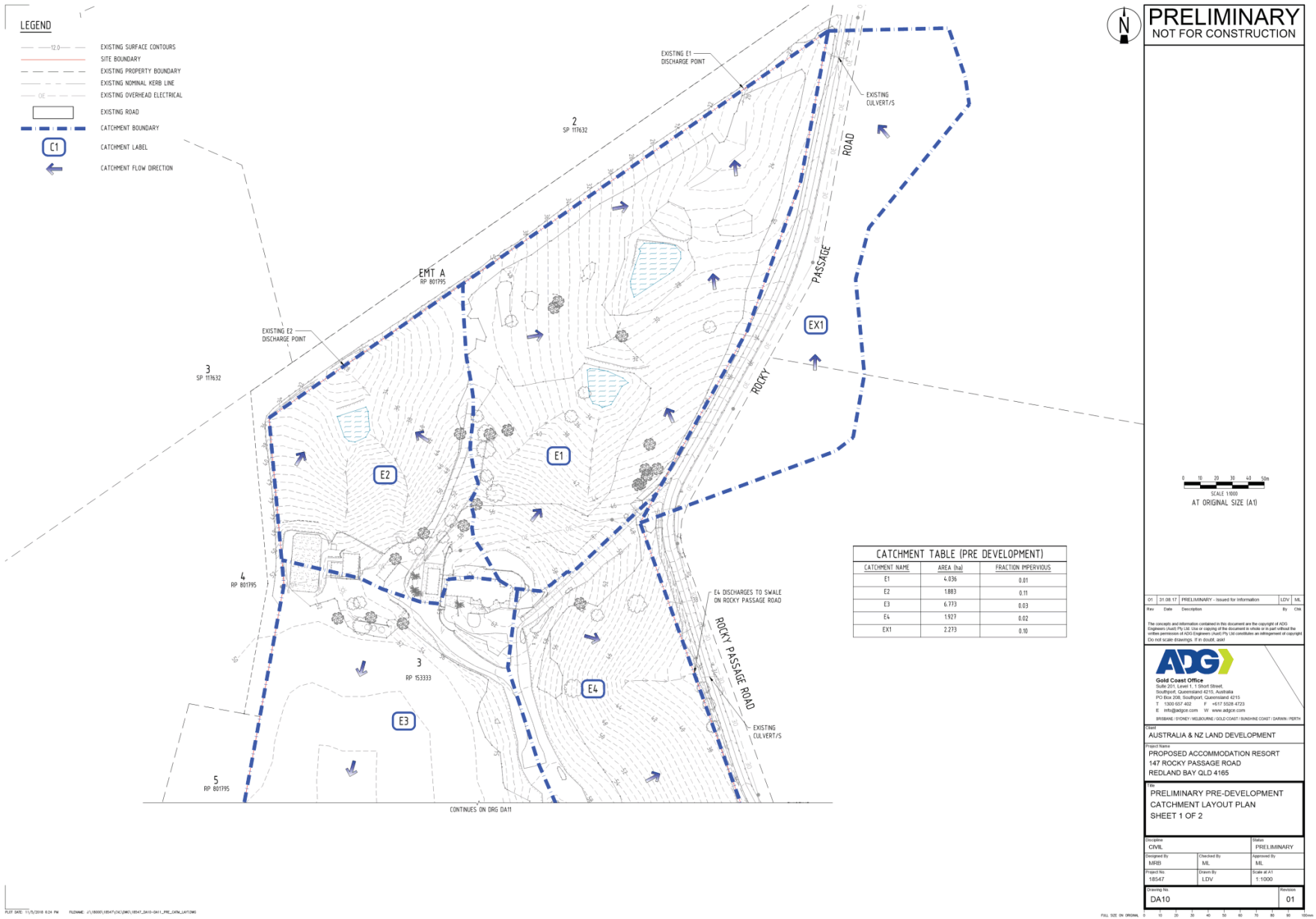
Project Name
PROPOSED ACCOMMODATION RESORT
147 ROCKY PASSAGE ROAD
REDLAND BAY QLD 4165

Title
TRAIL 1 AND TRAIL 2
LONGITUDINAL AND CROSS SECTIONS

Discipline	Status
CIVIL	PRELIMINARY
Designed By: DE	Checked By: ML	Approved By: ML
Project No: 18547	Drawn By: LDV	Scale at A1: AS SHOWN
Drawing No: DA09	Revision: 02

FULL SIZE ON ORIGINAL 0 10 20 30 40 50 60 70 80 90 100mm

PLOT DATE: 11/5/2018 6:24 PM FILENAME: J:\18000\18547\CAD\DWG\18547_DA09_TRAIL 1 AND 2_LONG_XSEC.DWG



CATCHMENT TABLE (PRE DEVELOPMENT)

CATCHMENT NAME	AREA (ha)	FRACTION IMPERVIOUS
E1	4.036	0.01
E2	1.883	0.11
E3	6.773	0.03
E4	1.927	0.02
EX1	2.273	0.10

PRELIMINARY
NOT FOR CONSTRUCTION

SCALE 1:1000
AT ORIGINAL SIZE (A1)

Rev	Date	Description	By	Chk
01	31.08.17	PRELIMINARY - Issued for Information	LDV	ML

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Client
AUSTRALIA & NZ LAND DEVELOPMENT

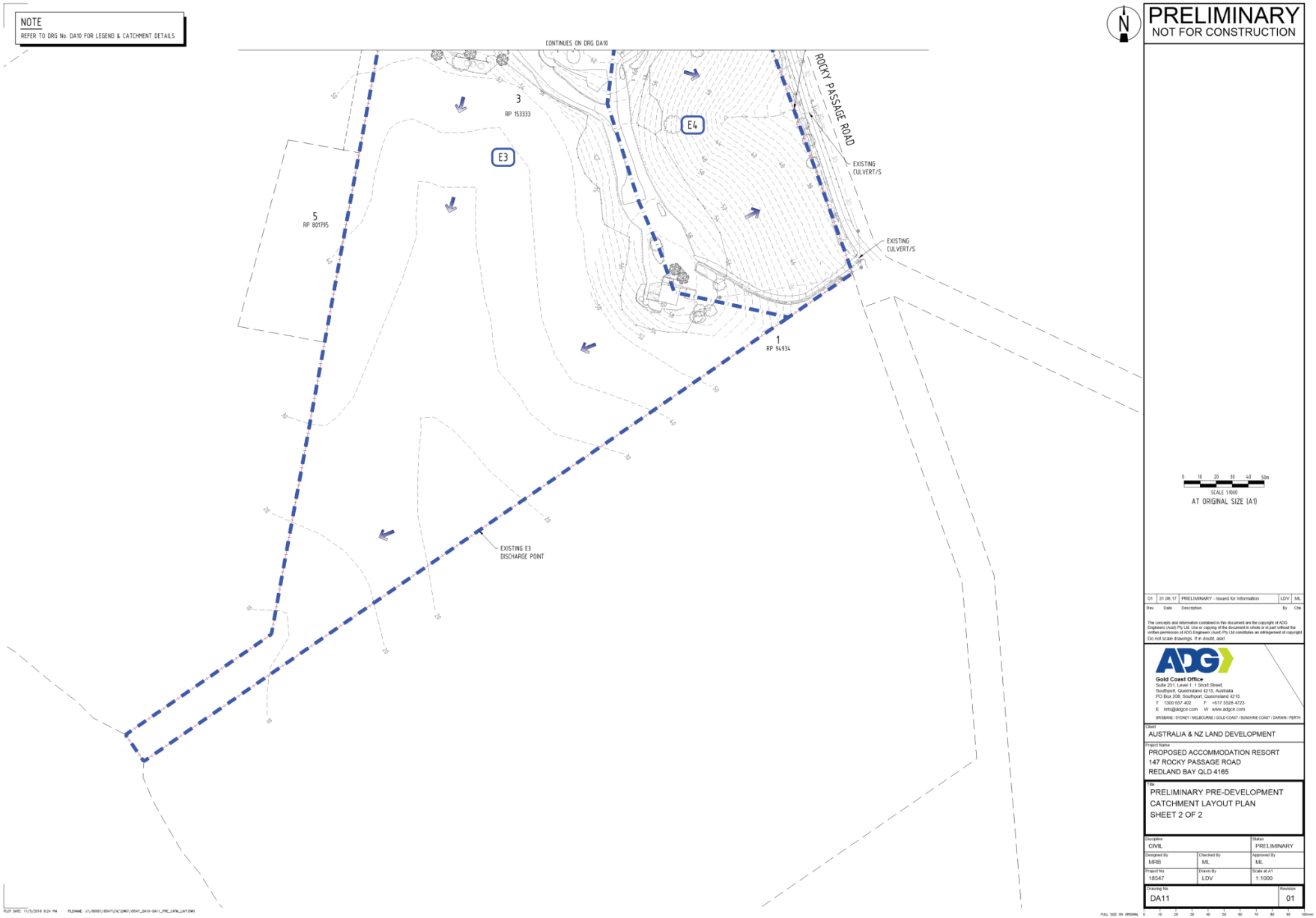
Project Name
PROPOSED ACCOMMODATION RESORT
147 ROCKY PASSAGE ROAD
REDLAND BAY QLD 4165

Title
PRELIMINARY PRE-DEVELOPMENT CATCHMENT LAYOUT PLAN
SHEET 1 OF 2

Discipline	Status
CIVIL	PRELIMINARY

Designed By	Checked By	Approved By
MRB	ML	ML
Project No	Drawn By	Scale at A1
18547	LDV	1:1000

Drawing No. DA10 Revision 01


NOTE
REFER TO DRG No. DA10 FOR LEGEND & CATCHMENT DETAILS
CONTINUES ON DRG DA10
ROCKY PASSAGE ROAD
3
RP 153333
E4
E3
EXISTING
CULVERT/S
5
RP 801795
EXISTING
CULVERT/S
1
RP 94934
EXISTING E3
DISCHARGE POINT
PRELIMINARY
NOT FOR CONSTRUCTION
SCALE 1:1000
AT ORIGINAL SIZE (A1)
01 31.08.17 PRELIMINARY - Issued for Information LDV ML
Rev Date Description By Chk
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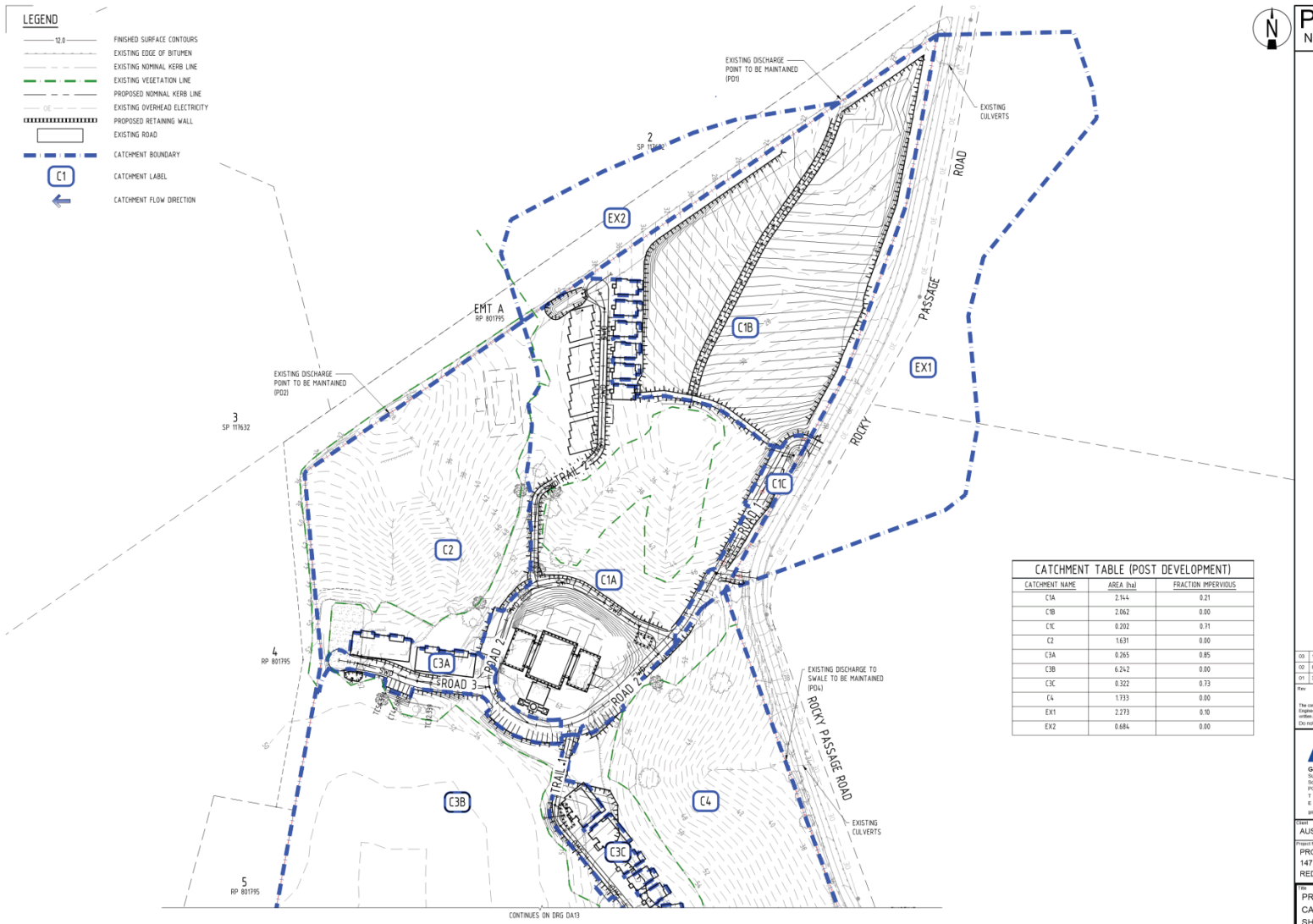
Client
AUSTRALIA & NZ LAND DEVELOPMENT
Project Name
PROPOSED ACCOMMODATION RESORT
147 ROCKY PASSAGE ROAD
REDLAND BAY QLD 4165
Title
PRELIMINARY PRE-DEVELOPMENT
CATCHMENT LAYOUT PLAN
SHEET 2 OF 2
Discipline
CIVIL
Status
PRELIMINARY
Designed By
MRB
Checked By
ML
Approved By
ML
Project No.
18547
Drawn By
LDV
Scale at A1
1:1000
Drawing No.
DA11
Revision
01



CATCHMENT TABLE (POST DEVELOPMENT)		
CATCHMENT NAME	AREA (ha)	FRACTION IMPERVIOUS
C1A	2.144	0.21
C1B	2.062	0.00
C1C	0.202	0.71
C2	1.631	0.00
C3A	0.265	0.85
C3B	6.242	0.00
C3C	0.322	0.73
C4	1.733	0.00
EX1	2.273	0.10
EX2	0.684	0.00

PRELIMINARY
NOT FOR CONSTRUCTION

SCALE 1:1000
AT ORIGINAL SIZE (A1)

Rev	Date	Description	By	Chk
03	12.11.18	PRELIMINARY - Issued for Information	AK	ML
02	05.11.18	PRELIMINARY - Issued for Information	AK	ML
01	31.08.17	PRELIMINARY - Issued for Information	LDV	ML

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Client
AUSTRALIA & NZ LAND DEVELOPMENT

Project Name
PROPOSED ACCOMMODATION RESORT
147 ROCKY PASSAGE ROAD
REDLAND BAY QLD 4165

Title
PRELIMINARY POST-DEVELOPMENT CATCHMENT LAYOUT PLAN
SHEET 1 OF 2

Discipline	Status
CIVIL	PRELIMINARY

Designed By	Checked By	Approved By
MRB	ML	ML
Project No.	Drawn By	Scale at A1
18547	LDV	1:1000

Drawing No. DA12 Revision 03

FULL SIZE ON ORIGINAL 0 10 20 30 40 50 60 70 80 90 100mm


NOTE
REFER TO DRG No. DA12 FOR LEGEND
CONTINUES ON DRG DA12
ROCKY PASSAGE ROAD
TRAIL 1
C3B
C3C
C4
EXISTING CULVERTS
EXISTING CULVERTS
5
RP 801795
1
RP 94934
EXISTING DISCHARGE POINT
TO BE MAINTAINED (PD3)
PRELIMINARY
NOT FOR CONSTRUCTION
SCALE 1:1000
AT ORIGINAL SIZE (A1)
00 12.11.18 PRELIMINARY - Issued for Information AK ML
00 05.11.18 PRELIMINARY - Issued for Information AK ML
01 31.08.17 PRELIMINARY - Issued for Information LDV ML
Rev Date Description By Chk
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Client
AUSTRALIA & NZ LAND DEVELOPMENT
Project Name
PROPOSED ACCOMMODATION RESORT
147 ROCKY PASSAGE ROAD
REDLAND BAY QLD 4165
Title
PRELIMINARY POST-DEVELOPMENT
CATCHMENT LAYOUT PLAN
SHEET 2 OF 2
Discipline CIVIL
Status PRELIMINARY
Designed By MRB
Checked By ML
Approved By ML
Project No. 18547
Drawn By LDV
Scale at A1 1:1000
Drawing No. DA13
Revision 03

LEGEND

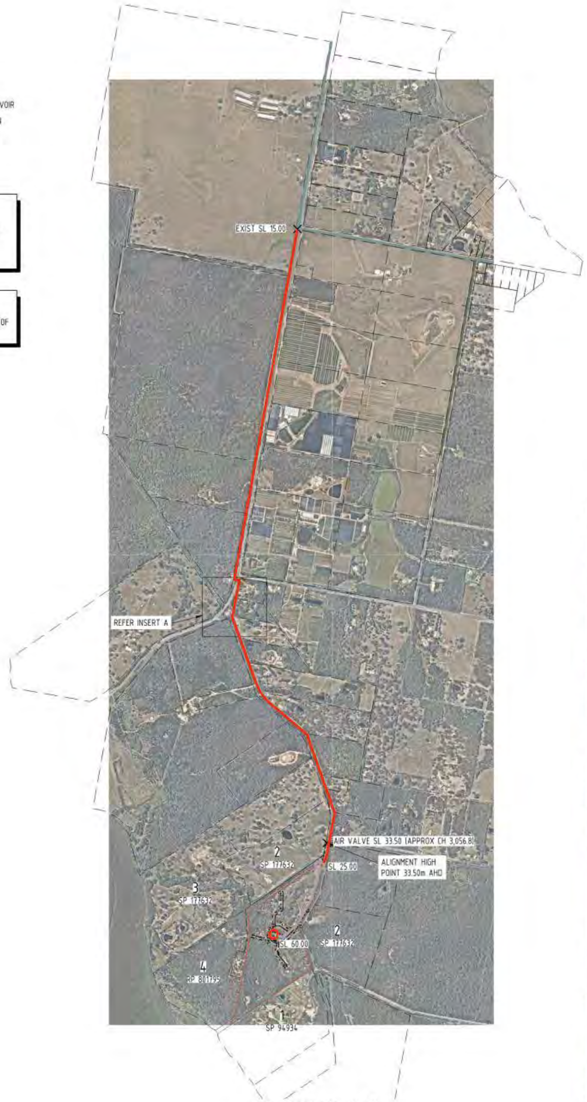
—12.0—	EXISTING SURFACE CONTOURS
	SITE BOUNDARY
	EXISTING PROPERTY BOUNDARY
	EXISTING DN100 AC MAIN
	EXISTING DN150 AC MAIN
	PROPOSED DN90 PE 100 LOW-FLOW MAIN
	PROPOSED ON-SITE POTABLE WATER RESERVOIR
	PROPOSED ON-SITE BOOSTER PUMP STATION
	PROPOSED BOOSTER-RESERVOIR LINK MAIN

NOTE

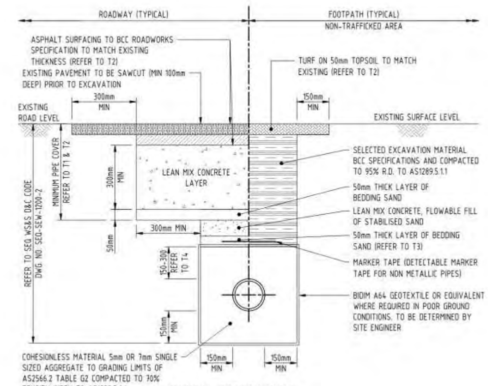
ALL SHOW SURFACE LEVELS ARE BASED ON COUNCIL RECORDS AND ARE APPROXIMATE ONLY. FINAL SURFACE LEVELS WILL DEPEND ON THE EXACT ALIGNMENT OF THE PROPOSED MAIN, WHICH WILL BE DETERMINED AT THE DETAILED DESIGN PHASE.

NOTE

HIGHLIGHTED FEATURES OF THE ALIGNMENT ASSUME CONSTRUCTION OF THE PROPOSED LOW FLOW MAIN ON THE WESTERN ROAD VERGE.



PIPE ALIGNMENT PLAN
SCALE 1:10000



TYPICAL TRENCH DETAIL
SCALE 1:10

TRENCH NOTES:

T1. MINIMUM COVER ON MAINS FROM PERMANENT LEVEL SHALL BE THE GREATER OF SEQ WS&S DC CODE DWG. NO. SEQ-WAT-1200-2 OR BRISBANE CITY COUNCIL STANDARD DRAWINGS BSD 2042 & BSD2043.

T2. ROAD CROSSING, VERGES AND PATHS TRENCH RESTORATION SHALL BE IN ACCORDANCE WITH BCC STANDARD DRAWING BSD 2042 & BSD 2043.

T3. PROVIDE 50 THICK LAYER OF BEDDING SAND IF FLOWABLE FILL CONCRETE OR OTHER LOW PERMEABLE FILL IS USED AS EMBEDMENT.

T4. 150mm MINIMUM OVERLAY FOR NON TRAFFICABLE AND 300mm MINIMUM FOR TRAFFICABLE.

DETAIL A
SCALE 1:1000

PRELIMINARY
NOT FOR CONSTRUCTION

SCALE 1:10 AT ORIGINAL SIZE (A1)
SCALE 1:1000 AT ORIGINAL SIZE (A1)
SCALE 1:10000 AT ORIGINAL SIZE (A1)

Rev	Date	Description	By	Chk
01	31.08.17	PRELIMINARY - Issued for Information	LDV	ML

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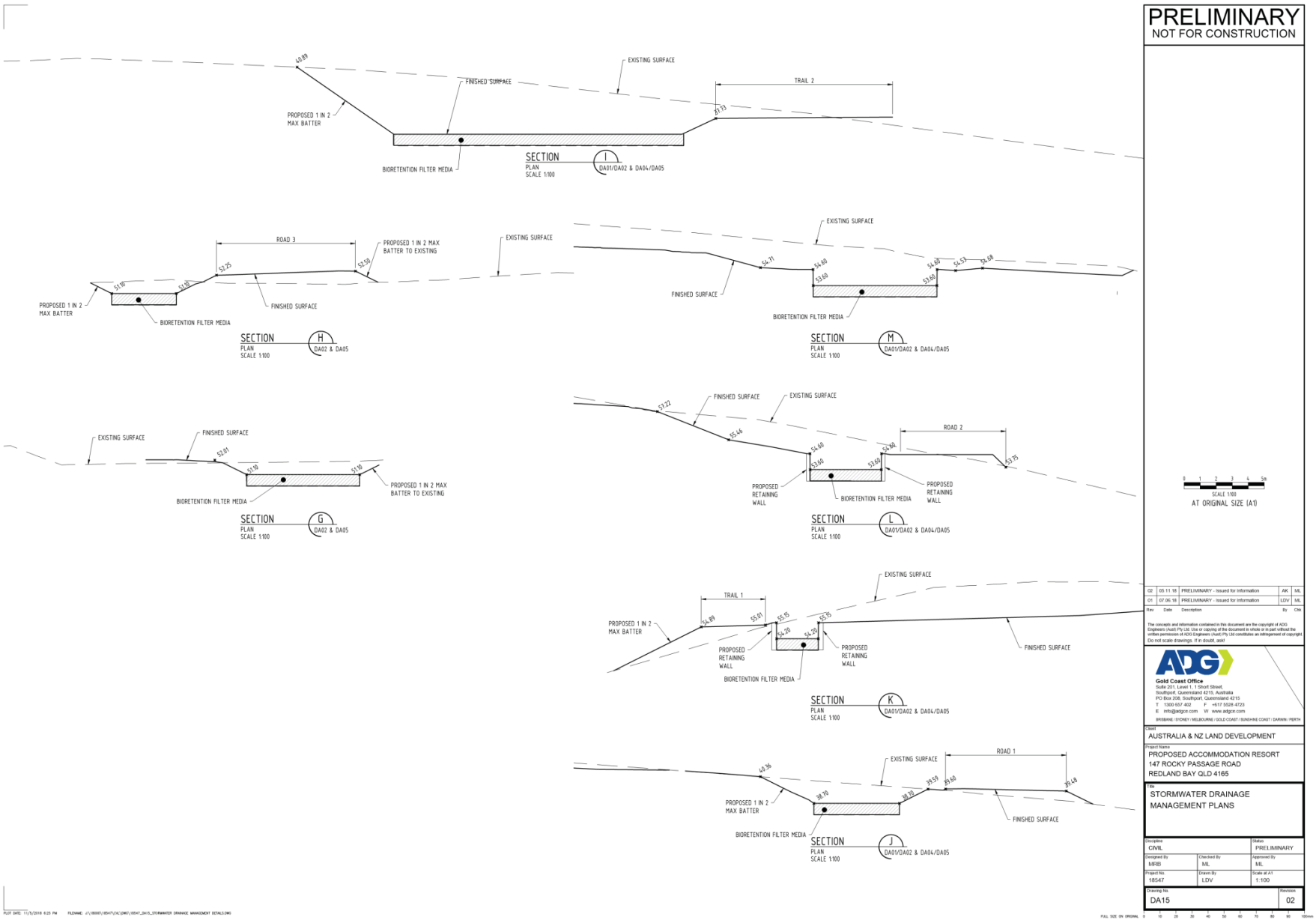
Client: AUSTRALIA & NZ LAND DEVELOPMENT

Project Name: PROPOSED ACCOMMODATION RESORT
147 ROCKY PASSAGE ROAD
REDLAND BAY QLD 4165

Title: PROPOSED POTABLE WATER SUPPLY LAYOUT PLAN

Discipline		Status
CIVIL		PRELIMINARY
Designed By: MRB	Checked By: ML	Approved By: ML
Project No.: 18547	Drawn By: LDV	Scale at A1: 1:10000; 1:1000
Drawing No.: DA14		Revision: 01


40.89
EXISTING SURFACE
FINISHED SURFACE
TRAIL 2
37.33
PROPOSED 1 IN 2
MAX BATTER
BIORETENTION FILTER MEDIA
SECTION I
PLAN
SCALE 1:100
DA01/DA02 & DA04/DA05
ROAD 3
PROPOSED 1 IN 2 MAX
BATTER TO EXISTING
EXISTING SURFACE
52.25
52.50
52.18
52.18
PROPOSED 1 IN 2
MAX BATTER
FINISHED SURFACE
BIORETENTION FILTER MEDIA
SECTION H
PLAN
SCALE 1:100
DA02 & DA05
EXISTING SURFACE
54.71
54.60
54.60
54.53
54.68
53.60
53.60
FINISHED SURFACE
BIORETENTION FILTER MEDIA
SECTION M
PLAN
SCALE 1:100
DA01/DA02 & DA04/DA05
EXISTING SURFACE
FINISHED SURFACE
52.81
52.16
52.16
BIORETENTION FILTER MEDIA
PROPOSED 1 IN 2 MAX
BATTER TO EXISTING
SECTION G
PLAN
SCALE 1:100
DA02 & DA05
57.22
FINISHED SURFACE
EXISTING SURFACE
55.44
ROAD 2
54.60
54.60
53.60
53.60
53.75
PROPOSED
RETAINING
WALL
BIORETENTION FILTER MEDIA
PROPOSED
RETAINING
WALL
SECTION L
PLAN
SCALE 1:100
DA01/DA02 & DA04/DA05
EXISTING SURFACE
TRAIL 1
PROPOSED 1 IN 2
MAX BATTER
54.89
55.01
55.35
55.35
54.70
54.70
PROPOSED
RETAINING
WALL
PROPOSED
RETAINING
WALL
FINISHED SURFACE
BIORETENTION FILTER MEDIA
SECTION K
PLAN
SCALE 1:100
DA01/DA02 & DA04/DA05
40.36
EXISTING SURFACE
ROAD 1
39.59
39.60
39.48
38.70
38.70
PROPOSED 1 IN 2
MAX BATTER
FINISHED SURFACE
BIORETENTION FILTER MEDIA
SECTION J
PLAN
SCALE 1:100
DA01/DA02 & DA04/DA05
PRELIMINARY
NOT FOR CONSTRUCTION
SCALE 1:100
AT ORIGINAL SIZE (A1)
02 05.11.18 PRELIMINARY - Issued for Information AK ML
01 07.06.18 PRELIMINARY - Issued for Information LDV ML
Rev Date Description By Chk
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BRISBANE / SYDNEY / MELBOURNE / GOLD COAST / SUNSHINE COAST / DARWIN / PERTH
Client
AUSTRALIA & NZ LAND DEVELOPMENT
Project Name
PROPOSED ACCOMMODATION RESORT
147 ROCKY PASSAGE ROAD
REDLAND BAY QLD 4165
Title
STORMWATER DRAINAGE
MANAGEMENT PLANS
Discipline CIVIL
Status PRELIMINARY
Designed By MRB
Checked By ML
Approved By ML
Project No. 18547
Drawn By LDV
Scale at A1 1:100
Drawing No. DA15
Revision 02
FULL SIZE ON ORIGINAL
PLOT DATE: 11/5/2018 6:25 PM FILENAME: J:\18000\18547\CAD\DWG\18547_DA15_STORMWATER DRAINAGE MANAGEMENT DETAILS.DWG

147-205 Rocky Passage Road, Redland Bay
ADG Ref: 18547 C R001 REV02 05.11.2018
November 2018

Appendix F
Water Supply Calculations

Table F1 – Water Network Boundary Conditions at Serpentine Creek Road – Scenic Road intersection

Flow (L/s)	Pressure (m)
0.00*	49.4
5.00*	48.8
10.00*	47.7
15.95	46.2
23.55	43.77
29.26	41.34
34.47	38.91
38.86	36.47
43.01	34.04
46.74	31.61
50.32	29.18
53.67	26.75
56.68	24.32
59.87	21.88
62.63	19.45
65.52	17.02
68.25	14.59
70.8	12.16
73.44	9.73
75.83	7.29

Note: Boundary Conditions at connection point supplied by Redland Bay Council 25.01.2017.

* Interpolated from higher flow values.

Appendix G
Supporting Correspondence

Matthew Brown

From: Matthew Ingerman <Matthew.Ingerman@redland.qld.gov.au>
Sent: Wednesday, 25 January 2017 3:40 PM
To: Matthew Brown
Cc: 18547; Michael Lepelaar
Subject: RE: Water Supply - Lot 3 RP153333
Attachments: Rocky Passage QH curve.xlsx

Hi Matthew,

Please see attached for indicative Q-H curve for the 150mm dia main at the end of our network in Serpentine Creek Road (near Scenic Road).

Regards,

Matt I

Matthew Ingerman
Principal Engineer Water Distribution
Redland Water
Redland City Council
PO Box 21 Cleveland QLD 4163
P 07 3829 8979
F 07 3829 8765
M 0456 606 306

From: Matthew Brown [mailto:mbrown@adgce.com]
Sent: Monday, 23 January 2017 9:56 AM
To: Matthew Ingerman
Cc: 18547; Michael Lepelaar
Subject: Water Supply - Lot 3 RP153333

Hi Matthew,

Thanks for taking my phone call a moment ago. As discussed I am investigating the water supply options for Lot 3 RP153333. According to Re-e-map the nearest water supply main is a DN150 AC main located at the corner of Scenic Road and Serpentine Creek Road, approximately 3.2km north of the site via the road reserve. ADG proposes the use of a small diameter, low-flow main (<1 L/s) to the site in order to supply a local private reservoir which would then have pressures boosted to supply the internal reticulation network within the site. As such ADG requests the release of water main boundary conditions in order to access the viability of such a solution.

On the phone you discussed the option of exploring the use of a larger main to supply the site. This would possibly eliminate the need for a local reservoir and also provide a means of mains supply to the properties north of the development site. If offsets are available for the developer in the construction of this main then I believe this is an option worth exploring.

Kind regards,

Matthew Brown
Civil Engineer

D: 07 5552 4718 mbrown@adgce.com
T: 1300 657 402
Suite 201/Level 1, 1 Short Street Southport QLD 4215
PO Box 208 Southport QLD 4215


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147-205 Rocky Passage Road, Redland Bay

Conceptual Stormwater Management Plan

New Land Tourism Pty Ltd

November 2018

Document Verification

Job Title 147-205 Rocky Passage Road, Redland Bay

Job Number 18547

Document Title Stormwater Management Plan

Document Control

Date	Document	Revision No.	Author	Reviewer
17.05.2017	Stormwater Management Plan	00	M Brown	M Lepelaar
31.08.2017	Stormwater Management Plan - Revised Site Layout	01	M Brown	M Lepelaar
05.11.2018	Stormwater Management Plan - Revised Site Layout	02	M Brown	M Lepelaar

Approval for Issue

Name	Signature	Date
Matthew Brown		05.11.2018
Michael Lepelaar		05.11.2018

Contents

Tables

Figures

Appendices

Executive Summary

ADG Engineers (Aust.) Pty Ltd has been engaged by New Land Tourism Pty Ltd to prepare a Stormwater Management Plan suitable for submission to Redland City Council (RCC) as additional information in support of a Development Application for a proposed Eco Development located at 147-205 Rocky Passage Road, Redland Bay.

The proposed development is described as a new eco development. Associated car-parking bays, internal driveway access ways and landscaped areas will additionally be provided to support the development.

This report comprises of the stormwater quantity and quality assessments to determine the requirements for onsite stormwater detention and the need for stormwater treatment measures.

The stormwater quantity objective was to demonstrate that there is no increase in peak discharges from the subject site. This considered storm events up to and including the Q_{100} storm event. The purpose for this is to ensure that the existing infrastructure and/or downstream properties are not adversely affected. The above mentioned objectives are achieved through the use of detention storage measures.

To achieve the water quantity objectives, the proposed strategy involves:

- A total detention volume of 608m^3 for the site. This volume is to be provided above the existing dam within catchment C1. The volume will be achieved by providing a controlled outlet to the dam by way of low flow pipe & weir arrangements.

It is proposed to incorporate bioretention areas to treat stormwater outflows. These bioretention areas are required as Water Sensitive Urban Design (WSUD) features in order to achieve the water quality objectives for South East Queensland specified in the State Planning Policy (SPP), and the Urban Stormwater Quality Planning Guidelines, namely, the removal of gross pollutants, suspended solids, nitrogen and phosphorus to target reduction levels.

- In total a treatment area of 146m^2 is needed in order to achieve the required level of reduction.

All relevant standards and guidelines are addressed including criteria from Redland City Council Planning Scheme, QUDM and the SPP.

1 INTRODUCTION

1.1 GENERAL

ADG Engineers (Aust.) Pty Ltd has been engaged by New Land Tourism Pty Ltd to prepare a Stormwater Management Plan (SMP) suitable for submission to Redland City Council (RCC) as additional information in support of a Development Application for a proposed development located at 147-205 Rocky Passage Road, Redland Bay.

The proposed development as described in Jared Poole Design architectural drawings, dated 12th September 2018, is for a proposed new eco development. Associated car-parking bays, internal roads and landscaped areas will additionally be developed to support the development.

This report comprises of both stormwater quantity and quality assessments.

1.2 BACKGROUND INFORMATION

This report was compiled using information from the following sources:

- 'Dial Before You Dig' (DBYD) As-Constructed information
- Site survey by Arnold Development Consultants, dated 20/11/2015.
- A detailed plan of development prepared by Jared Poole Design.
- Councils "Red-e Map" interactive mapping service
- Google imagery

2 THE SITE

2.1 LOCATION

The subject site is located at 147-205 Rocky Passage Road, Redland Bay within the Redland City Council local government area and thus will be assessed by Redland City Council officers.

Figure 1 below displays the locality of the subject site. The site is bound by Rocky Passage Road to the east, Lot 1 on RP94934 to the south, Lots 4 & 5 on RP801795 to the west, EMT A on RP801795 and Lot 2 on SP117632 to the north. The site has access to the Logan River via a 20m wide strip in the property's south.

Figure 1 – Locality Map (As accessed from Google maps 20.01.2017)

2.2 PROPERTY DETAILS

The total site area is approximately 14.62ha and the existing land titles are provided in **Table 1** below.

Table 1 – Property Detail

Property	Site Details
Title	Lot 3 on RP153333
Street Address	147-205 Rocky Passage Road, Redland Bay, QLD 4165
Total Site Area	14.62 ha

3 SITE CHARACTERISTICS & SURROUNDS

3.1 DESCRIPTION

The subject site currently comprises of one freehold property (Lot 3 on RP153333). Under the Redland City Council Planning Scheme the subject site is currently zoned as a 'Regional Landscape and Rural Production Area'. Aerial Photograph of the site is shown in **Figure 2**.

3.2 DIMENSIONS

The total site area is 14.62ha and is shaped like a rhombus with indented sides, stretching approximately 900m from north to south, and approximately 220m from east to west. The site has approximately 540m of road frontage to Rocky Passage Road on the east side of the site and 20m of frontage to the Logan River to the south west.

3.3 FEATURES

The existing site features a predominately pervious area consisting of two existing dwellings with accompanying garage/shed structures. The main residence is located centrally in the allotment and a smaller cottage is located approximately 150m to the south of the main residence. There is a pool area and tennis court to the west of the main residence.

To the north of the allotment are three lakes, and one lake to the south west.

There is a concrete driveway connecting Rocky Passage Road to a bitumen parking area out the front of the residence.

The site area which is not occupied by the features identified above, may be classified as having dense bushland with high permeability.

For futher information regarding the existing features of the site please refer to the detailed survey provided by Arnold Development Consultants located in **Appendix B**.

Figure 2 – Existing Site Condition (As Accessed from Google Maps 20.01.2017)

4 PROPOSED DEVELOPMENT

The proposed development as described in Jared Poole Design architectural drawings, dated 12th September 2018, is for a proposed new eco development. This facility comprises of the following entities:

- Resort main building including indoor recreational facilities;
- 9 detached 3-bedroom villas;
- 52 attached 2-bedroom units across eleven buildings; and
- A swimming pool, pond, and a number of gardens.

Refer to the development drawings prepared by Jared Poole Design in **Appendix A** for further information regarding the proposed development.

4.1 External Catchments

As seen in **Figure 3** there is a 22,728m^2 area east of Rocky Passage Road that drains via existing culverts under the road and into Catchment 1. The road itself has a central crest, meaning around half of the road reserve also drains towards the site. An existing swale drain runs along the southern half of the eastern site boundary ensuring flows are confined to the road reserve. The northern half of the eastern boundary is not equipped with a swale drain, meaning flows sheet flow into the site from the road reserve. There is also a 6,837m^2 area north of the site that drains via overland flow into Catchment 1.

4.2 Point of Discharge (PD)

The existing site presently drains via overland flow in four separate directions:

- E1 discharges through PD1 in the north and drains north-west towards the Logan River via Lot 4 on RP801795, followed by Lots 1 and 2 on SP117632 and Lot 3 on RP223470. The flows presently exit the site thought the existing gully, and will continue to do so post-development;
- E2 discharges through PD2 in the north-west and drains towards the Logan River via Lot 4 on RP801795, followed by Lots 2 and 3 on SP117632. The flows presently exit the site thought the existing gully, and will continue to do so post-development;
- E3 discharges through PD3 in the south drains towards the Logan River, via Lots 1 and 2 on RP94934; and
- E4 discharges through PD4 in the East towards Redland bay via a culvert under Rocky Passage Road.

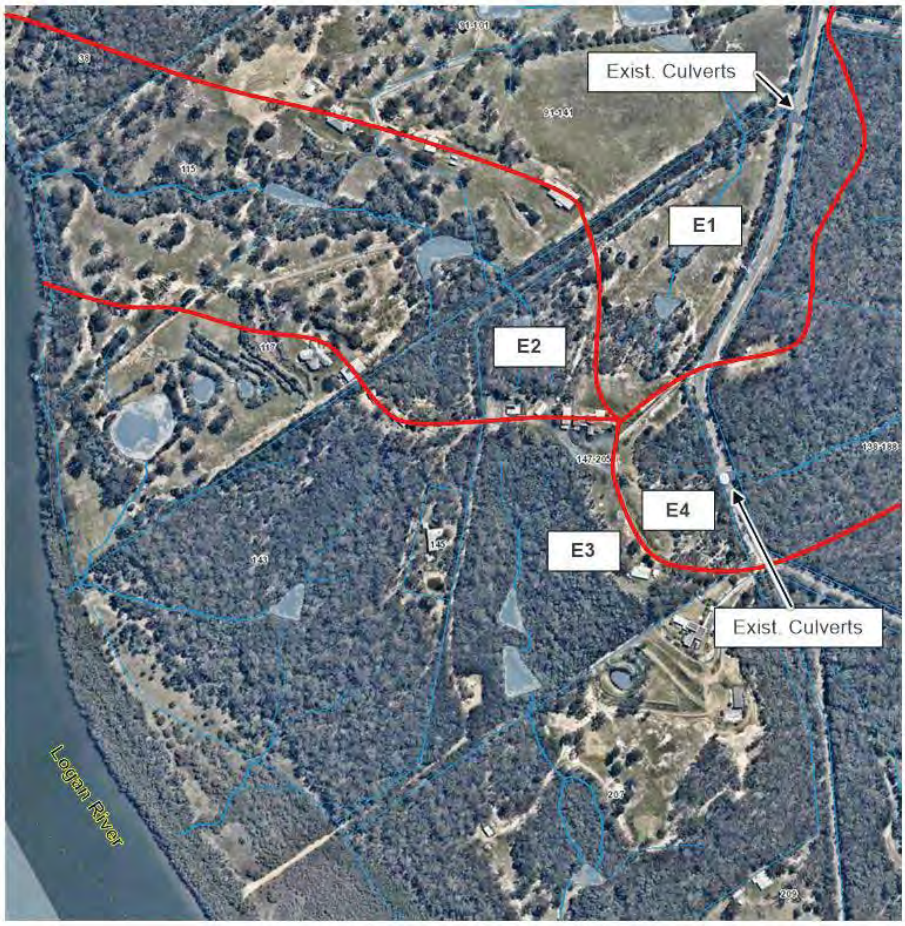


Figure 3 – Existing Site Catchments

4.3 Proposed Catchment Areas

The building footprint and exposed hardstand areas will cover just 7.8% of the subject site. The remaining pervious areas (92.2%) will be made up of landscaping, an effluent discharge zone for treatment of sewage and undisturbed vegetation.

A breakdown of the pervious and impervious areas for the proposed development is presented in **Table 2** below. Refer also to **Appendix C** for pre and post development catchment plans.

Table 2 - Post-Development Catchment Areas

Post-Development Catchment	Land Use	Area (m^2)	Percentage of Total Site Area (%)
Disturbed Areas			
C1A	Impervious roof areas	2,749	1.06%
	Exposed Roadway	1,545	0.21%
	Exposed other Hardstand	300	2.74%
	Exposed Pervious Areas	3,998	0.99%
C1C	Exposed Roadway	1,440	0.40%
	Exposed Pervious Areas	578	0.60%
C3A	Impervious roof areas	872	0.95%
	Exposed Roadway	1,380	0.27%
	Exposed Pervious Areas	398	1.17%
C3C	Impervious roof areas	1,703	0.44%
	Exposed Roadway	642	0.60%
	Exposed Pervious Areas	875	1.06%
	DISTURBED TOTAL	16,480	11.29%
Undisturbed Areas			
C1A	Exposed Pervious Areas	12,843	8.80%
C1B	Exposed Pervious Areas	20,622	14.12%
C2	Exposed Pervious Areas	16,311	11.17%
C3B	Exposed Pervious Areas	62,423	42.75%
C4	Exposed Pervious Areas	17,332	11.87%
	UNDISTURBED TOTAL	129,529	88.71%
	COMBINED TOTAL	146,011	100.00%

5 STORMWATER QUANTITY ASSESSMENT

Stormwater drainage infrastructure will be implemented throughout the site to convey stormwater to one of the four PD draining to the Logan River. A pit and pipe system will be utilised to convey the minor storm flows to treatment devices as outlined in Section 6. Runoff from a major rainfall event (Q100) will be conveyed as overland flow down the access driveway (ensuring a depth velocity multiplier of less than 0.40) before discharging to an on-site stormwater detention upstream of the PD. The access driveway and subsequent infrastructure shall be sized to accommodate the Q100 flow. For extreme storm events, overflow points will be located along the central driveway that promote flow towards PD and away from the proposed buildings. A preliminary Stormwater Layout Plan can be found in **Appendix C**.

The stormwater design solution shall ensure that flows from Catchment 4 (see **Figure 3**) that are directed towards the existing culverts under Rocky Passage Road shall not be increased as a result of the proposed development and will contain negligible exposed impervious surfaces. Any increase in site discharge shall be directed towards one of the three PD draining towards the Logan River. In order to mitigate the increase in site discharge it is proposed to provide on-site detention.

5.1 External Catchments

An external catchment drains to Catchment 1 through the site. This External Catchment has been designated EX1 and can be seen in **Appendix C**. EX1 includes the Rocky Passage Road reserve north of the crest adjacent to the existing site entry and a large area of existing land to the east of the road. The portion of EX1 east of Rocky Passage Road drains under the road via a culvert adjacent to the site's northern boundary. The external catchment will not be modified by the proposed development and no change to the discharge from the catchment is anticipated.

5.2 Proposed Catchments

As seen in **Appendix C**, the proposed catchments maintain the existing PDs currently in place and modify the existing catchment boundaries.

5.3 Rational Method Overview

A rational method analysis was conducted to demonstrate which catchments will result in an increase in runoff volume as a result of the proposed catchment boundary modification, as discussed in Section 5.2.

Table 3 - Post-Development Overall Catchment Areas

Pre-Dev. Catchment	Pre-Dev. Area (m^2)	Pre-Dev. Fraction Impervious	Pre-Dev. Q100 Flow (m^3/s)	Post-Dev. Catchment	Post-Dev. Area (m^2)	Post-Dev. Fraction Impervious	Post-Dev. Q100 Flow (m^3/s)
E1	40,358	0.01	1.837	C1	44,075	0.14	2.356
E2	18,827	0.11	0.913	C2	16,311	0.00	0.768
E3	67,731	0.03	3.238	C3	68,293	0.07	3.156
E4	19,266	0.02	0.941	C4	17,332	0.00	0.846

As demonstrated in **Table 3**, the proposed division of catchment boundaries will result in an increase in discharge to catchment C1. All other catchments experience a reduction in discharge as a result of the proposed development.

5.4 XP Method Analysis

From the Bureau of Meteorology IFD intensity/frequency duration data for the subject site the $^{1}I_{10}$ (1 in 10 year, 1 hour rainfall intensity) is 67mm/hr.

As discussed in Section 5.3, an increase in stormwater flows is anticipated only at catchment C1. Therefore only area upstream of this discharge point was considered as a part of this analysis. For the purposes of this assessment, zero storage outside of the proposed On-Site Detention has been considered in the post development analysis.

5.5 Stormwater Quantity Modelling – XP-STORM

An XP-STORM Hydraulic and Runoff model was created to analyse the pre-development and post-development scenarios. The models include a typical 1D node-link connectivity identifying the proposed catchments upstream of C1 and hydraulic parameters. The proposed strategy is to reduce all increases of post-development runoff to at or below pre-development levels.

Global storms were used to run all design storm events within the same model. XP-STORM uses Australian Rainfall and Runoff nomographs with an absolute depth multiplier to produce site specific hydrographs for use within the hydraulic analysis. Where:

Depth Multiplier = Rainfall Intensity (mm/hr) x Storm Duration (mins) / 60.

The 1hr storm event was identified as the duration having the highest peak discharge.

5.5.1 XP-STORM Rainfall Parameters

IFD data for the site was sourced from the Bureau of Meteorology region was used for the determination of the XP-STORM absolute depth multipliers. The multipliers were applied to the Zone 3 temporal pattern (applicable to north-east coast of Australia). **Table 3** and **Table 4** display tabulated summaries of the adopted rainfall intensities as well as the depth multipliers used for the XP-STORM analysis.

Table 4: Adopted Intensity Frequency Data (mm/ hr)

Storm Duration (mins)	Average Recurrence Interval (Years)						
	1	2	5	10	20	50	100
5	124.46	157.18	191.25	210.28	236.83	271.23	297.14
10	95.40	120.63	147.45	162.41	183.34	210.43	230.74
15	80.10	101.38	124.05	136.71	154.39	177.29	194.50
20	70.08	88.76	108.71	119.87	135.44	155.62	170.80
25	62.78	79.57	97.57	107.67	121.72	139.94	153.66
30	57.15	72.46	88.97	98.25	111.14	127.87	140.47
45	45.72	58.04	71.55	79.18	89.72	103.43	113.77
60	38.56	49.02	60.64	67.24	76.32	88.13	97.06
90	29.88	38.06	47.37	52.69	59.97	69.46	76.64
120	24.71	31.52	39.43	43.97	50.15	58.22	64.35

Table 5: XPSTORM Rainfall Multipliers Applied to Temporal Patterns (mm)

Storm Duration (mins)	Average Recurrence Interval (Years)						
	1	2	5	10	20	50	100
10	15.900	20.105	24.575	27.069	30.557	35.072	38.457
15	20.025	25.346	31.011	34.176	38.597	44.323	48.624
20	23.358	29.586	36.235	39.958	45.148	51.874	56.934
25	26.160	33.153	40.653	44.861	50.715	58.308	64.025
30	28.575	36.232	44.486	49.127	55.570	63.933	70.233
45	34.287	43.532	53.659	59.383	67.293	77.572	85.328
60	38.562	49.016	60.639	67.236	76.317	88.132	97.058
90	44.819	57.083	71.054	79.032	89.950	104.185	114.966
120	49.415	63.044	78.860	87.934	100.295	116.442	128.700

5.5.2 Modelling Assumptions and Methodology

The following modelling assumptions were used to create the XP-STORM Models:

- Two (2) separate models were generated, which were:
  - Pre-Development (which included all areas upstream of catchment C1); and
  - Post-Development (which included all areas upstream of catchment C1).
- Each model included runoff nodes for each contributing sub-catchment
- The sub-catchment areas were split into 0% impervious & 100% impervious areas.
- Infiltration uniform losses of 11mm Initial & 2.5 mm/hr (absolute) continuing were applied to the pervious areas and 2.0mm Initial & 0.0 mm/hr (absolute) continuing to the impervious areas of the sub-catchments.
- The models were run at various durations for a constant ARI to determine the critical storm event.

5.5.3 Detention Basin

It is proposed that the detention volume will be provided via controlled outlets to the dam by way of low flow pipe & weir arrangements. The location of the detention basin is shown indicatively in **Appendix C**, with 608m^3 of storage located downstream of Catchment C1A. Preliminary modelling of the site indicates that flows will be mitigated to pre-developed levels or lower for all catchments and events up-to and including the Q100 event using this configuration. The exception to this is Catchment C3, where a slight increase in flow (<3%) is observed post-development. As this catchment is immediately upstream of the Logan River however, it is proposed that this is an acceptable outcome. Detailed design of the OSD outlet configuration downstream of Catchment C1A and confirmation of the required on-site detention volume shall be provided at the detailed design phase.

The Preliminary Stormwater Drainage Layout Plan in **Appendix C** shows the proposed catchment areas, along with an indicative stormwater drainage network and Detention Basin locations and sizes.

Pre-development versus post-development comparisons of the major peak discharge for the catchments upstream of C1 and C3 are presented in **Table 6** and **Table 7** respectively and is shown graphically in **Appendix E**. As the remaining catchments across the site are comprised entirely of areas unaffected by the proposed development they have not been assessed in this way.

Table 6: XP-STORM Modelling Results for C1

Design Storm (ARI)	Pre-Development Flows (m^3/s)	Post-Development Flows, Mitigated (m^3/s)	Flow change from Pre-Development (%)
100	2.076	1.763	-15.08
50	1.833	1.574	-14.13
20	1.596	1.396	-12.53
10	1.342	1.196	-10.88
5	1.161	1.041	-10.34
2	0.857	0.763	-10.97

Table 7: XP-STORM Modelling Results for C3

Design Storm (ARI)	Pre-Development Flows (m^3/s)	Post-Development Flows, Mitigated (m^3/s)	Flow change from Pre-Development (%)
100	3.596	3.660	1.78
50	3.187	3.247	1.88
20	2.794	2.853	2.11
10	2.337	2.392	2.35
5	1.990	2.042	2.61
2	1.464	1.471	0.48

The proposed detention measures successfully mitigate the post-development flows to below pre-development conditions.

5.6 Onsite Detention Lifecycle Costs

A lifecycle cost analysis is not a part of the scope of this report. All stormwater infrastructure associated with the development shall be maintained and serviced by the owners of the development at **no cost to council**.

5.7 Effluent Disposal Area Bypass

Discharge from the OSD basin is to bypass the effluent disposal area by means of an open channel drain, as seen in **Appendix C**. The proposed drain will cater for flows up to and including the Q100 rainfall event for the site. Table drains around the perimeter of the site will channel sheet flows that would otherwise enter the effluent disposal area to catchment C1.

5.8 Recommendation

Preliminary modelling of the site indicates that $608m^3$ of storage volume is required upstream of catchment C1 in order to mitigate the impacts of the proposed development. This volume will require confirmation at the detailed design phase once the dimensions and outlet configurations of the basin are finalised.

6 STORMWATER QUALITY ASSESSMENT

This assessment identifies issues relating to stormwater quality runoff and assesses possible methods of treatment if required. The aim of this section of the report is to determine practical approaches to achieving improvements in the quality of the stormwater run-off from the site that can be readily implemented.

The objective is to provide the following:

- Nitrogen and Phosphorous removal
- Gross Pollutant and Suspended Solids Removal
- All of the site's impervious areas discharge to suitable treatment device/s
- Treatment device selection criteria are to be in accordance with Industry Best Practice and, WSUD Engineering Guidelines
- Provide engineering diagrams of the stormwater quality treatment of the proposed development

6.1 Construction Phase

During the construction phase of the development, there is a risk of sedimentation transport due to large areas of disturbed land. A sediment and erosion control plan will be prepared as part of a future operational works application and as a minimum, the following measures shall be implemented:

Stage 1: Pre construction

- All erosion and sediment control (ESC) devices are to be installed prior to any earth disturbing activities

Stage 2: Construction

- All ESC devices are to be maintained to operational levels, as specified in the management plans and drawings.
- During Excavation, the contractor shall provide a temporary sediment basin and pump out stormwater only once the water has settled and has achieved an acceptable quality to the satisfaction of Council (i.e. no turbidity and acceptable pH levels).

Stage 3: Pre-Operational Stage (all disturbed areas stabilized, 90% of all proposed structures completed)

- All ESC devices can be removed only if approved by the superintendent and engineers.

6.2 Operational Phase

During the operational phase, it is proposed to have flows from the roof, podium area and sealed roads drain through bioretention areas before discharging from the site and ultimately into the Logan River via neighbouring properties.

6.3 Stormwater Quality Improvement Devices

No existing stormwater treatment measures are present within the site and therefore the proposed development offers the opportunity to provide such devices. Due to the significant area of the site that will remain unaltered, only the portion of the site proposed for development has been considered for the purpose of this assessment. It has been assumed that any future works in the undeveloped portion of the site will implement a separate stormwater treatment strategy.

6.3.1 Bio-Retention

The proposed quality stormwater treatment measures for the development will consist of a minimum of five bioretention area/s as detailed in **Table 8**.

Table 8 - Proposed Bioretention Areas

Catchment (as per Figure 3)	Area (m^2)
C1A - TOP	41
C1A - BOTTOM	33
C1C	16
C3A	24
C3C	32
TOTAL	146

The runoff from the catchments will be directed to one of the bio-retention filter areas. No treatment is proposed for flows within Catchments C2 and C4, due to the negligible development area proposed in these catchments. Five bioretention areas have been assumed, with the locations as shown in **Appendix C**.

These filter areas will remove nutrients and fine particles which are produced during the operational phase of the development. A combination of extended detention time and nutrient removing flora will treat the incoming stormwater through an engineered filter media.

Internal stormwater drainage shall be designed and constructed in accordance with AS3500.3 and all other relevant standards and guidelines.

Maintenance of the SQIDs will be the responsibility of the owners of the development. The maintenance should be carried out in accordance with the manufacturer's recommendations and as a minimum shall include the following:

6.4 MUSIC Model

The stormwater run-off from the considered catchments was modelled using MUSIC version 6.2.1 and the water quality objectives for South East Queensland specified in the Urban Stormwater Quality Planning Guidelines of 80% TSS reduction, 60% TP reduction, 45% TN reduction, and 90% Gross Pollutants reduction.

The MUSIC model included five areas of bioretention as shown in **Figure 4**.

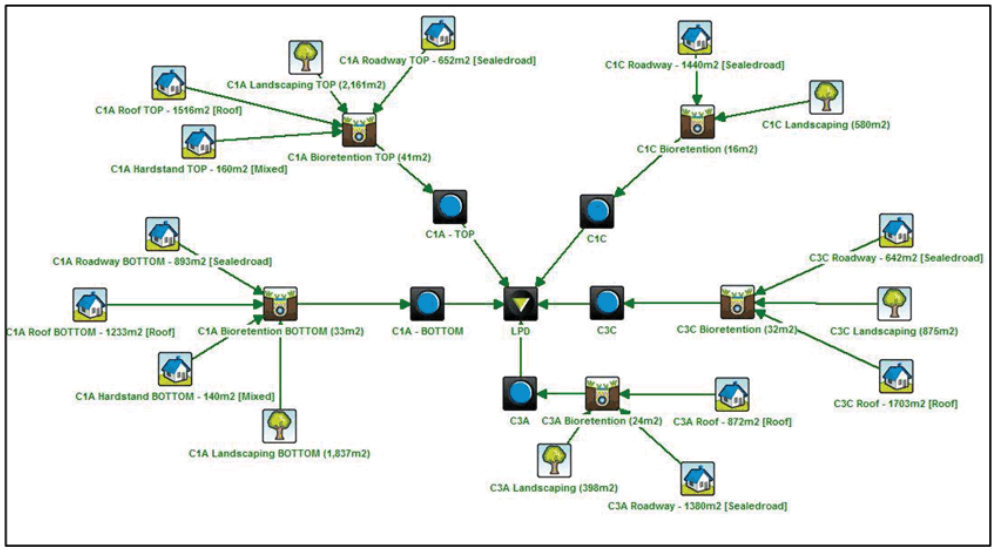
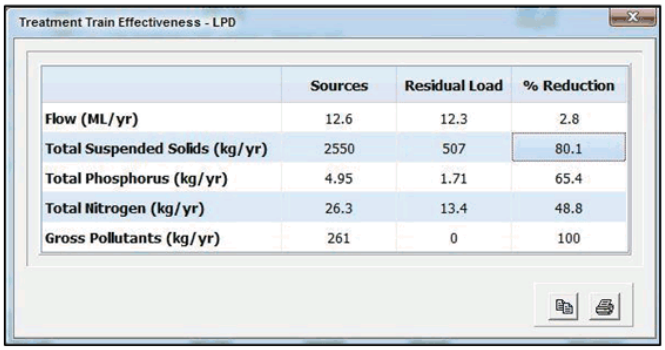


Figure 4 : Treatment train

The results of the above MUSIC model are presented in **Figure 5** below.



	Sources	Residual Load	% Reduction
Flow (ML/yr)	12.6	12.3	2.8
Total Suspended Solids (kg/yr)	2550	507	80.1
Total Phosphorus (kg/yr)	4.95	1.71	65.4
Total Nitrogen (kg/yr)	26.3	13.4	48.8
Gross Pollutants (kg/yr)	261	0	100

Figure 5 : Results for the treatment train

The above results meet the percent reduction water quality objectives identified by Redland City Council standards, the Urban Stormwater Quality Planning Guidelines 2010 and the SPP.

Details of the MUSIC model are attached within **Appendix D** for further information.

6.5 On-site Treatment Lifecycle Costs

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

6.6 Water Quality Monitoring

No water quality monitoring is proposed for this development at this stage due to the nature of the development and the expected pollutant levels. This would not be considered a high risk source.

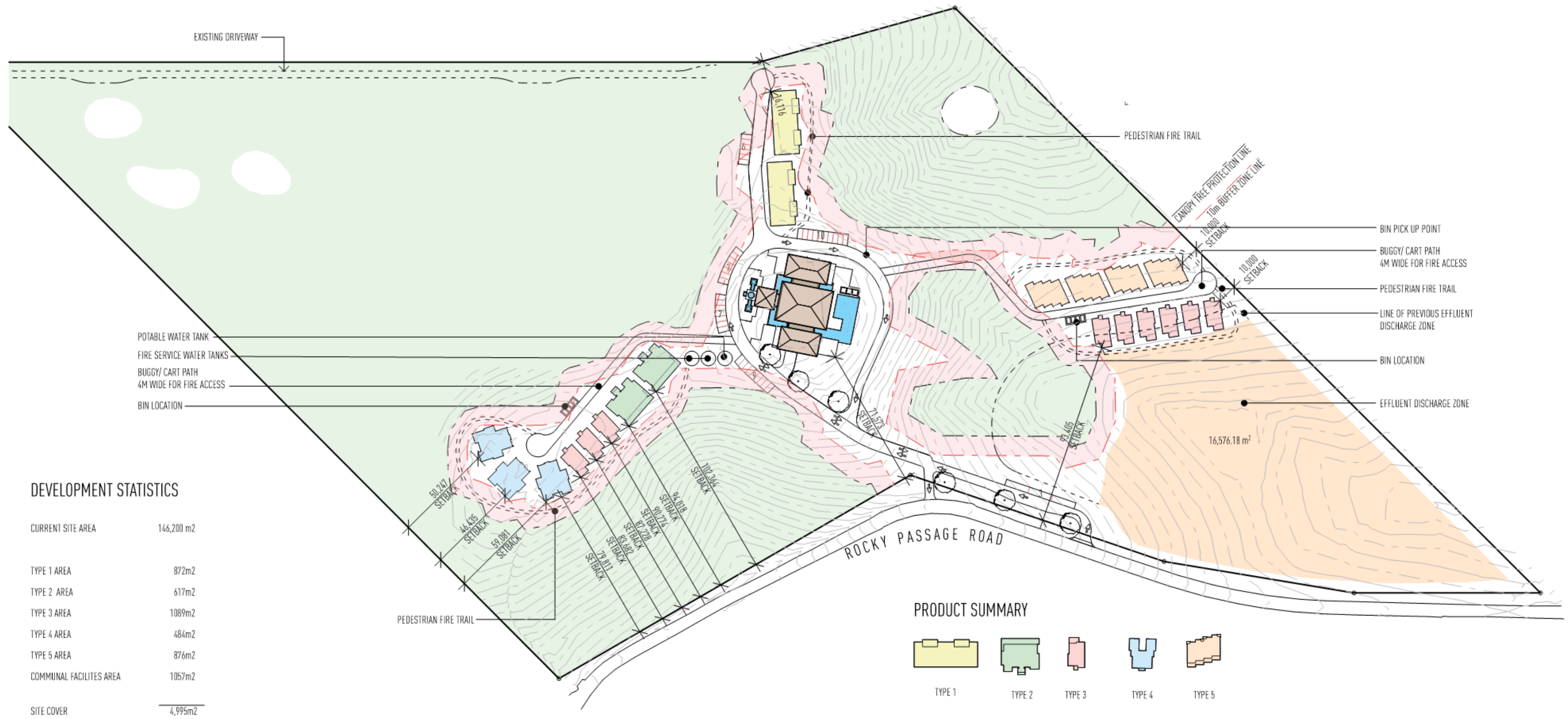
7 CONCLUSION

As outlined in Section 5 of this report, 608m^3 of on-site detention is proposed in order to mitigate flows discharging from the site to pre-development levels. Treatment of stormwater flows will be via multiple bioretention areas located downstream of catchments where development is proposed, combining for a total treatment area of at least 146m^2.

In preparing this report, we have achieved a pollutant load reduction as required by the Urban Stormwater Quality Planning Guidelines 2010, the SPP and Redland City Council standards.

It is our opinion that if the abovementioned recommendations are implemented, the proposed development will comply with the intent of Redland City Council requirements for stormwater quality management.

Appendix A
Jared Poole Design Development Drawings



DEVELOPMENT STATISTICS

CURRENT SITE AREA	146,200 m2	
TYPE 1 AREA	872m2	
TYPE 2 AREA	617m2	
TYPE 3 AREA	1089m2	
TYPE 4 AREA	484m2	
TYPE 5 AREA	876m2	
COMMUNAL FACILITES AREA	1057m2	
SITE COVER	4,995m2	
SITE COVER PERCENTAGE	3.4 %	(4,995m2 / 146,200m2)

CAR PARKING SCHEDULE

CARPARKING SPACE PROVIDED 80 (23 CENTRAL FACILITY BASEMENT)
(AS PER TRAFFIC ENGINEERS)

PRODUCT SUMMARY

TYPE 1 TYPE 2 TYPE 3 TYPE 4 TYPE 5

YEILD SUMMARY

YEILD	No. OF ACCOMMODATION BUILDINGS	No. OF UNITS/BUILDING	No. OF BEDROOMS/UNIT	TOTAL YIELD (ROOMS)
TYPE 1	2	8	2 BEDROOMS	32
TYPE 2	2	4	2 BEDROOMS	16
TYPE 3	9	1	3 BEDROOMS	27
TYPE 4	3	4	2 BEDROOMS	24
TYPE 5	4	4	2 BEDROOMS	32
TOTAL	20			131

CONCEPT MASTER PLAN

SCALE 1:2000 @ A3

ISSUE	DATE	DESCRIPTION
A	06.12.16	PRELIMINARY ISSUE
B	09.02.17	CONSULTANT ISSUE
C	24.02.17	UPDATE RESIDENCE NAMES AND NUMBERS ON CONCEPT PLAN
D	13.03.17	SITE PLAN UPDATED WITH CONSULTANT INFORMATION
E	29.08.18	SITE PLAN UPDATED WITH CONSULTANT INFORMATION
F	12.09.18	SITE PLAN UPDATED WITH CONSULTANT INFORMATION

JAREDPOOLEDESIGN
LEVEL 1 33 ELKHORN AVENUE, SURFERS PARADISE, Q. 4217 AUSTRALIA
PO BOX 42, ISLE OF CAPRI, Q. 4217 AUSTRALIA
TEL 07 5527 5300 EMAIL INFO@JPD.COM.AU WEB JPD.COM.AU

NORTH

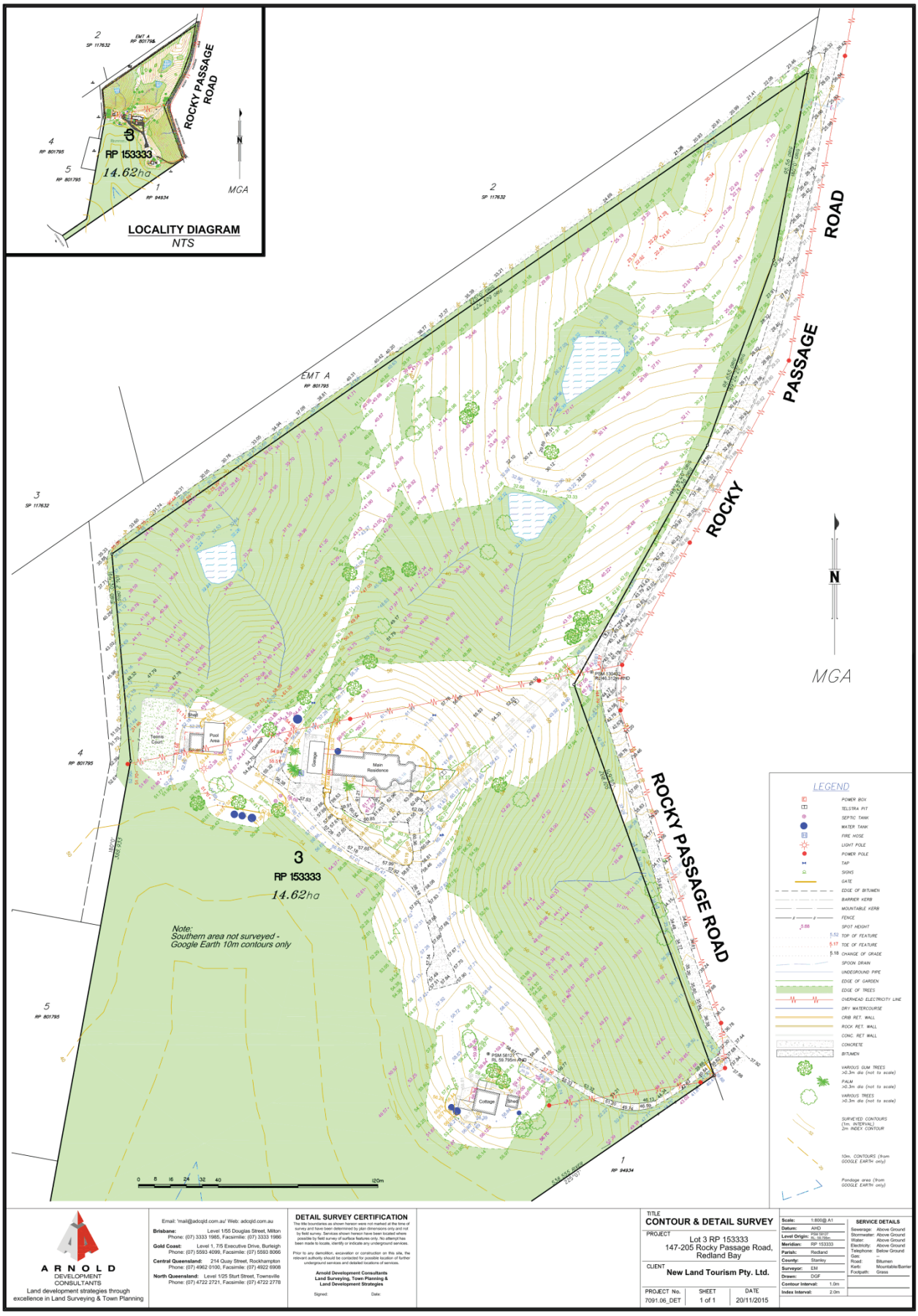
PROJECT
A PROPOSED NEW ECO DEVELOPMENT
AT
REDLAND BAY QUEENSLAND QLD
FOR
NEW LAND TOURISM PTY LTD

DRAWING - CONCEPT MASTER PLAN
DRAWING No. BP783/4.1
ISSUE F

POOLE

147-205 Rocky Passage Road, Redland Bay
ADG Ref: 18547 C R002 REV02 05.11.2018
November 2018

Appendix B
Site Survey



ARNOLD DEVELOPMENT CONSULTANTS
Land development strategies through excellence in Land Surveying & Town Planning

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North Queensland: Level 1/25 Sturt Street, Townsville Phone: (07) 4722 2721, Facsimile: (07) 4722 2778

DETAIL SURVEY CERTIFICATION
The title boundaries as shown hereon were not marked at the time of survey and have been determined by plan dimensions only and not by field survey. Services shown hereon have been located where possible by field survey of surface features only. No attempt has been made to locate, identify or indicate any underground services.
Prior to any demolition, excavation or construction on this site, the relevant authority should be contacted for possible location of further underground services and detailed locations of services.
Arnold Development Consultants
Land Surveying, Town Planning & Land Development Strategies
Signed: Date:

TITLE
CONTOUR & DETAIL SURVEY
PROJECT
Lot 3 RP 153333
147-205 Rocky Passage Road, Redland Bay
CLIENT
New Land Tourism Pty. Ltd.

PROJECT No.	SHEET	DATE
7091.06_DET	1 of 1	20/11/2015

Scale:	1:800@ A1
Datum:	AHD
Level Origin:	PSM 59107 RL 59.795m
Meridian:	RP 153333
Parish:	Redland
County:	Stanley
Surveyor:	EM
Drawn:	DGF
Contour Interval:	1.0m
Index Interval:	2.0m

SERVICE DETAILS

Sewerage:	Above Ground
Stormwater:	Above Ground
Water:	Above Ground
Electricity:	Above Ground
Telephone:	Below Ground
Gas:	
Road:	Bitumen
Kerb:	Mountable/Barrier
Footpath:	Grass

Appendix C
Conceptual Drainage Layout Plan


LEGEND
FINISHED SURFACE CONTOURS
EXISTING SURFACE LEVEL
FINISHED SURFACE LEVEL
EXISTING EDGE OF BITUMEN
EXISTING NOMINAL KERB LINE
EXISTING VEGETATION LINE
PROPOSED NOMINAL KERB LINE
EXISTING STORMWATER DRAINAGE
EXISTING SEWER
EXISTING WATER
EXISTING OVERHEAD ELECTRICITY
EXISTING GAS
EXISTING TELECOMMUNICATIONS
PROPOSED BATTER
LIMIT OF WORKS
PROPOSED EASEMENTS
PROPOSED RETAINING WALL
PROPOSED STORMWATER DRAINAGE
PROPOSED ROOFWATER DRAINAGE
PROPOSED SEWER
PROPOSED WATER MAIN
PROPOSED ELECTRICITY
EXISTING ROAD
PROPOSED ASPHALT PAVEMENT
ROADWORKS CHAINAGE
41m² BIO RETENTION AREA
608m³ DETENTION ABOVE EXISTING DAM LEVEL
CONTROLLED OUTLET FROM DETENTION BASIN
16m² BIO RETENTION AREA
PROPOSED 33m² BIO RETENTION AREA
TRAIL
ROAD 1
ROCKY
PASSAGE
ROAD
CONTINUES ON DRG DA05
PRELIMINARY
NOT FOR CONSTRUCTION
SCALE 1:500
AT ORIGINAL SIZE (A1)
Rev Date Description By Chk
04 12.11.18 PRELIMINARY - Issued for Information DE ML
03 09.11.18 PRELIMINARY - Issued for Information AK ML
02 07.06.18 PRELIMINARY - Issued for Information DS ML
01 31.08.17 PRELIMINARY - Issued for Information LDV ML
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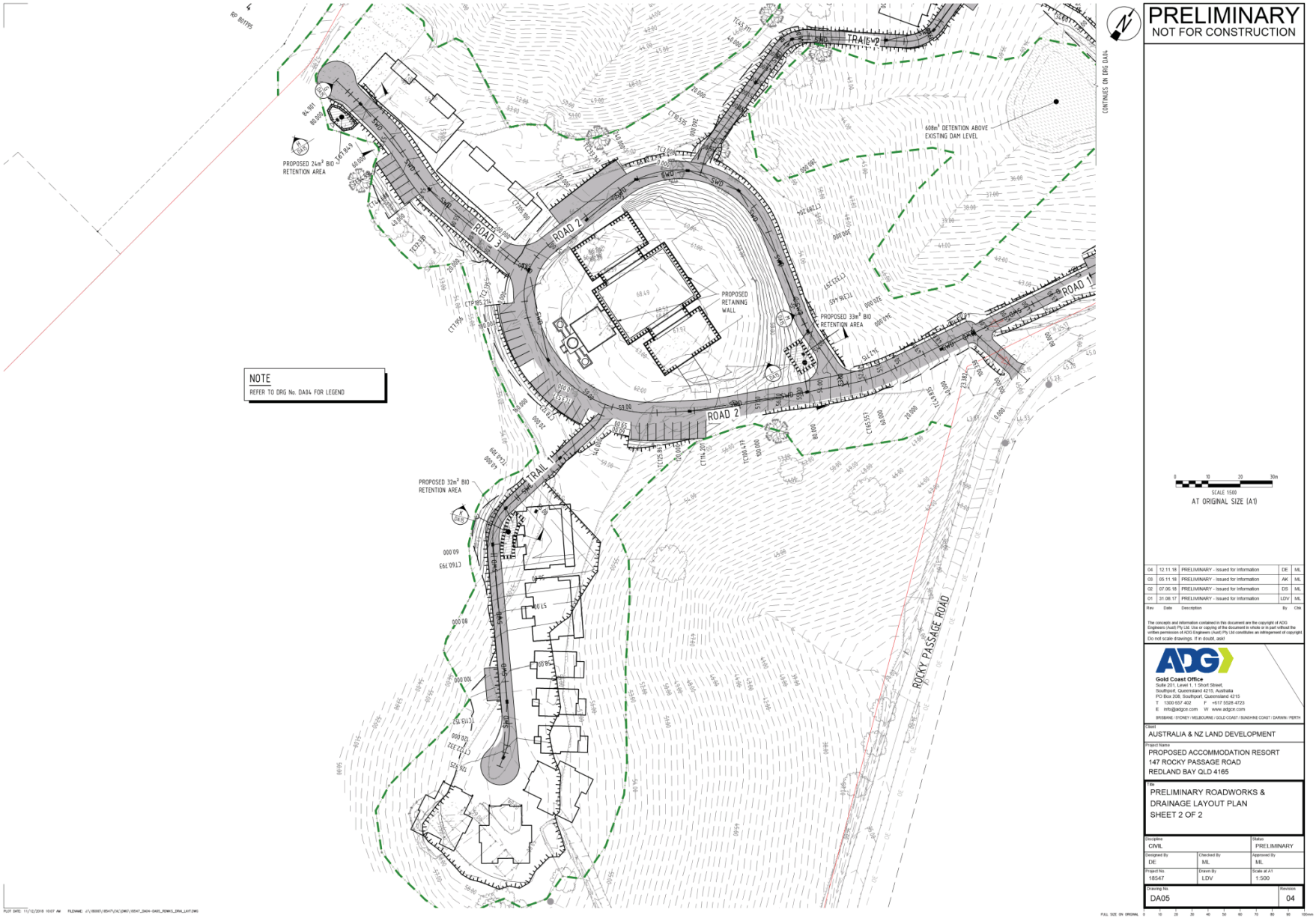
BRISBANE / SYDNEY / MELBOURNE / GOLD COAST / SUNSHINE COAST / DARWIN / PERTH
Client
AUSTRALIA & NZ LAND DEVELOPMENT
Project Name
PROPOSED ACCOMMODATION RESORT
147 ROCKY PASSAGE ROAD
REDLAND BAY QLD 4165
Title
PRELIMINARY ROADWORKS & DRAINAGE LAYOUT PLAN
SHEET 1 OF 2
Discipline CIVIL
Status PRELIMINARY
Designed By DE
Checked By ML
Approved By ML
Project No. 18547
Drawn By LDV
Scale at A1 1:500
Drawing No. DA04
Revision 04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NOT FOR CONSTRUCTION
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PROPOSED 32m² BIO RETENTION AREA
PROPOSED 33m² BIO RETENTION AREA
608m³ DETENTION ABOVE EXISTING DAM LEVEL
PROPOSED RETAINING WALL
ROAD 1
ROAD 2
ROAD 3
TRAIL
ROCKY PASSAGE ROAD
CONTINUES ON DRG DA04
SCALE 1:500
AT ORIGINAL SIZE (A1)
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SHEET 2 OF 2
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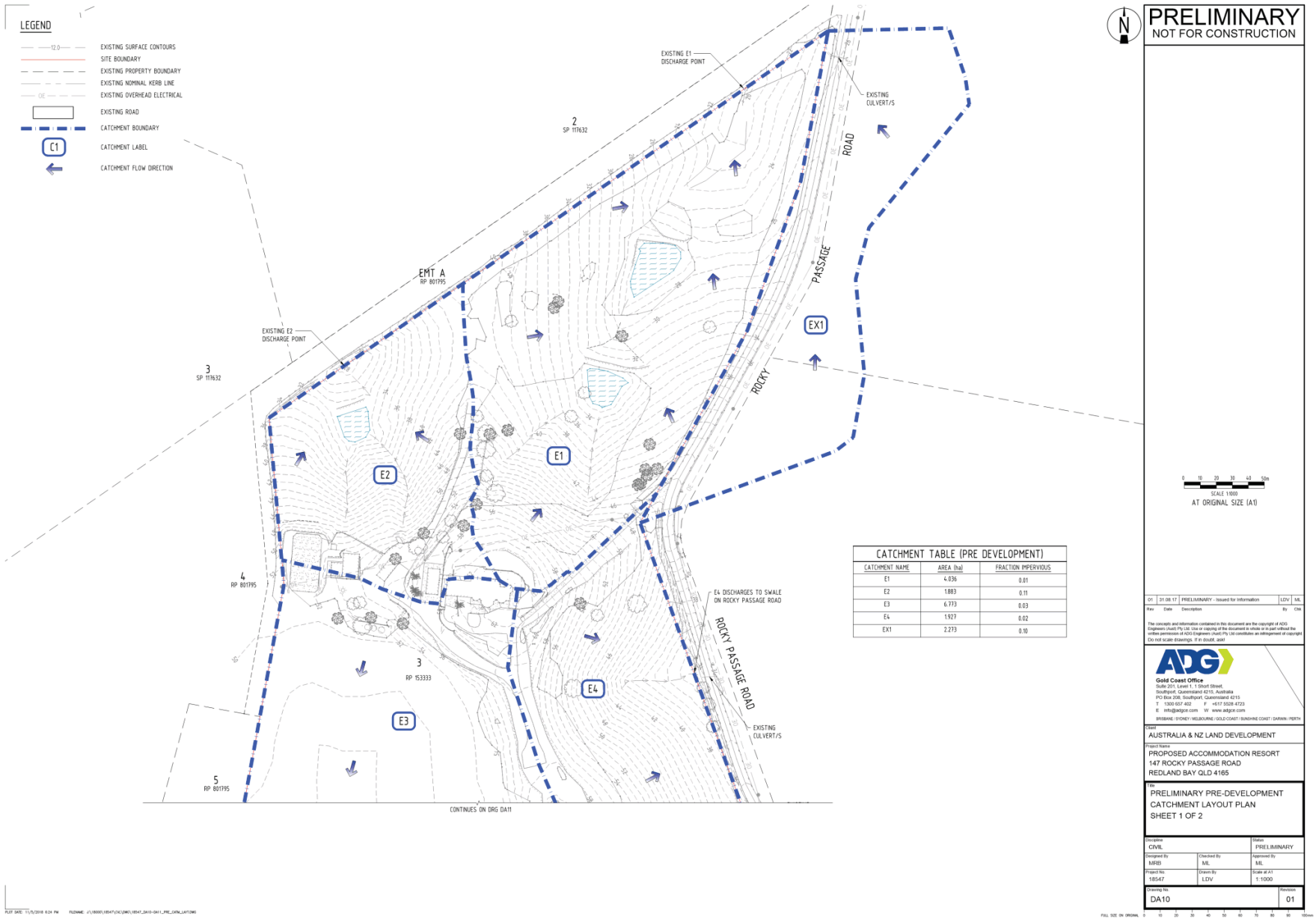

CATCHMENT TABLE (PRE DEVELOPMENT)

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E1	4.036	0.01
E2	1.883	0.11
E3	6.773	0.03
E4	1.927	0.02
EX1	2.273	0.10

Rev	Date	Description	By	Chk
01	31.08.17	PRELIMINARY - Issued for Information	LDV	ML

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Client
AUSTRALIA & NZ LAND DEVELOPMENT

Project Name
PROPOSED ACCOMMODATION RESORT
147 ROCKY PASSAGE ROAD
REDLAND BAY QLD 4165

Title
PRELIMINARY PRE-DEVELOPMENT CATCHMENT LAYOUT PLAN
SHEET 1 OF 2

Discipline	Status
CIVIL	PRELIMINARY

Designed By	Checked By	Approved By
MRB	ML	ML
Project No	Drawn By	Scale at A1
18547	LDV	1:1000

Drawing No. DA10 Revision 01

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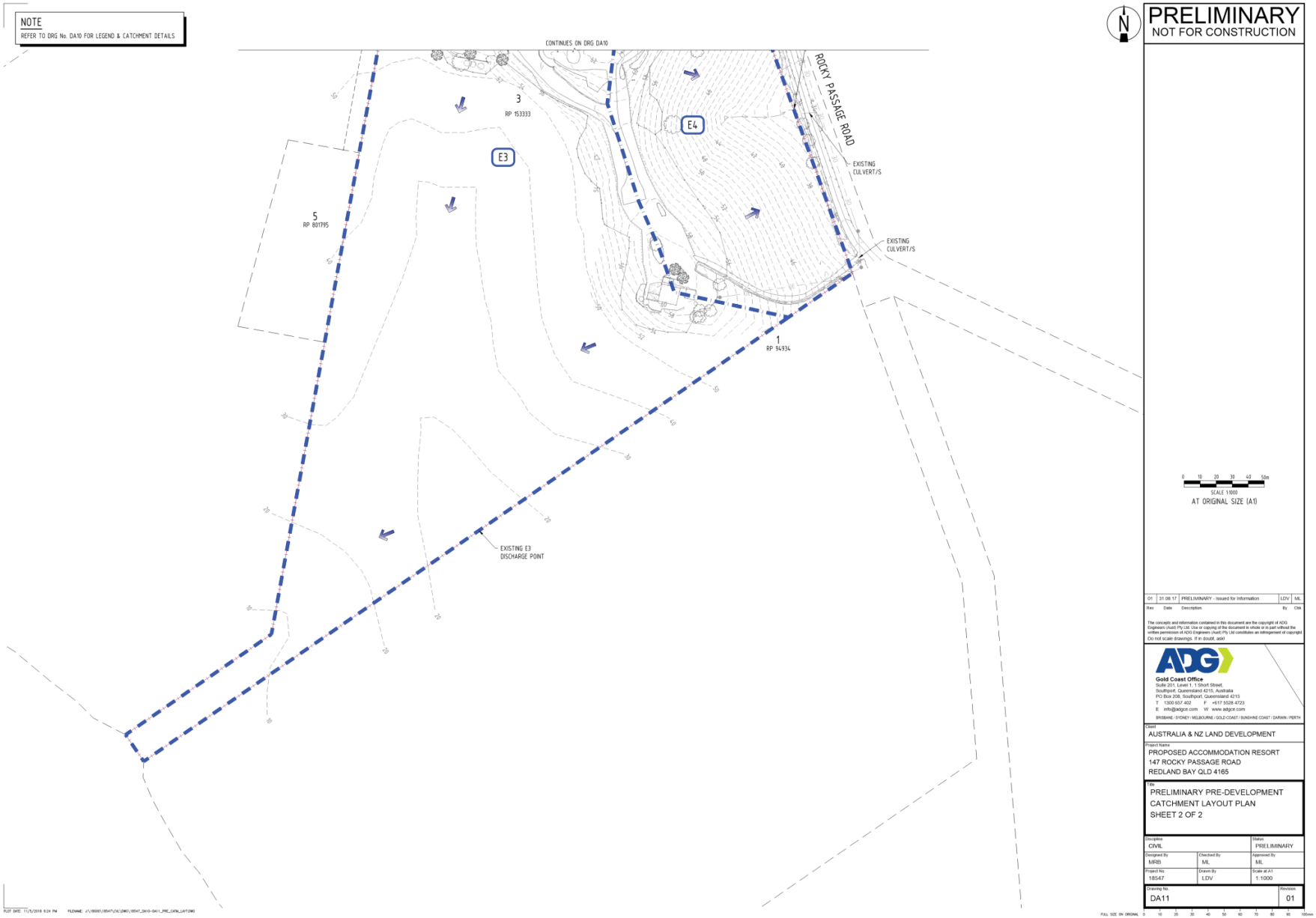
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REFER TO DRG No. DA10 FOR LEGEND & CATCHMENT DETAILS
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RP 153333
E4
E3
EXISTING
CULVERT/S
5
RP 801795
EXISTING
CULVERT/S
1
RP 94934
EXISTING E3
DISCHARGE POINT
PRELIMINARY
NOT FOR CONSTRUCTION
SCALE 1:1000
AT ORIGINAL SIZE (A1)
01 31.08.17 PRELIMINARY - Issued for Information LDV ML
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Project Name
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147 ROCKY PASSAGE ROAD
REDLAND BAY QLD 4165
Title
PRELIMINARY PRE-DEVELOPMENT
CATCHMENT LAYOUT PLAN
SHEET 2 OF 2
Discipline
CIVIL
Status
PRELIMINARY
Designed By
MRB
Checked By
ML
Approved By
ML
Project No.
18547
Drawn By
LDV
Scale at A1
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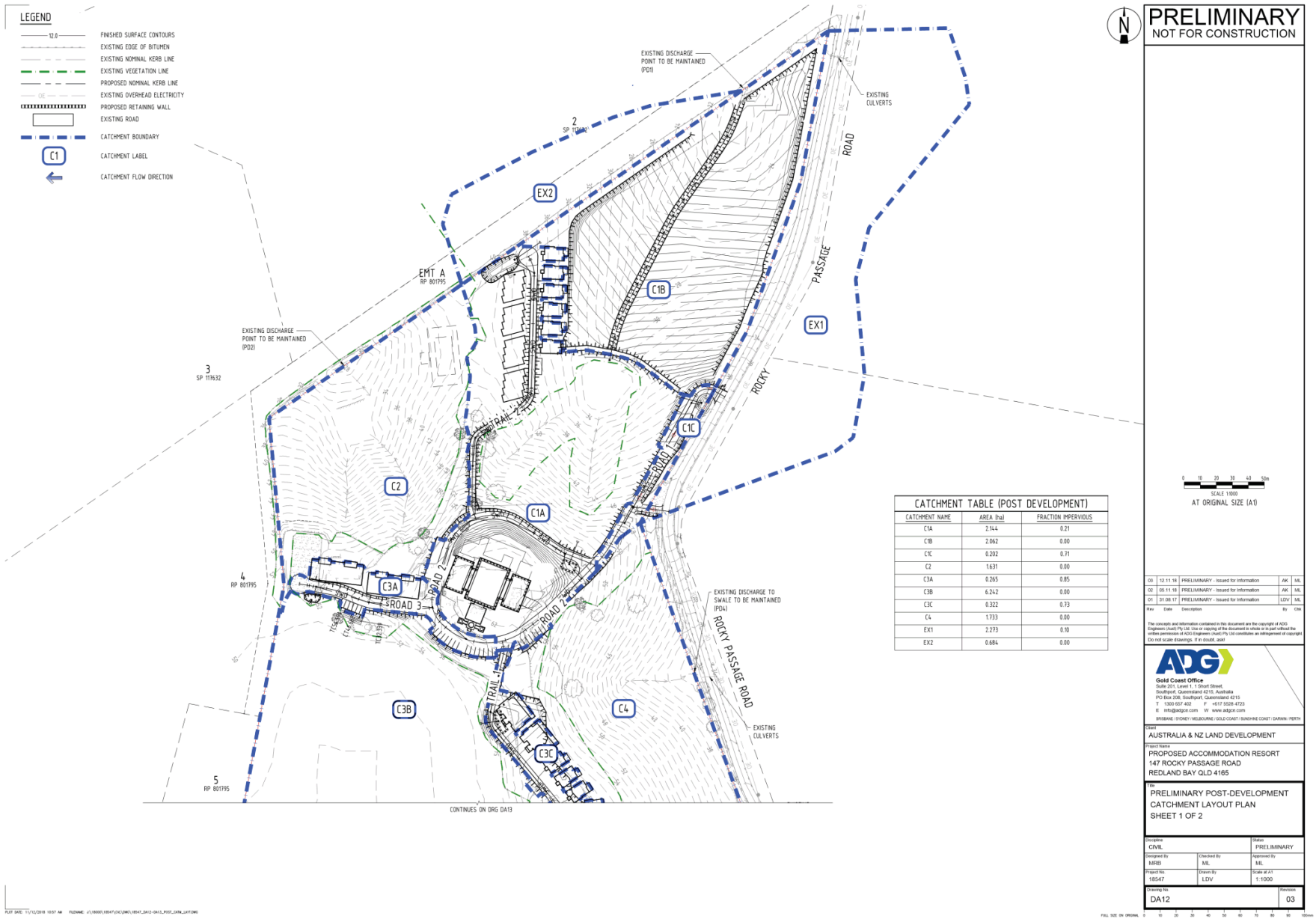
Drawing No.
DA11
Revision
01



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C1B	2.062	0.00
C1C	0.202	0.71
C2	1.631	0.00
C3A	0.265	0.85
C3B	6.242	0.00
C3C	0.322	0.73
C4	1.733	0.00
EX1	2.273	0.10
EX2	0.684	0.00

PRELIMINARY
NOT FOR CONSTRUCTION

SCALE 1:1000
AT ORIGINAL SIZE (A1)

Rev	Date	Description	By	Chk
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02	05.11.18	PRELIMINARY - Issued for Information	AK	ML
01	31.08.17	PRELIMINARY - Issued for Information	LDV	ML

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Client
AUSTRALIA & NZ LAND DEVELOPMENT

Project Name
PROPOSED ACCOMMODATION RESORT
147 ROCKY PASSAGE ROAD
REDLAND BAY QLD 4165

Title
PRELIMINARY POST-DEVELOPMENT CATCHMENT LAYOUT PLAN
SHEET 1 OF 2

Discipline	Status
CIVIL	PRELIMINARY

Designed By	Checked By	Approved By
MRB	ML	ML
Project No.	Drawn By	Scale at A1
18547	LDV	1:1000

Drawing No. DA12 Revision 03

FULL SIZE ON ORIGINAL 0 10 20 30 40 50 60 70 80 90 100mm


NOTE
REFER TO DRG No. DA12 FOR LEGEND
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ROCKY PASSAGE ROAD
TRAIL
C3B
C3C
C4
EXISTING CULVERTS
EXISTING CULVERTS
5
RP 801795
1
RP 94934
EXISTING DISCHARGE POINT
TO BE MAINTAINED (PD3)
PRELIMINARY
NOT FOR CONSTRUCTION
SCALE 1:1000
AT ORIGINAL SIZE (A1)
00 12.11.18 PRELIMINARY - Issued for Information AK ML
00 05.11.18 PRELIMINARY - Issued for Information AK ML
01 31.08.17 PRELIMINARY - Issued for Information LDV ML
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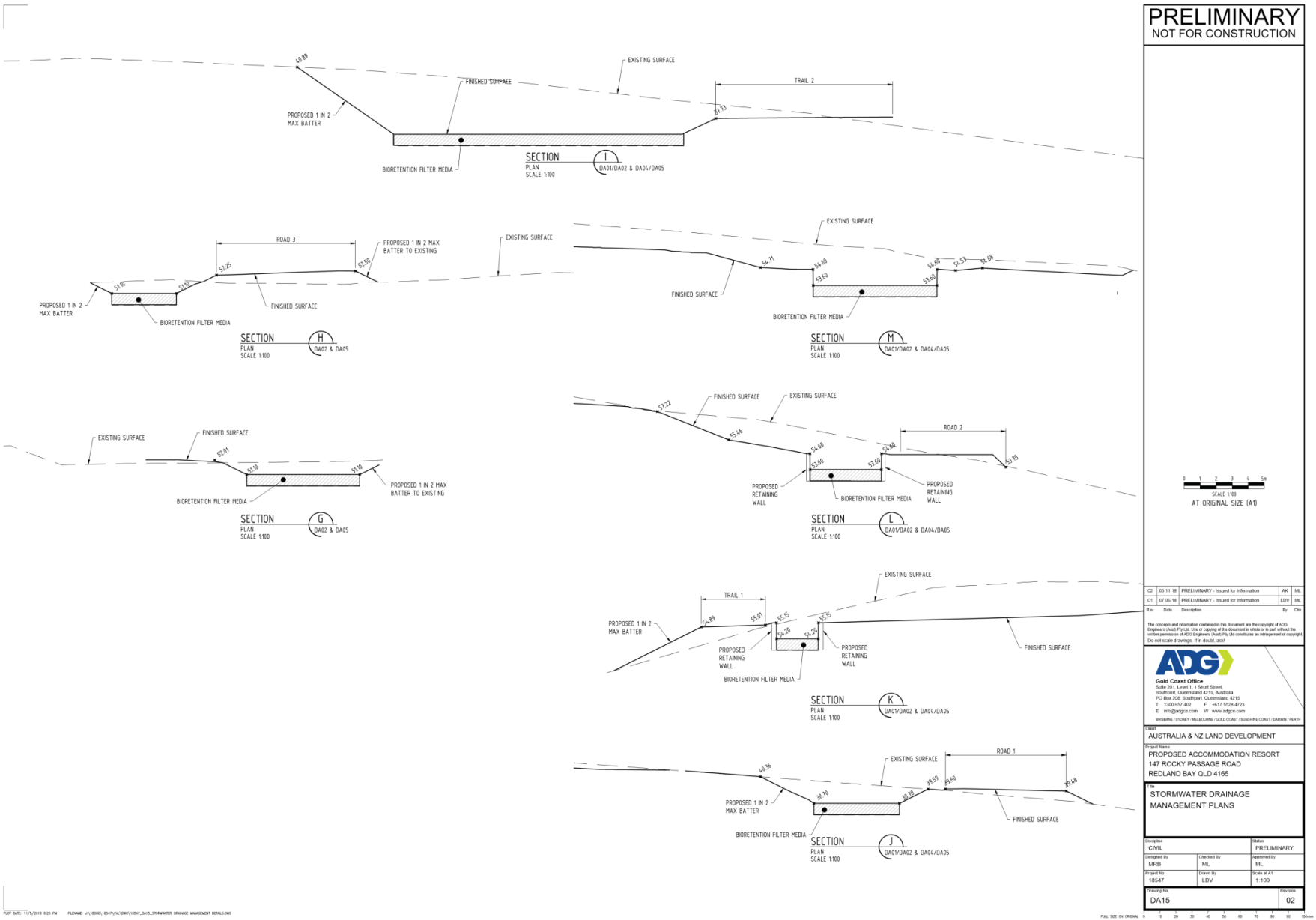
Project Name
PROPOSED ACCOMMODATION RESORT
147 ROCKY PASSAGE ROAD
REDLAND BAY QLD 4165
Title
PRELIMINARY POST-DEVELOPMENT
CATCHMENT LAYOUT PLAN
SHEET 2 OF 2
Discipline CIVIL
Status PRELIMINARY
Designed By MRB
Checked By ML
Approved By ML
Project No 18547
Drawn By LDV
Scale at A1 1:1000
Drawing No. DA13
Revision 03


PRELIMINARY
NOT FOR CONSTRUCTION
EXISTING SURFACE
FINISHED SURFACE
TRAIL 2
PROPOSED 1 IN 2 MAX BATTER
BIORETENTION FILTER MEDIA
SECTION I PLAN SCALE 1:100 DA01/DA02 & DA04/DA05
ROAD 3
PROPOSED 1 IN 2 MAX BATTER TO EXISTING
SECTION H PLAN SCALE 1:100 DA02 & DA05
SECTION M PLAN SCALE 1:100 DA01/DA02 & DA04/DA05
SECTION G PLAN SCALE 1:100 DA02 & DA05
ROAD 2
PROPOSED RETAINING WALL
SECTION L PLAN SCALE 1:100 DA01/DA02 & DA04/DA05
TRAIL 1
SECTION K PLAN SCALE 1:100 DA01/DA02 & DA04/DA05
ROAD 1
SECTION J PLAN SCALE 1:100 DA01/DA02 & DA04/DA05
SCALE 1:100
AT ORIGINAL SIZE (A1)
02 05.11.18 PRELIMINARY - Issued for Information AK ML
01 07.06.18 PRELIMINARY - Issued for Information LDV ML
Rev Date Description By Chk
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Client
AUSTRALIA & NZ LAND DEVELOPMENT
Project Name
PROPOSED ACCOMMODATION RESORT
147 ROCKY PASSAGE ROAD
REDLAND BAY QLD 4165
Title
STORMWATER DRAINAGE MANAGEMENT PLANS
Discipline CIVIL
Status PRELIMINARY
Designed By MRB
Checked By ML
Approved By ML
Project No 18547
Drawn By LDV
Scale at A1 1:100
Drawing No. DA15
Revision 02
PLOT DATE: 11/5/2018 6:25 PM FILENAME: J:\18000\18547\CAD\DWG\18547_DA15_STORMWATER DRAINAGE MANAGEMENT DETAILS.DWG

Appendix D
MUSIC Model Data

MUSIC Model Information

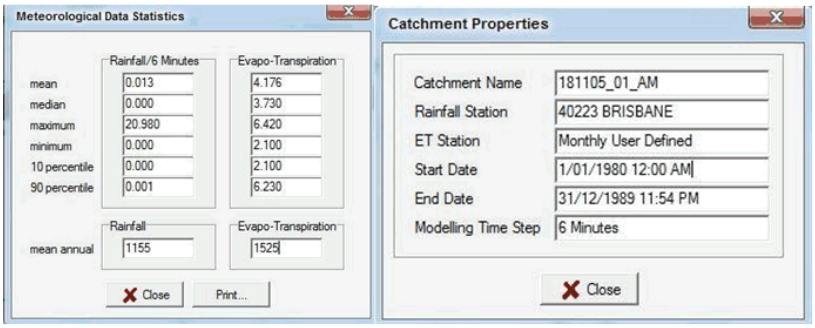
Introduction

The quality of stormwater runoff and the impact of the proposed stormwater quality improvement measures were analyzed using MUSIC Version 6.3.0 according to the *MUSIC Modeling Guidelines Version 1.0, Water by Design 2010.* For a summary of the modeled catchments within the site see Table 2 within this document.

Meteorological Data

The MUSIC model was carried out using the following parameters:

- Modeling period should be 10 years with a time step of 6 minutes.
- The nearest available 6 minute time step rainfall series to the subject site is Rainfall Station 40223 Brisbane, with a mean annual rainfall of 1155 mm, and data from: 1/1/1980 to 31/12/1989.



Evaporation was applied as monthly mean. The mean annual evaporation was 1525mm.

Source Nodes - Fractions Impervious

The source nodes were defined as 4 source types: roofing, roadways, landscaping, and exposed hardstand.

The areas of the source nodes were estimated from the proposed Architectural layout plans in **Appendix A**.

Source Nodes - Pollutant Exports

Pollutant export parameters were assigned per Table 3.8 of the MUSIC Modeling Guidelines. The pollutant export parameters adopted in the MUSIC model are summarized in the Table below:

Table 3.8 Pollutant export parameters for split catchment land use (log^{10} values)

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.
	Urban residential						
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

Source Nodes – Rainfall Runoff Parameters

Rainfall runoff parameters were assigned per Table 3.7 of the MUSIC Modeling Guidelines for Urban Residential.

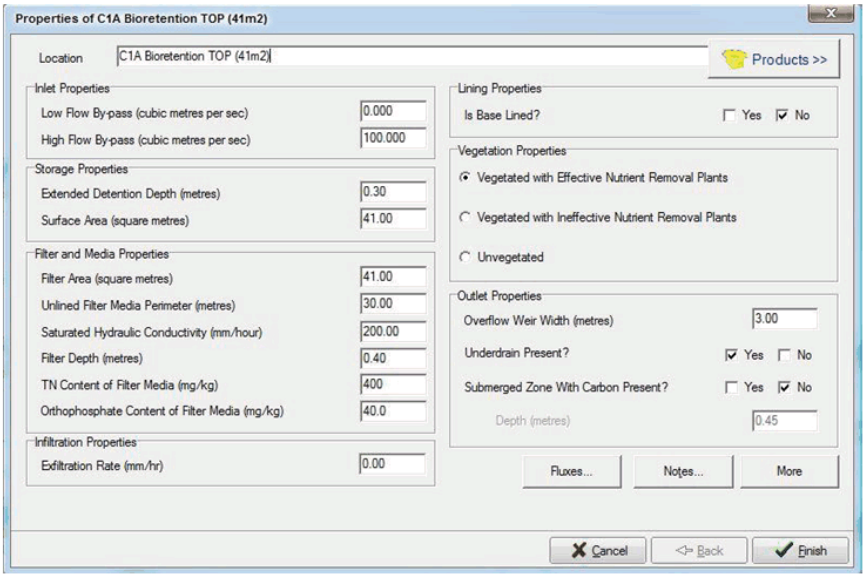
The rainfall runoff parameters entered in the MUSIC model are summarized in the figure below:

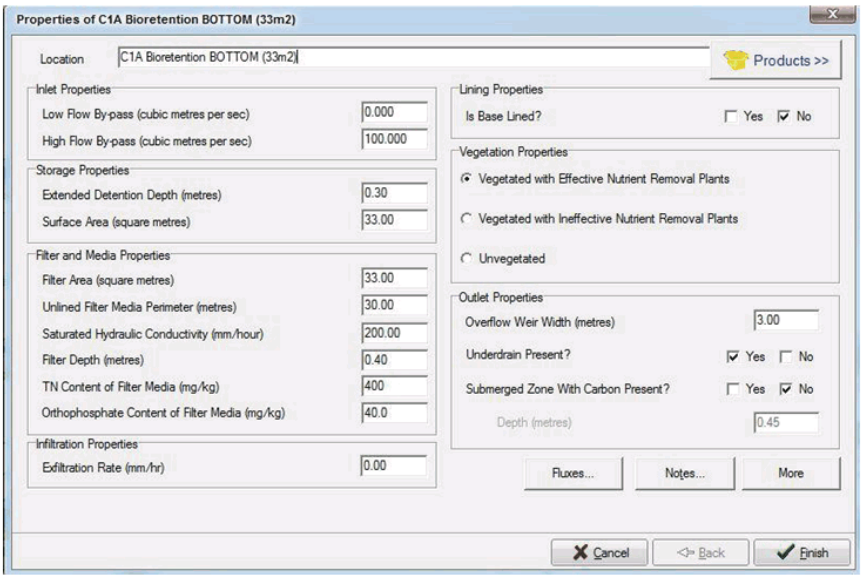
Rainfall-Runoff Parameters

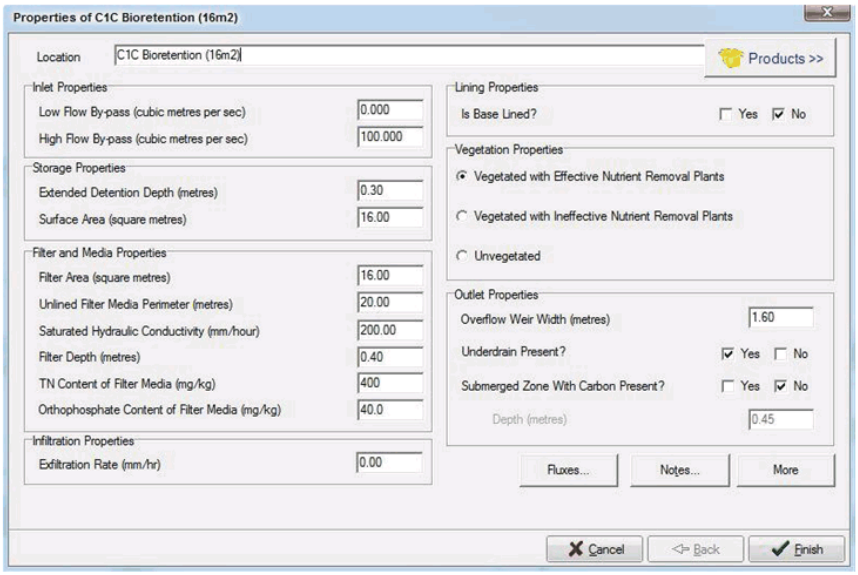
Impervious Area Properties	
Rainfall Threshold (mm/day)	1.00
Pervious Area Properties	
Soil Storage Capacity (mm)	500
Initial Storage (% of Capacity)	10
Field Capacity (mm)	200
Infiltration Capacity Coefficient - a	211.0
Infiltration Capacity Exponent - b	5.00
Groundwater Properties	
Initial Depth (mm)	50
Daily Recharge Rate (%)	28.00
Daily Baseflow Rate (%)	27.00
Daily Deep Seepage Rate (%)	0.00

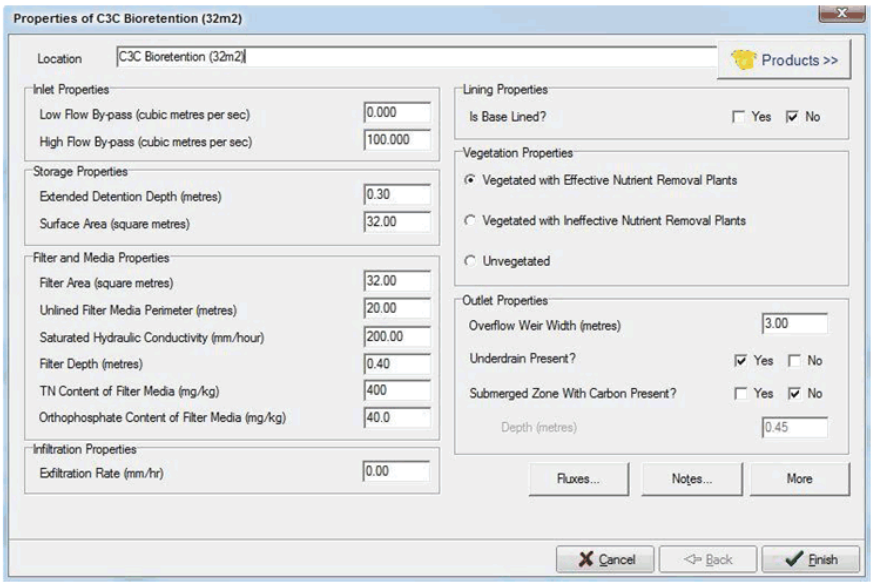
Input Parameters

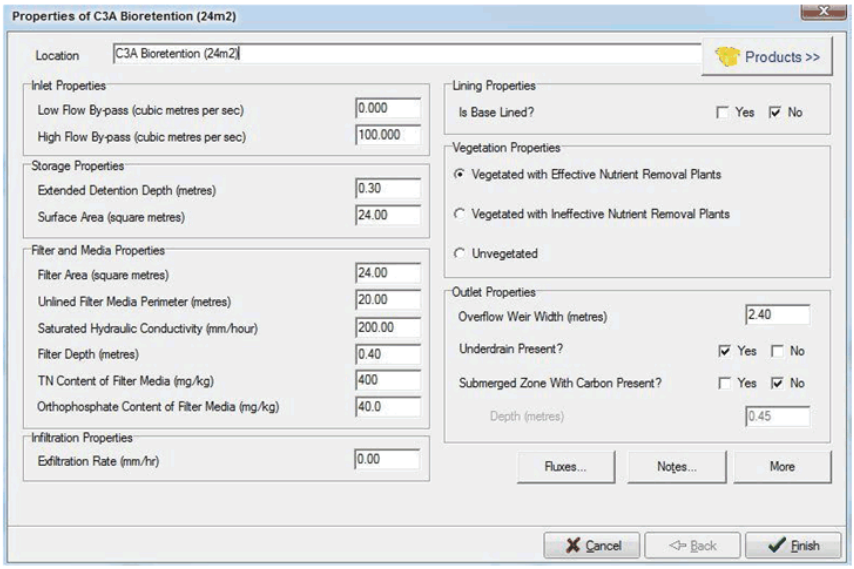
Bioretention:




Properties of C1A Bioretention BOTTOM (33m2)
Location
C1A Bioretention BOTTOM (33m2)
Products >>
Inlet Properties
Low Flow By-pass (cubic metres per sec) 0.000
High Flow By-pass (cubic metres per sec) 100.000
Storage Properties
Extended Detention Depth (metres) 0.30
Surface Area (square metres) 33.00
Filter and Media Properties
Filter Area (square metres) 33.00
Unlined Filter Media Perimeter (metres) 30.00
Saturated Hydraulic Conductivity (mm/hour) 200.00
Filter Depth (metres) 0.40
TN Content of Filter Media (mg/kg) 400
Orthophosphate Content of Filter Media (mg/kg) 40.0
Infiltration Properties
Exfiltration Rate (mm/hr) 0.00
Lining Properties
Is Base Lined? Yes No
Vegetation Properties
Vegetated with Effective Nutrient Removal Plants
Vegetated with Ineffective Nutrient Removal Plants
Unvegetated
Outlet Properties
Overflow Weir Width (metres) 3.00
Underdrain Present? Yes No
Submerged Zone With Carbon Present? Yes No
Depth (metres) 0.45
Fluxes...
Notes...
More
Cancel
Back
Finish

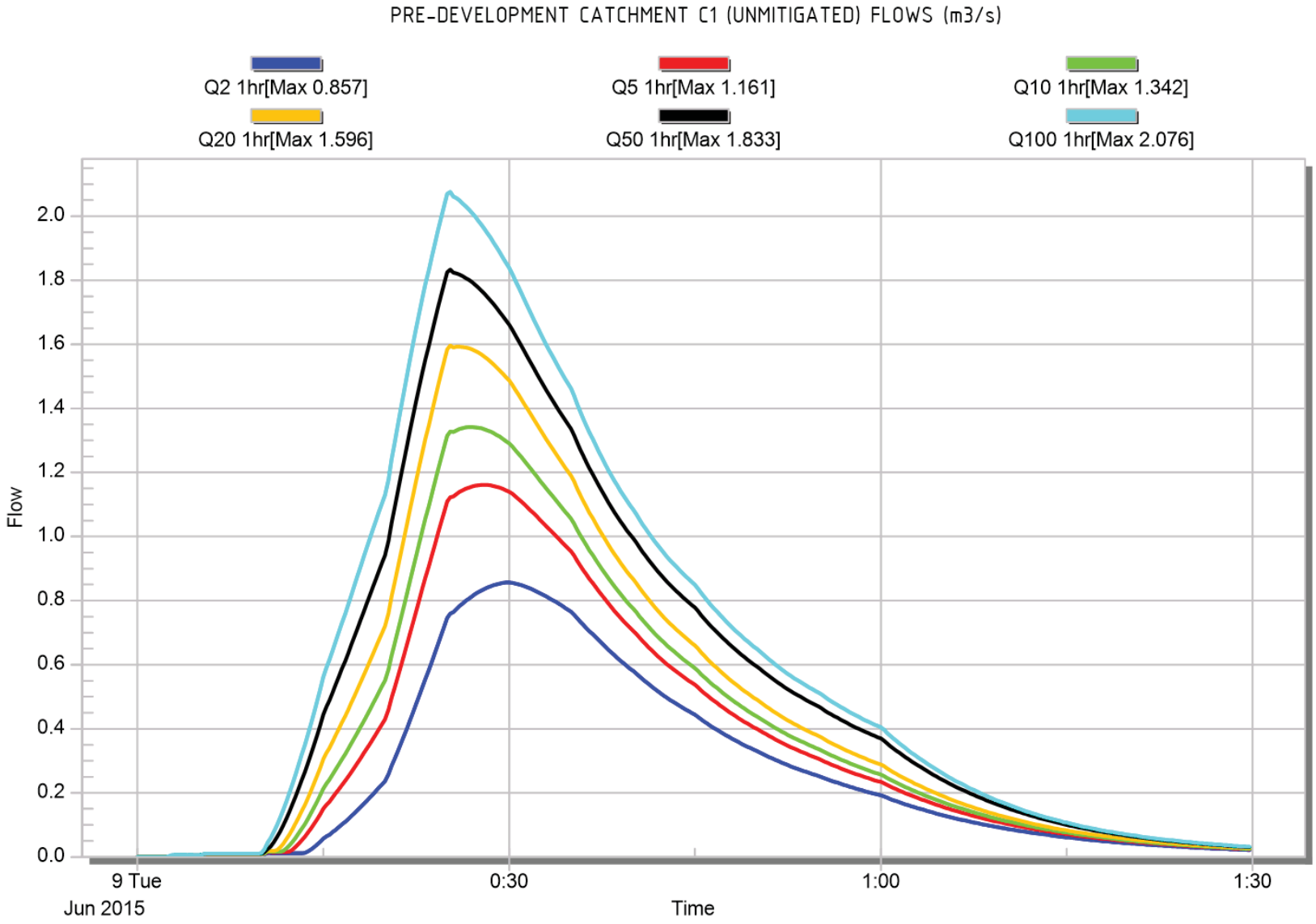

Properties of C1C Bioretention (16m2)
Location
C1C Bioretention (16m2)
Products >>
Inlet Properties
Low Flow By-pass (cubic metres per sec) 0.000
High Flow By-pass (cubic metres per sec) 100.000
Storage Properties
Extended Detention Depth (metres) 0.30
Surface Area (square metres) 16.00
Filter and Media Properties
Filter Area (square metres) 16.00
Unlined Filter Media Perimeter (metres) 20.00
Saturated Hydraulic Conductivity (mm/hour) 200.00
Filter Depth (metres) 0.40
TN Content of Filter Media (mg/kg) 400
Orthophosphate Content of Filter Media (mg/kg) 40.0
Infiltration Properties
Exfiltration Rate (mm/hr) 0.00
Lining Properties
Is Base Lined? Yes No
Vegetation Properties
Vegetated with Effective Nutrient Removal Plants
Vegetated with Ineffective Nutrient Removal Plants
Unvegetated
Outlet Properties
Overflow Weir Width (metres) 1.60
Underdrain Present? Yes No
Submerged Zone With Carbon Present? Yes No
Depth (metres) 0.45
Fluxes...
Notes...
More
Cancel
Back
Finish

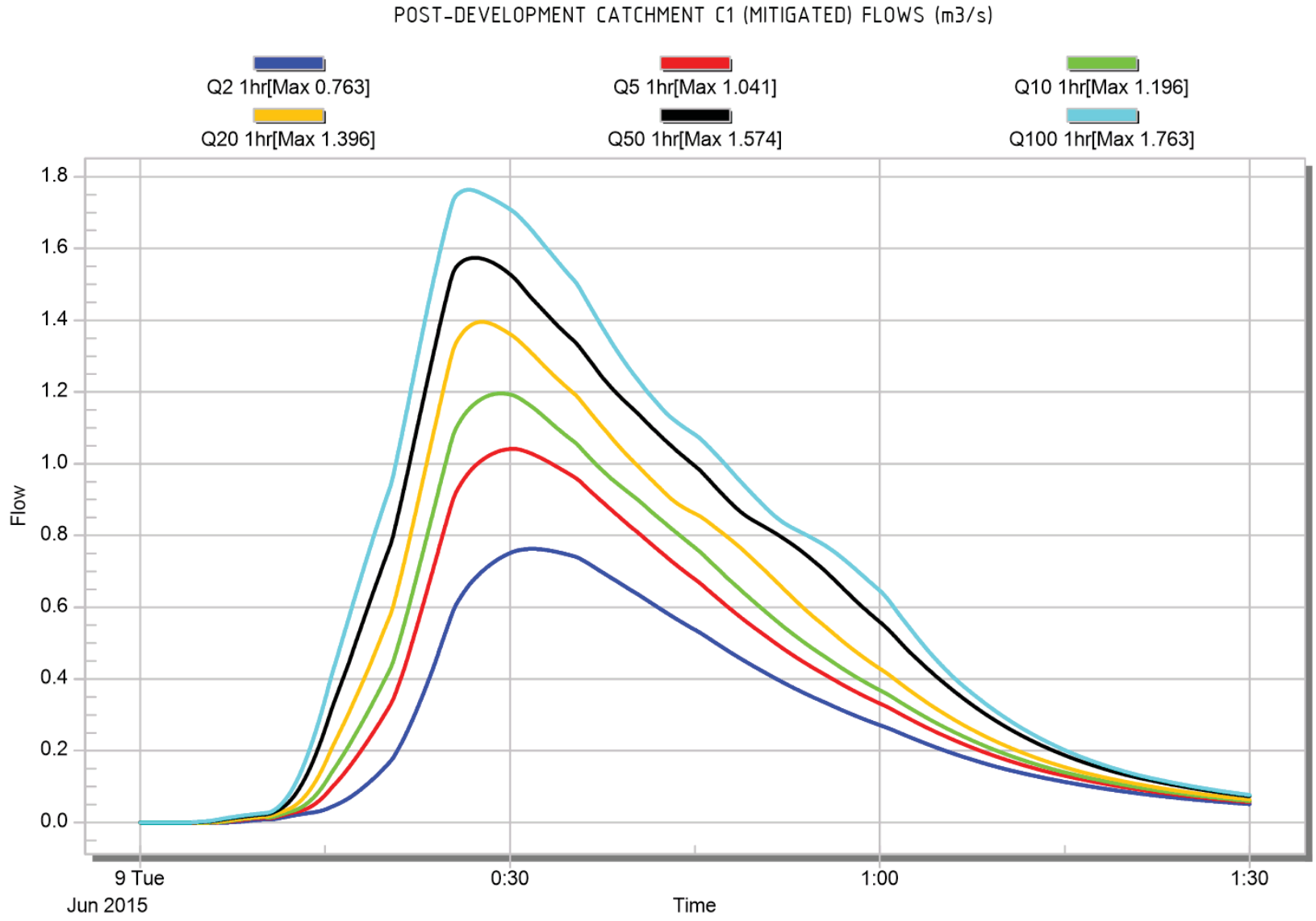




The Treatment Train Diagrams for the Model can be found in **Figure 4** within Section 6.4 of this document.

Appendix E
Stormwater Quantity Model Outputs

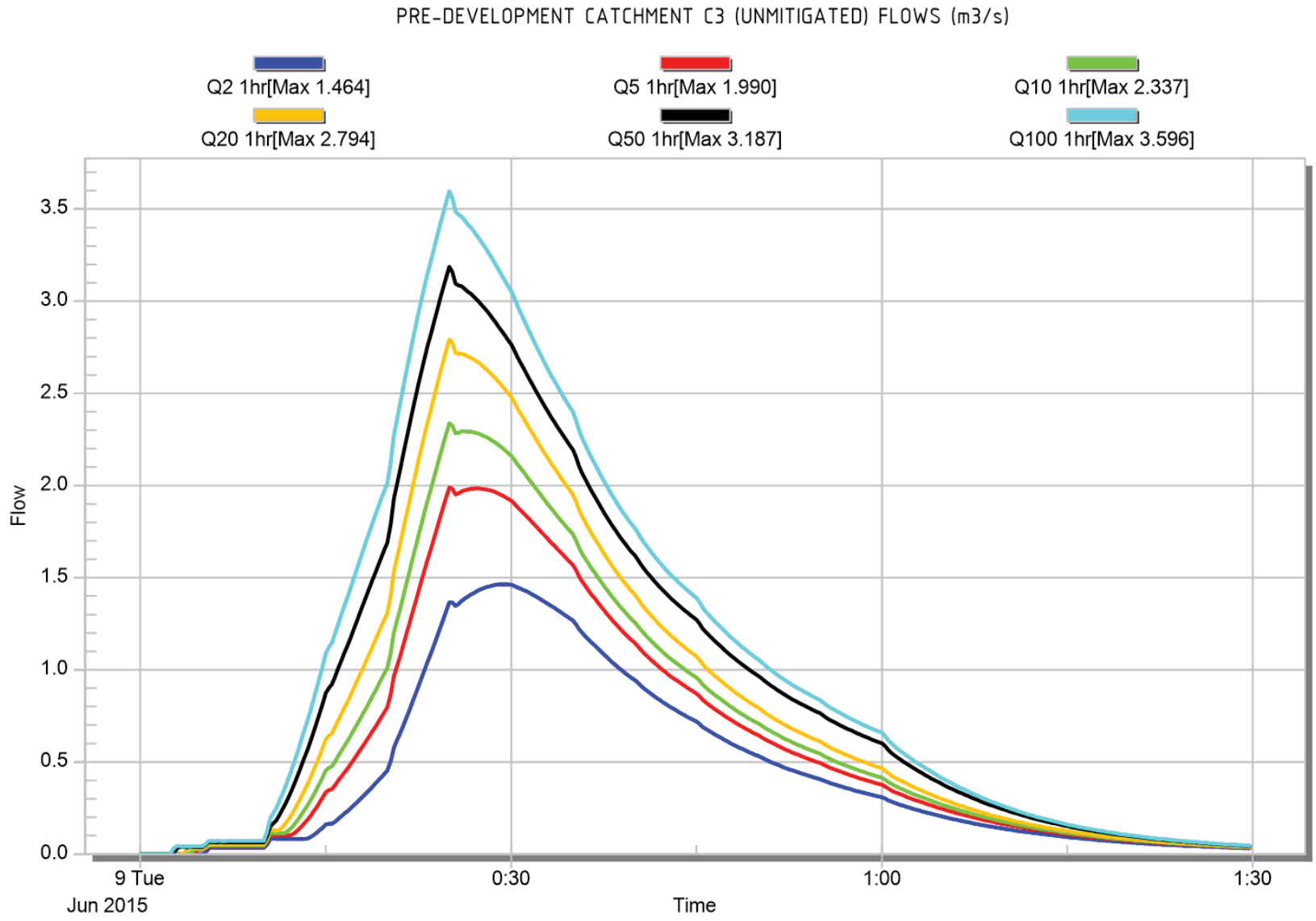

PRE-DEVELOPMENT CATCHMENT C1 (UNMITIGATED) FLOWS (m3/s)
Q2 1hr[Max 0.857]
Q5 1hr[Max 1.161]
Q10 1hr[Max 1.342]
Q20 1hr[Max 1.596]
Q50 1hr[Max 1.833]
Q100 1hr[Max 2.076]
Flow
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
9 Tue
Jun 2015
0:30
1:00
1:30
Time

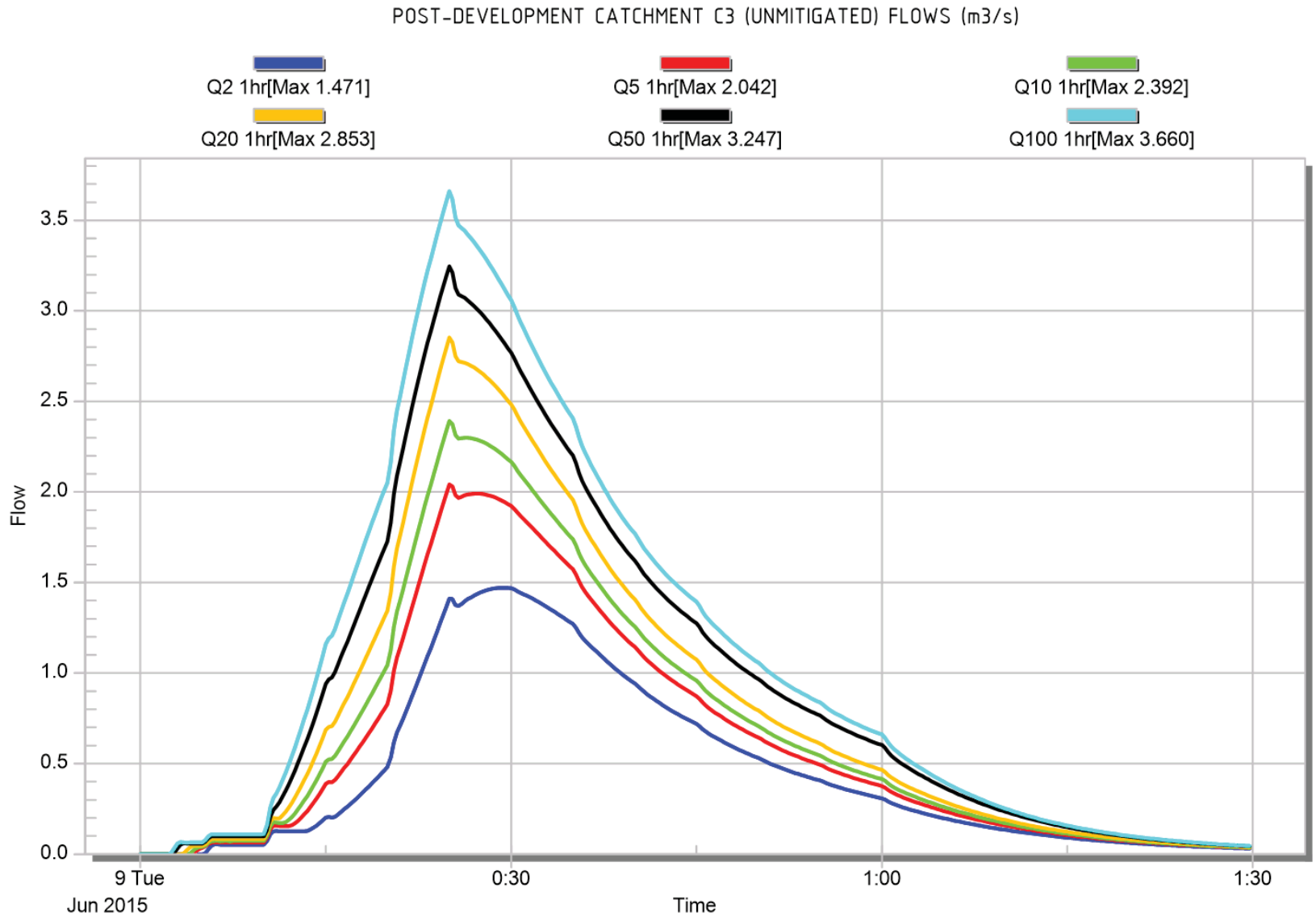

POST-DEVELOPMENT CATCHMENT C1 (MITIGATED) FLOWS (m3/s)
Q2 1hr[Max 0.763]
Q5 1hr[Max 1.041]
Q10 1hr[Max 1.196]
Q20 1hr[Max 1.396]
Q50 1hr[Max 1.574]
Q100 1hr[Max 1.763]
Flow
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
9 Tue
Jun 2015
0:30
1:00
1:30
Time

POST-DEVELOPMENT CATCHMENT C1A STORAGE CHARACTERISTICS (m3/s)

Name	Storm	Node Name	Flood Loss	Max Volume	Max Water De	Max Water El	Max Surface
Post C1A	Q2 1hr	Post C1A	0.000	302.235	0.390	33.050	906.710
Post C1A	Q5 1hr	Post C1A	0.000	373.103	0.466	33.126	951.370
Post C1A	Q10 1hr	Post C1A	0.000	418.009	0.513	33.173	978.680
Post C1A	Q20 1hr	Post C1A	0.000	485.618	0.581	33.241	1017.650
Post C1A	Q50 1hr	Post C1A	0.000	553.759	0.646	33.306	1054.850
Post C1A	Q100 1hr	Post C1A	0.000	607.392	0.697	33.357	1083.260

11/05/18 16:13:47 1/1


PRE-DEVELOPMENT CATCHMENT C3 (UNMITIGATED) FLOWS (m3/s)
Q2 1hr[Max 1.464]
Q5 1hr[Max 1.990]
Q10 1hr[Max 2.337]
Q20 1hr[Max 2.794]
Q50 1hr[Max 3.187]
Q100 1hr[Max 3.596]
Flow
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
9 Tue
Jun 2015
0:30
1:00
1:30
Time


POST-DEVELOPMENT CATCHMENT C3 (UNMITIGATED) FLOWS (m3/s)
Q2 1hr[Max 1.471]
Q5 1hr[Max 2.042]
Q10 1hr[Max 2.392]
Q20 1hr[Max 2.853]
Q50 1hr[Max 3.247]
Q100 1hr[Max 3.660]
Flow
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
9 Tue
Jun 2015
0:30
1:00
1:30
Time

147-205 Rocky Passage Road, Redland Bay
ADG Ref: 18547 C R002 REV02 05.11.2018
November 2018

Appendix F
Planning Codes

Division 9 - Stormwater Management

8.9.1 Stormwater Management Code

(1) This division contains the provisions for the Stormwater Management Code, that incorporates -

(a) Compliance with the Stormwater Management Code (section 8.9.2);

(b) Overall Outcomes of the Stormwater Management Code (section 8.9.3);

(c) Specific Outcomes and Probable Solutions applicable to Assessable Development (section 8.9.4).

8.9.2 Compliance with the Stormwater Management Code

(1) Development that is consistent with the specific outcomes in section 8.9.4 complies with the Stormwater Management Code.

8.9.3 Overall Outcomes of the Stormwater Management Code

(1) The overall outcomes are the purpose of the Stormwater Management Code.

(2) The overall outcomes sought for the Stormwater Management Code are the following -

(a) to ensure -

(i) effective management of the quantity and quality of stormwater run-off;

(ii) stormwater run-off does not adversely impact on the quality of receiving waters, including waterways, wetlands and Moreton Bay;

(iii) provision of efficient and effective stormwater management that provides adequate protection for people and property from the effects of overland flow or flooding;

(iv) maintenance of the natural flow regime of stormwater through the application of water sensitive urban design (WSUD) principles, where possible.

Stormwater Management

8.9.4 Specific Outcomes and Probable Solutions applicable to Assessable Development

Assessable Development				
Specific Outcomes		**Probable Solutions**		**Applicant's Response**
S1.	(1) Stormwater drainage design - (a) protects and preserves land below the 1 percent Annual Exceedance Probability (AEP) flood level; (b) retains, enhances and incorporates natural overland drainage lines; (c) maintains the hydraulic capacity of natural overland drainage lines within the lot or premises; (d) maintains pre-development velocity and quantity of run-off; (e) protects and enhances water quality of receiving waters; (f) does not worsen or cause nuisance to adjacent, upstream and downstream land; (g) maximises the application of water sensitive urban design principles including source, conveyance and discharge mechanisms; (h) ensures the mechanisms incorporated are of a size and nature suited to the expected run-off; (i) integrates with open space without adversely impacting on the core purpose of the open space; (j) considers the full extent of maintenance requirements and costs associated with devices used within the system.	**P1.**	(1) Stormwater drainage design - (a) protects and maintains land below the 1 percent AEP in its natural state; (b) ensures stormwater run-off leaving a lot or premises complies with the water quality objectives in Part 9 - Schedule 11 - Water Quality Objectives unless identified as part of a regional solution in Part 10 – Priority Infrastructure Plan; (c) identifies and determines the 1 percent AEP of natural overland drainage lines where the lot or premises - (i) has an upstream catchment area greater than 5 hectares; or (ii) is 2500m^2 or greater in area; (d) maximises the retention and use of natural overland drainage lines through their identification, and minimises earthworks that will result in stormwater run-off being redirected. **Note -** The Stormwater Management Plan	**Complies. Refer to Stormwater Management Plan by ADG** - **No Land subject to development is located below the 1% AEP event** - **Stormwater treatment devices proposed across development**

Assessable Development				
Specific Outcomes		**Probable Solutions**		**Applicant's Response**
			prepared for the development should detail how all matters contained in S1. are addressed. Refer to Planning Scheme Policy 9 - Infrastructure Works for more information.	
S2.	ASS Management - (1) Uses and other development do not - (a) excavate or otherwise remove soil or sediment identified as containing ASS; (b) permanently or temporarily extract groundwater that results in the aeration of previously saturated ASS; (c) undertake filling that results in - (i) actual ASS being moved below the water-table; previously saturated ASS being aerated.	**P2.**	(1) Stormwater drainage design - (a) meets the stormwater flow capacity requirements of the relevant design storm event - (i) where for the minor system - as detailed in Table 1 - Minor System Design Storm Event by Road Frontage Classification and Zone; (ii) where for the major system - 1 percent AEP; (b) ensures the major system caters for 50 percent blockage in the minor system without causing inundation of building floor levels.	**To be complied with at detailed design phase.**
S3.	(1) Stormwater management for roof and surface drainage - (a) has the capacity to control roof and surface run-off and any excess flows from the land or upstream land to prevent stormwater flows from entering buildings; (b) avoids the risk of flooding.	**P3.**	(1) Stormwater management - (a) for reconfiguration that will result in roof-water through adjoining properties - (i) for residential reconfiguration, a maximum of two lots is served by a pipe system that discharges roof water run-off to the nearest downhill road reserve or lawful point of discharge; or (ii) for other reconfiguration, an	**N/A**

Assessable Development				
Specific Outcomes		Probable Solutions		Applicant's Response
			inter-lot drainage system discharges roof and surface run-off to the nearest available downhill road reserve or lawful point of discharge; (iii) avoids the risk of flooding by ensuring that uses and other development are undertaken on land above the 1 percent AEP flood and storm tide level (2.4 metres AHD).	
S4.	(1) For residential uses and other development located on the SMBI, to protect natural drainage systems, stormwater management - (a) utilises a range of source, conveyance and discharge mechanisms, such as stormwater storage systems, retention trenches, to reuse and reduce stormwater run-off volumes, peaks and velocity; (b) ensures stormwater discharge is dispersed naturally in a wide sheet flow to minimise erosion impacts; (c) maximises the use of permeable surfaces to allow infiltration of stormwater run- off.	**P4.**	(1) For residential uses and other development located on the SMBI, except for a lot or premises that is located on the high side of a constructed road with kerb and channel, stormwater management - (a) incorporates methods other than direct piping of stormwater that promotes wide sheet flow of stormwater such as - (i) soakage chambers, absorption trenches, rubble pits; or (ii) rainwater tanks fitted with a first flush system.	**N/A**

Table 1 - Minor System Design Storm Event by Road Frontage Classification and Zone

Zone		Design Storm Event		
Zones	Lot	Arterial, Sub-Arterial and Trunk Collector Roads		Access Streets and Collector Roads
		Longitudinal Drainage	Cross Road Drainage in Sag	Longitudinal and Cross Road Drainage
- Urban Residential - including all sub-areas; - Low Density Residential; - Park Residential; - SMBI Residential - including sub-area SR1; - Point Lookout Residential; - Point Lookout Tourist - including all sub-areas - Environmental Protection; - Conservation - including all sub-areas; - Rural Non Urban - including all sub-areas	N/A	10 percent AEP (10 year ARI)	2 percent AEP (50 year ARI)	50 percent AEP (2 year ARI)
- Medium Density Residential - including all sub-areas; - Major Centre - including all sub-areas; - District Centre; - Neighbourhood Centre - including all sub-areas; - Local Centre - including sub-area LC1; - SMBI Centre - including sub-area SC1; - Point Lookout Centre	10 percent AEP (10 year ARI)	10 percent AEP (10 year ARI)	2 percent AEP (50 year ARI)	10 percent AEP (10 year ARI)

Zone		Design Storm Event		
Zones	Lot	Arterial, Sub-Arterial and Trunk Collector Roads		Access Streets and Collector Roads
		Longitudinal Drainage	Cross Road Drainage in Sag	Longitudinal and Cross Road Drainage
- Commercial Industry - including sub-area CM1; - General Industry - including sub-area GL1; - Island Industry - including sub-area IS1; - Marine Activity - including all sub-areas; - Community Purposes - including all sub-areas	50 percent AEP (2 year ARI)	10 percent AEP (10 year ARI)	2 percent AEP (50 year ARI)	50 percent AEP (2 year ARI)
- Open Space	N/A	10 percent AEP (10 year ARI)	2 percent AEP (50 year ARI)	100 percent AEP (1 year ARI)

Division 6 - Flood Prone, Storm Tide and Drainage Constrained Land Overlay

Assessable Development				
Specific Outcomes		**Probable Solutions**		**Applicants Response**
S1.	Where proposed on a lot or premises shown on this overlay map as - ■ Flood Prone or Storm Tide; or ■ SMBI Flood Prone and Storm Tide (1) Uses and other development avoid the risk of flooding by not being undertaken on land below the 1 percent AEP (1 in 100 year ARI) flood and the RL 2.4 AHD (1% AEP) storm tide level; **Note -** ■ 1 percent Annual Exceedance Probability (AEP) is equivalent to the 1 in 100 year Average Recurrence Interval (ARI) and applies to flood and storm tide events. ■ For the purposes of this planning scheme the defined flood event (DFE) for the planning scheme area is the 1 percent AEP flood level or RL 2.4 AHD (1% AEP storm tide level) whichever is appropriate. ■ Survey investigation and analysis is necessary to accurately identify the 1 percent AEP for flooding and storm tide constraints. ■ A cadastral surveyor performs survey work, with all analysis work undertaken by a suitably qualified Registered	**P1.**	(1) Avoid the risk of flooding by- (a) for a material change of use - buildings are sited on land that is above the 1 percent AEP flood and storm tide level; or (b) reconfiguration ensures no lots are created that adjoin or extend over the DFE; or (c) for building work - all floor levels are above the DFE; or (d) operational work is undertaken on land above the DFE; (e) having at least one accessway or road evacuation route that is trafficable for emergency evacuations during all flood or storm tide events up to and including the defined flood event (DFE) level.	**Complies. No development proposed in flood affected areas**

Assessable Development				
	Specific Outcomes		Probable Solutions	Applicants Response
	Professional Engineer of Queensland (RPEQ). All levels are noted as AHD levels. ■ To assist in performing the survey investigation and analysis, refer to Part 11 - Planning Scheme Policy 7 - Flood Prone, Storm Tide and Drainage Constrained Land. ■ In some instances the local government may have undertaken detailed flood survey or have on record a flood study for the site that has been undertaken by a suitably qualified person. Contact the local government to verify if this information is available.			
	(2) Uses and other development - (a) maintain safety of people and property; (b) ensure minimal impact on the environment; (c) protect native plants; (d) do not alter the flood characteristics of land below the flood or storm tide level by - (i) ensuring the free flow of flood or tidal waters; (ii) not concentrating flood or tidal waters, or intensifying flow velocity on land up or downstream; (iii) not reducing the floodplain storage capacity; (e) maintain visual amenity; (f) minimise the extent of excavation or fill; or		(2) No probable solution identified; or	

Assessable Development			
	Specific Outcomes	**Probable Solutions**	**Applicants Response**
	Note - ■ A detailed environmental investigation and analysis undertaken by a suitably qualified person is necessary to demonstrate no adverse environmental impacts. ■ To assist in performing the environmental investigation, refer to Part 11 - Planning Scheme Policy 4 - Ecological Impacts.		
	(3) On the mainland, the redevelopment, alteration or addition to an existing development on a lot or premises that is partly or wholly below the flood or storm tide level - (a) is located above the flood or storm tide level; or (b) where required to locate partly below the flood or storm tide level pole design is used; or (c) where required to locate mostly below the flood or storm tide level achieve a finished land level of no greater than the flood or storm tide level for that part of the lot or premises required to site buildings; (d) protects native plants; (e) maintains the flood characteristics of land below the flood or storm tide level by - (i) ensuring the free flow of flood	(3) No probable solution identified.	

Assessable Development				
Specific Outcomes		**Probable Solutions**		**Applicants Response**
	or tidal waters; (ii) not concentrating flood or tidal waters, or intensifying flow velocity on land up or downstream; (iii) not reducing the floodplain storage capacity; (f) maintains visual amenity.			
S2.	Where proposed on a lot or premises shown as Drainage Constrained Land on this overlay map - (1) Uses and other development - (a) minimise adverse impacts associated with overland flow paths, high water table and seepage; achieve legal access through adjoining lots, in the form of an easement, to the development site, where access to the lot or premises is not available, due to the road reserve being drainage constrained.	**P2.**	(1) No probable solution identified. **Note -** ■ A detailed survey and drainage investigation is necessary, in order to accurately identify drainage constraints. ■ A cadastral surveyor performs survey work, with all analysis work undertaken by a suitably qualified Registered Professional Engineer of Queensland (RPEQ). All levels should be noted as AHD levels. ■ To assist in performing the survey and drainage investigation, refer to Planning Scheme Policy 7 - Flood Prone, Storm Tide and Drainage Constrained land. Refer to Schedule 6 - Movement Network and Road Design to achieve access requirements.	

Assessable Development				
Specific Outcomes		**Probable Solutions**		**Applicants Response**
S3.	Hazardous Materials - Bulk manufacture and storage of hazardous materials takes place above the flood or storm tide level to minimise risk to public safety and the environment.	**P3.**	No probable solution identified.	**To be complied with at construction phase.**
S4.	Utility Infrastructure - (1) Infrastructure maintains its function during a flood or storm tide event. **Note -** ■ Refer to relevant zone code/s that specify the recommended flood levels for community infrastructure. The use or other development complies with any applicable criteria set out by a Floodplain Management Plan.	**P4.**	(1) Any components of infrastructure that are likely to fail to function or may result in contamination when inundated by flood or storm tide flows, such as electrical switch gear and motors, or water supply pipeline air valves are - (a) located above the flood or storm tide level; or (b) designed and constructed to exclude floodwater intrusion/infiltration; Infrastructure is designed and constructed to resist hydrostatic and hydrodynamic forces as a result of inundation by a flood or storm tide level.	**To be complied with at detailed design phase.**

Assessable Development				
Specific Outcomes		**Probable Solutions**		**Applicants Response**
	Environmental Values -			
S5.	The environmental values of land subject to flood, storm tide or drainage constraints are protected and maintained.	**P5.**	No probable solution is identified. **Note -** ▪ A detailed environmental investigation and analysis undertaken by a suitably qualified person is necessary to demonstrate no adverse impacts on environmental values. ▪ To assist in performing the environmental investigation, refer to Part 11 - ◆ Planning Scheme Policy 4 Ecological Impacts; ◆ Planning Scheme Policy 14 - Waterways, Wetlands and Moreton Bay.	**Complies.** **Proposed development to take place outside of land subject to flood and storm tide. Drainage philosophy of existing site to be maintained**

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TRAFFIC IMPACT ASSESSMENT

PROPOSED TOURIST HOTEL / ACCOMMODATION FACILITY

147 – 205 ROCKY PASSAGE ROAD, REDLAND BAY

LOT 3 ON RP153333

Prepared for

NEW LAND TOURISM PTY LTD

5 OCTOBER 2017

rytenskild Traffic Group

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1.0 INTRODUCTION

Rytenskild Traffic Group (RTG) has been engaged by New Land Tourism Pty Ltd to prepare a Traffic Impact Assessment of its proposed term hotel / accommodation facility development at Redland Bay.

This report forms part of a Development Application to be lodged with the Redland City Council. The following issues have been assessed during the study:

- Car parking supply and design;
- Access arrangements;
- Pedestrians and cyclists;
- Servicing provisions;
- Road network impact assessment.

A response to the Redland Transport Code has been appended to this report.

We note the following matters regarding access and servicing matters, raised by Council during prelodgement discussions:

Property Access:

- *The location of the existing sealed access to the property is at the crest of a hill.*
- *Rocky Passage Road is typically 60km/hr except adjacent to the subject property and access driveway which is signed at a speed of 40km/h due to the combined crest and road bend (adjacent to the property's access) and road use history.*
- *The existing property access location currently services only the existing dwelling however with the new proposal to significantly increase the number of tourists who can attend the site and the poor sight visibility available when turning into the property, a traffic safety report is required to be provided with any development application.*
- *The report must address suitability of the current access location given the proposed use and whether the access point remains the safest location to access the development or possible relocation of the development's access point further north where the road is flatter and not on a sharp bend and consider potential upgrades to road warning signage.*
- *There is very limited to no safe on street parking in Rocky Passage Road adjacent to the existing site access.*
- *Currently a security gate controls access to the property. Any future development should remain ungated as there is currently no provision outside the gate to park as a visitor or undertake 'U' turn to leave the front of the property if required.*
- *Future visitor parking on-site should be undertaken on sealed car park surfaces to control runoff.*

Servicing:

- Any proposed Tourist Accommodation facility must cater for motor coach parking and manoeuvring (and 'U' turn) within the site. Swept path drawings are required to support the proposal.
- Waste collection for the existing dwelling is currently kerb side collection from wheelie bins in Rocky Passage Road.
- Any proposed Tourist Accommodation facility must cater for collection of refuse and recycle bins from within the site. A waste management plan including bulk bin storage and collection must be provided with any development application.

2.0 SUBJECT SITE

As shown in Figure 2.1, the subject site is located on the western side of Rocky Passage Road. The site is identified as Lot 3 on RP153333 and has a total site area of 14.62 hectares.

Adjacent to the site, Rocky Passage Road has a local access function and terminates further to the south. The speed limit along Rocky Passage Road is generally 60 Km / Hr, however there is a 40 Km / Hr speed zone adjacent to the existing site access.

Images of Rocky Passage Road adjacent to site access is shown in Figure 2.2.

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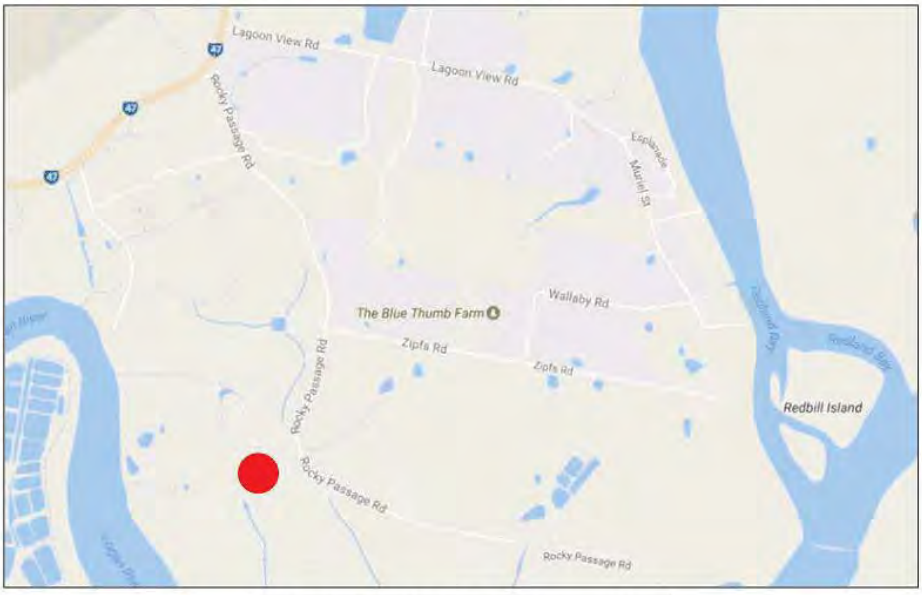

FIGURE 2.1 - LOCATION OF SUBJECT SITE

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Rocky Passage Road adjacent to existing site access facing north

Rocky Passage Road adjacent to existing site access facing south

Rocky Passage Road facing south

FIGURE 2.2 – IMAGES OF ROCKY PASSAGE ROAD

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3.0 PROPOSED PLAN OF DEVELOPMENT

The proposed plan of development is for tourist accommodation comprising of a total of 64 accommodation units distributed throughout the site. The proposed mix of accommodation types are as follows:

Apartment Villa:	16 x two – bedroom
"Banyan Tree" residence:	16 x three – bedroom
"Soul Rest" residence:	8 x four – bedroom
Apartment units:	24 x one – bedroom
Total:	**64 accommodation units**

Access is proposed to be gained via a new driveway off Rocky Passage Road, approximately 85 metres north of the existing access point. The existing access driveway is proposed to be closed.

A total of 64 car parking spaces are proposed to be provided over the site as follows:

Ground:	41 spaces
Basement:	23 spaces
Total:	**64 spaces**

The proposal provides a coach set down area which is suitable for up to three standard (12.5 metre long) buses. It is expected that a significant number of visitors will travel to the site by coach and will not arrive by private vehicle.

The applicant has advised that the facility will be operated by up to 30 full time staff over two shifts. It is estimated that equal share of international and domestic visitors will arrive to the site.

The overall site plan is shown in Figure 3.1.

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FIGURE 3.1 – SITE MASTER PLAN

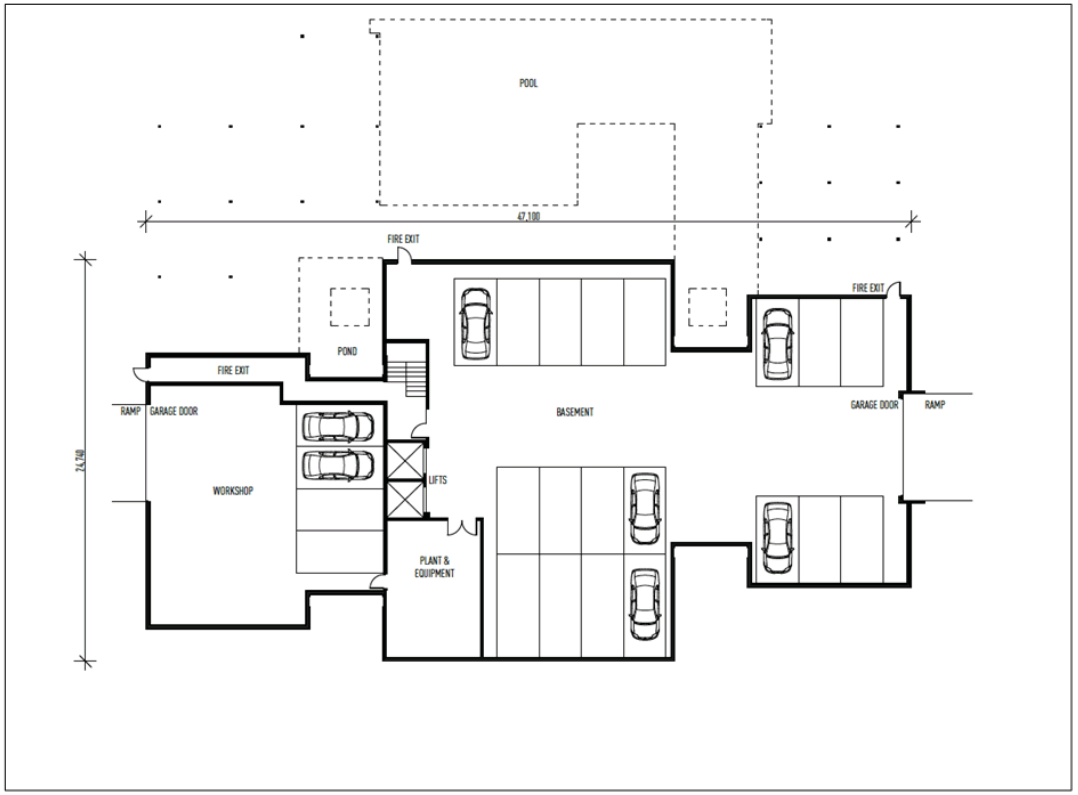

FIGURE 3.2 – CENTRAL FACILITY BASEMENT FLOOR PLAN

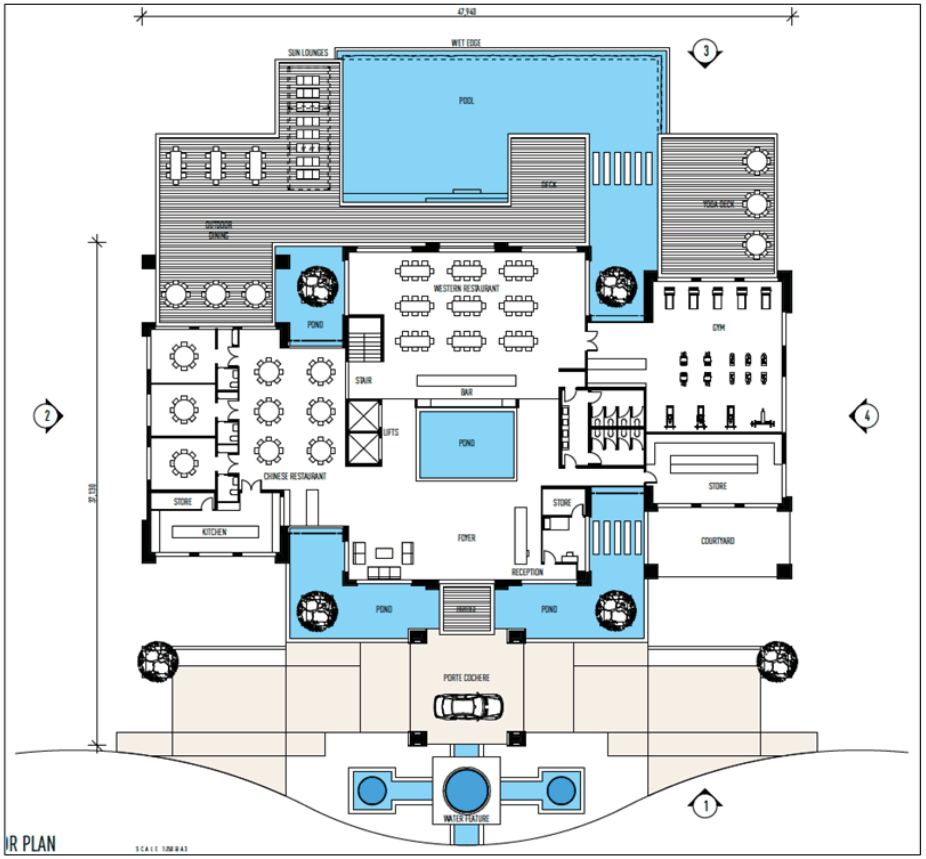

FIGURE 3.3 – CENTRAL FACILITY GROUND FLOOR PLAN

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4.0 DEVELOPMENT TRAFFIC ESTIMATES

4.1 Trip Generation

Development traffic generation rates have been sourced from the Department of Main Roads, *Road Planning and Design Manual (RPDM).* The following trip generation rate is applicable to the proposed development:

Tourist Accommodation:
Motel:
Peak Hour 0.4 trips per accommodation unit
Daily 4 trips per accommodation unit

Application of the above rate, the proposed development yields a traffic generation potential of 26 peak hour trips, as follows:

Table 4.1 - Estimated Development Traffic Generation

Component	Morning Peak Hour			Afternoon Peak Hour		
	In	Out	Total	In	Out	Total
Accommodation Units (64 units):	18	8	**26**	8	18	**26**

Peak Hour Distribution: AM – 20 /80, PM – 60 / 40

The above trip generation estimates are considered to be conservative (high), as it is expected that a significant proportion of guests will arrive by private bus or another private charter service. Furthermore, given the location of the site and the proposed type of accommodation service, it is not expected that guests will leave the site frequently. The above standard trip generation rates are based on survey data collected for standard motels located in built up areas.

4.2 Trip Distribution

For the purposes of this assessment it is assumed that all traffic generated by the development will travel to and from the north on Rocky Passage Road. The resultant estimates of peak hour traffic movements at the proposed access point are shown in Figure 4.1.

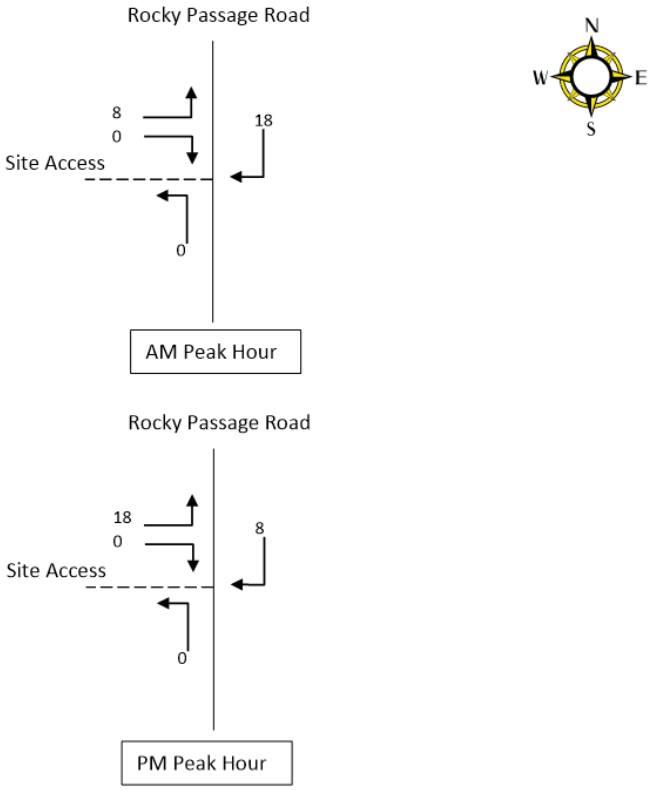

FIGURE 4.1 – PEAK HOUR TRIP DISTRIBUTION VOLUMES

As indicated above, the proposed development will generate a relatively low traffic volume. The volumes shown will not trigger the need for an upgrade of Rocky Passage Road.

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5.0 CAR PARKING

In accordance with the Redland Planning Scheme, the following car parking rate is most suitable for the proposed development:

Tourist Accommodation	1 space per room plus 1 space for the manager plus 1 space per 2 employees plus the requirement for any associated activities such as a restaurant or function room	HRV

Application of the above rate results in a car parking requirement of 80 spaces, as follows:

Table 5.1: Car Parking Requirements under Redland Planning Scheme

Component	Minimum Car Parking Spaces Required
Guests (64 units)	64 spaces
Manager and staff (30 staff)	1 + 15 spaces
Total	**80 spaces**

The above car parking rates are considered appropriate for tourist accommodation facilities which mainly depend of visitors arriving to the site by private vehicle (i.e. motel). Given the significant percentage of international visitors, the proposal provides a bus set down area suitable for three standard buses.

The applicant has advised that visitors to the site will include a breakdown of 50% international and 50% domestic patrons. it is therefore considered that a reduced guest car parking rate of 0.75 spaces per unit is more appropriate. This results in a total operational car parking requirement of 64 spaces, including 16 spaces for staff.

The proposal provides a total of 64 carparking spaces, satisfying the operational car parking demand for the proposed development.

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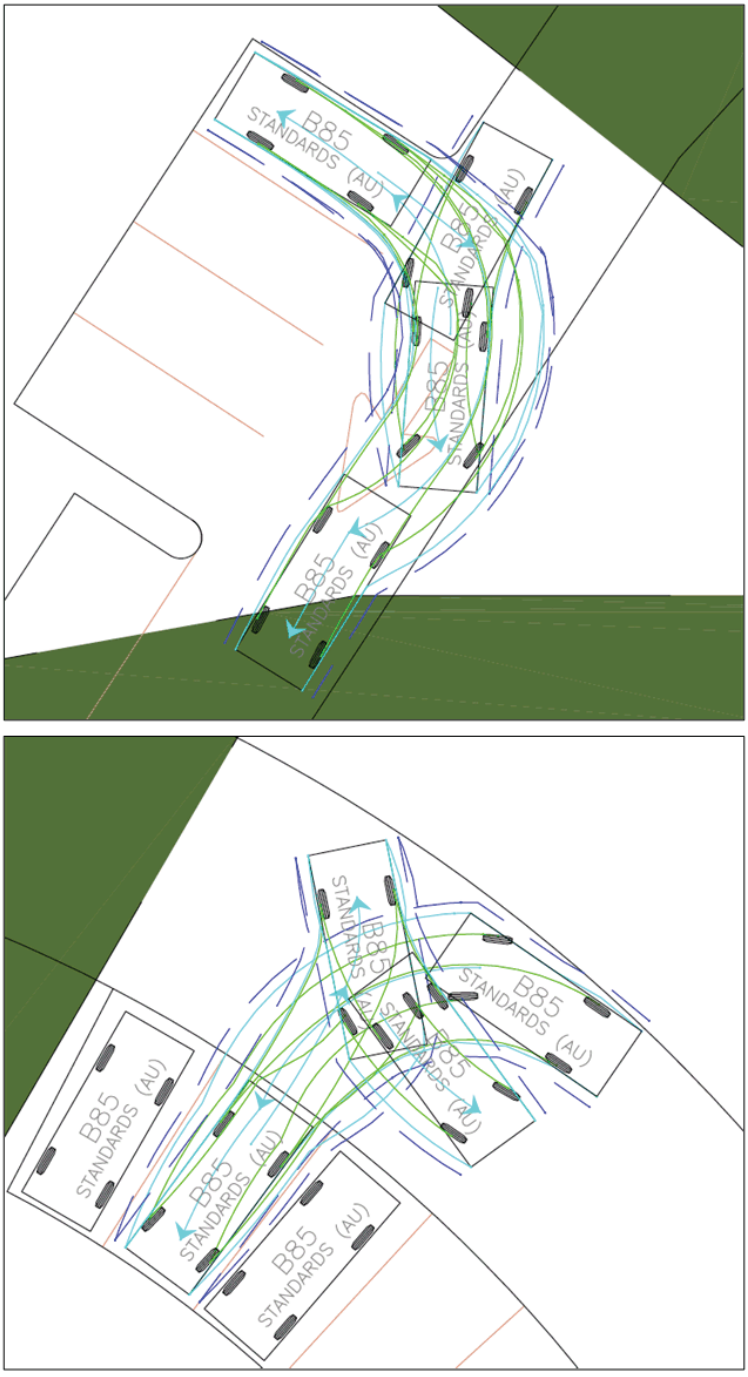

FIGURE 5.1 – 85TH PERCENTILE VEHICLE MANOEUVRING

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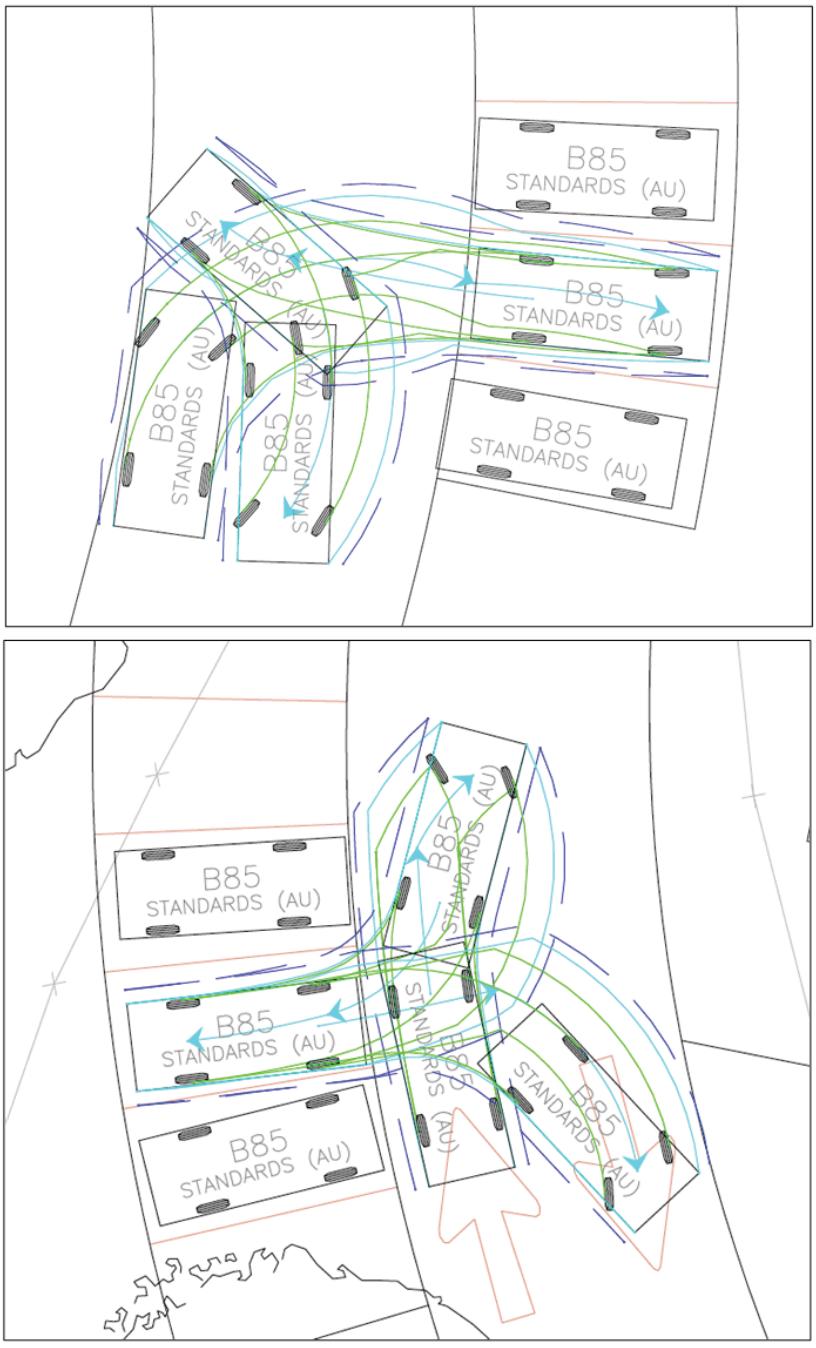

FIGURE 5.2 – 85TH PERCENTILE VEHICLE MANOEUVRING

FIGURE 5.3 – 85TH PERCENTILE VEHICLE MANOEUVRING

6.0 ACCESS ARRANGEMENTS

Access is proposed to be gained via a new driveway located approximately 85 metres north of the existing access point. The proposed access location has been determined on – site and to achieve satisfactory view lines in each direction.

Rytenskild Traffic Group carried out a survey of vehicle speeds adjacent to the site. As shown as Appendix A, Rocky Passage Road only carried in the order of 45 vehicles per day. The surveyed 85th percentile speed was 60km/hr in the southbound direction and 63km/hr in the northbound direction.

As shown in Figure 6.2, the proposed access point allows a sight distance of approximately 88 metres in each direction which complies with the surveyed 85th percentile speed of 63km/hr.

Given the very low volumes on Rocky Passage Road, it is considered that road widening is not required to allow dedicated turning facilities.

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FIGURE 6.1 – PROPOSED ACCESS ARRANGEMENTS

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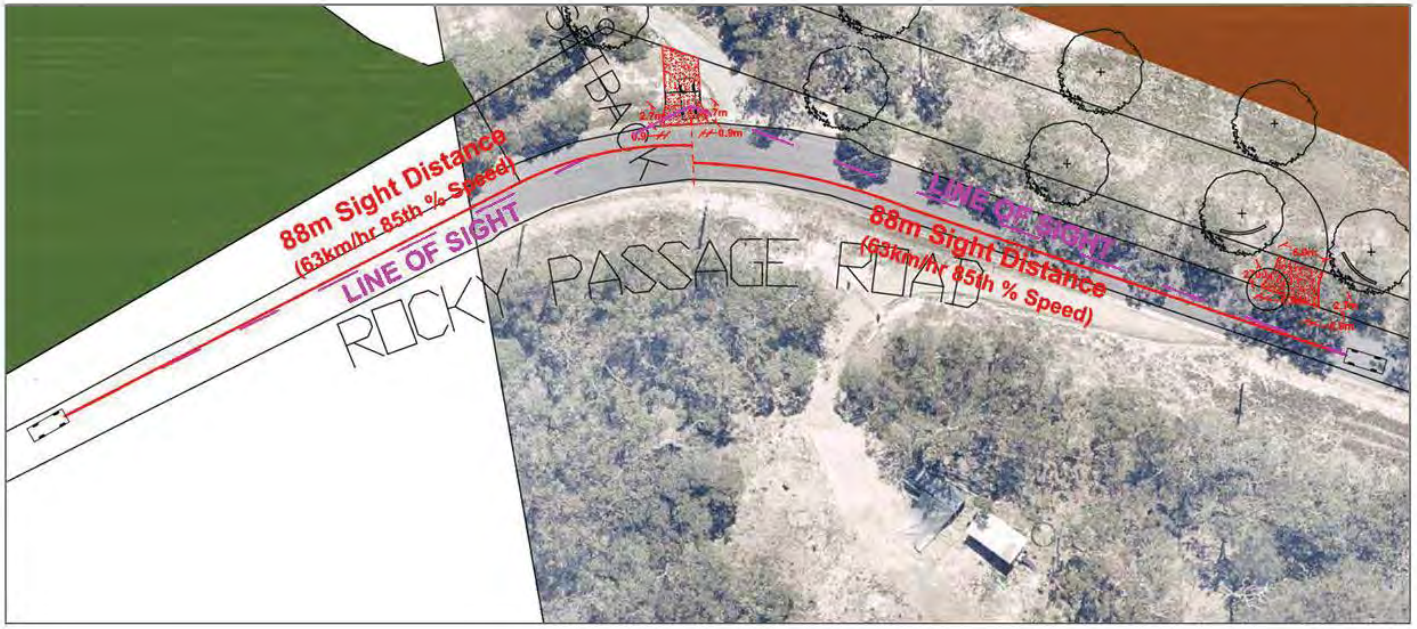

FIGURE 6.2 – SIGHT DISTANCE PROVISION

7.0 SERVICING PROVISIONS

In accordance with the Redland Planning Scheme, the proposed plan of development allows for access by Heavy Rigid Vehicles. As shown in Figure 7.1, a Heavy Rigid Vehicle can satisfactorily access and manoeuvre on – site whilst maintaining adequate clearance to obstructions at all times.

As shown in Figure 7.3 and 7.4, provision has also been made for large tourist coaches to enter and exit the site in a forward direction with adequate provision on – site for coach parking.

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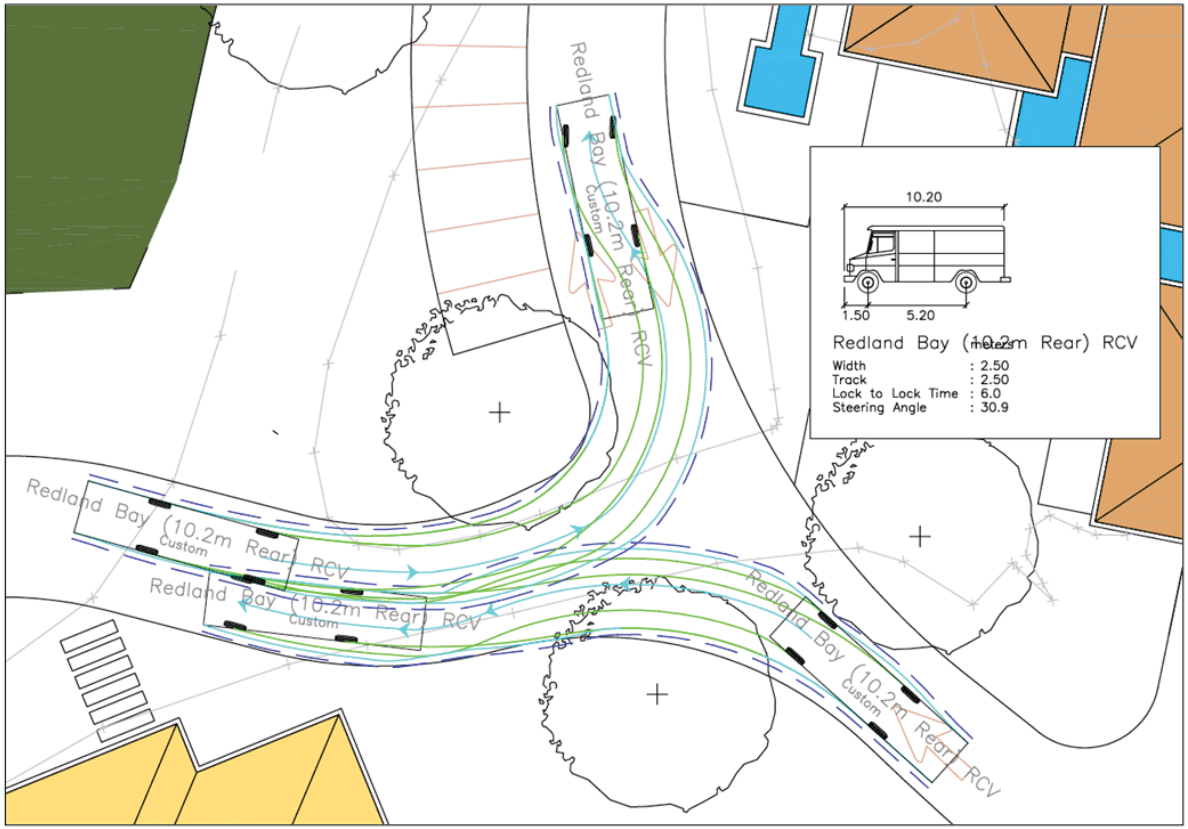

FIGURE 7.1 – RCV ON – SITE MANOEUVRING

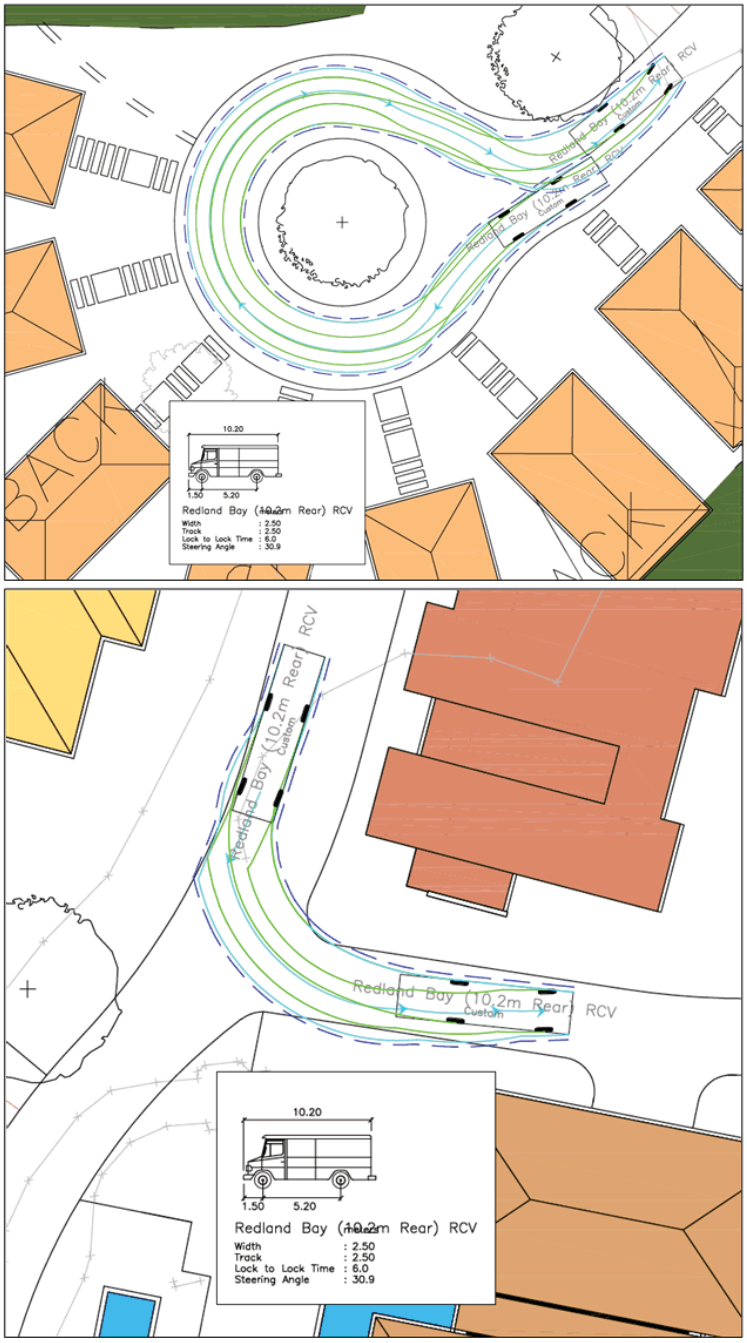

FIGURE 7.2 – RCV ON – SITE MANOEUVRING

FIGURE 7.3 – RCV ON – SITE MANOEUVRING

FIGURE 7.4 – RCV ON – SITE MANOEUVRING

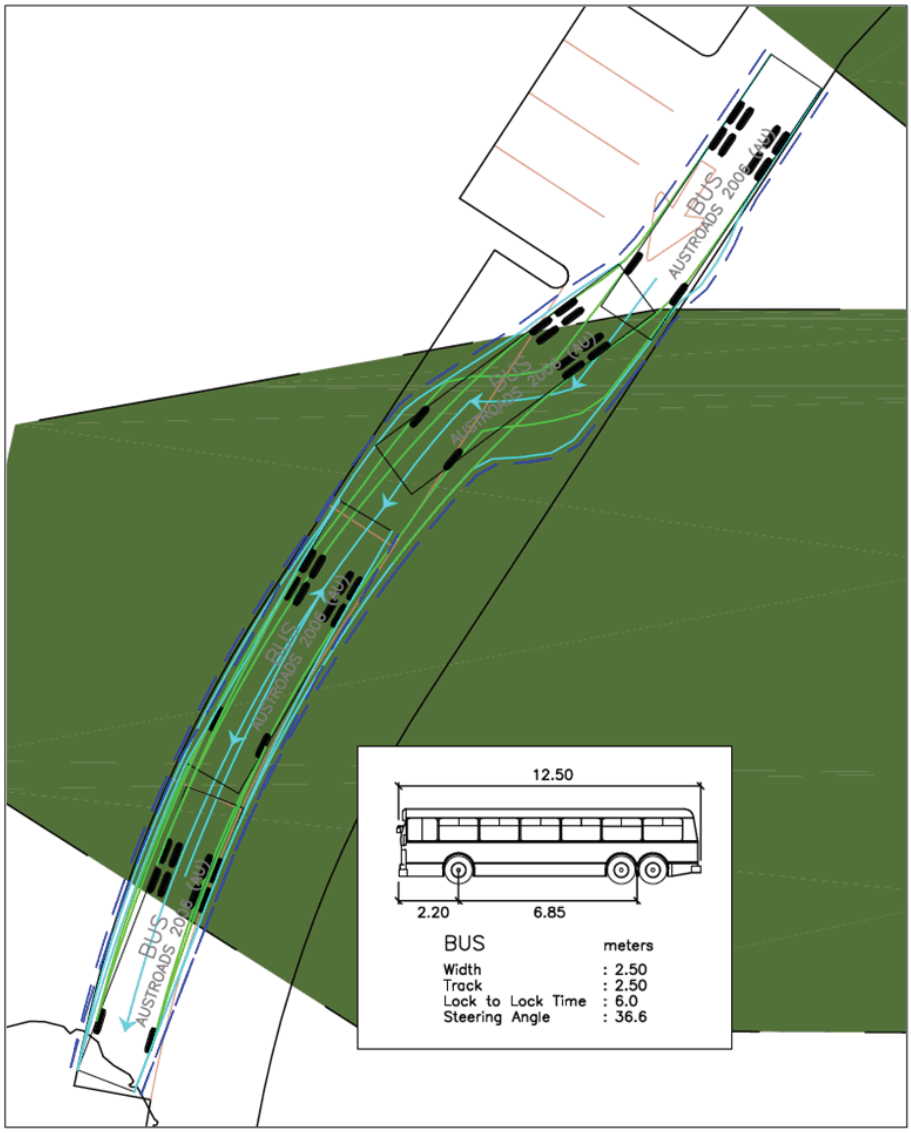

FIGURE 7.5 – 12.5 METRE BUS MANOEUVRING

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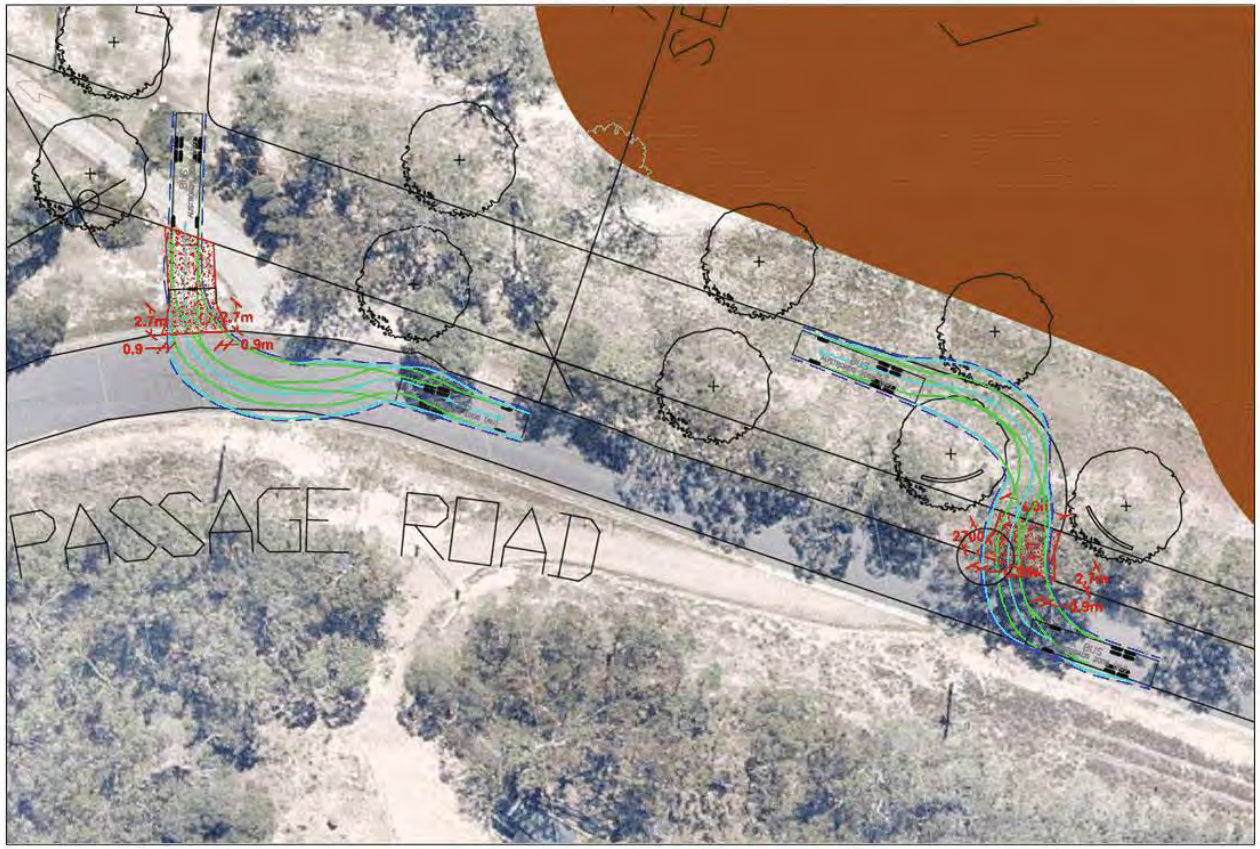

FIGURE 7.6– 12.5 METRE BUS MANOEUVRING

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FIGURE 7.7– 12.5 METRE BUS MANOEUVRING

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FIGURE 7.8– 12.5 METRE BUS MANOEUVRING

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8.0 SUMMARY OF CONCLUSIONS & RECOMMENDATIONS

- The subject site is located on the western side of Rocky Passage Road. The site is identified as Lot 3 on RP153333 and has a total site area of 14.62 hectares. Rocky Passage Road is a two lane road and has a local access function in the vicinity of the site.

- The proposed plan of development is for tourist accommodation comprising of a total of 64 accommodation units plus recreational facilities. Access is proposed to be gained via a new driveway off Rocky Passage Road, approximately 85 metres north of the existing access point. The existing access driveway is proposed to be closed.

- It is estimated that the proposal will generate in the order of 26 vehicle movements per hour, when fully occupied. This volume is considered to be relatively low and will not trigger the need for an upgrade of Rocky Passage Road.

- The proposal provides a total of 64 car parking spaces and three coach set down bays. As discussed in Section 5, such is considered to be satisfactory based on the operational characteristics of the proposed development.

- Access is proposed to be gained via a new driveway located approximately 85 metres north of the existing access point. The proposed access location has been determined on – site and to achieve satisfactory view lines in each direction.

- In accordance with the Redland Planning Scheme, the proposed plan of development allows for access by Heavy Rigid Vehicles. a Heavy Rigid Vehicle can satisfactorily access and manoeuvre on – site whilst maintaining adequate clearance to obstructions at all times. Provision has also been made for large tourist coaches to enter and exit the site in a forward direction with adequate provision on – site for coach parking.

APPENDICES

APPENDIX A – REDLAND TRANSPORT CODE RESPONSE
APPENDIX B – SURVEYED TRAFFIC VOLUMES AT ROCKY PASSAGE ROAD ADJACENT TO SITE

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Appendix A – Redland Transport Code Response

Division 1 - Access and Parking

Overall Outcomes of the Access and Parking Code

(1) The overall outcomes are the purpose of the Access and Parking Code.

(2) The overall outcome sought for the Access and Parking Code is the following -

(a) to ensure -
- (i) provision of safe and convenient vehicular access to development;
- (ii) efficiency of vehicle movements in the movement network is maintained;
- (iii) development is provided with safe and functional on-site parking that meets user needs;
- (iv) car parking areas and structures are well located and designed to be compatible with the local character;
- (v) provision of servicing and manoeuvring areas that facilitate clear and safe internal on-site vehicle movements and allow access for service vehicles.

Specific Outcomes and Probable Solutions applicable to Assessable Development

Assessable Development		
Specific Outcomes	**Probable Solutions**	**Applicant's Response**

Acc s and Parking

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Assessable Development				
Specific Outcomes		**Probable Solutions**		**Applicant's Response**
S1.	Off-Street Parking - (1) Uses and other development provide off-street vehicle parking that - (a) is clearly defined, safe and easily accessible; (b) takes into consideration - (i) the type and size of development; (ii) expected resident, employee and customer movements; (iii) the location of the use; (iv) the capacity of the existing road network to accommodate on-street parking; (v) access to public transport; (c) includes dedicated parking spaces for - (i) people with a disability; (ii) motor cycles and bicycles; (d) where on SMBI or NSI - incorporates the number of spaces determined by the local government on the basis of the location and nature of the use. **Note -** - For information on where car parking requirements may be decreased at the	**P1.**	(1) Uses and other development - (a) comply with Part 9 - Schedule 1 - Access and Parking - Table 1 - Minimum On-Site Vehicle Parking Requirements; (b) where vehicle access requirements to a lot or premises reduces the number of on-street spaces, the number of off-street parking spaces required by P1.1(a) is increased by the number of on-street spaces lost; (c) where vehicle parking requirements exceed 5 car parking spaces, provide vehicle parking facilities for persons with a disability - (i) at the rate of 1 car parking space per 50 spaces with a minimum of 1 space; (ii) at a rate in excess of P1.1 (i) where for a use that is likely to generate a higher demand for disabled parking spaces; (iii) in accordance with *Australian Standard 2890.2: 2004 - Parking Facilities - Off-Street Parking*; (d) where a shop with more than 2000m^2 gross leaseable area - provide motorcycle parking spaces at a rate determined by the local government.	COMPLIES – REFER TO SECTION 5.

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Assessable Development				
Specific Outcomes		**Probable Solutions**		**Applicant's Response**
	discretion of the local government, refer to Planning Scheme Policy 3 - Contributions and Security Bonding. Credit is given for parking spaces for an existing lawfully established use where development is for a tenancy change. Refer to explanatory note to Table 1 in Part 9 - Schedule 1 - Access and Parking.			
S2.1	On-street Parking - (1) On-street resident and visitor parking is provided according to projected needs, taking into account - (a) total parking demand; parking opportunities within the lot or premises; (c) non-residential and external parking generators; (d) road reserve and lot widths; (e) driveway locations (1) The carriageway width, verge width and driveway dimensions allow for unobstructed and efficient access to properties when a vehicle is parked on the opposite side of the road.	**P2.1**	(1) On-street parking - for dwelling houses and dual occupancies is provided within the carriageway at a rate of one parking space per dwelling unit; (b) for all other uses - no probable solution identified; (c) in addition to P2.1(1)(a) - is provided in proximity to open space areas and community facilities (1) On-street parking - (a) in culs-de-sac and in locations where lot frontages are less than 15 metres incorporates indented bays or other on-street parking provisions; (b) is enhanced by locating driveway entrances a minimum of 10 metres apart.	COMPLIES.

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Assessable Development				
Specific Outcomes		**Probable Solutions**		**Applicant's Response**
S2.1.		**S2.2**		
S3.1	Driveway Location and Design - (1) Driveways are located having regard to the following - (a) optimising public safety and convenience; (b) characteristics of the frontage road including - (i) road type; (ii) road target speed; (iii) traffic volumes; (iv) vertical and horizontal geometry; (v) queue and turn lane lengths; (c) where the site is bounded by more than one street frontage, the secondary street provides the main vehicle entry/exit point;	**P3.2**	(1) Driveway location and design - (a) complies with Part 9 - Schedule 1 - Access and Parking - Table 2 - Driveway Access Location; (b) limits the straight alignment of a driveway to a maximum of 20 metres; (c) maintains sight distances by - (i) for industrial, centre, community or other large scale uses, and for driveways to car parking areas associated with residential or tourist uses, complying with *Australian Standard 2890.1: 2004 - Parking Facilities - Off-Street Car Parking*; or (ii) for other residential uses including dual occupancies and dwelling houses -	COMPLIES.

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Assessable Development				
Specific Outcomes		**Probable Solutions**		**Applicant's Response**
	(d) location of existing utility infrastructure, such as power poles, street lighting, gully pits and the like; (e) location of existing bus stops, taxi ranks, traffic control devices; (f) pedestrian and cycle paths and crossings; (g) maintaining on-street parking; (h) ensuring adequate visibility between vehicles on a driveway and pedestrians on the verge; reconfiguration, whether clear visibility between driveways and the verge; (j) location of street trees existing in the road reserve; (2) The maximum number of driveways accessing a lot or premises is one, unless it can be shown that multiple driveways will improve ingress/egress, internal traffic operation, and pedestrian safety.		a. splaying the fence at 45 degrees; or b. reducing the fence height to 1.2 metres; or c. incorporating a mixture of these treatments; or (iii) for reconfiguration that results in a road frontage lot creating 1 or 2 internal lots - a . the road frontage lot is truncated at the junction of the front boundary and the accessway for a distance of 1 metre along the frontage and 5 metres along the accessway; b. fencing in the truncated area is no greater than 1.2 metres high to ensure clear sight lines to the verge; or (iv) for reconfiguration that results in numerous lots and includes internal lots - a. incorporating a truncation of 1 x 5 metres on each side of the accessway on access or higher order roads; b. where there are two adjoining internal lots created, a common accessway serves both lots and incorporates a truncation of 1 x 5 metres on each side of the accessway; (d) is not within the approach and exit areas of a bus stop;	

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Assessable Development				
Specific Outcomes		**Probable Solutions**		**Applicant's Response**
	(1) Access to trunk collector, sub- arterial and arterial roads is restricted to optimise the function and efficiency of those roads through - (a) ensuring that where the lot or premises adjoins a trunk collector, sub-arterial or arterial road, all vehicles are able to enter and leave the lot or premises in a forward direction; (b) restricting access to sub- arterial and arterial roads to left in/left out traffic movements through construction of a raised centre		(2) No probable solution identified. **Note -** The requirements of Main Roads must be achieved when on a state controlled road. (1) No probable solution identified. **Note -** - Refer to Part 9 - Schedule 6 - Movement Network and Road Design for further information on the function of trunk collector, sub-arterial and arterial roads. - Road widening and resultant land dedication may be necessary for the introduction of a median and/or left/right turn land for access to uses and other development.	

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Assessable Development				
Specific Outcomes		Probable Solutions		Applicant's Response
	median that limits right turns in/out of the site; ensuring median breaks do not occur on sub-arterial and arterial roads to provide ingress/egress to private property, except where - (i) the entrance/exit is a public street; (ii) the spacing of major intersections is considered satisfactory for current operations and does not prejudice plans for future traffic control; (iii) the disruption to through traffic would be greater without the median break than it would be if no break were provided; (d) providing an indented right turn lane where a median break is constructed; or (e) providing a passing lane or turn lane where the road does not have a central median and right turn access is proposed.			
	(1) Access to uses and other development in centres (a) is suitable to the location and enhances the function of the centre; (b) incorporates shared access		(1) No probable solution identified.	

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Assessable Development				
Specific Outcomes		**Probable Solutions**		**Applicant's Response**
	arrangements or amalgamations of smaller lots; (c) ensures that driveways across footpaths carrying high pedestrian and cyclist volumes are only provided where it can be demonstrated that pedestrian and cyclist priority is not threatened.			
S3.2 **S3.3**		**P3.2** **P3.3**		
S4.	Driveway Crossovers - (1) Driveways are designed for the - (a) volume of traffic generated by the use; (b) road type to which access is required; (c) existing and predicted future traffic volumes of the road to which access is sought; (d) number of car parking spaces served by the driveway; (e) size of the largest vehicle likely to	**P4.**	(1) Driveway - (a) crossovers - (i) for dual occupancies and dwelling houses comply with Standard Drawings RRSC-2, RRSC-16 or RRSC-17 depending on the verge design; or (ii) for aged persons and special needs housing, apartment buildings, mobile home parks and multiple dwellings comply with	COMPLIES.

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Assessable Development				
Specific Outcomes		**Probable Solutions**		**Applicant's Response**
	use the driveway on a regular basis; (f) number of service bays served by the driveway; (2) Driveway crossovers and their splays/kerb tapers do not protrude across adjoining property boundaries. **Note -** - Refer to Planning Scheme Policy 9 - Infrastructure Works for further information in achieving this specific outcome. - Refer to Part 7 - Division 4 - Domestic Driveway Crossover Code, for design requirements relating to driveway crossovers for a dwelling house or dual occupancy.		Standard Drawings RSC-3; or (iii) for industrial and commercial uses comply with Standard Drawings R-RSC-4; (b) crossfall is not more than - (i) 3 percent different to the slope of the kerb and channel at the location of the driveway; or (ii) where there is no kerb and channel - a. 3 percent different to the slope from the centreline of the road; or b. 10 percent where the slope from the centreline of the road is greater than 13 percent; (2) No probable solution identified.	

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Assessable Development				
Specific Outcomes		**Probable Solutions**		**Applicant's Response**
S5.	Internal Accessways for Development with a Community Management Statement - Internal accessways are incorporated into the design of large residential developments in order to provide safe and efficient internal traffic operations, especially where service and waste collection vehicles are required to access the site.	**P5.**	Uses and other development comply with Part 9 - Schedule 1 - Access and Parking - Table 3 - Internal Accessways for Development with a Community Management Statement	COMPLIES.
S6.	Queuing - (1) Driveways provide for queuing in order that internal and external traffic operations are not obstructed through ensuring that - (a) defined on-site queue areas do not conflict with internal intersections or manoeuvring areas; (b) where security gates are proposed at the entrance to the development - (i) the required queuing length is provided between the property boundary and the gate system; (ii) sufficient space is provided in front of the security gates to enable a car to manoeuvre and exit the site in a forward direction.	**P6.**	(1) Uses and other development - (a) comply with the queue requirements shown in Part 9 - Schedule 1 - Access and Parking - Table 4 - Minimum On-site Queuing Requirements in the absence of more reliable site specific data; (b) incorporate a queuing area with the following dimensions - (i) on-site single queuing lanes are a minimum of 3.6 metres wide with at least 300mm horizontal clearance provided on each side of the queuing lane; (ii) an adjoining breakdown lane/strip 2 metres wide is provided on one side of a single queuing lane; (iii) multiple queuing lanes are a	COMPLIES.

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Assessable Development				
Specific Outcomes		**Probable Solutions**		**Applicant's Response**
	Note - - Security gates are only considered appropriate in relation to access to secure car parking areas and some industrial uses. - Entry queues are of primary importance since they have the potential to most readily obstruct external traffic operations, but exit queues can also disrupt internal circulating traffic thereby blocking entry lanes. - Refer to Part 6 - Division 9 - Drive Through Restaurants Code for further requirements regarding the location and design of drive through restaurants.		minimum width of 3 metres each with at least	
S7.1	Vehicle Parking Areas and Structures - (1) Vehicle parking areas and structures are designed to - (a) provide a clear internal movement hierarchy; (b) discourage high vehicular speed and short-cutting; (c) be clearly distinguishable from pedestrian entries and paths; (d) be easily negotiated by vehicles and pedestrians, including persons with a disability; (e) ensure vehicles do not reverse	**P7.1**	(1) The layout of car parking areas and structures - (a) complies with the internal movement system as illustrated in Diagram 1 - Internal Movements in Car Parking Areas and includes - (i) circulation road; (ii) circulation aisle; (iii) parking aisle; (iv) parking spaces; (b) ensures that where a service area is accessed through the car parking area	COMPLIES

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Assessable Development				
Specific Outcomes		Probable Solutions		Applicant's Response
	into areas of high pedestrian activity; (f) ensure traffic congestion does not adversely affect the external traffic system; (g) optimise safety and security of users.		or structure, the service aisle is directly accessed from the circulation aisle and not from other elements of the internal movement system; (c) incorporates separators between parking rows which include planted landscaping; (d) ensures that where wheel stops are used - (i) they are located 500mm from the closed end of the parking space; (ii) have no obstructions higher than 100mm within the 500mm overhang area; (iii) the area of the overhang does not form part of the landscaped area; avoids dead end aisles; (e) avoids cross intersections, especially between car parking and service areas; (f) orientates access aisles such that they intersect with circulation roads and circulation aisles at angles greater than 75 degrees; (h) orientates parking aisles at a right angle to the main building frontage - refer to Diagram 2 - Parking Bay Alignment; **Note -** Car parking at right angles to the building frontage allows greater vision of pedestrians	

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Assessable Development				
Specific Outcomes		Probable Solutions		Applicant's Response
			and other vehicles when entering and exiting parking aisles and minimises the necessity for pedestrians to move across multiple parking aisles. (h) incorporates circulation roads which comply with Part 9 - Schedule 1 - Access and Parking - Table 5 - Minimum Circulation Road Width in Car Parking Areas; (i) maintains gradients in car parking areas and structures which - (i) comply with Part 9 - Schedule 1 - Access and Parking - Table 6 - Maximum Longitudinal Grades in Car Parking Areas; (ii) are above the minimum gradient which is defined by drainage requirements and depends on the type of surface and its roughness; **Note -** Refer to *Australian Standard 2890.1: 2004 - Parking Facilities - Off Street Car Parking* for further information regarding minimum gradient in car parking areas. (h) incorporates car parking spaces that - (i) comply with Part 9 - Schedule 1 - Access and Parking - Table 7 - Minimum Car Space Widths;	

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Assessable Development				
Specific Outcomes		**Probable Solutions**		**Applicant's Response**
			(ii) are 5.4 metres in length, except for small car spaces and parallel parking spaces; (iii) if parallel parking spaces, are a minimum of 6 metres in length, except where - a. the space is at the open end of the row of spaces - a minimum of 5.4 metres; or b. the space is closed by a kerb at one end - a minimum of 6.3 metres; or c. enclosed by a kerb at both ends - a minimum of 6.6 metres; (iv) where the side boundary of the car parking space is adjacent to an obstruction greater than 150mm high that restricts doors from opening, 300mm is added to the width of the space outlined in Part 9 - Schedule 1 - Access and Parking - Table 7 - Minimum Car Space Widths; (v) do not have a gradient across them that exceeds 5 percent (1 in 20).	
			(1) At locations where pedestrian and vehicle conflicts are likely to occur - (a) sight distances of at least 2.5 seconds of travel time at the designated speed	

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Assessable Development				
Specific Outcomes		Probable Solutions		Applicant's Response
			are provided; (b) splayed corners on structures are incorporated; (c) landscaping is designed to allow clear views; (d) sign placement ensures that views are not impeded;	
	(1) Parking areas are designed to - (a) provide a progressive reduction in speed between the external road and internal parking spaces; (b) ensure lower speeds near areas of high pedestrian activity through the use of appropriate road geometry or devices designed to limit speed; (c) maintain sight distances which are appropriate for the likely operating speeds in all areas of potential pedestrian/vehicle and vehicle/vehicle conflict; (2) A clearly defined pedestrian network is provided that - (a) is located in areas where people will choose to walk; (b) ensures that pedestrian movement through car parking areas or structures are along aisles rather than across them; (3) Provision is made for pedestrian and vehicular queues at conflict points; (4) Parking areas are lit to provide security for night-time users.		(2) In large open car parks with greater than 200 car parking spaces, a pedestrian path between parking spaces is provided on every second aisle; (3) No probable solution identified; (4) Lighting is provided in accordance with *Australian Standard 1158.1:1997 - Road Lighting - Vehicular Traffic (Category V) Lighting - Performance Installation and Design Requirements*. (1) No probable solution identified; (2) No probable solution identified.	

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Assessable Development				
Specific Outcomes		Probable Solutions		Applicant's Response
	(1) Vehicle and pedestrian exits and main routes are clearly sign- posted to allow casual users to easily find their way around; (2) Signage - (a) being directional, regulatory, warning or informative and incorporating approved pavement markings, is erected on-site to - (i) control traffic movement and driver behaviour; (ii) warn of any potential safety hazards; (b) is provided on-site to clearly indicate the existence and location of access points to car parking areas where - (i) parking areas are located at the rear of the development; or (ii) access to the car parking area is not from the main road frontage; or (iii) there are multiple access points serving different car parking areas; or (iv) visitor parking is provided for housing and is not visible from the frontage road or access driveway; or (v) access/egress is via one- way driveways; (c) where development is expected to		(1) No probable solution identified.	

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Assessable Development				
Specific Outcomes		Probable Solutions		Applicant's Response
	generate vehicular movements during hours of darkness incorporates self-illuminated and/or reflector signs. (1) Car parking areas are landscaped to - (a) provide shade; (b) maximise infiltration of stormwater run-off; (c) define parking areas; (d) reduce direct visibility of car parking areas from external viewpoints; (e) soften views of hardstand areas. (1) Car parking structures are designed and located so as not to dominate the streetscape or undermine the character and visual amenity of the area and - (a) ground floor car parking structures are located behind active frontages and people orientated facilities; (b) above ground car parking structures are - (i) located above or at the rear of retail or commercial uses; (ii) designed, finished and landscaped to complement the building design; (iii) designed to avoid ramps or		(1) Car parking structures - (a) have a maximum frontage to a public street, whichever is the lesser of - (i) 20 percent of the building frontage inclusive of driveways; or (ii) 10 metres; or (b) where below ground, do not extend more than 1 metre above the ground level; (c) maintain a minimum clearance height between the floor and any overhead obstructions of 2.5 metres; (b) maintain a minimum height clearance of 2.5 metres extending from the open end of all disabled car parking spaces to a point not less than 2.2 metres from the front of the parking space.	

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Assessable Development				
Specific Outcomes		**Probable Solutions**		**Applicant's Response**
	strong horizontal and vertical features dominating the building façade; (c) openings in the car parking structure facade optimise internal surveillance while concealing parking operations as much as possible; (d) stairwells and elevators are clearly visible and potential entrapment areas are eliminated.			
S7.2		**P7.2**		
		P7.3		
S7.3				
S7.4		**P7.4**		

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Assessable Development				
Specific Outcomes		**Probable Solutions**		**Applicant's Response**
S7.5		**P7.5**		
S8.	Servicing and Manoeuvring Areas - (1) Servicing and manoeuvring areas - (a) provide the space required for loading, unloading, waste collection, manoeuvring and queuing; (b) are located to eliminate on- street loading; (c) do not detract from the streetscape or visual amenity of the area; (d) are separated from areas of pedestrian movement within the premises or on adjoining premises; or (e) where requiring the sharing of internal roads or aisles by service vehicles and passenger vehicles are designed to cater for the queuing requirements of both; (f) design and site layout -	**P8.**	(1) Servicing and manoeuvring areas - (a) comply with Part 9 - Schedule 1 - Access and Parking - Table 8 - Design Dimensions for Service Aisles and Loading/Unloading Bays; (b) have a minimum vertical clearance of 4.5 metres for waste collection vehicle manoeuvring for 7.1 metres for bin lifting; or (c) where the minimum vertical clearance is less than 4.5 metres for manoeuvring or 7.1 metres for bin lifting, a letter from the proposed waste collection contractor is provided giving full details of the proposed system; (d) where disposal of industrial or commercial liquid waste by discharge to road tankers is required the road tanker is able to park wholly on-site and	COMPLIES

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Assessable Development				
Specific Outcomes		Probable Solutions		Applicant's Response
	(i) achieves adequate provision for on-site servicing that is clearly defined, safe and easily accessible; (ii) provides for the vehicle dimensions and turning paths for the design vehicles expected to use the lot or premises; (iii) enables vehicles to manoeuvre into a service bay when all other bays are occupied; (iv) are configured to allow the design vehicle to dock or park in a service bay with only one reverse movement; (v) where service vehicles are required to reverse into a loading dock, maintains the truck driver on the side of the turning movement; (vi) maintains clear access to waste containers for collection vehicles; (vii) ensures that service vehicles entering a site do not queue across footpaths or onto external roads; (viii) prevents any manoeuvring occurring within the defined queuing area; (i) contains any potential adverse impacts of servicing within the lot		comply with all other requirements of this probable solution; (e) do not incorporate changes of surface gradients which exceed 5 percent (1 in 20); or (f) where the surface gradient exceeds 5 percent (1 in 20), a grade transition is provided to prevent scraping of vehicles' undersides or structural damage to towing connections. **Note -** - Where the volume of service vehicle traffic is significant, servicing and manoeuvring areas are larger than the minimum in order to promote easier and more efficient vehicle movements. - Refer to Planning Scheme Policy 9 - Infrastructure Works for turning and manoeuvring templates. - Where evidence from the waste collection contractor indicates collection will occur outside normal service/delivery or business times, it may be permissible to allow waste collection vehicles to utilise service bays or parking spaces for access.	

Assessable Development				
Specific Outcomes		Probable Solutions		Applicant's Response
	or premises.			

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Appendix B – Surveyed Traffic Volumes at Rocky Passage Road Adjacent to Site

MetroCount Traffic Executive
Weekly Vehicle Counts

WeeklyVehicle-1104 -- English (ENA)

Datasets:
Site: **[Rocky Passage Road] Rocky Passage Road, near no 148**
Direction: 7 - North bound A>B, South bound B>A. **Lane:** 0
Survey Duration: 23:08 Sunday, 26 February 2017 => 17:12 Friday, 3 March 2017
Zone:
File: Rocky Passage Road 0 2017-03-03 1712.EC0 (Plus)
Identifier: W616JE68 MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default (v3.21 - 15275)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:
Filter time: **23:08 Sunday, 26 February 2017 => 17:12 Friday, 3 March 2017**
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range: 10 - 160 km/h.
Direction: North (bound)
Separation: All - (Headway)
Name: Default Profile
Scheme: Vehicle classification (AustRoads94)
Units: Metric (meter, kilometer, m/s, km/h, kg, tonne)
In profile: Vehicles = 158 / 319 (49.53%)

Weekly Vehicle Counts

WeeklyVehicle-1104
Site: Rocky Passage Road.0.0NS
Description: **Rocky Passage Road, near no 148**
Filter time: **23:08 Sunday, 26 February 2017 => 17:12 Friday, 3 March 2017**
Scheme: Vehicle classification (AustRoads94)
Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12) Dir(N) Sp(10,160) Headway(>0)

	Mon 27 Feb	Tue 28 Feb	Wed 01 Mar	Thu 02 Mar	Fri 03 Mar	Sat 04 Mar	Sun 05 Mar	Averages 1 - 5	1 - 7
Hour									
0000-0100	0	0	0	0	0	*	*	0.0	0.0
0100-0200	0	0	0	0	0	*	*	0.0	0.0
0200-0300	0	0	0	0	0	*	*	0.0	0.0
0300-0400	0	0	0	0	0	*	*	0.0	0.0
0400-0500	1	2	0	0	0	*	*	0.6	0.6
0500-0600	1	1	2	3	0	*	*	1.4	1.4
0600-0700	2	0	1	0	0	*	*	0.6	0.6
0700-0800	2	4	**5<**	**5<**	0	*	*	**3.2<**	**3.2<**
0800-0900	3	4	3	3	0	*	*	2.6	2.6
0900-1000	**3<**	**5<**	2	3	0	*	*	2.6	2.6
1000-1100	1	0	4	2	0	*	*	1.4	1.4
1100-1200	2	2	2	4	**0<**	*	*	2.0	2.0
1200-1300	3	5	4	**6<**	0	*	*	**3.6<**	**3.6<**
1300-1400	3	4	2	4	0	*	*	2.6	2.6
1400-1500	3	4	2	4	0	*	*	2.6	2.6
1500-1600	3	1	5	1	0	*	*	2.0	2.0
1600-1700	**7<**	1	1	0	0	*	*	1.8	1.8
1700-1800	3	**7<**	**6<**	0	0	*	*	3.2	3.2
1800-1900	2	1	1	0	*	*	*	1.0	1.0
1900-2000	0	1	0	0	*	*	*	0.3	0.3
2000-2100	1	0	0	0	*	*	*	0.3	0.3
2100-2200	0	1	0	0	*	*	*	0.3	0.3
2200-2300	0	0	0	0	*	*	*	0.0	0.0
2300-2400	0	0	0	0	*	*	*	0.0	0.0
Totals									
0700-1900	35	38	37	32	*	*	*	28.6	28.6
0600-2200	38	40	38	32	*	*	*	30.0	30.0
0600-0000	38	40	38	32	*	*	*	30.0	30.0
0000-0000	40	43	40	35	*	*	*	32.0	32.0
AM Peak	0900	0900	0700	0700	1100	*	*		
	3	5	5	5	0	*	*		
PM Peak	1600	1700	1700	1200	*	*	*		
	7	7	6	6	*	*	*		

* - No data.

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MetroCount Traffic Executive
Speed Statistics

SpeedStat-1106 -- English (ENA)

Datasets:

Site:	**[Rocky Passage Road] Rocky Passage Road, near no 148**
Direction:	7 - North bound A>B, South bound B>A. **Lane:** 0
Survey Duration:	23:08 Sunday, 26 February 2017 => 17:12 Friday, 3 March 2017
Zone:	
File:	Rocky Passage Road 0 2017-03-03 1712.EC0 (Plus)
Identifier:	W616JE68 MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm:	Factory default (v3.21 - 15275)
Data type:	Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time:	**23:08 Sunday, 26 February 2017 => 17:12 Friday, 3 March 2017**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range:	10 - 160 km/h.
Direction:	North (bound)
Separation:	All - (Headway)
Name:	Default Profile
Scheme:	Vehicle classification (AustRoads94)
Units:	Metric (meter, kilometer, m/s, km/h, kg, tonne)
In profile:	Vehicles = 158 / 319 (49.53%)

Speed Statistics

SpeedStat-1106

Site:	Rocky Passage Road.0.0NS
Description:	**Rocky Passage Road, near no 148**
Filter time:	**23:08 Sunday, 26 February 2017 => 17:12 Friday, 3 March 2017**
Scheme:	Vehicle classification (AustRoads94)
Filter:	Cls(1 2 3 4 5 6 7 8 9 10 11 12) Dir(N) Sp(10,160) Headway(>0)

Vehicles = 158
Posted speed limit = 60 km/h, Exceeding = 45 (28.48%), Mean Exceeding = 64.35 km/h
Maximum = 78.2 km/h, **Minimum** = 20.2 km/h, **Mean** = 55.3 km/h
85% Speed = 63.0 km/h, **95% Speed** = 66.6 km/h, **Median** = 55.4 km/h
20 km/h Pace = 47 - 67, **Number in Pace** = 133 (84.18%)
Variance = 68.96, **Standard Deviation** = 8.30 km/h

Speed Bins (Partial days)

Speed	Bin		Below		Above		Energy	vMult	n * vMult
0 - 10	0	0.0%	0	0.0%	158	100.0%	0.00	0.00	0.00
10 - 20	0	0.0%	0	0.0%	158	100.0%	0.00	0.00	0.00
20 - 30	2	1.3%	2	1.3%	156	98.7%	0.00	0.00	0.00
30 - 40	3	1.9%	5	3.2%	153	96.8%	0.00	0.00	0.00
40 - 50	30	19.0%	35	22.2%	123	77.8%	0.00	0.00	0.00
50 - 60	78	49.4%	113	71.5%	45	28.5%	0.00	0.00	0.00
60 - 70	40	25.3%	153	96.8%	5	3.2%	0.00	0.00	0.00
70 - 80	5	3.2%	158	100.0%	0	0.0%	0.00	0.00	0.00
80 - 90	0	0.0%	158	100.0%	0	0.0%	0.00	0.00	0.00
90 - 100	0	0.0%	158	100.0%	0	0.0%	0.00	0.00	0.00
100 - 110	0	0.0%	158	100.0%	0	0.0%	0.00	0.00	0.00
110 - 120	0	0.0%	158	100.0%	0	0.0%	0.00	0.00	0.00
120 - 130	0	0.0%	158	100.0%	0	0.0%	0.00	0.00	0.00
130 - 140	0	0.0%	158	100.0%	0	0.0%	0.00	0.00	0.00
140 - 150	0	0.0%	158	100.0%	0	0.0%	0.00	0.00	0.00
150 - 160	0	0.0%	158	100.0%	0	0.0%	0.00	0.00	0.00
160 - 170	0	0.0%	158	100.0%	0	0.0%	0.00	0.00	0.00
170 - 180	0	0.0%	158	100.0%	0	0.0%	0.00	0.00	0.00
180 - 190	0	0.0%	158	100.0%	0	0.0%	0.00	0.00	0.00
190 - 200	0	0.0%	158	100.0%	0	0.0%	0.00	0.00	0.00

Total Speed Rating = 0.00
Total Moving Energy (Estimated) = 0.00

Speed limit fields (Partial days)

	Limit	Below		Above	
0	60 (PSL)	113	71.5%	45	28.5%

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MetroCount Traffic Executive
Weekly Vehicle Counts

WeeklyVehicle-1105 -- English (ENA)

Datasets:

Site:	**[Rocky Passage Road] Rocky Passage Road, near no 148**
Direction:	7 - North bound A>B, South bound B>A. **Lane:** 0
Survey Duration:	23:08 Sunday, 26 February 2017 => 17:12 Friday, 3 March 2017
Zone:	
File:	Rocky Passage Road 0 2017-03-03 1712.EC0 (Plus)
Identifier:	W616JE68 MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm:	Factory default (v3.21 - 15275)
Data type:	Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time:	**23:08 Sunday, 26 February 2017 => 17:12 Friday, 3 March 2017**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range:	10 - 160 km/h.
Direction:	South (bound)
Separation:	All - (Headway)
Name:	Default Profile
Scheme:	Vehicle classification (AustRoads94)
Units:	Metric (meter, kilometer, m/s, km/h, kg, tonne)
In profile:	Vehicles = 160 / 319 (50.16%)

Weekly Vehicle Counts

WeeklyVehicle-1105

Site:	Rocky Passage Road.0.0NS
Description:	**Rocky Passage Road, near no 148**
Filter time:	**23:08 Sunday, 26 February 2017 => 17:12 Friday, 3 March 2017**
Scheme:	Vehicle classification (AustRoads94)
Filter:	Cls(1 2 3 4 5 6 7 8 9 10 11 12) Dir(S) Sp(10,160) Headway(>0)

	Mon 27 Feb	Tue 28 Feb	Wed 01 Mar	Thu 02 Mar	Fri 03 Mar	Sat 04 Mar	Sun 05 Mar	Averages 1 - 5	Averages 1 - 7
Hour									
0000-0100	0	0	0	0	0	*	*	0.0	0.0
0100-0200	0	0	0	0	0	*	*	0.0	0.0
0200-0300	0	0	0	0	0	*	*	0.0	0.0
0300-0400	0	0	0	0	0	*	*	0.0	0.0
0400-0500	0	0	0	0	0	*	*	0.0	0.0
0500-0600	1	0	0	0	0	*	*	0.2	0.2
0600-0700	0	0	2	1	0	*	*	0.6	0.6
0700-0800	1	1	1	3	0	*	*	1.2	1.2
0800-0900	2	**4<**	1	**6<**	0	*	*	2.6	2.6
0900-1000	1	3	2	2	0	*	*	1.6	1.6
1000-1100	**5<**	3	**6<**	2	0	*	*	**3.2<**	**3.2<**
1100-1200	1	3	4	3	**0<**	*	*	2.2	2.2
1200-1300	4	4	5	**7<**	0	*	*	**4.0<**	**4.0<**
1300-1400	5	4	1	4	0	*	*	2.8	2.8
1400-1500	5	1	3	4	0	*	*	2.6	2.6
1500-1600	3	2	4	2	0	*	*	2.2	2.2
1600-1700	3	**5<**	**5<**	0	0	*	*	2.6	2.6
1700-1800	**6<**	3	1	0	0	*	*	2.0	2.0
1800-1900	3	4	1	0	*	*	*	2.0	2.0
1900-2000	0	0	4	0	*	*	*	1.0	1.0
2000-2100	3	1	1	0	*	*	*	1.3	1.3
2100-2200	0	1	0	0	*	*	*	0.3	0.3
2200-2300	0	2	0	0	*	*	*	0.5	0.5
2300-2400	0	0	1	0	*	*	*	0.3	0.3
Totals									
0700-1900	39	37	34	33	*	*	*	29.0	29.0
0600-2200	42	39	41	34	*	*	*	32.1	32.1
0600-0000	42	41	42	34	*	*	*	32.9	32.9
0000-0000	43	41	42	34	*	*	*	33.0	33.0
AM Peak	1000	0800	1000	0800	1100	*	*		
	5	4	6	6	0	*	*		
PM Peak	1700	1600	1600	1200	*	*	*		
	6	5	5	7	*	*	*		

* - No data.

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MetroCount Traffic Executive
Speed Statistics

SpeedStat-1107 -- English (ENA)

Datasets:

Site:	**[Rocky Passage Road] Rocky Passage Road, near no 148**
Direction:	7 - North bound A>B, South bound B>A. **Lane:** 0
Survey Duration:	23:08 Sunday, 26 February 2017 => 17:12 Friday, 3 March 2017
Zone:	
File:	Rocky Passage Road 0 2017-03-03 1712.EC0 (Plus)
Identifier:	W616JE68 MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm:	Factory default (v3.21 - 15275)
Data type:	Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time:	**23:08 Sunday, 26 February 2017 => 17:12 Friday, 3 March 2017**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range:	10 - 160 km/h.
Direction:	South (bound)
Separation:	All - (Headway)
Name:	Default Profile
Scheme:	Vehicle classification (AustRoads94)
Units:	Metric (meter, kilometer, m/s, km/h, kg, tonne)
In profile:	Vehicles = 160 / 319 (50.16%)

Speed Statistics

SpeedStat-1107

Site:	Rocky Passage Road.0.0NS
Description:	**Rocky Passage Road, near no 148**
Filter time:	**23:08 Sunday, 26 February 2017 => 17:12 Friday, 3 March 2017**
Scheme:	Vehicle classification (AustRoads94)
Filter:	Cls(1 2 3 4 5 6 7 8 9 10 11 12) Dir(S) Sp(10,160) Headway(>0)

Vehicles = 160
Posted speed limit = 60 km/h, Exceeding = 27 (16.88%), Mean Exceeding = 64.79 km/h
Maximum = 73.2 km/h, **Minimum** = 15.5 km/h, **Mean** = 50.3 km/h
85% Speed = 60.1 km/h, **95% Speed** = 66.6 km/h, **Median** = 50.4 km/h
20 km/h Pace = 42 - 62, **Number in Pace** = 112 (70.00%)
Variance = 105.35, **Standard Deviation** = 10.26 km/h

Speed Bins (Partial days)

Speed	Bin		Below		Above		Energy	vMult	n * vMult
0 - 10	0	0.0%	0	0.0%	160	100.0%	0.00	0.00	0.00
10 - 20	1	0.6%	1	0.6%	159	99.4%	0.00	0.00	0.00
20 - 30	4	2.5%	5	3.1%	155	96.9%	0.00	0.00	0.00
30 - 40	22	13.8%	27	16.9%	133	83.1%	0.00	0.00	0.00
40 - 50	50	31.3%	77	48.1%	83	51.9%	0.00	0.00	0.00
50 - 60	56	35.0%	133	83.1%	27	16.9%	0.00	0.00	0.00
60 - 70	24	15.0%	157	98.1%	3	1.9%	0.00	0.00	0.00
70 - 80	3	1.9%	160	100.0%	0	0.0%	0.00	0.00	0.00
80 - 90	0	0.0%	160	100.0%	0	0.0%	0.00	0.00	0.00
90 - 100	0	0.0%	160	100.0%	0	0.0%	0.00	0.00	0.00
100 - 110	0	0.0%	160	100.0%	0	0.0%	0.00	0.00	0.00
110 - 120	0	0.0%	160	100.0%	0	0.0%	0.00	0.00	0.00
120 - 130	0	0.0%	160	100.0%	0	0.0%	0.00	0.00	0.00
130 - 140	0	0.0%	160	100.0%	0	0.0%	0.00	0.00	0.00
140 - 150	0	0.0%	160	100.0%	0	0.0%	0.00	0.00	0.00
150 - 160	0	0.0%	160	100.0%	0	0.0%	0.00	0.00	0.00
160 - 170	0	0.0%	160	100.0%	0	0.0%	0.00	0.00	0.00
170 - 180	0	0.0%	160	100.0%	0	0.0%	0.00	0.00	0.00
180 - 190	0	0.0%	160	100.0%	0	0.0%	0.00	0.00	0.00
190 - 200	0	0.0%	160	100.0%	0	0.0%	0.00	0.00	0.00

Total Speed Rating = 0.00
Total Moving Energy (Estimated) = 0.00

Speed limit fields (Partial days)

	Limit	Below		Above	
0	60 (PSL)	133	83.1%	27	16.9%

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MetroCount Traffic Executive
Weekly Vehicle Counts

WeeklyVehicle-1103 -- English (ENA)

Datasets:

Site:	**[Rocky Passage Road] Rocky Passage Road, near no 148**
Direction:	7 - North bound A>B, South bound B>A. **Lane:** 0
Survey Duration:	23:08 Sunday, 26 February 2017 => 17:12 Friday, 3 March 2017
Zone:	
File:	Rocky Passage Road 0 2017-03-03 1712.EC0 (Plus)
Identifier:	W616JE68 MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm:	Factory default (v3.21 - 15275)
Data type:	Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time:	**23:08 Sunday, 26 February 2017 => 17:12 Friday, 3 March 2017**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range:	10 - 160 km/h.
Direction:	North, East, South, West (bound)
Separation:	All - (Headway)
Name:	Default Profile
Scheme:	Vehicle classification (AustRoads94)
Units:	Metric (meter, kilometer, m/s, km/h, kg, tonne)
In profile:	Vehicles = 318 / 319 (99.69%)

MetroCount Traffic Executive
Weekly Vehicle Counts

WeeklyVehicle-1103 -- English (ENA)

Datasets:

Site:	**[Rocky Passage Road] Rocky Passage Road, near no 148**
Direction:	7 - North bound A>B, South bound B>A. **Lane:** 0
Survey Duration:	23:08 Sunday, 26 February 2017 => 17:12 Friday, 3 March 2017
Zone:	
File:	Rocky Passage Road 0 2017-03-03 1712.EC0 (Plus)
Identifier:	W616JE68 MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm:	Factory default (v3.21 - 15275)
Data type:	Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time:	**23:08 Sunday, 26 February 2017 => 17:12 Friday, 3 March 2017**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range:	10 - 160 km/h.
Direction:	North, East, South, West (bound)
Separation:	All - (Headway)
Name:	Default Profile
Scheme:	Vehicle classification (AustRoads94)
Units:	Metric (meter, kilometer, m/s, km/h, kg, tonne)
In profile:	Vehicles = 318 / 319 (99.69%)

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Weekly Vehicle Counts

WeeklyVehicle-1103
Site: Rocky Passage Road.0.0NS
Description: **Rocky Passage Road, near no 148**
Filter time: **23:08 Sunday, 26 February 2017 => 17:12 Friday, 3 March 2017**
Scheme: Vehicle classification (AustRoads94)
Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12) Dir(NESW) Sp(10,160) Headway(>0)

	Mon 27 Feb	Tue 28 Feb	Wed 01 Mar	Thu 02 Mar	Fri 03 Mar	Sat 04 Mar	Sun 05 Mar	Averages 1 - 5	Averages 1 - 7
Hour									
0000-0100	0	0	0	0	0	*	*	0.0	0.0
0100-0200	0	0	0	0	0	*	*	0.0	0.0
0200-0300	0	0	0	0	0	*	*	0.0	0.0
0300-0400	0	0	0	0	0	*	*	0.0	0.0
0400-0500	1	2	0	0	0	*	*	0.6	0.6
0500-0600	2	1	2	3	0	*	*	1.6	1.6
0600-0700	2	0	3	1	0	*	*	1.2	1.2
0700-0800	3	5	6	8	0	*	*	4.4	4.4
0800-0900	5	8	4	**9<**	0	*	*	**5.2<**	**5.2<**
0900-1000	4	**8<**	4	5	0	*	*	4.2	4.2
1000-1100	**6<**	3	**10<**	4	0	*	*	4.6	4.6
1100-1200	3	5	6	7	**0<**	*	*	4.2	4.2
1200-1300	7	9	9	**13<**	0	*	*	**7.6<**	**7.6<**
1300-1400	8	8	3	8	0	*	*	5.4	5.4
1400-1500	8	5	5	8	0	*	*	5.2	5.2
1500-1600	6	3	**9<**	3	0	*	*	4.2	4.2
1600-1700	**10<**	6	6	0	0	*	*	4.4	4.4
1700-1800	9	**10<**	7	0	0	*	*	5.2	5.2
1800-1900	5	5	2	0	*	*	*	3.0	3.0
1900-2000	0	1	4	0	*	*	*	1.3	1.3
2000-2100	4	1	1	0	*	*	*	1.5	1.5
2100-2200	0	2	0	0	*	*	*	0.5	0.5
2200-2300	0	2	0	0	*	*	*	0.5	0.5
2300-2400	0	0	1	0	*	*	*	0.3	0.3
Totals									
0700-1900	74	75	71	65	*	*	*	57.6	57.6
0600-2200	80	79	79	66	*	*	*	62.1	62.1
0600-0000	80	81	80	66	*	*	*	62.8	62.8
0000-0000	83	84	82	69	*	*	*	65.0	65.0
AM Peak	1000	0900	1000	0800	1100	*	*		
	6	8	10	9	0	*	*		
PM Peak	1600	1700	1500	1200	*	*	*		
	10	10	9	13	*	*	*		

*** - No data.**

rytenskild
Traffic Engineering

GOLD COAST Unit 2/24, Surfers Ave Mermaid Beach QLD 4218
BRISBANE Level 5 (Christie Centre), 320 Adelaide St QLD 4000
SYDNEY Level 26, 44 Market St NSW 2000

T 1300 220 020 E info@rytenskildtraffic.com
F 1300 087 177 W www.rytenskildtraffic.com

7 June 2018
RTEref: 17056

Chief Executive Officer
Redland City Council
Po Box 21
CLEVELAND QLD 4163

Dear Sir / Madam,

RESPONSE TO COUNCIL'S REQUEST FOR FURTHER INFORMATION
PROPOSED TOURIST HOTEL / ACCOMMODATION FACILITY
147 – 205 ROCKY PASSAGE ROAD, REDLAND BAY
COUNCIL REF: MCU17/0090

Reference is made to the above Development Application and Council's Request for Further Information (RFI) dated 10 November 2017. Rytenskild Traffic Engineering (RTE) has been engaged to prepare a response to Items 4 and 7 of the request, as follows:

4. P4.3 (1) of Tourist Accommodation Code (TAC) seeks for car parking provisions to comply with Part 9 - Schedule 1 - Access and Parking - *Table 1 - Minimum On-Site Vehicle Parking Requirements*. Accordingly for Tourist Accommodation - 1 space per room plus 1 space for the manager plus 1 space per 2 employees plus the requirement for any associated activities such as a restaurant or function room. The proposal provides 64 car parking spaces instead of 80 car parking spaces as per the requirement above.

The Traffic Impact Assessment Report has advised that visitors to the site will include a breakdown of 50% international and 50% domestic patrons and it has recommended that a reduced car parking rate of 0.75 spaces per unit is more appropriate. This results in a total operational car parking requirement of 64 spaces, including 16 spaces for staff.

The operational characteristics of the use (combination of local Vs international visitors) could change over time. The proposal will be short of 16 car parking spaces in accordance with P4.3 (1). Please demonstrate how the proposal complies with S4.3 of Tourist Accommodation Code to provide sufficient on-site car parking caters for employees and visitors. Please provide a revised Traffic Impact Assessment Report that includes:

- Car parking demand of other similar tourist accommodations;
- Occupancy rate of these facilities.

Response:
The proposed plan of development has been modified to include an additional 16 parking spaces, and therefore complies with Council's requirements. The modified plan of development is provided as Attachment A. As shown, additional parking spaces have been provided along the roadways leading to the individual accommodation units. This parking will therefore be convenient for guests.

The layout and dimensions of the parking spaces comply with AS2890.1:2004, and the road layout is suitable for low volume usage. It is noted that heavy vehicles will not regularly use the roads where additional parking has been provided, as waste collection vehicles will only use the main circulation road within the site.

It is noted that the core facilities (gymnasium, restaurant, day spa etc.) are intended to function as ancillary to the accommodation use. That is, they will primarily be used by guests of the development and generally not open to the general public. As is the case with other similar types of tourist accommodation developments, it may be the case that non – guests are permitted to use the facilities when occupancy levels at the development permit for such to occur. This would only happen on an occasional basis when the facility has capacity. At those times, there would be sufficient parking available on the site to facilitate such visitors, as there would only be a relatively low number of guests at the site. On this basis, it is considered that additional car parking is not required to service the ancillary core facilities.

7. Provide a waste management plan for the development according to Redland Planning Scheme Policy 9 – Infrastructure Works, Chapter 16 – Waste Management, Section 9.16.12 - Preparation of Waste Management Plans.

Response:
A waste management plan has been prepared by Burchills. Rytenskild Traffic Engineering has liaised with Burchills to ensure that waste collection vehicles will be able to circulate throughout the site satisfactorily. Swept path diagrams for a front loading waste collection vehicle are provided as Attachment B.

Please contact the undersigned regarding any queries in relation to this matter.

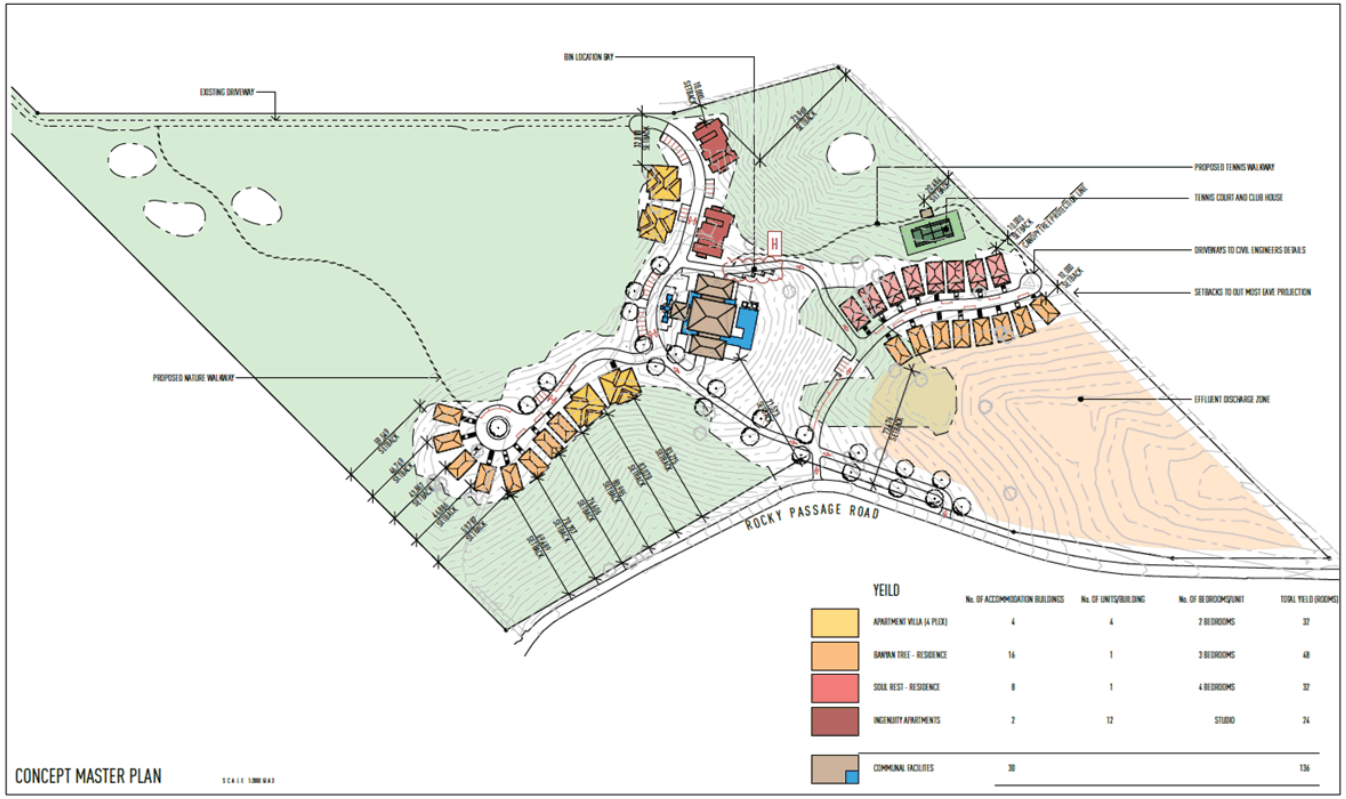
Yours faithfully

LUKE RYTENSKILD
DIRECTOR, B.ENG (Civil), RPEQ 6293

ATTACHMENTS:
ATTACHMENT A – MODIFIED SITE LAYOUT PLAN
ATTACHMENT B – SWEPT PATH DIAGRAMS FOR WASTE COLLECTION VEHICLE

rytenskild Traffic Engineering

ATTACHMENT A – MODIFIED SITE LAYOUT PLAN



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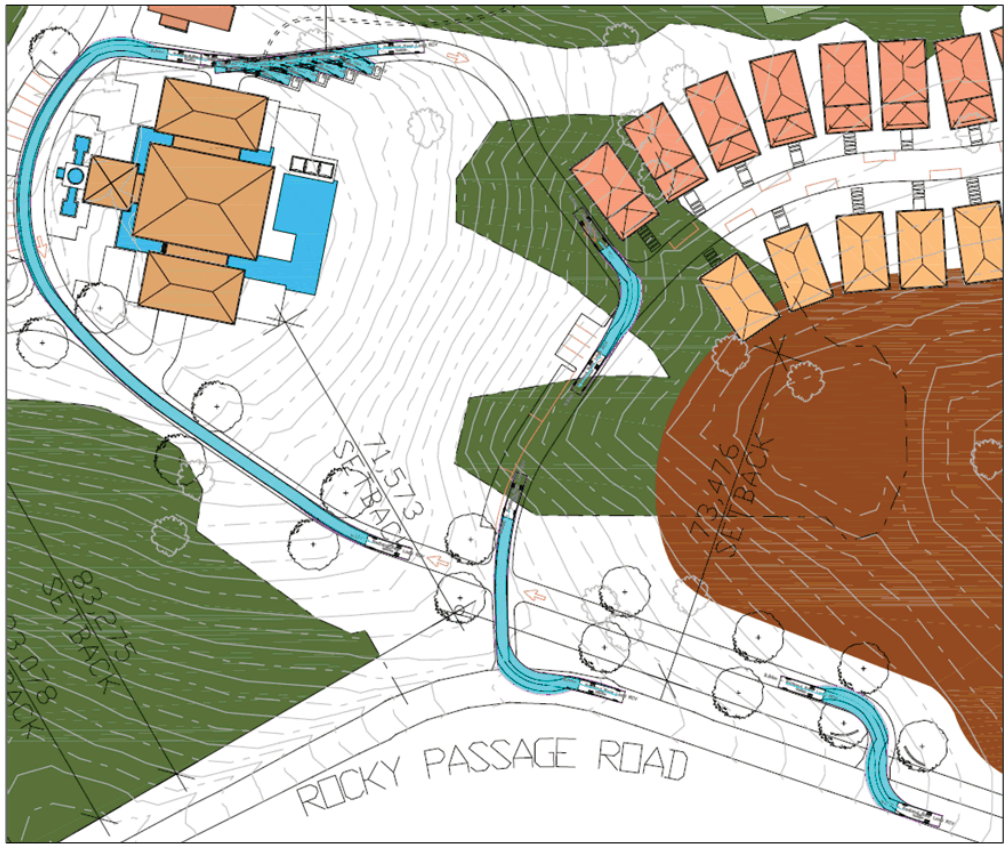
Traffic Engineering

ATTACHMENT B – SWEPT PATH DIAGRAMS FOR WASTE COLLECTION VEHICLE



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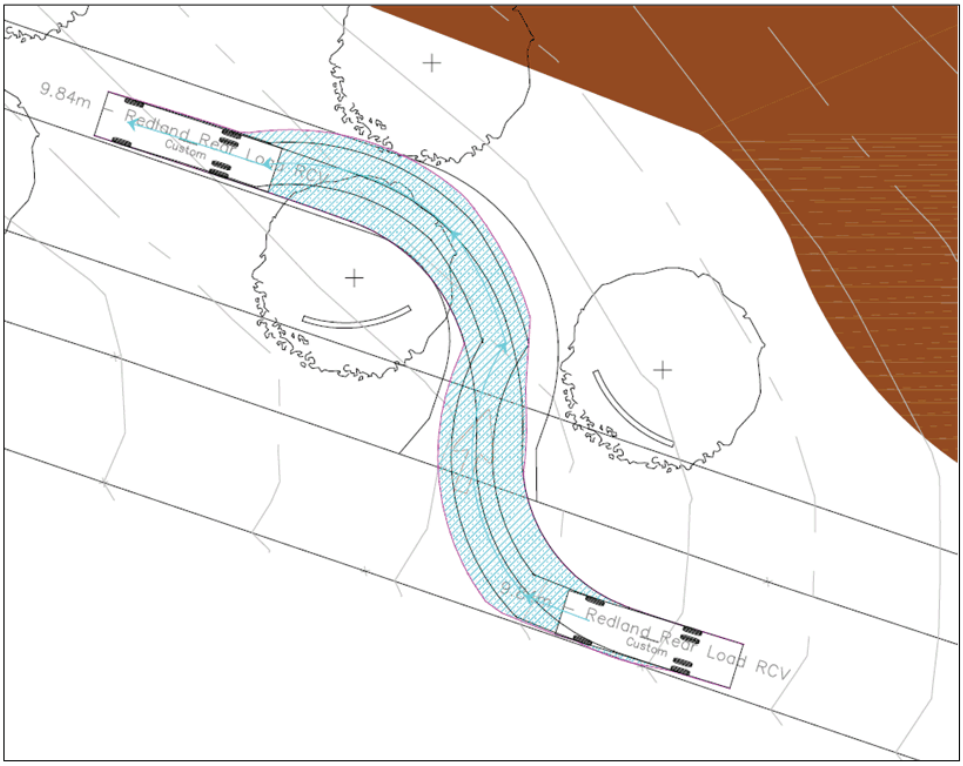

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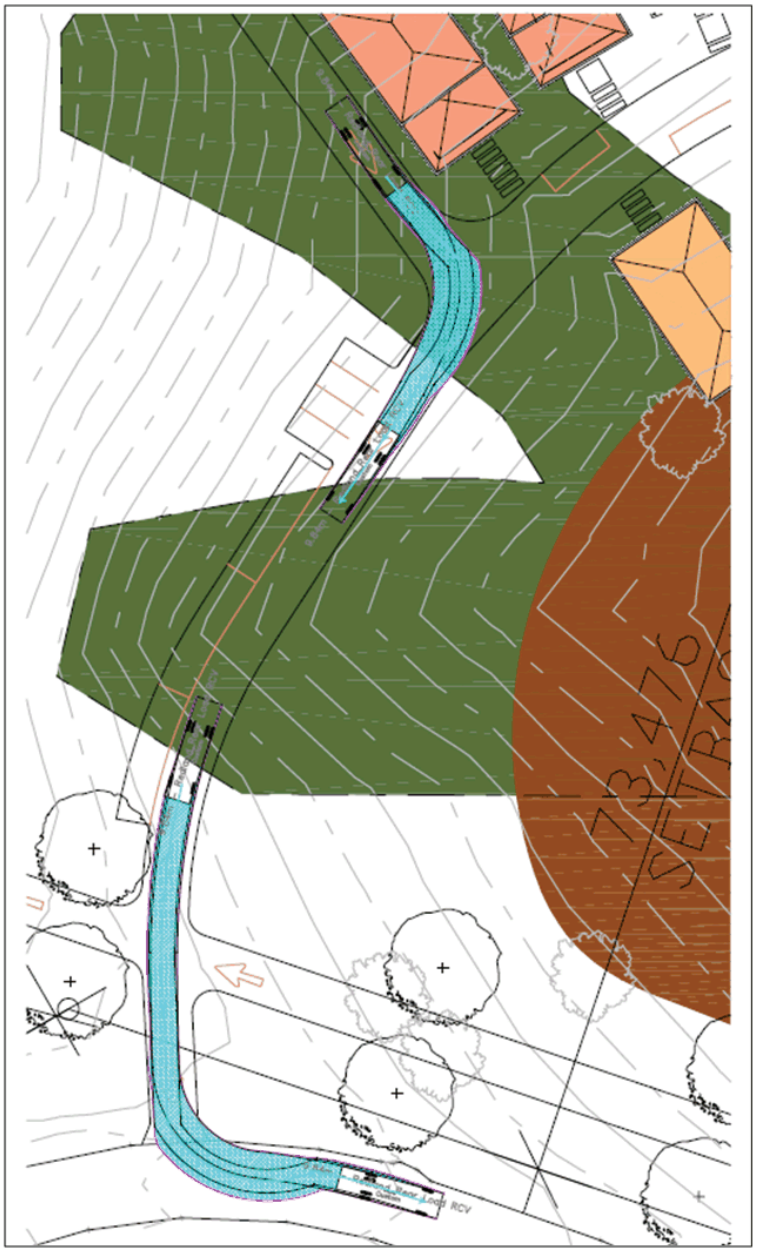

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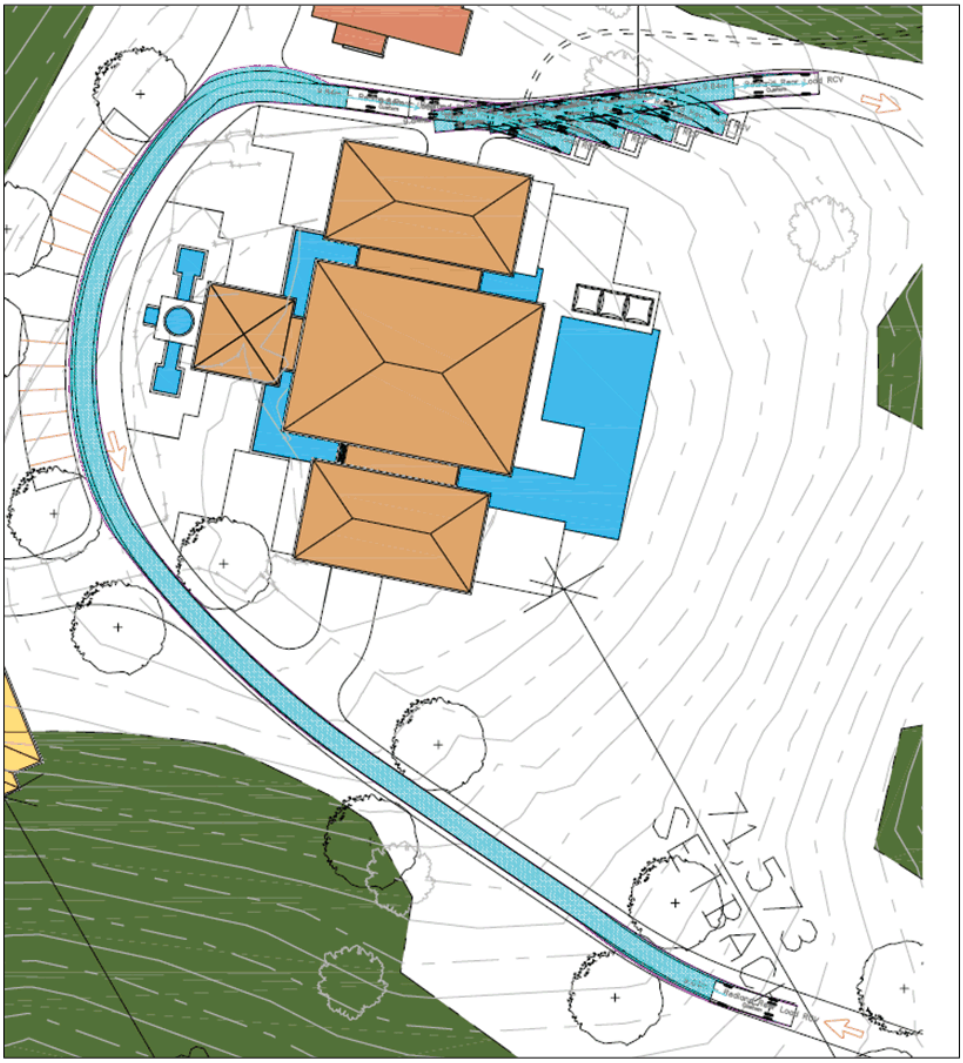

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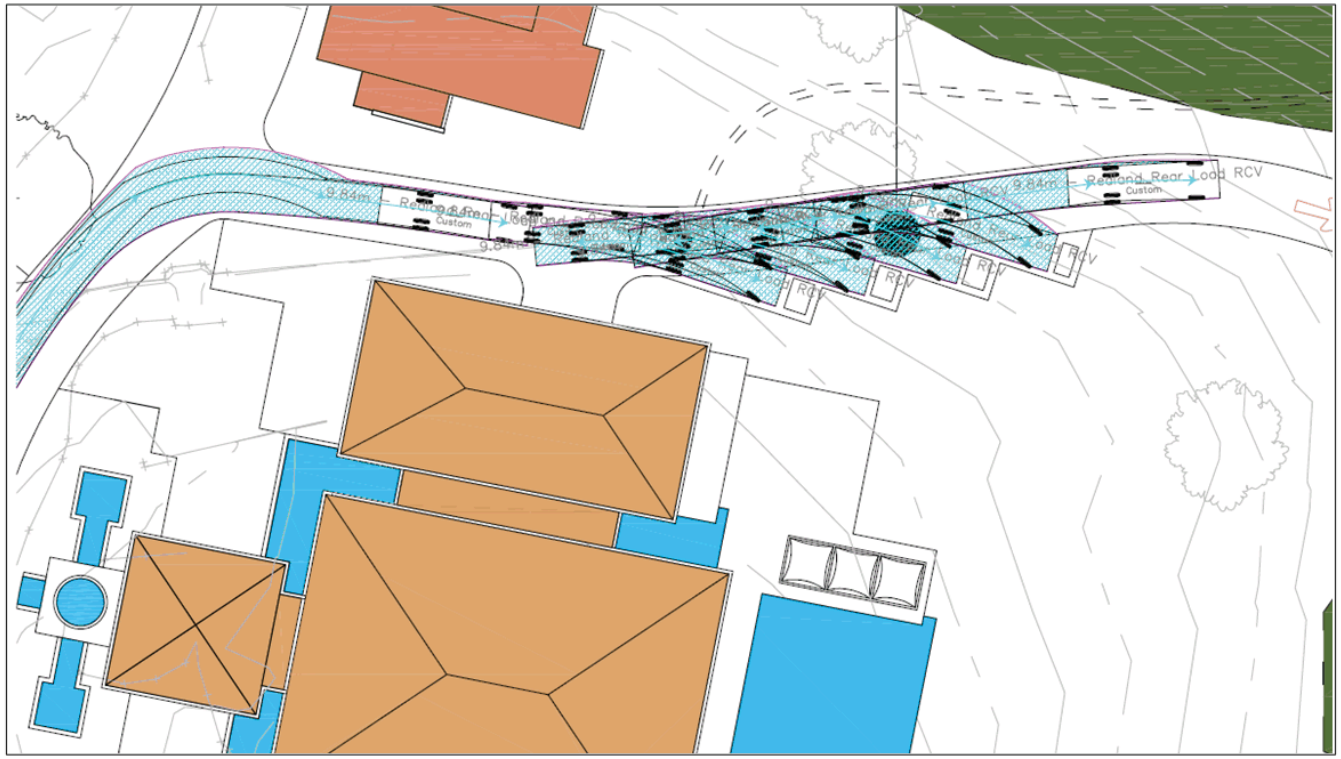

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geotech INVESTIGATIONS PTY LTD

REPORT ON

BROADSCALE LANDSLIDE SUSCEPTIBILITY ASSESSMENT

FOR

PROPOSED 'HOLIDAY FACILITY' DEVELOPMENT

NO.147 – 205 ROCKY PASSAGE ROAD

REDLAND BAY

PREPARED FOR

NEW LAND TOURISM PTY LTD

PROJECT REF: **GI 2791-A**

19 JULY 2016

DRILLING ENVIRONMENTAL GEOTECHNICAL

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Document Details

Project Number	GI 2791-a
Report Title	Report on Broadscale Landslide Susceptibility Assessment Proposed Holiday Facility Development
Site Address	No.147-205 Rocky Passage Road, Redland Bay, South-East Queensland
Prepared for	New Land Tourism Pty Ltd

Revision	Date	Prepared By	Checked by	Approved for Issue
Final	19/07/16	A. O'Carroll	J Walle	J Walle

Report Distribution

Revision	Date	Recipient	Method
Final	21/07/16	Yongcong Liang; New Land Tourism Pty Ltd	yong@ausnewland.com.au

This document was prepared in accordance with the scope of services described in Geotech Investigations Pty Ltd proposal and trading conditions as agreed with the client. This report is issued for the specific client, project and purpose(s) as described in the report, and should not be used or relied upon for other projects or purposes on the site or other sites.

The undersigned, for and on behalf of Geotechnical Investigations Pty Ltd, confirm that this document and all attached drawings, logs, and test results prepared by Geotech Investigations Pty Ltd have been checked and reviewed for errors, omissions and inaccuracies.

Yours faithfully
For and on behalf of
Geotech Investigations Pty Ltd

Andrew O'Carroll *BEng Civil, M.I.E. (Aust)*
Geotechnical Engineer

James Walle *RPEQ (15701), RPEng (Civil), BEng (Civil)*
Senior Geotechnical Engineer

DRILLING ENVIRONMENTAL GEOTECHNICAL

GeoTech INVESTIGATIONS PTY LTD

Our Ref: AOC:jw: GI 2791-a

DRILLING ENVIRONMENTAL GEOTECHNICAL

TABLE OF CONTENTS

APPENDICES:-

Our Ref: AOC:jw: GI 2791-a

1. INTRODUCTION

As requested, Geotech Investigations Pty Ltd (GI) has completed a Landslide susceptibility assessment for the proposed 'Holiday Facility' development at No.147 – 205 Rocky Passage Road, Redland Bay. GI has received a Contour & Detail Survey Plan by Arnold Development Consultants, referenced Drawing No: 7091.06 dated 20/11/2016, refer to Appendix A. Based on the plan and brief by the client, the proposed development is to include:-

- Reconfiguration of the existing residential lot into a 'Holiday Facility' comprising 8 self-contained dwellings, inclusive of associated effluent disposal areas. These indicative areas are shown as superimposed pink spots on the Contour & Detail Survey Plan by Arnold Development Consultants.
- At the time of preparing this report, specific details for the proposed construction had not been supplied, however it is understood that the proposed double storey dwellings will likely be supported on pole-home construction.

The assessment was limited to the 8 exclusive areas described above. The report will be used to assist with the Development Application along with the civil & structural consultants and earthworks contractor.

1.1 Scope of Works

The scope of the geotechnical services provided by GI was directed towards evaluating the following items, as detailed below and in the proposal (Ref: P16 1784-a dated 10 June 2016):-

- Subsurface conditions, including groundwater;
- Slope stability hazard risk analysis using The Australian Geomechanics Society (AGS) guidelines for the proposed building areas;
- Earthworks, excavations, temporary and permanent batter slopes;
- Constructability issues and constraints, if apparent;
- Shrink-swell movements, Site Classification in accordance with AS2870-2011; and
- Typical footing options and allowable bearing pressures.

The investigation comprised a detailed site walkover, followed by the excavation and sampling of 9 test pits and permeability testing in 8 locations, followed by engineering assessment and reporting.

2. SITE DESCRIPTION AND OBSERVATIONS

A site visit was carried out on the 28th of June 2016 by a Geotechnical Engineer from our office, with the purpose of viewing the building envelopes and making observations with regard to the local geology, existing vegetation, geomorphology, topography and any signs of existing instability of the natural slopes.

The overall site is 14.62 hectares in total area, located on the western side of Rocky Passage Road, Redland Bay. At the time of the investigation, the 8 proposed building areas were scattered throughout the allotment, with 4 of the 8 locations localised on the upper slopes of the southern ridge formation.

Some of the existing conditions are detailed on the attached site plan prepared by GI, refer to Appendix A, and site observations can be described as:-

- The central portion of the allotment comprised a vacated two to three storey dwelling positioned on top of a hill, refer Figure 1, with an existing older vacated single storey house on the southern portion of the allotment. An existing tennis court and detached indoor pool were located approximately 35 m to the west of the existing dwelling.
- The general topography of the overall allotment sloped away to the north and south of the existing dwelling. The localised topography of the building areas can be typically summarised as planar to slightly convex in shape, with localised slopes generally measured at between 8 and 19 degrees, refer Figures 2 to 5 and the attached site plan S01 as appendix A.
- The building areas were typically located on grass vegetation clear of trees or located amongst lightly dense native tree vegetation, refer Figures 2 to 5. The south-western portion of the allotment comprised dense tree vegetation, where no building areas were located.
- Three existing dams were located within the northern half of the allotment.

Figure 1: Existing dwelling located on the hill (highest point of allotment)

Figure 2: Looking to location of TP 4, typical of grassed vegetation uphill of tree vegetation.

Figure 3: Looking to location of TP 1, typical of lightly dense tree vegetation.

Figure 4: Looking to location of TP 6, typical of northern half of allotment with open grass vegetation and dams.

Figure 5: Looking at TP 7 facing south-west from the northern corner of the allotment

Figure 6: Subsurface profile of TP 7

3. REGIONAL GEOLOGY

Reference to geological mapping by the Geological Survey of Queensland 1:100,000 series indicates the site is underlain by Devonian to carboniferous aged Neranleigh-Fernvale Beds (NFB), which typically comprise "*Mudstone, shale, arenite, chert, jasper, basic metavolcanics, pillow lava, conglomerate*

4. SITE INVESTIGATION

4.1 Field Work Methodology

Fieldwork was undertaken on the 30th of June 2016, and comprised the excavation and sampling of 9 test pits, designated TP 1 to TP 9, using a 5.5 tonne excavator utilising both a 300 mm and 450 mm wide teethed bucket. The test pits were undertaken at accessible locations within the proposed approximate building envelope locations to termination depths between 1.2 m and 2.5 m. Furthermore, Pocket Penetrometer testing was carried out in the cuttings and walls of the test pits to assess approximate undrained shear strengths of the cohesive soils (guide only). The approximate locations of the test pits are shown on the Site Plan S01, refer to Appendix A, with hand help GPS coordinates taken for each location, shown on the attached engineering logs as Appendix B.

This investigation has been carried out generally in accordance with AS 1726 – 1993[1] in terms of soil description. The fieldwork was carried out by an experienced geotechnical engineer who positioned and logged the materials encountered in the test pits. At the completion of excavation, the test pits were backfilled with removed spoil and tamped down in layers with the back of the teethed bucket.

[1] Australian Standard AS 1726-1993 *'Geotechnical site investigations'*, Standards Australia

4.2 Field Work Results

The results of the fieldwork are described in the form of Engineering Logs in Appendix B, along with explanatory notes in Appendix C.

In summary, the subsurface conditions encountered in the test pits can be described as a shallow **topsoil** layer over residual **soils** (clays and silts) then extremely and highly weathered **rock,** described as arenite and siltstone. Table 1 has summarised the depths of these layers.

Fill material was encountered in the location of TP 4 only to a depth of 0.7 m. Documentation regarding the fill has not been provided and considering the time since placement (greater than 20 years) it is not likely this information will be available, therefore the fill material is considered to be 'uncontrolled' in accordance with AS 2870.

Table 1: Summary of Subsurface Materials

Test Pit No.	Top Soil (m)	Fill (m)	Residual Clays / Silts (m)	(EW) Rock (m)	(HW) Rock (m)	T.D. (m)
TP 1	0 – 0.3	N/A	0.3 – 1.4	N/A	1.4– 1.6	1.6(1)
TP 2	0 – 0.2	N/A	0.2 – 0.6	0.6 – 1.1	1.1– 1.2	1.2(1)
TP 3	0 – 0.3	N/A	0.3 – 0.9	0.9 – 1.1	1.1– 1.2	1.2(1)
TP 4	0 – 0.25	0.25 – 0.7	0.7 – 1.2	N/A	1.2– 1.3	1.3(1)
TP 5	0 – 0.15	N/A	0.15 – 0.7	0.7 – 1.1	1.1– 1.3	1.3(1)
TP 6	0 – 0.1	N/A	0.1 – 1.6	1.6 – 1.8	1.8– 1.9	1.9(1)
TP 7	0 – 0.1	N/A	0.1 – 1.8	1.8 – 2.5	N/A	2.5
TP 8	0 – 0.1	N/A	0.1 – 1.2	N/A	1.2 – 1.3	1.3(1)
TP 9	0 – 0.3	N/A	0.3 – 0.9	0.9 – 1.3	1.3– 1.6	1.6(1)

Notes: (1) Refusal with Toothed Bucket EW – Extremely Weathered
HW – Highly Weathered NE - Not Encountered

Groundwater seepage was not observed during the investigation, while the test pits remained open. It should be noted that groundwater is affected by climatic conditions, varying soil permeability, and will therefore vary over time.

5. BROADSCALE ASSESSMENT OF THE LIKELIHOOD OF SLOPE INSTABILITY USING AGS GUIDELINES

5.1 Discussion

Natural hill slopes are formed by processes which reflect the site geology, climate and environment. The natural process can be influenced by human intervention in the form of earthworks, construction or other related activities. The risk associated in hill side construction is far greater than level construction. Good hill side building practices should be adopted to decrease the risk associated with it. Figures on good and bad hillside construction are presented in Appendix D of this report.

To define a slope as being 'stable' or 'unstable' is not technically feasible, however assessing the likelihood of slope movement can help in defining the stability of the site. Several methods can be adopted to assess the likelihood of slope movement including existing surface features supplemented with knowledge of the subsurface profile and experience gained on similar sites.

A five-fold subdivision of landside likelihood categories has been developed by the Australian Geomechanics Society-Sydney Group (AGS-SG) and is described in their 1985 paper on "Geotechnical Risk Associated with Hillside Development". In March 2003, the AGS Sub-Committee on landslide Risk

Management subsequently published "Landslide Risk Management Concepts and Guidelines" which review their earlier publication with the most current review in the 2007 publications.

The guidelines typically define and assess the "risk" as a function of the likelihood or probability of an event occurring (i.e. landslide, batter failure etc.) and the damage that this event may have (i.e. damage to property, loss of life etc.). Landslide and hazard risk zoning is a method of identifying different areas on a site with regard to the potential of a hazard or risk and incorporating this risk into local planning and development. The risk assessment process involves answering the following question:-

- What might happen?
- How likely is it?
- What damage or injury may result?
- How important is it?
- What can be done about it?

It is normal to carry out a preliminary assessment of the first two points and is generally based on the site observations and soil profiles. This type of assessment has been carried out for the subject site.

The causes of slope instability are well documented in the above mentioned literature and include the following factors:-

- Slope angle;
- Underlying geology and soil types;
- Vegetation cover;
- Variable and transient factors such as rainfall intensity, overland water flows, groundwater flows, piezometric pressures and seismic vibrations;
- Presence of soil masses in an unstable condition (ie. past movement); and
- Man-made factors such as construction activity including earthworks, removal of vegetation and changes to the surface and subsurface drainage, retaining walls, etc.

For any given area some of the above factors can be identified, while other possible contributing factors can be considered. From studying existing slope instabilities and the failure mechanisms, it is possible to

make an assessment of the potential, relative likelihood of similar conditions arising in other areas. Slope instabilities can also be induced from man-made factors including:-

- The construction of fill slopes;
- Undermining of steep slopes;
- Changing of water flow paths, in particular at the toe of slopes;
- Concentrated stormwater flow onto building platforms;
- Inadequate design and/or construction of retaining walls; and
- Saturation of soil below septic waste disposal absorption fields.

The terminology of the AGS Guidelines has been employed in the descriptions of hazards and the qualitative assessment of the likelihood, consequence and risk of slope instability. The following guidelines can be used for describing the likelihood of slope movement;

Likelihood	Probability	Qualitative Risk	Significance
Barely Credible	10^{-6}	Very Low	Acceptable
Rare	10^{-5}	Low	Usually Acceptable
Unlikely	10^{-4}	Moderate	May be tolerated
Possible	10^{-3}	High	Unacceptable
Likely	10^{-2}	Very High	Unacceptable
Almost Certain	10^{-1}	Extremely High	Unacceptable

Any proposed residential development should generally include works which result in 'acceptable' or 'usually acceptable' risk level to the property after construction. In some cases, subject to appropriate monitoring and maintenance programs, a 'may be tolerated' risk may be accepted. Definitions of acceptable and tolerable risk as included in the AGS Guidelines attached as Appendix D.

5.2 Risk Categorisation

The site has been qualitatively classified in accordance with the methods of the AGS. The effect of these hazards on the site has been summarised in Table 2, together with a qualitative assessment of likelihood, consequence and risk to the property in its present condition.

Table 2: Hazard and Risk Summary for Proposed Building Areas

Hazard	Likelihood	Possible Consequence	Risk Category
Landslip in existing slopes between 15 and 19 degrees	Rare	Major damage to proposed structures, buried services, proposed driveways, retaining walls and parked vehicles. Existing mature trees around building area becoming up-rooted and may fall in location of structure. Potential injury and loss of life.	Low

Debris (including cobbles) falling / rolling down from upper hill.	Unlikely	Potential injury to person/s. Minor damage to proposed structures.	Low
Surface water from upper slopes weakening founding soils.	Unlikely	Minor / moderate damage to structures for repair, based on extent of water ponding.	Low

5.3 Suggestions to Reduce / Maintain the Risk of Instability

The risk mitigation will need to concentrate on maintaining the "low" risk categories within the proposed building areas. The recommendations in Table 3 below are designed to maintain or reduce the risk of slope instability to an acceptable level for future development of the site.

Table 3: Risk Mitigation Measures for Proposed Building Areas

Hazard	Hazard Mitigation Measures	Risk Category
Landslip in existing slopes between 15 – 19 degrees	• Adhere to all recommended suitable drainage control upslope of the proposed structures. • Design footings to be found into the residual soils or weathered rock – refer Section 7.2. • It is suggested proposed structures positioned on slopes in excess of 15 degrees to employ pole-home type construction, and earthworks are to be minimised to a maximum of 1 m cut and fill (unsupported). • It is suggested that structures positioned on slopes less than 15 degrees may employ both pole-home and slab-on-ground construction.	Low
Debris (including cobbles) falling / rolling down from upper hill.	Contractors to be aware of conditions during construction and risk assessments completed for such activities where cobbles may be dislodged.	Low
Surface water from upper slopes weakening founding soils.	To reduce runoff over the building footprints, it is suggested that appropriate catchment systems such as bund walls or spoon drains be installed above the proposed structures to collect and divert runoff away from the building areas. Ensure all drainage recommendations provided by the civil designer, and hydraulic consultant / building designer at the time of construction **are adhered to.**	Low

The following recommendations are a summary and also aimed to assist with reducing or maintaining the risk of slope instability:-

- **Footings for all structures and retaining walls must be founded into the underlying residual soils or very low strength (or better) weathered rock stratum, refer to Section 7.2.**

- Although any placement of unsupported fill material is unknown for the proposed building areas, unsupported fill heights should be minimised to less than 1 m, and all fill must be well compacted, and placed in accordance with AS 3798 under 'Level 1' conditions. All 'controlled' fill batters are to be trimmed to a gradient not exceeding 1V:2H (26°). If unsupported fill material is to exceed 1 m in height, GI must be contacted to undertake a reassessment based on the new proposed conditions.
- Ensure all stormwater and roof water management plans, drainage plans and retaining walls are adhered to, particularly in relation to ensuring that all surface water is collected and diverted away from the building envelopes, top of batters and retaining walls. Preventing additional runoff on the site is essential in maintaining and improving the existing risk of instability.
- Maintain good vegetation over the site and provide additional vegetation with good root systems for all batters and cut embankments.

Additional information, which should be adopted during construction, is given in 'AGS Australian Geoguide LR7 (Landslide Risk)' and 'Guidelines to Good and Bad Hillside Practices' attached in Appendix E.

5.4 Effluent Disposal Area Stability

It is anticipated the application areas for the effluent disposal areas will be constructed to the side or downhill from the locations of the proposed building areas. Based on the residual subsurface conditions and relatively shallow rock encountered in the location of all test pits, and in conjunction with the relatively uniform vegetated topography, it is likely that these locations will not increase the risk of instability to unacceptable levels.

GI suggests that a nominal minimum distance of 10 m from the structure to the effluent disposal area be employed where practicable. If the configuration does not permit this minimum distance to be exercised, then GI must further assess the risk following review of the individual effluent disposal plans. GI considers the anticipated effluent disposal areas can be constructed with a "low" risk of likelihood of instability.

6. EARTHWORKS RECOMMENDATIONS

6.1 Earthworks

At the time of this broad scale investigation, earthworks are **anticipated** to be limited to minor cut and fill construction over the proposed building locations. No fill material greater than 1 m in height is to be 'unsupported' as part of the proposed tourist dwellings without reviewing the proposed earthworks. Should additional earthworks be proposed, this office must be contacted to provide further advice.

Generally, all earthworks are to be carried out in accordance with AS 3798 – 2007[2]. The following earthworks procedures can be used as a preliminary guide to support slab-on-ground and pavements, however must be based on local council guidelines and the design engineers specifications:-

[2] Australian Standard AS 3798-2007 *'Guidelines on earthworks for residential and commercial developments'*, Standards Australia

- The building and pavement areas, and areas to accept new fill, should be prepared by removing any 'uncontrolled' fill, loose debris, and soils that are wet, or contain vegetation or deleterious materials.
- The exposed subgrade should be test rolled using a 12 tonne roller (or similar), loaded water truck or dump truck to determine the presence of any soft spots, which should be excavated out and replaced with compacted select fill. The surface should be tyned to 0.2 m depth, moisture conditioned and then compacted. New fill material should be placed in layers not exceeding 250 mm loose thickness, or less depending on compaction equipment.
- Structural fill for earthworks should comprise select granular material, and be uniformly compacted to 95% Standard MDD, with moisture content within 2% wet or dry of OMC for cohesive material. Where backfill for service trenches is carried out, the above layer thickness applies however if vibrating plates are used, the layers are to be placed in 100mm loose thickness.
- Areas to accept fill material must then be benched to allow the fill material to 'key in' into the slope. The benches should slope forward at 1V:10H to allow drainage and be between 0.6 m to 1 m in vertical height.
- All filled batter slopes should be overfilled and cut back to profile to ensure compaction at the edge of the batter faces. The surface of the batter must be protected from erosion (i.e. mulching, etc.), and concrete lined spoon drains should be constructed at the crest and toe of all cut and filled batters.
- The placement of fill material to support building loads and pavements must be placed and compacted under 'Level 1' full-time geotechnical inspections and testing.

Field testing must be carried out to confirm the standard of compaction achieved and the moisture content during the construction. The test frequency and extent of testing is to be carried out as per AS 3798, Section 8.0 and compaction testing is to be carried out by a NATA accredited laboratory.

6.1.1 Excavations

Very low to low strength highly weathered rock was encountered in most testing locations between depths of 0.1 m and 1.8 m below **existing** surface levels. If material is required to be excavated during earthworks, service trench excavations, then specific advice is to be sought from GI.

For preliminary purposes only, based on experience with similar rock materials, it is suggested equipment with a minimum 20 to 30 tonne capacity should be allowed for when excavating estimated low strength rock. Ripping tyne attachments, rock breaking techniques and larger equipment may also assist confined footing trenches, or where bulk excavations are required to be carried out for the roads. **The client and contractor must be aware that most testing locations were terminated at depths between 1.2 m and 1.9 m. Although it is anticipated excavations will not exceed these depths, the strength and degree of weathered rock below the depth of investigation is not known.**

6.2 Batter Slopes and Embankments in Soil and Rock

Stable batter angles in soils are strongly dependent upon fill type and compaction, soil type and strength, strength of underlying soils, slope angle / height and surcharge loadings. For the purpose of preliminary design, the batter slopes presented in Table 4 are considered to be suitable for the different soil and rock conditions encountered on the site. Where soil / rock conditions vary from those presented in Table 4, GI may provide guidance and alternative slope angles on site during construction. At these batter slopes, some movement at and behind the slope crest, as well as some localised slumping of batter faces may occur.

Excavations within the very low to low strength weathered siltstone, and the stability of excavations in these rock materials is governed by the presence of geological structures such as bedding planes, joints and faults. It is recommended that temporary slopes of 1V:0.5H be adopted for design purposes, however steeper excavations may be possible. Inspection of excavations must be carried out by GI at the time of construction to assess whether steeper slope angles are permitted for the exposed conditions.

The batter slopes assume that no surcharge loadings will be applied to the crest of the slope, and that no seepage out of the batter is present. If seepage is encountered or present at any stage suitable batter slopes will be required for these conditions. Although not likely, if batters are to be higher than 3 m, the batters will be required to be benched to a minimum 1 m horizontally, where this is the case. All permanent batter slopes are to be protected from erosion and scour by use of appropriate drainage and vegetation.

Table 4: Slopes Angles for Batter Heights < 1 m (Unsurcharged, Horizontal Ground Behind Crest) [1]

Material Description	Short Term (Maximum)	Long Term (Maximum)
Residual Soils – Very Stiff to Hard	1V:1H (45°)	1V:2H (26°)
Controlled Fill Batters[2]	1V:1H (45°)	1V:2H (26°)
Very Low Strength (or better) Rock[3]	1V:0.5H (63°)	1V: 1H (45°)

Notes:

[1] A geotechnical engineer from GI is required to be on site during excavations of embankments and placement of fill batters to confirm safe batter slopes. These slopes assume the batters are not underlain by lower bearing strata.

[2] All 'controlled' fill batters should be overfilled, compacted and cut back at a maximum angle given in Table 4 for filled batters. These slope angles are dependent on the fill material used.

[3] The stability of excavations in rock is often governed by the presence of geological structures such as bedding planes, joints and faults. A suitably experienced Engineering Geologist/Geotechnical Engineer must inspect the excavations at the time of construction to assess whether the slope angles recommended in Table 4 are appropriate for the exposed conditions.

6.2 Slope Support

The retaining structures (if any) will likely be supporting gravel backfill, new fill, residual soils and weathered rock. Flexible retaining walls (i.e., those which are free to rotate or tilt), may be designed using a triangular pressure distribution, adopting the earth pressure parameters and 'active' earth pressure coefficient (K_a) provided in Table 5 below.

The values provided in Table 5 are ultimate values, and appropriate safety factor or strength reduction factor should be included.

Table 5: Earth Pressure Design Parameters (non-sloping crest)

Soil Stratum	Unit weight (kN/m^3)	K_O	K_A	K_P
'Controlled' Fill	17-19	0.50	0.35	3.0
Residual Very Stiff (or better) Soils	18	0.40	0.25	4.0
Very Low Strength Weathered Rock	20	0.40	0.25	4.0
Low Strength Weathered Rock (or stronger)	22	0.43	0.27	3.7

The design of all retaining walls will need to take into account any sloping ground surface behind the walls, as well as the usual design constraints and issues. The lateral earth pressure coefficients provided in Table 5 have not made allowances for surcharge loadings from future structures and these should be taken into consideration when designing the retaining wall system. Any backfill placed behind the wall should be loose granular material.

Foundation parameters provided by GI for the proposed structures may be adopted for retaining wall foundations as per Section 7.2. The parameters adopted for footings for cantilevered retaining walls should be reduced by one third to account for lateral loads.

7. FOOTING RECOMMENDATIONS

7.1 Preliminary Shrink-Swell Movements and Site Classification

A Site Classification is provided to allow the determination of appropriate footing sizes and slab details to be designed, and is based on the soil profile, the soil reactivity, and the climatic conditions at the site. The soil profile is identified by the site investigation drilling and in-situ testing, while the soil reactivity is assessed from laboratory testing to provide the Shrink-Swell Index (I_{ss}). On the majority of sites, this information is used to calculate the characteristic surface movement (y_s), which is an estimation of the amount of movement at the surface of the site, subject to normal seasonal wetting and drying. These calculations are also based on knowledge of the proposed works, as earthworks have the effect of changing how the soil reacts to seasonal moisture changes.

Climatic conditions for this site are based on published data by Fox[3], which indicate this region is located bordering Climatic Zone 1 'Alpine/wet coastal' and Climatic Zone 2 'Wet Temperate'. A value for the change in soil suction at the surface (Δu) of 1.2 picofarads (pF) and an average design depth soil suction change (H_S) value of 1.7 m could be adopted in calculations to determine y_S. AS 2870 indicates that seasonal cracking to a 'crack depth' of $H_S/2$ should be considered for natural sites not subject to earthworks, and ignored for sites subject to recent or proposed earthworks.

[3] Fox, E. A., 2000: *"A climate-based design depth of suction map of Queensland and the use of such maps to classify sites under AS 2870-1996"*, Australian Geomechanics, Volume 35, Volume 4, December 2000, Australian Geomechanics Society, Barton ACT

Based on laboratory testing from nearby sites on similar soils in the area and employing the visual tactile method within AS 2870 *Section 2.3.2 Instability Index,* a shrink-swell Index (I_{SS}) of 2.5 to 3.5 % / pF has been adopted in the y_s calculations. The results of these calculations reveal that under normal soil moisture variations (i.e. seasonal), y_s values for the existing residual soil profile encountered in the test pits are estimated to be in the order of 35 mm to 45 mm. Therefore, the majority of sites in their current condition may be preliminary classified as **'Class M'** (moderately reactive) and **'Class H1'** (highly reactive) in accordance with AS 2870, as outlined in Table 6 below. Suggested design information is provided in Section 7.2 below.

Table 6: Summary of Site Classification for Building Envelopes

Test Pit No.	Preliminary Site Classification
TP 1	Class M
TP 2	Class H1
TP 3	Class M
TP 4	Class P(1)
TP 5	Class M
TP 6	Class H1
TP 7	Class H1
TP 8	Class H1

Notes: (1) The conditions encountered must be classified as 'Class P' in accordance with the provisions of AS 2870 due to the existence of fill ground. The existing subsurface conditions have a reactivity similar to 'Class H1'.

This classification is relevant to sites subject to seasonal moisture changes only. Abnormal moisture conditions, such as from the removal or planting of trees, poor site drainage, and development of gardens adjacent to the footings, may cause higher movements to occur, probably resulting in unacceptable damage.

7.2 Footing Recommendations

Based on the results of the fieldwork, the exposed subgrade in the area of the proposed building envelopes following very limited earthworks will comprise areas of shallow newly placed fill material, very stiff to hard residual soils and weathered rock (siltstone and arenite).

In order to reduce the risk of variable settlements and surface movements, it is suggested that all footings be found into the uniform residual clays or weathered rock. Typically, shallow footings such as strip and pad footings or a stiffened raft (including waffle raft systems) could be designed for an allowable bearing pressure of 100 kPa in the very stiff (or better) residual clay material or 400 kPa in the very low strength (or better) highly weathered rock. This will require the use of deepened footings, bored piers or excavation bucket piers to transfer loads in areas of existing or newly placed fill material. Construction loads **are not** to be supported in any topsoil, existing fill or proposed builders fill. Bored piers found into the very stiff (or better) residual clays and very low strength (or better) highly weathered rock may be designed for an allowable end bearing pressure of 150 kPa and 600 kPa respectively.

All footings, edge beams and internal beams should be founded in uniform material to limit the potential for differential settlements that are likely to damage the dwellings, i.e. not partially in fill and partly in residual soils or weathered rock.

Inspection of footing trenches, bored piers or founding subgrade level should be carried out by GI for confirmation of the above bearing pressures prior to placement of concrete.

CSIRO Publication BTF 18 *'Foundation Maintenance and Footing Performance: A Homeowner's Guide'* provides some guidance material, attached in Appendix E, which should be provided to land owners.

8. IN-SITU PERMEABILITY

As requested, testing to determine the permeability (K_{sat}) of the sub-surface material on the 8 proposed building locations was carried out. The constant head field permeability tests were undertaken at PT 1 and PT 8 on the 28th of June 2016, refer Figure 7 below.

Figure 7: Typical setup of the field permeability testing facing north-east at the location of PT 8.

The results of the permeability testing are presented in Table 7 below. The locations of the permeability tests are shown on Site Plan S01 attached in Appendix A.

Table 7: Summary of Insitu Permeability Tests

Sample Location	Depth of Hole below Surface Level (m)	Predominant Soil Classification (Soil Category) [1]	Permeability K_{sat} (m/sec)	Notes
PT 1	0.36	Sandy clay loam (4) to 0.2m, over silty clay loam (4)	$2.84x10^{-6}$	*Trace gravel.*

PT 2	See Note	See Note	See Note	*Hand-auger refusal in 4 attempts due to gravels- Same material as PT 1 so adopt PT 2 value.*
PT 3	0.55	Silty loam (3) to 0.28m, over sandy clay (5) to 0.5m over silty clay (5)	$4.71x10^{-7}$	*N/A*
PT 4	0.51	Silty loam (4) to 0.35m, over silty clay (5)	$1.27x10^{-6}$	*N/A*
PT 5	0.52	Sandy clay (5) to 0.25m, over heavy clay (6)	Adopt greater than 10^{-8} to 10^{-9}	*No movement of water level in 30 mins.*
PT 6	0.33	Clay loam (4) to 0.18m, over heavy clay (6)	Adopt greater than 10^{-8} to 10^{-9}	*No movement of water level in 30 mins.*
PT 7	0.54	Sandy clay loam (4) to 0.28m, over heavy clay (6)	Adopt greater than 10^{-8} to 10^{-9}	*No movement of water level in 30 mins.*
PT 8	0.51	Light clay (5) to 0.22m, over heavy clay (6)	$3.48x10^{-7}$	*Recommend allowing a lower permeability ($\approx 10^{-8}$) as this result is likely to reduce with time.*

Notes: (1) Soil Classification and Soil Category carried out in accordance with Table E1 'Assessment of Soil Textures (AS/NZS 1547: 2012)

9. LIMITS OF INVESTIGATION

Recommendations given in this report are based on the information supplied regarding the proposed building locations in conjunction with the findings of the investigation. Any change in the construction type or building locations may require additional testing and/or make recommendations invalid.

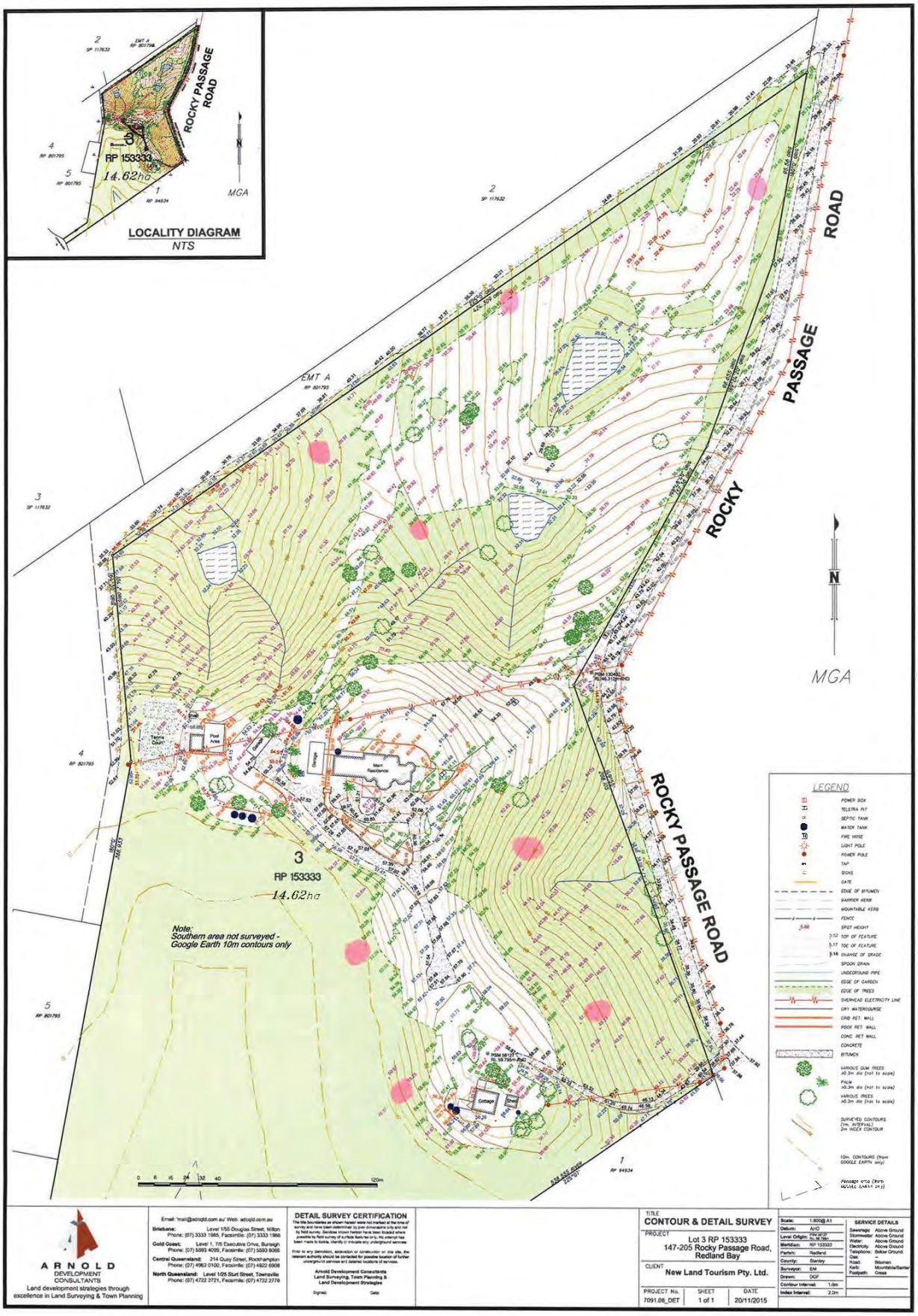
Every reasonable effort has been made to locate test sites so that the test pits are representative of the soil conditions within the proposed envelopes to be investigated.

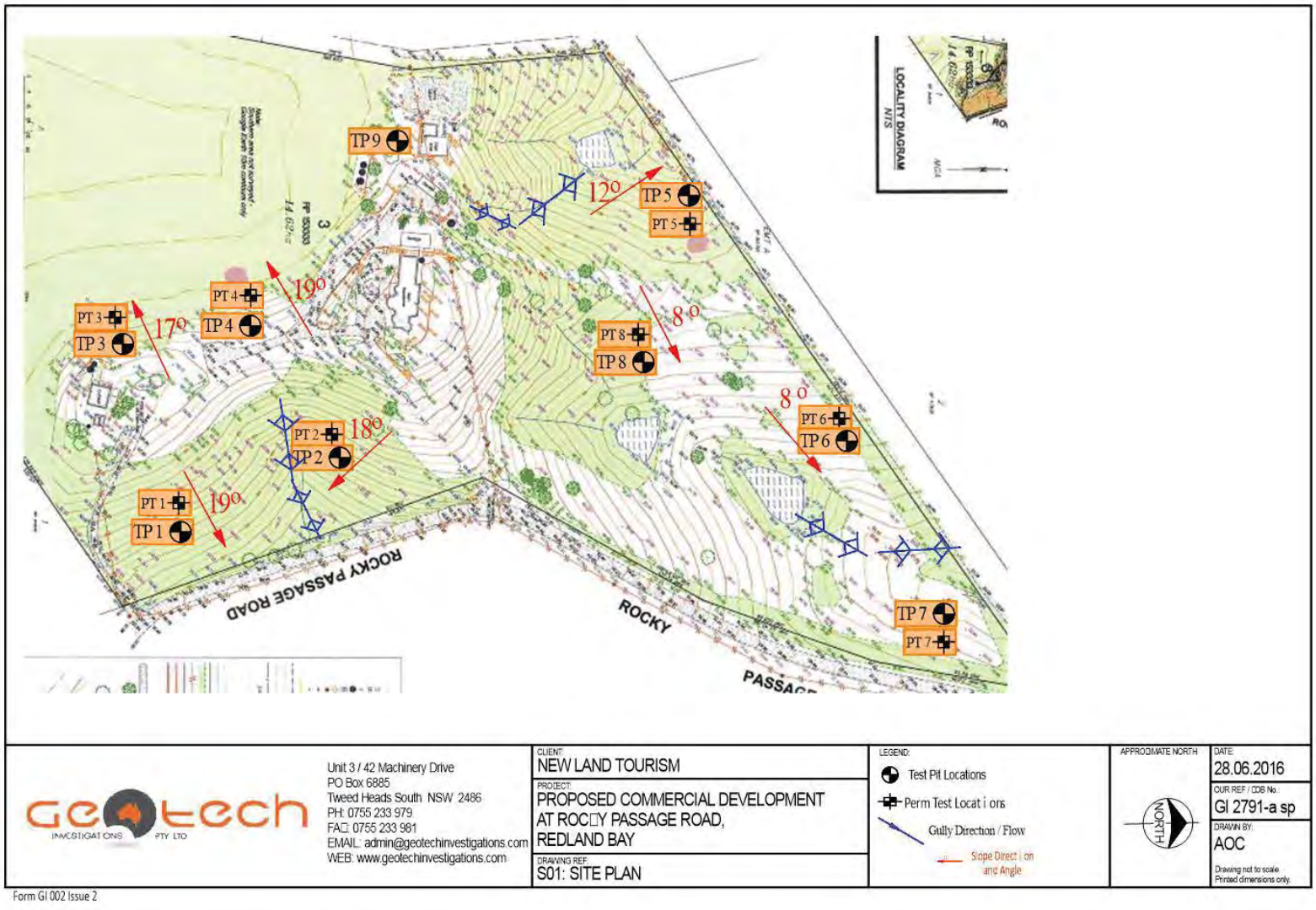
Our Ref: AOC:jw: GI 2791-a

DRILLING
ENVIRONMENTAL
GEOTECHNICAL

APPENDIX A

CONTOUR & DETAIL SURVEY PLAN BY ARNOLD DEVELOPMENT CONSULTANTS (REFERENCED DWG NO: 7091.06 DATED 20/11/2016)
GI SITE PLAN S01


LOCALITY DIAGRAM
NTS
ROCKY PASSAGE ROAD
RP 153333
14.62ha
MGA
ROCKY PASSAGE ROAD
EMT A
RP 801795
3
RP 153333
14.62ha
Note:
Southern area not surveyed -
Google Earth 10m contours only
LEGEND
ARNOLD
DEVELOPMENT CONSULTANTS
Land development strategies through excellence in Land Surveying & Town Planning
DETAIL SURVEY CERTIFICATION
Arnold Development Consultants
Land Surveying, Town Planning & Land Development Strategies
TITLE
CONTOUR & DETAIL SURVEY
PROJECT
Lot 3 RP 153333
147-205 Rocky Passage Road, Redland Bay
CLIENT
New Land Tourism Pty. Ltd.
PROJECT No. 7091.06_DET
SHEET 1 of 1
DATE 20/11/2015
SERVICE DETAILS


TP9
TP5
PT5
12°
TP4
PT4
19°
TP3
PT3
17°
TP8
PT8
8°
TP6
PT6
8°
TP2
PT2
18°
TP1
PT1
19°
TP7
PT7
ROCKY PASSAGE ROAD
ROCKY
LOCALITY DIAGRAM
NTS
Unit 3 / 42 Machinery Drive
PO Box 6885
Tweed Heads South NSW 2486
PH: 0755 233 979
FAX: 0755 233 981
EMAIL: admin@geotechinvestigations.com
WEB: www.geotechinvestigations.com
CLIENT: NEW LAND TOURISM
PROJECT: PROPOSED COMMERCIAL DEVELOPMENT AT ROCKY PASSAGE ROAD, REDLAND BAY
DRAWING REF: S01: SITE PLAN
LEGEND:
Test Pit Locations
Perm Test Locations
Gully Direction / Flow
Slope Direction and Angle
APPROXIMATE NORTH
NORTH
DATE: 28.06.2016
OUR REF / CDB No.: GI 2791-a sp
DRAWN BY: AOC
Drawing not to scale
Printed dimensions only
Form GI 002 Issue 2

Our Ref: AOC:jw: GI 2791-a

DRILLING
ENVIRONMENTAL
GEOTECHNICAL

APPENDIX B

ENGINEERING LOGS – TEST PIT PROFILES TP 1 TO TP 9

GEOTECH INVESTIGATIONS PTY LTD

Unit 3/42 Machinery Drive, Tweed Heads South NSW 2486
Ph: 0755 233 979 Fax: 0755 233 981

ENGINEERING LOG – TEST PIT PROFILE

GPS:	N:	27° 41´ 51.84˝	E:	153° 18´ 6.53˝

CLIENT: NEW LAND TOURISM — **BOREHOLE I.D. :** TP 1

PROJECT: LOT 3 (No.147-205) ROCKY PASSAGE ROAD REDLAND BAY — **JOB No.:** GI 2791-a

EQUIPMENT TYPE: 5.5 TONNE EXCAVATOR — **BUCKET SIZE:** 300mm and 450mm — **PAGE:** 1 of 1

Method	Water	Depth (m)	Graphic Log	Material Description	Consistency / Rel. Density	Sample / Test	DCP Blows / 100mm	Structure and additional observation
TB		0.0		(CI) Sandy CLAY: Medium plasticity, With gravel, Moist ($w<w_p$), Dark grey				TOPSOIL
		0.5		(CH) Silty CLAY: High plasticity, With sand, Moist ($w<w_p$), Pale brown mottled orange/brown	VSt	PP = 280- 350		RESIDUAL
		1.0						Inclusions of (EW) ARENITE
		1.5		(HW) ARENITE: Fine grained, Pale grey mottled brown and orange	VLw Lw	Pick		
		2.0						
		2.5						
		3.0						
		3.5						
		4.0						
		4.5						

TP 1 TERMINATED AT 1.6m – TOOTHED BUCKET REFUSAL REFUSAL

METHOD		WEATHERING	
AD	Auger Drilling	EW	Extremely
C	Casing	HW	Highly
MS	Mud Support	DW	Distinctly
NMLC	Rock Coring	MW	Moderately
RR	Rock Roller	SW	Slightly
TB	Toothed Bucket	F	Fresh
TC	Tri Cone		
WB	Wash Bore		
WATER			
▼	Water Level		
►	Water Seepage		

CONSISTENCY / DENSITY / ROCK STRENGTH			
VS	Very Soft	D	Dense
S	Soft	VD	Very Dense
F	Firm	Fb	Friable
St	Stiff	ELw	Extremely Low
VSt	Very Stiff	VLw	Very Low
Hd	Hard	Lw	Low
VL	Very Loose	M	Medium
L	Loose	H	High
MD	Medium Dense	VH	Very High

SAMPLES / TESTS	
U( )	Undisturbed (size in mm)
D	Disturbed
BS	Bulk Sample
DCP	Dynamic Cone Penetrometer
SPT	Standard Penetrometer Test
N	Number of blows for SPT / 300mm
VS	Vane Shear
A	Acid Sulfate Sample
PP	Pocket Penetrometer (kPa)

Logged By:	AO'C	Date:	30/06/16	Checked By:	AOC	Date:	19/07/16

Form GI 003h Issue 2

GEOTECH INVESTIGATIONS PTY LTD

Unit 3/42 Machinery Drive, Tweed Heads South NSW 2486
Ph: 0755 233 979 Fax: 0755 233 981

ENGINEERING LOG – TEST PIT PROFILE

GPS:	N:	27° 41′ 49.13″	E:	153° 18′ 4.70″

CLIENT: NEW LAND TOURISM	**BOREHOLE I.D. :** TP 2
PROJECT: LOT 3 (No.147-205) ROCKY PASSAGE ROAD REDLAND BAY	**JOB No.:** GI 2791-a
EQUIPMENT TYPE: 5.5 TONNE EXCAVATOR / **BUCKET SIZE:** 300mm and 450mm	**PAGE:** 1 of 1

Method	Water	Depth (m)	Graphic Log	Material Description	Consistency / Rel. Density	Sample / Test	DCP Blows / 100mm	Structure and additional observation
TB		0		(CI) Sandy CLAY: Medium plasticity, With gravel, Moist ($w<w_p$), Dark grey				TOPSOIL
				(CH) Silty CLAY: High plasticity, Trace of sand, Moist ($w<w_p$), Grey /brown mottled dark red/orange	Hd	PP > 400		RESIDUAL
		0.5						
				(EW) SILTSTONE: Remoulds to (MH) Clayey SILT: High plasticity, Moist ($w<w_p$), Pale grey mottled dark red and orange		PP > 400		
		1.0						
				(HW) SILTSTONE: Fine grained, Pale grey mottled brown and orange	Lw			
		1.5						
		2.0						
		2.5						
		3.0						
		3.5						
		4.0						
		4.5						

TP 2 TERMINATED AT 1.2m – TOOTHED BUCKET REFUSAL REFUSAL

METHOD		WEATHERING	
AD	Auger Drilling	EW	Extremely
C	Casing	HW	Highly
MS	Mud Support	DW	Distinctly
NMLC	Rock Coring	MW	Moderately
RR	Rock Roller	SW	Slightly
TB	Toothed Bucket	F	Fresh
TC	Tri Cone		
WB	Wash Bore		
WATER			
▼	Water Level		
►	Water Seepage		

CONSISTENCY / DENSITY / ROCK STRENGTH			
VS	Very Soft	D	Dense
S	Soft	VD	Very Dense
F	Firm	Fb	Friable
St	Stiff	ELw	Extremely Low
VSt	Very Stiff	VLw	Very Low
Hd	Hard	Lw	Low
VL	Very Loose	M	Medium
L	Loose	H	High
MD	Medium Dense	VH	Very High

SAMPLES / TESTS	
U( )	Undisturbed (size in mm)
D	Disturbed
BS	Bulk Sample
DCP	Dynamic Cone Penetrometer
SPT	Standard Penetrometer Test
N	Number of blows for SPT / 300mm
VS	Vane Shear
A	Acid Sulfate Sample
PP	Pocket Penetrometer (kPa)

Logged By:	AO'C	Date:	30/06/16	Checked By:	AOC	Date:	19/07/16

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GEOTECH INVESTIGATIONS PTY LTD

Unit 3/42 Machinery Drive, Tweed Heads South NSW 2486
Ph: 0755 233 979 Fax: 0755 233 981

ENGINEERING LOG – TEST PIT PROFILE

GPS:	N:	27° 41′ 52.6″	E:	153° 18′ 2.66″

CLIENT: NEW LAND TOURISM	**BOREHOLE I.D. :** TP 3
PROJECT: LOT 3 (No.147-205) ROCKY PASSAGE ROAD REDLAND BAY	**JOB No.:** GI 2791-a
EQUIPMENT TYPE: 5.5 TONNE EXCAVATOR / **BUCKET SIZE:** 300mm and 450mm	**PAGE:** 1 of 1

Method	Water	Depth (m)	Graphic Log	Material Description	Consistency / Rel. Density	Sample / Test	DCP Blows / 100mm	Structure and additional observation
TB		0		(CI) Sandy CLAY: Medium plasticity, Moist ($w<w_p$), Dark grey				TOPSOIL
		0.5		(CI) Silty CLAY: Medium plasticity, With sand, Moist ($w<w_p$), Pale brown mottled orange/brown	VSt	PP = 350		RESIDUAL
		1.0		(EW) SILTSTONE: Remoulds to (MH) Clayey SILT: High plasticity, Moist ($w<w_p$), Pale grey mottled dark red and orange	Hd	PP > 400		
				(HW) SILTSTONE: Fine grained, Pale grey mottled brown and orange	Lw	Pick		
		1.5						
		2.0						
		2.5						
		3.0						
		3.5						
		4.0						
		4.5						

TP 3 TERMINATED AT 1.2m – TOOTHED BUCKET REFUSAL REFUSAL

METHOD		WEATHERING		CONSISTENCY / DENSITY / ROCK STRENGTH				SAMPLES / TESTS	
AD	Auger Drilling	EW	Extremely	VS	Very Soft	D	Dense	U( )	Undisturbed (size in mm)
C	Casing	HW	Highly	S	Soft	VD	Very Dense	D	Disturbed
MS	Mud Support	DW	Distinctly	F	Firm	Fb	Friable	BS	Bulk Sample
NMLC	Rock Coring	MW	Moderately	St	Stiff	ELw	Extremely Low	DCP	Dynamic Cone Penetrometer
RR	Rock Roller	SW	Slightly	VSt	Very Stiff	VLw	Very Low	SPT	Standard Penetrometer Test
TB	Toothed Bucket	F	Fresh	Hd	Hard	Lw	Low	N	Number of blows for SPT / 300mm
TC	Tri Cone			VL	Very Loose	M	Medium	VS	Vane Shear
WB	Wash Bore			L	Loose	H	High	A	Acid Sulfate Sample
WATER				MD	Medium Dense	VH	Very High	PP	Pocket Penetrometer (kPa)
▼	Water Level								
►	Water Seepage								

Logged By:	AO'C	Date:	30/06/16	Checked By:	AOC	Date:	19/07/16

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Unit 3/42 Machinery Drive, Tweed Heads South NSW 2486
Ph: 0755 233 979 Fax: 0755 233 981

ENGINEERING LOG – TEST PIT PROFILE

GPS:	N:	27° 41′ 50.05″	E:	153° 18′ 2.06″

CLIENT: NEW LAND TOURISM — **BOREHOLE I.D. :** TP 4

PROJECT: LOT 3 (No.147-205) ROCKY PASSAGE ROAD REDLAND BAY — **JOB No.:** GI 2791-a

EQUIPMENT TYPE: 5.5 TONNE EXCAVATOR — **BUCKET SIZE:** 300mm and 450mm — **PAGE:** 1 of 1

Method	Water	Depth (m)	Graphic Log	Material Description	Consistency / Rel. Density	Sample / Test	DCP Blows / 100mm	Structure and additional observation
TB		0.25		(Cl) Sandy CLAY: Medium plasticity, Moist ($w<w_p$), Dark grey				TOPSOIL
		0.5		(Cl) Gravelly CLAY: Medium plasticity, With sand, Trace of cobbles, Moist ($w<w_p$), Grey/brown	St	PP = 120 - 150		FILL
		1.0		(CH) Silty CLAY: High plasticity, Trace of sand, Moist ($w<w_p$), Grey brown mottled dark red/orange	Hd	PP > 400		RESIDUAL
				(HW) SILTSTONE: Fine grained, Pale grey mottled brown and orange	Lw	Pick		
		1.5						
		2.0						
		2.5						
		3.0						
		3.5						
		4.0						
		4.5						

TP 4 TERMINATED AT 1.3m – TOOTHED BUCKET REFUSAL REFUSAL

METHOD		WEATHERING	
AD	Auger Drilling	EW	Extremely
C	Casing	HW	Highly
MS	Mud Support	DW	Distinctly
NMLC	Rock Coring	MW	Moderately
RR	Rock Roller	SW	Slightly
TB	Toothed Bucket	F	Fresh
TC	Tri Cone		
WB	Wash Bore		

WATER	
▼	Water Level
►	Water Seepage

CONSISTENCY / DENSITY / ROCK STRENGTH			
VS	Very Soft	D	Dense
S	Soft	VD	Very Dense
F	Firm	Fb	Friable
St	Stiff	ELw	Extremely Low
VSt	Very Stiff	VLw	Very Low
Hd	Hard	Lw	Low
VL	Very Loose	M	Medium
L	Loose	H	High
MD	Medium Dense	VH	Very High

SAMPLES / TESTS	
U( )	Undisturbed (size in mm)
D	Disturbed
BS	Bulk Sample
DCP	Dynamic Cone Penetrometer
SPT	Standard Penetrometer Test
N	Number of blows for SPT / 300mm
VS	Vane Shear
A	Acid Sulfate Sample
PP	Pocket Penetrometer (kPa)

Logged By:	AO'C	Date:	30/06/16	Checked By:	AOC	Date:	19/07/16

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ENGINEERING LOG – TEST PIT PROFILE

GPS:	N:	27° 41′ 43.1″	E:	153° 18′ 0.21″

CLIENT: NEW LAND TOURISM — **BOREHOLE I.D. :** TP 5

PROJECT: LOT 3 (No.147-205) ROCKY PASSAGE ROAD REDLAND BAY — **JOB No.:** GI 2791-a

EQUIPMENT TYPE: 5.5 TONNE EXCAVATOR — **BUCKET SIZE:** 300mm and 450mm — **PAGE:** 1 of 1

Method	Water	Depth (m)	Graphic Log	Material Description	Consistency / Rel. Density	Sample / Test	DCP Blows / 100mm	Structure and additional observation
TB		0.15		(CL) Sandy CLAY: Low plasticity, With silt, Moist, Brown				TOPSOIL
				(CH) Silty CLAY: High plasticity, Trace of sand, Moist ($w<w_p$), Pale brown mottled orange	Hd	PP > 400		RESIDUAL
		0.5						
				(EW) SILTSTONE: Remoulds to (MH) Clayey SILT: High plasticity, Moist ($w<w_p$), Pale grey mottled dark red and orange				
		1.0						
				(HW) SILTSTONE: Fine grained, Pale grey mottled red and orange	VLw /Lw	Pick		
		1.5						
		2.0						
		2.5						
		3.0						
		3.5						
		4.0						
		4.5						

TP 5 TERMINATED AT 1.3m – TOOTHED BUCKET REFUSAL REFUSAL

METHOD		WEATHERING	
AD	Auger Drilling	EW	Extremely
C	Casing	HW	Highly
MS	Mud Support	DW	Distinctly
NMLC	Rock Coring	MW	Moderately
RR	Rock Roller	SW	Slightly
TB	Toothed Bucket	F	Fresh
TC	Tri Cone		
WB	Wash Bore		

WATER	
▼	Water Level
►	Water Seepage

CONSISTENCY / DENSITY / ROCK STRENGTH			
VS	Very Soft	D	Dense
S	Soft	VD	Very Dense
F	Firm	Fb	Friable
St	Stiff	ELw	Extremely Low
VSt	Very Stiff	VLw	Very Low
Hd	Hard	Lw	Low
VL	Very Loose	M	Medium
L	Loose	H	High
MD	Medium Dense	VH	Very High

SAMPLES / TESTS	
U( )	Undisturbed (size in mm)
D	Disturbed
BS	Bulk Sample
DCP	Dynamic Cone Penetrometer
SPT	Standard Penetrometer Test
N	Number of blows for SPT / 300mm
VS	Vane Shear
A	Acid Sulfate Sample
PP	Pocket Penetrometer (kPa)

Logged By: AO'C **Date:** 30/06/16 **Checked By:** AOC **Date:** 19/07/16

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Unit 3/42 Machinery Drive, Tweed Heads South NSW 2486
Ph: 0755 233 979 Fax: 0755 233 981

ENGINEERING LOG – TEST PIT PROFILE

GPS:	N:	27° 41´ 39.51˝	E:	153° 18´ 4.72˝

CLIENT: NEW LAND TOURISM	**BOREHOLE I.D. :** TP 6
PROJECT: LOT 3 (No.147-205) ROCKY PASSAGE ROAD REDLAND BAY	**JOB No.:** GI 2791-a
EQUIPMENT TYPE: 5.5 TONNE EXCAVATOR **BUCKET SIZE:** 300mm and 450mm	**PAGE:** 1 of 1

Method	Water	Depth (m)	Graphic Log	Material Description	Consistency / Rel. Density	Sample / Test	DCP Blows / 100mm	Structure and additional observation
TB		0		(CL) Sandy CLAY: Low plasticity, With silt, Moist, Brown				TOPSOIL
				(CH) Silty CLAY: High plasticity, Trace of sand, Moist ($w>w_p$), Orange/brown mottled brown	VSt	PP = 340		RESIDUAL
		0.5						
		1.0						
				(CH) Silty CLAY: High plasticity, Moist ($w>w_p$), Pale grey mottled dark red and orange	Hd	PP > 400		
		1.5						
				(EW) SILTSTONE: Remoulds to (MH) Clayey SILT: High plasticity, Moist ($w<w_p$), Pale grey mottled dark red and orange		PP > 400		
				(HW) SILTSTONE: Fine grained, Pale grey mottled red and orange	Lw	Pick		
		2.0						
		2.5						
		3.0						
		3.5						
		4.0						
		4.5						

TP 6 TERMINATED AT 1.9m – TOOTHED BUCKET REFUSAL REFUSAL

METHOD		WEATHERING		CONSISTENCY / DENSITY / ROCK STRENGTH				SAMPLES / TESTS	
AD	Auger Drilling	EW	Extremely	VS	Very Soft	D	Dense	U( )	Undisturbed (size in mm)
C	Casing	HW	Highly	S	Soft	VD	Very Dense	D	Disturbed
MS	Mud Support	DW	Distinctly	F	Firm	Fb	Friable	BS	Bulk Sample
NMLC	Rock Coring	MW	Moderately	St	Stiff	ELw	Extremely Low	DCP	Dynamic Cone Penetrometer
RR	Rock Roller	SW	Slightly	VSt	Very Stiff	VLw	Very Low	SPT	Standard Penetrometer Test
TB	Toothed Bucket	F	Fresh	Hd	Hard	Lw	Low	N	Number of blows for SPT / 300mm
TC	Tri Cone			VL	Very Loose	M	Medium	VS	Vane Shear
WB	Wash Bore			L	Loose	H	High	A	Acid Sulfate Sample
WATER				MD	Medium Dense	VH	Very High	PP	Pocket Penetrometer (kPa)
▼	Water Level								
►	Water Seepage								

Logged By:	AO'C	Date:	30/06/16	Checked By:	AOC	Date:	19/07/16

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Ph: 0755 233 979 Fax: 0755 233 981

ENGINEERING LOG – TEST PIT PROFILE

GPS:	N:	27° 41′ 37.53″	E:	153° 18′ 9.06″

CLIENT: NEW LAND TOURISM — **BOREHOLE I.D. :** TP 7

PROJECT: LOT 3 (No.147-205) ROCKY PASSAGE ROAD REDLAND BAY — **JOB No.:** GI 2791-a

EQUIPMENT TYPE: 5.5 TONNE EXCAVATOR — **BUCKET SIZE:** 300mm and 450mm — **PAGE:** 1 of 1

Method	Water	Depth (m)	Graphic Log	Material Description	Consistency / Rel. Density	Sample / Test	DCP Blows / 100mm	Structure and additional observation
TB		0		(CL) Silty CLAY: Low plasticity, With clay, Moist ($w<w_p$), Grey/brown				TOPSOIL
		0.5		(CH) Silty CLAY: High plasticity, Trace of sand, Moist ($w>w_p$), Grey /brown and dark red	VSt	PP = 310 - 360		RESIDUAL
		1.0						
		1.5		(CH) Silty CLAY: High plasticity, Moist ($w>w_p$), Pale grey mottled dark red and orange	Hd	PP > 400		
		2.0		(MH) Clayey SILT: High plasticity, Moist ($w<w_p$), Pale grey mottled dark red and orange		PP > 400		Pockets of (EW) siltstone
		2.5						
		3.0						
		3.5						
		4.0						
		4.5						

TP 7 TERMINATED AT 2.5m – LIMIT OF INVESTIGATION

METHOD		WEATHERING		CONSISTENCY / DENSITY / ROCK STRENGTH				SAMPLES / TESTS	
AD	Auger Drilling	EW	Extremely	VS	Very Soft	D	Dense	U( )	Undisturbed (size in mm)
C	Casing	HW	Highly	S	Soft	VD	Very Dense	D	Disturbed
MS	Mud Support	DW	Distinctly	F	Firm	Fb	Friable	BS	Bulk Sample
NMLC	Rock Coring	MW	Moderately	St	Stiff	ELw	Extremely Low	DCP	Dynamic Cone Penetrometer
RR	Rock Roller	SW	Slightly	VSt	Very Stiff	VLw	Very Low	SPT	Standard Penetrometer Test
TB	Toothed Bucket	F	Fresh	Hd	Hard	Lw	Low	N	Number of blows for SPT / 300mm
TC	Tri Cone			VL	Very Loose	M	Medium	VS	Vane Shear
WB	Wash Bore			L	Loose	H	High	A	Acid Sulfate Sample
WATER				MD	Medium Dense	VH	Very High	PP	Pocket Penetrometer (kPa)
▼	Water Level								
►	Water Seepage								

Logged By:	AO'C	Date:	30/06/16	Checked By:	AOC	Date:	19/07/16

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Ph: 0755 233 979 Fax: 0755 233 981

ENGINEERING LOG – TEST PIT PROFILE

GPS:	N:	27° 41′ 42.8″	E:	153° 18′ 3.60″

CLIENT: NEW LAND TOURISM — **BOREHOLE I.D. :** TP 8

PROJECT: LOT 3 (No.147-205) ROCKY PASSAGE ROAD REDLAND BAY — **JOB No.:** GI 2791-a

EQUIPMENT TYPE: 5.5 TONNE EXCAVATOR — **BUCKET SIZE:** 300mm and 450mm — **PAGE:** 1 of 1

Method	Water	Depth (m)	Graphic Log	Material Description	Consistency / Rel. Density	Sample / Test	DCP Blows / 100mm	Structure and additional observation
TB		0		(CL) Sandy CLAY: Low plasticity, With silt, Moist, Brown				TOPSOIL
				(CH) Silty CLAY: High plasticity, Trace of sand, Moist ($w>w_p$), Orange/brown mottled brown	VSt	PP = 310 - 340		RESIDUAL
		0.5						
		1.0		(CH) Silty CLAY: High plasticity, Moist ($w>w_p$), Pale grey mottled dark red and orange	Hd	PP > 400		
				(HW) SILTSTONE: Fine grained, Pale grey mottled red and orange	VLw/Lw	Pick		
		1.5						
		2.0						
		2.5						
		3.0						
		3.5						
		4.0						
		4.5						

TP 8 TERMINATED AT 1.3m – TOOTHED BUCKET REFUSAL REFUSAL

METHOD		WEATHERING	
AD	Auger Drilling	EW	Extremely
C	Casing	HW	Highly
MS	Mud Support	DW	Distinctly
NMLC	Rock Coring	MW	Moderately
RR	Rock Roller	SW	Slightly
TB	Toothed Bucket	F	Fresh
TC	Tri Cone		
WB	Wash Bore		
WATER			
▼	Water Level		
►	Water Seepage		

CONSISTENCY / DENSITY / ROCK STRENGTH			
VS	Very Soft	D	Dense
S	Soft	VD	Very Dense
F	Firm	Fb	Friable
St	Stiff	ELw	Extremely Low
VSt	Very Stiff	VLw	Very Low
Hd	Hard	Lw	Low
VL	Very Loose	M	Medium
L	Loose	H	High
MD	Medium Dense	VH	Very High

SAMPLES / TESTS	
U( )	Undisturbed (size in mm)
D	Disturbed
BS	Bulk Sample
DCP	Dynamic Cone Penetrometer
SPT	Standard Penetrometer Test
N	Number of blows for SPT / 300mm
VS	Vane Shear
A	Acid Sulfate Sample
PP	Pocket Penetrometer (kPa)

Logged By:	AO'C	Date:	30/06/16	Checked By:	AOC	Date:	19/07/16

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ENGINEERING LOG – TEST PIT PROFILE

GPS:	N:	27° 41′ 47.13″	E:	153° 17′ 59.09″

CLIENT: NEW LAND TOURISM	**BOREHOLE I.D. :** TP 9
PROJECT: LOT 3 (No.147-205) ROCKY PASSAGE ROAD REDLAND BAY	**JOB No.:** GI 2791-a
EQUIPMENT TYPE: 5.5 TONNE EXCAVATOR / **BUCKET SIZE:** 300mm and 450mm	**PAGE:** 1 of 1

Method	Water	Depth (m)	Graphic Log	Material Description	Consistency / Rel. Density	Sample / Test	DCP Blows / 100mm	Structure and additional observation
TB		0		(CL) Sandy CLAY: Low plasticity, With silt, Moist, Brown				TOPSOIL
		0.5		(CH) Silty CLAY: High plasticity, Trace of sand, Moist ($w>w_p$), Orange/brown mottled brown	Hd	PP > 400		RESIDUAL
		1.0		(EW) SILTSTONE: Remoulds to (MH) Clayey SILT: High plasticity, Moist ($w<w_p$), Pale grey mottled dark red and orange		PP > 400		
		1.5		(HW) SILTSTONE: Fine grained, Pale grey mottled red and orange	VLw /Lw			
		2.0						
		2.5						
		3.0						
		3.5						
		4.0						
		4.5						

TP 9 TERMINATED AT 1.6m – TOOTHED BUCKET REFUSAL REFUSAL

METHOD		WEATHERING		CONSISTENCY / DENSITY / ROCK STRENGTH				SAMPLES / TESTS	
AD	Auger Drilling	EW	Extremely	VS	Very Soft	D	Dense	U( )	Undisturbed (size in mm)
C	Casing	HW	Highly	S	Soft	VD	Very Dense	D	Disturbed
MS	Mud Support	DW	Distinctly	F	Firm	Fb	Friable	BS	Bulk Sample
NMLC	Rock Coring	MW	Moderately	St	Stiff	ELw	Extremely Low	DCP	Dynamic Cone Penetrometer
RR	Rock Roller	SW	Slightly	VSt	Very Stiff	VLw	Very Low	SPT	Standard Penetrometer Test
TB	Toothed Bucket	F	Fresh	Hd	Hard	Lw	Low	N	Number of blows for SPT / 300mm
TC	Tri Cone			VL	Very Loose	M	Medium	VS	Vane Shear
WB	Wash Bore			L	Loose	H	High	A	Acid Sulfate Sample
WATER				MD	Medium Dense	VH	Very High	PP	Pocket Penetrometer (kPa)
▼	Water Level								
►	Water Seepage								

Logged By:	AO'C	Date:	30/06/16	Checked By:	AOC	Date:	19/07/16

Form GI 003h Issue 2

Our Ref: AOC:jw: GI 2791-a

DRILLING ENVIRONMENTAL GEOTECHNICAL

APPENDIX C

GEOTECHNICAL REPORT STANDARD NOTES

GEOTECHNICAL REPORT STANDARD NOTES

SCOPE These standard notes may be of assistance when understanding terms and recommendations given in this report. These notes are for general conditions and not all terms given may be of concern to the report attached. The descriptive terms adopted by Geotech Investigations Pty Ltd are given below and are largely consistent with Australian Standards AS1726-1993 'Geotechnical Site Investigations'.

CLIENT can be described and is limited to the financier of this geotechnical investigation.

LEGALITY and privacy of this document is based on communication between Geotech Investigations Pty Ltd and the client. Unless indicated otherwise the report was prepared specifically for the client involved and for the purposes indicated by the client. Use by any other party for any purpose, or by the client for a different purpose, will result in recommendations becoming invalid and Geotech Investigations Pty Ltd will hold no responsibility for problems which may arise.

GEOTECHNICAL REPORTS are predominantly derived using professional estimates determined from the results of fieldwork, in-situ and laboratory testing and experience from previous investigations in the area, from which geotechnical engineers then formulate an opinion about overall subsurface conditions. The client must be made aware that the investigations are undertaken to ensure minimal site impact using test-pits or small diameter boreholes and soil conditions on-site may vary from those encountered during the investigation.

CLIENTS RESPONSIBILITY to notify this office should there be adjustments in proposed structure/location or inconsistencies with material descriptions given in this report and those encountered on site. Geotech Investigations Pty Ltd is able to provide a range of services from on-site inspections to full project supervision to confirm recommendations given in the report.

CSIRO Publication BTF 18 'Foundation Maintenance and Footing Performance: A Homeowner's Guide' explains how to adequately maintain drainage during and post construction which lies as the responsibility of the client. Suitable drainage ensures recommendations given in this report remain valid.

INVESTIGATION METHODS adopted by Geotech Investigations Pty Ltd are designed to incorporate individual project-specific factors to obtain information on the physical properties of soil and rock around a site to design earthworks and foundations for proposed structures. The following methods of investigation currently adopted by this company are summarised below:-

HAND AUGER – investigations enable field work to be undertaken where access is limited. The materials must have sufficient cohesion to stand unsupported in an unlined borehole and there must be no large cobbles boulders or other obstructions which would prevent rotation of the auger.

TEST-PITS – investigations are carried out with an excavator or backhoe, allowing a visual inspection of sub-surface material in-situ and from samples removed. The limit of investigation is restricted by the reach of the excavator or backhoe.

CONTINUOUS SPIRAL FLIGHT AUGERING TECHNIQUES – investigations are advanced by pushing a 100mm diameter spiral into the sub-surface and withdrawing it at regular intervals to allow sampling or testing as it emerges.

WASH BORING – investigations are advanced by removing the loosened soil from the borehole by a stream of water or drilling mud issuing from the lower end of the wash pipe which is worked up and down or rotated by hand in the borehole. The water or mud carries the soil up the borehole where it overflows at ground level where the soil in suspension is allowed to settle in a pond or tank and the fluid is re-circulated or discharged to waste as required.

NON-CORE ROTARY DRILLING – investigations are advanced using a rotary bit with water being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from feel and rate of penetration.

ROTARY MUD DRILLING – is carried out as above using mud as support and circulating fluid for the borehole drilling. The mud tends to mask the cuttings and reliable identification is again only possible from separate intact sampling.

CONTINUOUS CORE DRILLING – investigations are carried out in rock material, specimens of rock in the form of cylindrical cores are recovered from the drill holes by the means of core barrel. The core barrel is provided at its lower end with a detachable core bit which carries industrial diamond chips in a matrix of metal. Rotation of the barrel by means of the drill rods causes the core bit to cut an annulus in the rock, the cuttings being washed to the surface by a stream of pumped down the hollow drill rods.

GEOTECHNICAL REPORT STANDARD NOTES

TESTING METHODS adopted by Geotech Investigations Pty Ltd to determine soil properties include but not limited to the following:-

U50 – Undisturbed samples are obtained by inserting a 50mm diameter thin-walled steel tube into the material and withdrawing with a sample of the soil in a moderately undisturbed condition.

PP – Pocket Penetrometer tests are commonly used on thin walled tube samples of cohesive soils to evaluate consistency and approximate unconfined compressive strength of saturated cohesive soils. They may also be used for the same purpose in freshly excavated trenches.

VS – Vane Shear test are commonly used in-situ or on thin walled tube samples of cohesive soils by introducing the vane into the material where the measurement of the undrained shear strength is required. Then the vane is rotated and the torsional force required to cause shearing is calculated.

DCP – Dynamic Cone Penetrometer tests are commonly used in-situ to measure the strength attributes of penetrability and compaction of sub-surface materials.

SPT – Standard Penetration Tests are commonly uses to determine the density of granular deposits but are occasionally used in cohesive material as a means of determining strength and also of obtaining a relatively undisturbed sample. Samples and results are obtained by driving a 50mm diameter split tube through blows from a slide hammer with a weight of 63.5kg falling through a distance of 760mm. Blow counts are recorded for 150mm intervals with the sum of the number of blows required for the second and third 150mm of penetration is termed the "standard penetration resistance" or the "N-value".

GEOLOGICAL ORIGINS of sub-surface material plays a considerable role in the development of engineering parameters and have been summarised as follows:-

FILL – materials are man made deposits, which may be significantly more variable between test locations than naturally occurring soils.

RESIDUAL – soils are present in a region as a result of weathering over the geological time scale.

COLLUVIAL – soils have been deposited recently, on the geological time scale, as soils being transported slowly down slope due to gravitational creep.

ALLUVIAL – soils have been deposited recently, on the geological time scale, as water borne materials.

AEOLIAN – soils have been deposited recently, on the geological time scale, as wind borne materials.

SOIL DESCRIPTION is based on an assessment of disturbed samples, as recovered from boreholes and excavations, and from undisturbed materials. Soil descriptions adopted by Geotech Investigations Pty Ltd are largely consistent with AS 1726-1993 *'Geotechnical Site Investigation'*. Soil types are described according to the predominating particle size, qualified by the grading of other particles present on the following bases detailed in Table 1.

COHESIVE SOILS ability to hold moisture known as its liquid limit is the state of a soil when it goes from a solid state to a liquid state described in Table 2

TABLE 1

Soil Classification	Particle Size
Clay	< 0.002 mm
Silt	0.002 – 0.06 mm
Sand	0.06 – 2.00 mm
Gravel	2.00 – 60.0 mm

TABLE 2

Descriptive Type	Range of Liquid Limit %
Of low plasticity	≤ 35
Of medium plasticity	> 35 ≤ 50
Of high plasticity	> 50

Furthermore to soil description cohesive soils are described on their strength (assessed in conjunction with penetration tests) and liquid limit. Non-cohesive soil strengths are described by their density index. With descriptions for cohesive and non-cohesive soils summarised in Table 3.

TABLE 3

COHESIVE SOILS		NON-COHESIVE SOILS	
Term	**Undrained Shear Strength kPa**	**Term**	**Density Index %**
Very soft	≤ 12	Very Loose	≤15
Soft	> 12 ≤25	Loose	> 15 ≤35
Firm	> 25 ≤50	Medium Dense	> 35 ≤65
Stiff	> 50 ≤100	Dense	> 65 ≤85
Very Stiff	> 100 ≤200	Very Dense	> 85
Hard	> 200		

Description of terms used to describe material portion are summarised in Table 4.

TABLE 4

COARSE GRAINIED SOILS		FINE GRAINED SOILS	
% Fines	**Modifier**	**% Coarse**	**Modifier**
≤ 5	Omit or 'trace'	≤ 15	Omit or 'trace'
> 5 ≤12	Describe as 'with'	> 15 ≤30	Describe as 'with'
> 12	Prefix soil as 'silty/clayey'	> 30	Prefix soil as 'sandy/gravelly'

ROCK DESCRIPTIONS are determined from disturbed samples or specimens collected during field investigations. A rocks presence of defects and the effects of weathering are likely to have a great influence on engineering behaviour.

Rock Material Weathering Classification is summarised in Table 5.

TABLE 5

Term	Symbol	Definition
Residual Soils	-	Soil developed on extremely weathered rock; the mass structure and substance fabric are no longer evident; there is a large change in volume but the soil has not been significantly transported
Extremely Weathered Rock	XW	Rock is weathered to such an extent that it has 'soil' properties, i.e. it either disintegrates or can be remoulded, in water
Distinctly Weathered Rock	DW	Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining. Porosity may be increased by leaching, or may be decreased due to decomposition of weathering products in pores
Slightly Weathered Rock	SW	Rock is slightly discoloured but shows little or no change of strength from fresh rock
Fresh rock	FR	Rock shows no signs of decomposition or staining

Rock Material Strength Classification is summarised in Table 6.

TABLE 6

Term	Symbol	Point load index (MPa) I,50	Field guide to strength
Extremely Low	EL	≤0.03	Easily remoulded by hand to a material with soil properties
Very Low	VL	>0.03 ≤0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; too hard to cut a triaxial sample by hand. Pieces up to 3cm thick can be broken by finger pressure
Low	L	>0.1 ≤0.3	Easily scored with a knife; indentations 1mm to 3mm show in the specimen with firm blows of the pick point; has dull sound under hammer. A piece of core 150mm long 50mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling
Medium	M	>0.3 ≤1.0	Readily scored with a knife; a piece of core 150mm long by 50mm diameter can be broken by hand with difficulty
High	H	>1.0 ≤3.0	A piece of core 150mm long by 50mm diameter cannot be broken by hand but can be broken by a pick with a single firm blow; rock rings under hammer
Very High	VH	>3.0 ≤10	Hand specimen breaks with pick after more than one blow; rock rings under hammer
Extremely High	EH	>10	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer

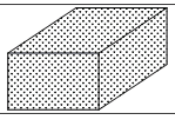
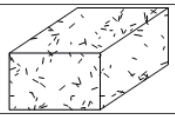
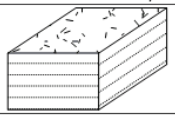
Rock Material Defect Shapes are summarised in Table 7.

TABLE 7

Term	Description
Planar	The defect does not vary in orientation.
Curved	The defect has a gradual change in orientation
Undulating	The defect has a wavy surface
Stepped	The defect has one or more well defined steps.
Irregular	The defect has many sharp changes of orientation
Smooth	The defect has a flat even finish
Rough	The defect has a irregular disoriented finish

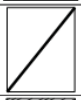
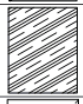
Rock Material Texture and Fabric are summarised in Table 8.

TABLE 8

Geological Description	Massive		Layered (Bedded foliate cleaved)
Diagram			
Fabric Type	Effectively homogenous and isotropic. Bulky or equi-dimensional grains uniformly distributed	Effectively homogeneous and isotropic. Elongated	Effective homogeneous with planar anisotropy. Elongated or tabular grains or pores in a layered arrangement

Rock Material Defect Type is summarised in Table 9

TABLE 9

Term	Definition	Diagram
Bedding	Signifying existence of beds or laminate. Planes dividing sedimentary rocks of the same or different lithology. Structure occurring in granite and similar rocks evident in a tendency to split more or less horizontally to the land surface	
Cross Bedding	Also called cross-lamination or false bedding. The structure commonly present in granular sedimentary rocks, which consists of tabular, irregularly lenticular or wedge-shaped bodies lying essentially parallel to the general stratification and which them selves show pronounced lamination structure in which the laminae are steeply inclined to the general bedding.	
Crushed Seam	A fracture at a more or less acute angle to applied force generally with some pulverized material along its surface	
Joint	A fracture in rock, generally more or less vertical or transverse to bedding, along which no appreciable movement has occurred.	
Parting	A small joint in rock or a layered rock where the tendency of crystals to separate along certain planes that are not true cleavage planes.	
Sheared Zone	A fracture that results from stresses which tend to shear one part of a specimen past the adjacent part	

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DRILLING ENVIRONMENTAL GEOTECHNICAL

APPENDIX D

AGS AUSTRALIAN GEOGUIDE LR7 (LANDSLIDE RISK)
GUIDELINES TO GOOD AND BAD HILLSIDE PRACTICE

AUSTRALIAN GEOGUIDE LR7 (LANDSLIDE RISK)

LANDSLIDE RISK

Concept of Risk

Risk is a familiar term, but what does it really mean? It can be defined as *"a measure of the probability and severity of an adverse effect to health, property, or the environment."* This definition may seem a bit complicated. In relation to landslides, geotechnical practitioners (GeoGuide LR1) are required to assess risk in terms of the likelihood that a particular landslide will occur and the possible consequences. This is called landslide risk assessment. The consequences of a landslide are many and varied, but our concerns normally focus on loss of, or damage to, property and loss of life.

Landslide Risk Assessment

Some local councils in Australia are aware of the potential for landslides within their jurisdiction and have responded by designating specific "landslide hazard zones". Development in these areas is often covered by special regulations. If you are contemplating building, or buying an existing house, particularly in a hilly area, or near cliffs, go first for information to your local council.

Landslide risk assessment must be undertaken by a geotechnical practitioner. It may involve visual inspection, geological mapping, geotechnical investigation and monitoring to identify:

- potential landslides (there may be more than one that could impact on your site)
- the likelihood that they will occur
- the damage that could result
- the cost of disruption and repairs and
- the extent to which lives could be lost.

Risk assessment is a predictive exercise, but since the ground and the processes involved are complex, prediction tends to lack precision. If you commission a landslide risk assessment for a particular site you should expect to receive a report prepared in accordance with current professional guidelines and in a form that is acceptable to your local council, or planning authority.

Risk to Property

Table 1 indicates the terms used to describe risk to property. Each risk level depends on an assessment of how likely a landslide is to occur and its consequences in dollar terms. "Likelihood" is the chance of it happening in any one year, as indicated in Table 2. "Consequences" are related to the cost of repairs and temporary loss of use if a landslide occurs. These two factors are combined by the geotechnical practitioner to determine the Qualitative Risk.

TABLE 2: LIKELIHOOD

Likelihood	Annual Probability
Almost Certain	1:10
Likely	1:100
Possible	1:1,000
Unlikely	1:10,000
Rare	1:100,000
Barely credible	1:1,000,000

The terms "unacceptable", "may be tolerated", etc. in Table 1 indicate how most people react to an assessed risk level. However, some people will always be more prepared, or better able, to tolerate a higher risk level than others.

Some local councils and planning authorities stipulate a maximum tolerable level of risk to property for developments within their jurisdictions. In these situations the risk must be assessed by a geotechnical practitioner. If stabilisation works are needed to meet the stipulated requirements these will normally have to be carried out as part of the development, or consent will be withheld.

TABLE 1: RISK TO PROPERTY

Qualitative Risk		Significance - Geotechnical engineering requirements
Very high	VH	**Unacceptable** without treatment. Extensive detailed investigation and research, planning and implementation of treatment options essential to reduce risk to Low. May be too expensive and not practical. Work likely to cost more than the value of the property.
High	H	**Unacceptable** without treatment. Detailed investigation, planning and implementation of treatment options required to reduce risk to acceptable level. Work would cost a substantial sum in relation to the value of the property.
Moderate	M	**May be tolerated** in certain circumstances (subject to regulator's approval) but requires investigation, planning and implementation of treatment options to reduce the risk to Low. Treatment options to reduce to Low risk should be implemented as soon as possible.
Low	L	**Usually acceptable** to regulators. Where treatment has been needed to reduce the risk to this level, ongoing maintenance is required.
Very Low	VL	**Acceptable**. Manage by normal slope maintenance procedures.

AUSTRALIAN GEOGUIDE LR7 (LANDSLIDE RISK)

Risk to Life

Most of us have some difficulty grappling with the concept of risk and deciding whether, or not, we are prepared to accept it. However, without doing any sort of analysis, or commissioning a report from an "expert", we all take risks every day. One of them is the risk of being killed in an accident. This is worth thinking about, because it tells us a lot about ourselves and can help to put an assessed risk into a meaningful context. By identifying activities that we either are, or are not, prepared to engage in we can get some indication of the maximum level of risk that we are prepared to take. This knowledge can help us to decide whether we really are able to accept a particular risk, or to tolerate a particular likelihood of loss, or damage, to our property (Table 2).

In Table 3, data from NSW for the years 1998 to 2002, and other sources, is presented. A risk of 1 in 100,000 means that, in any one year, 1 person is killed for every 100,000 people undertaking that particular activity. The NSW data assumes that the whole population undertakes the activity. That is, we are all at risk of being killed in a fire, or of choking on our food, but it is reasonable to assume that only people who go deep sea fishing run a risk of being killed while doing it.

It can be seen that the risks of dying as a result of falling, using a motor vehicle, or engaging in water-related activities (including bathing) are all greater than 1:100,000 and yet few people actively avoid situations where these risks are present. Some people are averse to flying and yet it represents a lower risk than choking to death on food. Importantly, the data also indicate that, even when the risk of dying as a consequence of a particular event is very small, it could still happen to any one of us any day. If this were not so, no one would ever be struck by lightning.

Most local councils and planning authorities that stipulate a tolerable risk to property also stipulate a tolerable risk to life. The AGS Practice Note Guideline recommends that 1:100,000 is tolerable in newly developed areas, where works can be carried out as part of the development to limit risk. The tolerable level is raised to 1:10,000 in established areas, where specific landslide hazards may have existed for many years. The distinction is deliberate and intended to prevent the concept of landslide risk management, for its own sake, becoming an unreasonable financial burden on existing communities. Acceptable risk is usually taken to be one tenth of the tolerable risk (1:1,000,000 for new developments and 1:100,000 for established areas) and efforts should be made to attain these where it is practicable and financially realistic to do so.

TABLE 3: RISK TO LIFE

Risk (deaths per participant per year)	**Activity/Event Leading to Death** (NSW data unless noted)
1:1,000	Deep sea fishing (UK)
1:1,000 to 1:10,000	Motor cycling, horse riding , ultra-light flying (Canada)
1:23,000	Motor vehicle use
1:30,000	Fall
1:70,000	Drowning
1:180,000	Fire/burn
1:660,000	Choking on food
1:1,000,000	Scheduled airlines (Canada)
1:2,300,000	Train travel
1:32,000,000	Lightning strike

More information relevant to your particular situation may be found in other AUSTRALIAN GEOGUIDES:

- GeoGuide LR1 - Introduction
- GeoGuide LR2 - Landslides
- GeoGuide LR3 - Landslides in Soil
- GeoGuide LR4 - Landslides in Rock
- GeoGuide LR5 - Water & Drainage
- GeoGuide LR6 - Retaining Walls
- GeoGuide LR8 - Hillside Construction
- GeoGuide LR9 - Effluent & Surface Water Disposal
- GeoGuide LR10 - Coastal Landslides
- GeoGuide LR11 - Record Keeping

The Australian GeoGuides (LR series) are a set of publications intended for property owners; local councils; planning authorities; developers; insurers; lawyers and, in fact, anyone who lives with, or has an interest in, a natural or engineered slope, a cutting, or an excavation. They are intended to help you understand why slopes and retaining structures can be a hazard and what can be done with appropriate professional advice and local council approval (if required) to remove, reduce, or minimise the risk they represent. The GeoGuides have been prepared by the Australian Geomechanics Society, a specialist technical society within Engineers Australia, the national peak body for all engineering disciplines in Australia, whose members are professional geotechnical engineers and engineering geologists with a particular interest in ground engineering. The GeoGuides have been funded under the Australian governments' National Disaster Mitigation Program.

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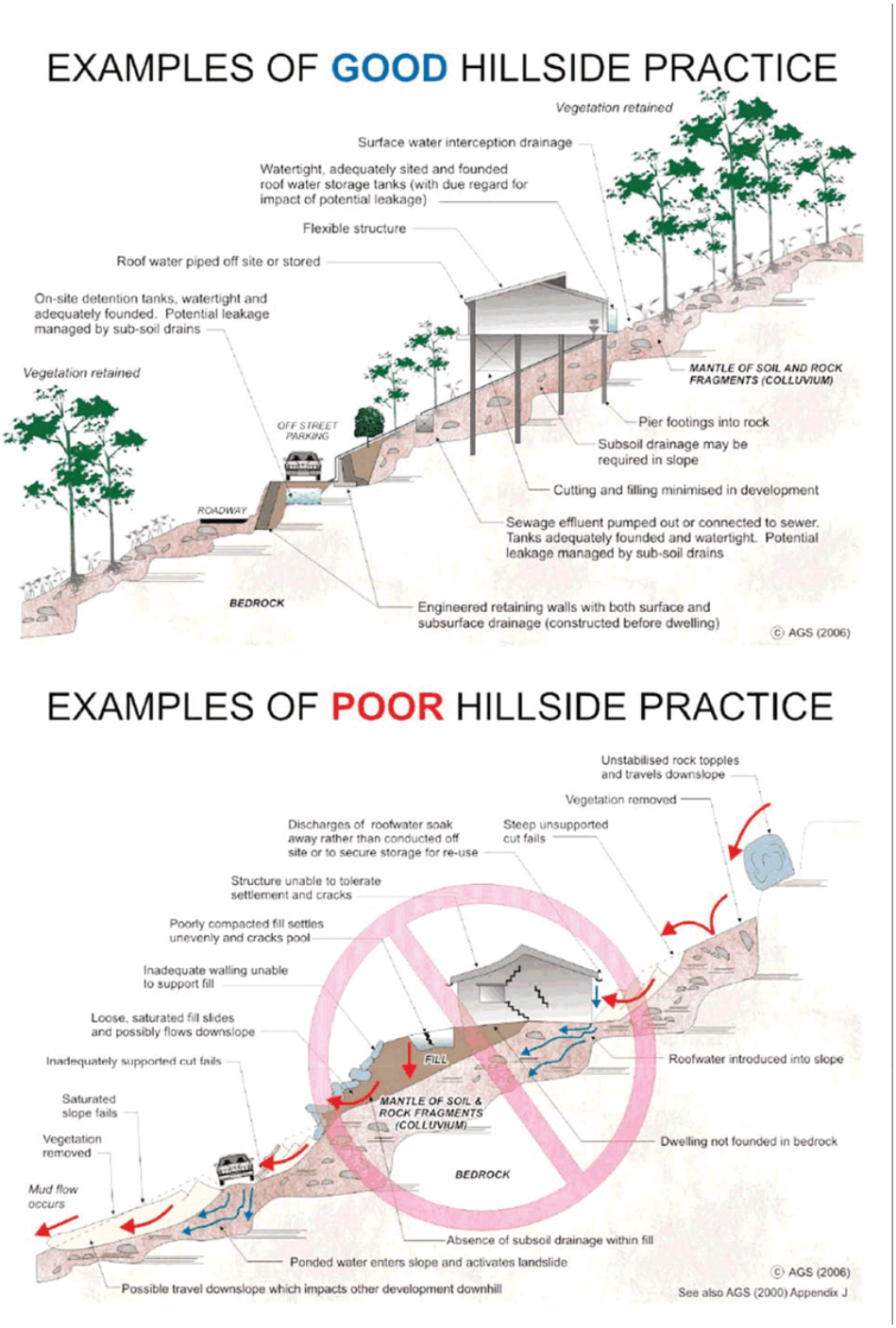
PRACTICE NOTE GUIDELINES FOR LANDSLIDE RISK MANAGEMENT 2007

APPENDIX G - SOME GUIDELINES FOR HILLSIDE CONSTRUCTION

	GOOD ENGINEERING PRACTICE	*POOR ENGINEERING PRACTICE*
ADVICE		
GEOTECHNICAL ASSESSMENT	Obtain advice from a qualified, experienced geotechnical practitioner at early stage of planning and before site works.	Prepare detailed plan and start site works before geotechnical advice.
PLANNING		
SITE PLANNING	Having obtained geotechnical advice, plan the development with the risk arising from the identified hazards and consequences in mind.	Plan development without regard for the Risk.
DESIGN AND CONSTRUCTION		
HOUSE DESIGN	Use flexible structures which incorporate properly designed brickwork, timber or steel frames, timber or panel cladding. Consider use of split levels. Use decks for recreational areas where appropriate.	Floor plans which require extensive cutting and filling. Movement intolerant structures.
SITE CLEARING	Retain natural vegetation wherever practicable.	Indiscriminately clear the site.
ACCESS & DRIVEWAYS	Satisfy requirements below for cuts, fills, retaining walls and drainage. Council specifications for grades may need to be modified. Driveways and parking areas may need to be fully supported on piers.	Excavate and fill for site access before geotechnical advice.
EARTHWORKS	Retain natural contours wherever possible.	Indiscriminatory bulk earthworks.
CUTS	Minimise depth. Support with engineered retaining walls or batter to appropriate slope. Provide drainage measures and erosion control.	Large scale cuts and benching. Unsupported cuts. Ignore drainage requirements
FILLS	Minimise height. Strip vegetation and topsoil and key into natural slopes prior to filling. Use clean fill materials and compact to engineering standards. Batter to appropriate slope or support with engineered retaining wall. Provide surface drainage and appropriate subsurface drainage.	Loose or poorly compacted fill, which if it fails, may flow a considerable distance including onto property below. Block natural drainage lines. Fill over existing vegetation and topsoil. Include stumps, trees, vegetation, topsoil, boulders, building rubble etc in fill.
ROCK OUTCROPS & BOULDERS	Remove or stabilise boulders which may have unacceptable risk. Support rock faces where necessary.	Disturb or undercut detached blocks or boulders.
RETAINING WALLS	Engineer design to resist applied soil and water forces. Found on rock where practicable. Provide subsurface drainage within wall backfill and surface drainage on slope above. Construct wall as soon as possible after cut/fill operation.	Construct a structurally inadequate wall such as sandstone flagging, brick or unreinforced blockwork. Lack of subsurface drains and weepholes.
FOOTINGS	Found within rock where practicable. Use rows of piers or strip footings oriented up and down slope. Design for lateral creep pressures if necessary. Backfill footing excavations to exclude ingress of surface water.	Found on topsoil, loose fill, detached boulders or undercut cliffs.
SWIMMING POOLS	Engineer designed. Support on piers to rock where practicable. Provide with under-drainage and gravity drain outlet where practicable. Design for high soil pressures which may develop on uphill side whilst there may be little or no lateral support on downhill side.	
DRAINAGE		
SURFACE	Provide at tops of cut and fill slopes. Discharge to street drainage or natural water courses. Provide general falls to prevent blockage by siltation and incorporate silt traps. Line to minimise infiltration and make flexible where possible. Special structures to dissipate energy at changes of slope and/or direction.	Discharge at top of fills and cuts. Allow water to pond on bench areas.
SUBSURFACE	Provide filter around subsurface drain. Provide drain behind retaining walls. Use flexible pipelines with access for maintenance. Prevent inflow of surface water.	Discharge roof runoff into absorption trenches.
SEPTIC & SULLAGE	Usually requires pump-out or mains sewer systems; absorption trenches may be possible in some areas if risk is acceptable. Storage tanks should be water-tight and adequately founded.	Discharge sullage directly onto and into slopes. Use absorption trenches without consideration of landslide risk.
EROSION CONTROL & LANDSCAPING	Control erosion as this may lead to instability. Revegetate cleared area.	Failure to observe earthworks and drainage recommendations when landscaping.
DRAWINGS AND SITE VISITS DURING CONSTRUCTION		
DRAWINGS	Building Application drawings should be viewed by geotechnical consultant	
SITE VISITS	Site Visits by consultant may be appropriate during construction/	
INSPECTION AND MAINTENANCE BY OWNER		
OWNER'S RESPONSIBILITY	Clean drainage systems; repair broken joints in drains and leaks in supply pipes. Where structural distress is evident see advice. If seepage observed, determine causes or seek advice on consequences.	

PRACTICE NOTE GUIDELINES FOR LANDSLIDE RISK MANAGEMENT 2007



Our Ref: AOC:jw: GI 2791-a

DRILLING
ENVIRONMENTAL
GEOTECHNICAL

APPENDIX E

CSIRO PUBLICATION BTF 18-2011

Foundation Maintenance and Footing Performance:
A Homeowner's Guide

CSIRO PUBLISHING
BTF 18-2011
replaces
Information
Sheet 10/91

Buildings can and often do move. This movement can be up, down, lateral or rotational. The fundamental cause of movement in buildings can usually be related to one or more problems in the foundation soil. It is important for the homeowner to identify the soil type in order to ascertain the measures that should be put in place in order to ensure that problems in the foundation soil can be prevented, thus protecting against building movement.

This Building Technology File is designed to identify causes of soil-related building movement, and to suggest methods of prevention of resultant cracking in buildings.

Soil Types

The types of soils usually present under the topsoil in land zoned for residential buildings can be split into two approximate groups – granular and clay. Quite often, foundation soil is a mixture of both types. The general problems associated with soils having granular content are usually caused by erosion. Clay soils are subject to saturation and swell/shrink problems.

Classifications for a given area can generally be obtained by application to the local authority, but these are sometimes unreliable and if there is doubt, a geotechnical report should be commissioned. As most buildings suffering movement problems are founded on clay soils, there is an emphasis on classification of soils according to the amount of swell and shrinkage they experience with variations of water content. The table below is Table 2.1 from AS 2870-2011, the Residential Slab and Footing Code.

Causes of Movement

Settlement due to construction

There are two types of settlement that occur as a result of construction:

- Immediate settlement occurs when a building is first placed on its foundation soil, as a result of compaction of the soil under the weight of the structure. The cohesive quality of clay soil mitigates against this, but granular (particularly sandy) soil is susceptible.
- Consolidation settlement is a feature of clay soil and may take place because of the expulsion of moisture from the soil or because of the soil's lack of resistance to local compressive or shear stresses. This will usually take place during the first few months after construction, but has been known to take many years in exceptional cases.

These problems are the province of the builder and should be taken into consideration as part of the preparation of the site for construction. Building Technology File 19 (BTF 19) deals with these problems.

Erosion

All soils are prone to erosion, but sandy soil is particularly susceptible to being washed away. Even clay with a sand component of say 10% or more can suffer from erosion.

Saturation

This is particularly a problem in clay soils. Saturation creates a bog-like suspension of the soil that causes it to lose virtually all of its bearing capacity. To a lesser degree, sand is affected by saturation because saturated sand may undergo a reduction in volume, particularly imported sand fill for bedding and blinding layers. However, this usually occurs as immediate settlement and should normally be the province of the builder.

Seasonal swelling and shrinkage of soil

All clays react to the presence of water by slowly absorbing it, making the soil increase in volume (see table below). The degree of increase varies considerably between different clays, as does the degree of decrease during the subsequent drying out caused by fair weather periods. Because of the low absorption and expulsion rate, this phenomenon will not usually be noticeable unless there are prolonged rainy or dry periods, usually of weeks or months, depending on the land and soil characteristics.

The swelling of soil creates an upward force on the footings of the building, and shrinkage creates subsidence that takes away the support needed by the footing to retain equilibrium.

Shear failure

This phenomenon occurs when the foundation soil does not have sufficient strength to support the weight of the footing. There are two major post-construction causes:

- Significant load increase.
- Reduction of lateral support of the soil under the footing due to erosion or excavation.

In clay soil, shear failure can be caused by saturation of the soil adjacent to or under the footing.

GENERAL DEFINITIONS OF SITE CLASSES

Class	Foundation
A	Most sand and rock sites with little or no ground movement from moisture changes
S	Slightly reactive clay sites, which may experience only slight ground movement from moisture changes
M	Moderately reactive clay or silt sites, which may experience moderate ground movement from moisture changes
H1	Highly reactive clay sites, which may experience high ground movement from moisture changes
H2	Highly reactive clay sites, which may experience very high ground movement from moisture changes
E	Extremely reactive sites, which may experience extreme ground movement from moisture changes

Notes

1. Where controlled fill has been used, the site may be classified A to E according to the type of fill used.
2. Filled sites. Class P is used for sites which include soft fills, such as clay or silt or loose sands; landslip; mine subsidence; collapsing soils; soil subject to erosion; reactive sites subject to abnormal moisture conditions or sites which cannot be classified otherwise.
3. Where deep-seated moisture changes exist on sites at depths of 3 m or greater, further classification is needed for Classes M to E (M-D, H1-D, H2-D and E-D).

Tree root growth
Trees and shrubs that are allowed to grow in the vicinity of footings can cause foundation soil movement in two ways:

- Roots that grow under footings may increase in cross-sectional size, exerting upward pressure on footings.
- Roots in the vicinity of footings will absorb much of the moisture in the foundation soil, causing shrinkage or subsidence.

Unevenness of Movement

The types of ground movement described above usually occur unevenly throughout the building's foundation soil. Settlement due to construction tends to be uneven because of:

- Differing compaction of foundation soil prior to construction.
- Differing moisture content of foundation soil prior to construction.

Movement due to non-construction causes is usually more uneven still. Erosion can undermine a footing that traverses the flow or can create the conditions for shear failure by eroding soil adjacent to a footing that runs in the same direction as the flow.

Saturation of clay foundation soil may occur where subfloor walls create a dam that makes water pond. It can also occur wherever there is a source of water near footings in clay soil. This leads to a severe reduction in the strength of the soil which may create local shear failure.

Seasonal swelling and shrinkage of clay soil affects the perimeter of the building first, then gradually spreads to the interior. The swelling process will usually begin at the uphill extreme of the building, or on the weather side where the land is flat. Swelling gradually reaches the interior soil as absorption continues. Shrinkage usually begins where the sun's heat is greatest.

Effects of Uneven Soil Movement on Structures

Erosion and saturation
Erosion removes the support from under footings, tending to create subsidence of the part of the structure under which it occurs. Brickwork walls will resist the stress created by this removal of support by bridging the gap or cantilevering until the bricks or the mortar bedding fail. Older masonry has little resistance. Evidence of failure varies according to circumstances and symptoms may include:

- Step cracking in the mortar beds in the body of the wall or above/below openings such as doors or windows.
- Vertical cracking in the bricks (usually but not necessarily in line with the vertical beds or perpends).

Isolated piers affected by erosion or saturation of foundations will eventually lose contact with the bearers they support and may tilt or fall over. The floors that have lost this support will become bouncy, sometimes rattling ornaments etc.

Seasonal swelling/shrinkage in clay
Swelling foundation soil due to rainy periods first lifts the most exposed extremities of the footing system, then the remainder of the perimeter footings while gradually permeating inside the building footprint to lift internal footings. This swelling first tends to create a dish effect, because the external footings are pushed higher than the internal ones.

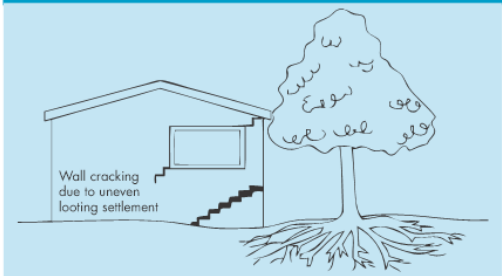
The first noticeable symptom may be that the floor appears slightly dished. This is often accompanied by some doors binding on the floor or the door head, together with some cracking of cornice mitres. In buildings with timber flooring supported by bearers and joists, the floor can be bouncy. Externally there may be visible dishing of the hip or ridge lines.

As the moisture absorption process completes its journey to the innermost areas of the building, the internal footings will rise. If the spread of moisture is roughly even, it may be that the symptoms will temporarily disappear, but it is more likely that swelling will be uneven, creating a difference rather than a disappearance in symptoms. In buildings with timber flooring supported by bearers and joists, the isolated piers will rise more easily than the strip footings or piers under walls, creating noticeable doming of flooring.

As the weather pattern changes and the soil begins to dry out, the external footings will be first affected, beginning with the locations where the sun's effect is strongest. This has the effect of lowering the external footings. The doming is accentuated and cracking reduces or disappears where it occurred because of dishing, but other cracks open up. The roof lines may become convex.

Doming and dishing are also affected by weather in other ways. In areas where warm, wet summers and cooler dry winters prevail, water migration tends to be toward the interior and doming will be accentuated, whereas where summers are dry and winters are cold and wet, migration tends to be toward the exterior and the underlying propensity is toward dishing.

Trees can cause shrinkage and damage



Movement caused by tree roots
In general, growing roots will exert an upward pressure on footings, whereas soil subject to drying because of tree or shrub roots will tend to remove support from under footings by inducing shrinkage.

Complications caused by the structure itself
Most forces that the soil causes to be exerted on structures are vertical – i.e. either up or down. However, because these forces are seldom spread evenly around the footings, and because the building resists uneven movement because of its rigidity, forces are exerted from one part of the building to another. The net result of all these forces is usually rotational. This resultant force often complicates the diagnosis because the visible symptoms do not simply reflect the original cause. A common symptom is binding of doors on the vertical member of the frame.

Effects on full masonry structures
Brickwork will resist cracking where it can. It will attempt to span areas that lose support because of subsided foundations or raised points. It is therefore usual to see cracking at weak points, such as openings for windows or doors.

In the event of construction settlement, cracking will usually remain unchanged after the process of settlement has ceased.

With local shear or erosion, cracking will usually continue to develop until the original cause has been remedied, or until the subsidence has completely neutralised the affected portion of footing and the structure has stabilised on other footings that remain effective.

In the case of swell/shrink effects, the brickwork will in some cases return to its original position after completion of a cycle, however it is more likely that the rotational effect will not be exactly reversed, and it is also usual that brickwork will settle in its new position and will resist the forces trying to return it to its original position. This means that in a case where swelling takes place after construction and cracking occurs, the cracking is likely to at least partly remain after the shrink segment of the cycle is complete. Thus, each time the cycle is repeated, the likelihood is that the cracking will become wider until the sections of brickwork become virtually independent.

With repeated cycles, once the cracking is established, if there is no other complication, it is normal for the incidence of cracking to stabilise, as the building has the articulation it needs to cope with the problem. This is by no means always the case, however, and monitoring of cracks in walls and floors should always be treated seriously.

Upheaval caused by growth of tree roots under footings is not a simple vertical shear stress. There is a tendency for the root to also exert lateral forces that attempt to separate sections of brickwork after initial cracking has occurred.

The normal structural arrangement is that the inner leaf of brickwork in the external walls and at least some of the internal walls (depending on the roof type) comprise the load-bearing structure on which any upper floors, ceilings and the roof are supported. In these cases, it is internally visible cracking that should be the main focus of attention, however there are a few examples of dwellings whose external leaf of masonry plays some supporting role, so this should be checked if there is any doubt. In any case, externally visible cracking is important as a guide to stresses on the structure generally, and it should also be remembered that the external walls must be capable of supporting themselves.

Effects on framed structures
Timber or steel framed buildings are less likely to exhibit cracking due to swell/shrink than masonry buildings because of their flexibility. Also, the doming/dishing effects tend to be lower because of the lighter weight of walls. The main risks to framed buildings are encountered because of the isolated pier footings used under walls. Where erosion or saturation causes a footing to fall away, this can double the span which a wall must bridge. This additional stress can create cracking in wall linings, particularly where there is a weak point in the structure caused by a door or window opening. It is, however, unlikely that framed structures will be so stressed as to suffer serious damage without first exhibiting some or all of the above symptoms for a considerable period. The same warning period should apply in the case of upheaval. It should be noted, however, that where framed buildings are supported by strip footings there is only one leaf of brickwork and therefore the externally visible walls are the supporting structure for the building. In this case, the subfloor masonry walls can be expected to behave as full brickwork walls.

Effects on brick veneer structures
Because the load-bearing structure of a brick veneer building is the frame that makes up the interior leaf of the external walls plus perhaps the internal walls, depending on the type of roof, the building can be expected to behave as a framed structure, except that the external masonry will behave in a similar way to the external leaf of a full masonry structure.

Water Service and Drainage

Where a water service pipe, a sewer or stormwater drainage pipe is in the vicinity of a building, a water leak can cause erosion, swelling or saturation of susceptible soil. Even a minuscule leak can be enough to saturate a clay foundation. A leaking tap near a building can have the same effect. In addition, trenches containing pipes can become watercourses even though backfilled, particularly where broken rubble is used as fill. Water that runs along these trenches can be responsible for serious erosion, interstrata seepage into subfloor areas and saturation.

Pipe leakage and trench water flows also encourage tree and shrub roots to the source of water, complicating and exacerbating the problem. Poor roof plumbing can result in large volumes of rainwater being concentrated in a small area of soil:

- Incorrect falls in roof guttering may result in overflows, as may gutters blocked with leaves etc.
- Corroded guttering or downpipes can spill water to ground.
- Downpipes not positively connected to a proper stormwater collection system will direct a concentration of water to soil that is directly adjacent to footings, sometimes causing large-scale problems such as erosion, saturation and migration of water under the building.

Seriousness of Cracking

In general, most cracking found in masonry walls is a cosmetic nuisance only and can be kept in repair or even ignored. The table below is a reproduction of Table C1 of AS 2870-2011.

AS 2870-2011 also publishes figures relating to cracking in concrete floors, however because wall cracking will usually reach the critical point significantly earlier than cracking in slabs, this table is not reproduced here.

Prevention/Cure

Plumbing
Where building movement is caused by water service, roof plumbing, sewer or stormwater failure, the remedy is to repair the problem. It is prudent, however, to consider also rerouting pipes away from the building where possible, and relocating taps to positions where any leakage will not direct water to the building vicinity. Even where gully traps are present, there is sometimes sufficient spill to create erosion or saturation, particularly in modern installations using smaller diameter PVC fixtures. Indeed, some gully traps are not situated directly under the taps that are installed to charge them, with the result that water from the tap may enter the backfilled trench that houses the sewer piping. If the trench has been poorly backfilled, the water will either pond or flow along the bottom of the trench. As these trenches usually run alongside the footings and can be at a similar depth, it is not hard to see how any water that is thus directed into a trench can easily affect the foundation's ability to support footings or even gain entry to the subfloor area.

Ground drainage
In all soils there is the capacity for water to travel on the surface and below it. Surface water flows can be established by inspection during and after heavy or prolonged rain. If necessary, a grated drain system connected to the stormwater collection system is usually an easy solution.

It is, however, sometimes necessary when attempting to prevent water migration that testing be carried out to establish watertable height and subsoil water flows. This subject is referred to in BTF 19 and may properly be regarded as an area for an expert consultant.

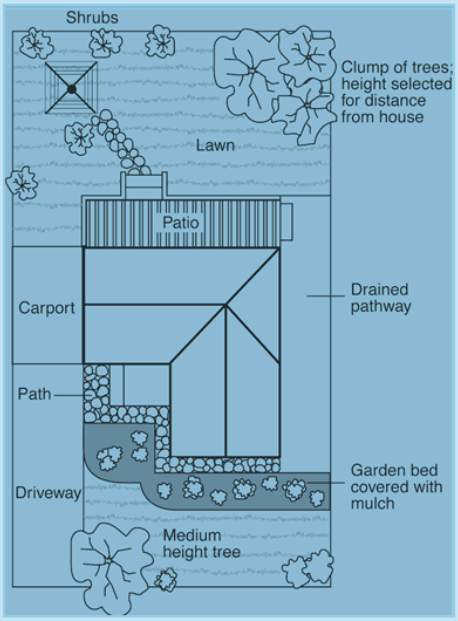
Protection of the building perimeter
It is essential to remember that the soil that affects footings extends well beyond the actual building line. Watering of garden plants, shrubs and trees causes some of the most serious water problems.

For this reason, particularly where problems exist or are likely to occur, it is recommended that an apron of paving be installed around as much of the building perimeter as necessary. This paving should

CLASSIFICATION OF DAMAGE WITH REFERENCE TO WALLS

Description of typical damage and required repair	Approximate crack width limit (see Note 3)	Damage category
Hairline cracks	<0.1 mm	0
Fine cracks which do not need repair	<1 mm	1
Cracks noticeable but easily filled. Doors and windows stick slightly.	<5 mm	2
Cracks can be repaired and possibly a small amount of wall will need to be replaced. Doors and windows stick. Service pipes can fracture. Weathertightness often impaired.	5–15 mm (or a number of cracks 3 mm or more in one group)	3
Extensive repair work involving breaking-out and replacing sections of walls, especially over doors and windows. Window and door frames distort. Walls lean or bulge noticeably, some loss of bearing in beams. Service pipes disrupted.	15–25 mm but also depends on number of cracks	4

Gardens for a reactive site



extend outwards a minimum of 900 mm (more in highly reactive soil) and should have a minimum fall away from the building of 1:60. The finished paving should be no less than 100 mm below brick vent bases.

It is prudent to relocate drainage pipes away from this paving, if possible, to avoid complications from future leakage. If this is not practical, earthenware pipes should be replaced by PVC and backfilling should be of the same soil type as the surrounding soil and compacted to the same density.

Except in areas where freezing of water is an issue, it is wise to remove taps in the building area and relocate them well away from the building – preferably not uphill from it (see BTF 19).

It may be desirable to install a grated drain at the outside edge of the paving on the uphill side of the building. If subsoil drainage is needed this can be installed under the surface drain.

Condensation

In buildings with a subfloor void such as where bearers and joists support flooring, insufficient ventilation creates ideal conditions for condensation, particularly where there is little clearance between the floor and the ground. Condensation adds to the moisture already present in the subfloor and significantly slows the process of drying out. Installation of an adequate subfloor ventilation system, either natural or mechanical, is desirable.

Warning: Although this Building Technology File deals with cracking in buildings, it should be said that subfloor moisture can result in the development of other problems, notably:

- Water that is transmitted into masonry, metal or timber building elements causes damage and/or decay to those elements.
- High subfloor humidity and moisture content create an ideal environment for various pests, including termites and spiders.
- Where high moisture levels are transmitted to the flooring and walls, an increase in the dust mite count can ensue within the living areas. Dust mites, as well as dampness in general, can be a health hazard to inhabitants, particularly those who are abnormally susceptible to respiratory ailments.

The garden

The ideal vegetation layout is to have lawn or plants that require only light watering immediately adjacent to the drainage or paving edge, then more demanding plants, shrubs and trees spread out in that order.

Overwatering due to misuse of automatic watering systems is a common cause of saturation and water migration under footings. If it is necessary to use these systems, it is important to remove garden beds to a completely safe distance from buildings.

Existing trees

Where a tree is causing a problem of soil drying or there is the existence or threat of upheaval of footings, if the offending roots are subsidiary and their removal will not significantly damage the tree, they should be severed and a concrete or metal barrier placed vertically in the soil to prevent future root growth in the direction of the building. If it is not possible to remove the relevant roots without damage to the tree, an application to remove the tree should be made to the local authority. A prudent plan is to transplant likely offenders before they become a problem.

Information on trees, plants and shrubs

State departments overseeing agriculture can give information regarding root patterns, volume of water needed and safe distance from buildings of most species. Botanic gardens are also sources of information. For information on plant roots and drains, see Building Technology File 17.

Excavation

Excavation around footings must be properly engineered. Soil supporting footings can only be safely excavated at an angle that allows the soil under the footing to remain stable. This angle is called the angle of repose (or friction) and varies significantly between soil types and conditions. Removal of soil within the angle of repose will cause subsidence.

Remediation

Where erosion has occurred that has washed away soil adjacent to footings, soil of the same classification should be introduced and compacted to the same density. Where footings have been undermined, augmentation or other specialist work may be required. Remediation of footings and foundations is generally the realm of a specialist consultant.

Where isolated footings rise and fall because of swell/shrink effect, the homeowner may be tempted to alleviate floor bounce by filling the gap that has appeared between the bearer and the pier with blocking. The danger here is that when the next swell segment of the cycle occurs, the extra blocking will push the floor up into an accentuated dome and may also cause local shear failure in the soil. If it is necessary to use blocking, it should be by a pair of fine wedges and monitoring should be carried out fortnightly.

This BTF was prepared by John Lewer FAIB, MIAMA, Partner, Construction Diagnosis.

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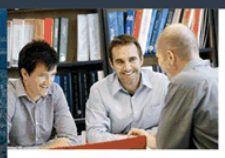

147-205 Rocky Passage Road, Redland Bay

Solid Waste Management Plan

Client: New Land Tourism Pty Ltd C/- Arnold Development Consultants
Project No: BE180134
Document No: BE180134-RP-SWMP-00

June 2018

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Executive Summary

Burchills Engineering Solutions was engaged by New Land Tourism Pty Ltd C/- Arnold Development Consultants to prepare a Solid Waste Management Plan (SWMP) in response to a Request for Information issued by Redland City Council for the proposed development at 147-205 Rocky Passage Rd, Redland Bay (MCU17/0090) formally known as Lot 3 on RP153333 (the subject site).

The development application proposes the establishment of a tourist accommodation complex, consisting of number of villas and apartments which shall deliver 136 double rooms or studios, recreational facilities (including a pool, gym and tennis court), central facility (including reception, restaurants and spa facility) 66m^2 and a total of 64 car and 3 bus parking spaces.

Local, State and Federal legislation and guidelines have been used to estimate the quantity of wastes generated from the development of the proposed building and facilities. Table 1 below summarises the quantity of wastes generated whilst Table 2 details the bin sizes and number of bins required for the safe management of waste along with collection frequencies.

Table 1 Proposed Development 147-205 Rocky Passage Rd, Redland Bay - Waste Generation

Land Use	Type of Waste	Quantity of waste generated (L/week)
	General	12,710.06L
	Recyclable	7,270.06L

Table 2 Proposed Development 147-205 Rocky Passage Rd, Redland Bay – Waste Container Requirements

Use Type	Type of Waste	Type of Bin	Size of Bin	Number of Bins	Collection Frequency (times/week)
Tourist Accommodation & Ancillary Recreational Uses	General Waste	Bulk Bin	2,300L	2	3
	Recyclables	Bulk Bin	1,500L	1	2
			2,300L	1	

The waste calculations shown in Table 1 above provides the raw volume of waste to be produced by the development. Design drawings prepared by Jared Poole Designs identify that the proposed development will include the use of Bulk Bins for the servicing of the site. Table 2 (below) identifies the number of bulk bins required and servicing rates for the proposed development.

Implementation of this Waste Management Plan during the construction and operational phases of the *proposed development will achieve:*

(a) more sustainable use of resources;
(b) reductions and cost savings of waste disposed to landfill;
(c) more efficient, cost effective and safe waste collection practices for the life of the development;
(d) improved community perceptions and relations.

The adoption of recycling and reuse programs will enable financial benefits in the form of reduced quantities of waste requiring collection disposal.

The adoption of a waste auditing and monitoring program in conjunction with an education program for facility management and staff will enable the better management of wastes and identification of opportunities for improvement.

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The experience you deserve

1. Introduction

Burchills Engineering Solutions was engaged by New Land Tourism Pty Ltd C/- Arnold Development Consultants to prepare a Solid Waste Management Plan (SWMP) in response to a Request for Information issued by Redland City Council for the proposed development at 147-205 Rocky Passage Rd, Redland Bay (MCU17/0090) formally known as Lot 3 on RP153333 (the subject site).

Item 7 of the information request issued by Redland City Council (RCC) on 10/11/2017 requests that the applicant:

> *Provide a waste management plan for the development according to Redland Planning Scheme Policy 9 – Infrastructure Works, Chapter 16 – Waste Management, Section 9.16.12 - Preparation of Waste Management Plans.*

This report details waste management practices and procedures for the proposed development which proposes the establishment of a tourist accommodation complex, consisting of number of villas and apartments which shall deliver 136 double rooms or studios, recreational facilities (including a pool, gym and tennis court), central facility (including reception, restaurants and spa facility) and a total of 64 car and 3 bus parking spaces.

The Concept Master Plan of the proposed development prepared by Jared Poole Design is included as Appendix A.

1.1 Scope and Purpose

The purpose of this SWMP is to outline the waste management provisions included within the development to demonstrate the efficient, safe and sustainable management of waste during the operational phase of the development. The report has been prepared to address the requirements of the *Environmental Protection (Waste Management) Policy 2000* and the *Redland Planning Scheme Version 7.1: Planning Scheme Policy 9 – Infrastructure Works, Chapter 16 – Waste Management*

As identified in *Planning Scheme Policy 9 – Infrastructure Works, Chapter 16 – Waste Management:*

> *The responsible management of solid waste that is generated during construction and for the life and occupation of the development can result in significant economic, social and environmental benefits. WMPs allow developers to achieve –*
>
> *(a) more sustainable use of resources;*
> *(b) reductions and cost savings of waste disposed to landfill;*
> *(c) more efficient, cost effective and safe waste collection practices for the life of the development;*
> *(d) improved community perceptions and relations.*

1.2 Environmental Objectives and Commitments

The main objectives of this SWMP are to:

- Reduce, reuse and recycle as much waste as possible within the site;

- Avoid adverse environmental impacts and harm or nuisance to the public onsite and offsite from the use and disposal of waste products;
- Demonstrate that the development incorporates suitable provisions for the storage of solid waste, including general waste and recyclable materials, which are appropriate and adequate for the type and amount of waste generated; and
- Demonstrate that solid waste and recyclables can be safely collected from the site with minimum disruption to traffic.

Waste management undertaken at the proposed development will be achieved through the implementation of the 'Waste Management Hierarchy' (WMH) outlined in Queensland's *Environmental Protection (Waste Management) Policy 2000*) which includes the following measures:

- Waste Avoidance;
- Waste Reduction;
- Waste Reuse;
- Waste Recycling; and
- Waste Disposal.

The WMH promotes waste avoidance, minimisation and recycling over current waste treatment and disposal practices as a means of obtaining more optimal environmentally sustainable outcomes. To achieve these objectives, the following programs will be implemented during the operational phase of the development:

- Source separation to minimise and avoid cross contamination;
- Solid material reuse and recycling where possible;
- Waste avoidance and minimisation through encouraging consideration of waste issues when purchasing;
- Sustainable resource recovery and onsite reuse during the operational phase;
- Disposal of all waste in a correct and safe manner; and
- Educational waste minimisation programs for management, operational staff and guests including education and signage.

In addition, an ongoing waste monitoring and auditing program can be implemented to identify areas of improvement.

1.3 Description of the Subject Site

The subject site is located at 147-205 Rocky Point Road, Redland Bay which is properly described as Lot 3 on RP153333. The subject site has a total area of 146,200m^2 (14.62ha) and is identified by the Redlands Planning Scheme Version 7.1 as being located within the *Environmental Protection* and *Conservation* zones.

The site in its current state is improved by two (2) residential dwellings and contains a number of ancillary structures including sheds, garages, pool and tennis court. Additionally, two rural dams are located within the sites northern extents and two man made water bodies exist within the sites south-western portion.

Approximately 45% of the subject site has been cleared of its native vegetation which is now a maintained lawn which surrounds the primary residence. The remainder of the site is heavily vegetated with open Eucalypt forest regrowth which contains a number of mature trees.

Access to the site is gained via Rocky Passage Rd which constitutes the site's eastern boundary. The area surrounding the subject site is characterised by Rural and Rural Residential development, with the lot bound to the north and south by large rural residential lots containing residential dwellings. To the west of the site (approximately 190m) is the Logan River, while to the east is a large covenant area which is heavily vegetated.

Figure 1.1 depicts the location of the proposed development while Figure 1.2 shows an aerial photograph of the subject site.

Figure 1.1 Locality Plan (Courtesy: QLD Government)

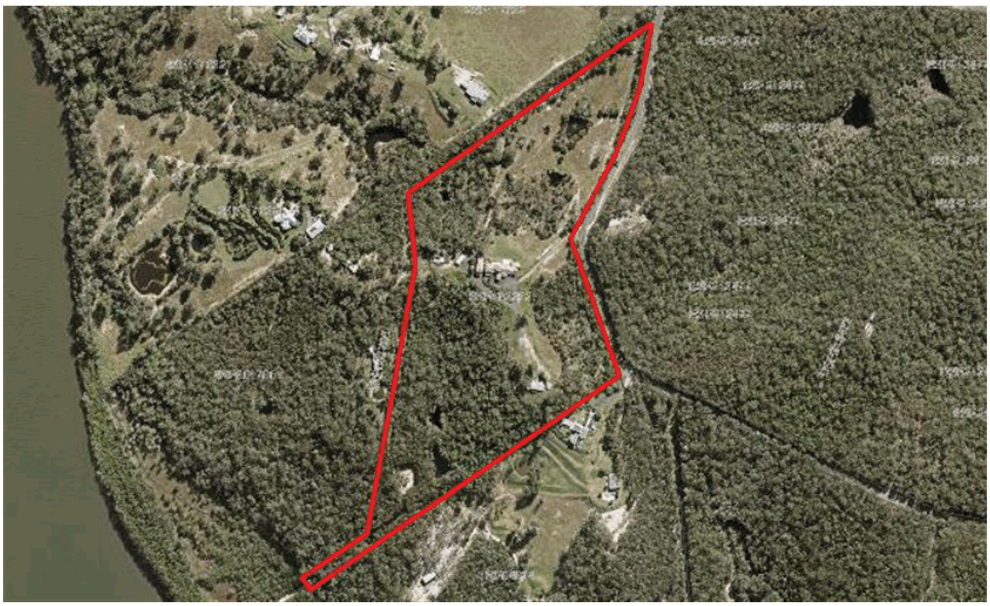

Figure 1.2 Aerial Photograph (Courtesy: QLD Government)

1.4 Description of Proposed Development

The development application (MCU17/0090) proposes the establishment of a tourist accommodation complex at the subject site. The proposal shall result in the establishment of 30 buildings in total across the site. These buildings shall consist of:

- Four (4) Apartment Villas delivering:
  - 16 x 2 (two) bedrooms units.
- Sixteen (16) Banyan Tree Residences delivering:
  - 16 x 3 (three) bedroom residences.
- Eight (8) Soul Rest Residences delivering:
  - 8 x 4 (four) bedroom residences.
- Two (2) Ingenuity Apartment buildings delivering:
  - 24 x 1 (one) bedroom studios.

In total, the proposed development shall deliver 136 double rooms / studios and shall also include recreational facilities (including a pool, gym and tennis court), a central facility (including reception, restaurants and spa facility) and a total of 64 car and 3 bus parking spaces.

For further details regarding the proposed tourist accommodation resort development, please refer to architectural drawings prepared by Jared Poole Design attached in Appendix A. Figure 1.3 below provides an excerpt of design drawings showing the concept master plan of the proposal.

Figure 1.3 Concept Master Plan (Courtesy: Jared Poole Design)

1.5 Policy and Regulatory Framework

This report has been prepared in accordance with local and state policy and legislative requirements. Policies, guidelines and legislation that are applicable to waste management during the operational phase for the proposed development include:

- *Redland Planning Scheme Version 7.1* – regulates development;
- Redland City Council 2015-2020 Waste Reduction and Recycling Plan – strategic guidance for sustainable waste management;
- *Redland Planning Scheme Version 7.1: Planning Scheme Policy 9 – Infrastructure Works, Chapter 16 – Waste Management* – prescribes waste requirements for new development within the Redland local government area;
- Queensland *Sustainable Planning Act 2009* – regulates the development assessment process;
- Queensland *Environmental Protection Act 1994* - Provides an overarching General Environmental Duty and environmental harm provisions;
- Queensland *Environmental Protection Regulation 2008* - Contains schedule of regulated wastes, Environmentally Relevant Activities (for licensing);
- Queensland *Environmental Protection (Waste Management) Policy 2000*;
- Queensland *Environmental Legislation Amendment and Repeal Regulation (No.1) 2014*;
- Queensland *Waste Reduction and Recycling Act 2011*; and
- *Queensland's Waste Avoidance and Resource Productivity Strategy (2014-2024)*.

In accordance with Schedule 2, Part 12 of the Environmental Protection Regulation 2008, waste management activities that are to be carried out as part of the proposed development do not constitute an Environmentally Relevant Activity (ERA). Therefore, the proposed development does not require approvals pursuant to the *Environmental Protection Act 1994*.

2. Sustainable Waste Management

Sustainable Waste Management (SWM) is one of the keys to environmental sustainability. SWM is about the responsible consumption of products and services and views waste as a resource to be utilised and not as a problem to be ignored. SWM aims to address the long-term pressures of a growing population through the recovery, recycling, reuse and minimisation of the waste stream, and the management of resources in an environmentally sound and economically effective manner.

Best practice encourages appropriate occupant behaviour in relation to waste management and increases the amenity, ease of use of waste services, environmental performance and reputation of developments with well-managed waste disposal facilities.

Waste management systems may incorporate any or all of the following:

- Garbage services to manage residual wastes, i.e. those not collected by a dedicated recycling or organics collection service;
- Recycling services to manage dry recyclable materials. The type of recyclables may vary across different council areas, but generally covers recyclable materials generated in a typical accommodation village, including paper and cardboard, glass bottles and jars, steel cans and aerosols, aluminium packaging and plastic containers. Recyclables may be collected as separate streams of each material type or as a commingled (mixed) stream;
- Organics services to manage garden and food organics, which may include a bin-based collection system or onsite composting; and
- Bulky waste services to manage bulky items, such as furniture or white goods.

Best practice waste management systems are effective and safe; occupants can use them with ease and collection crews can easily service them. The design, installation and ongoing management of best practice systems encourage occupants to use the services appropriately. This includes greater participation in the services provided, minimised waste generation, increased resource recovery and a reduction in contamination of recyclables and organics.

2.1 Waste Management Hierarchy

A Waste Management Hierarchy (WMH) can be developed for the proposed development site in accordance with the *Environmental Protection (Waste Management) Policy 2000*. The WMH is a framework for prioritising waste management practices to achieve the best environmental outcome. The WMH promotes waste avoidance, minimisation and recycling over current waste treatment and disposal practices as a means of obtaining more optimal environmental outcomes. A schematic representation of the hierarchy is shown in Figure 2.1.

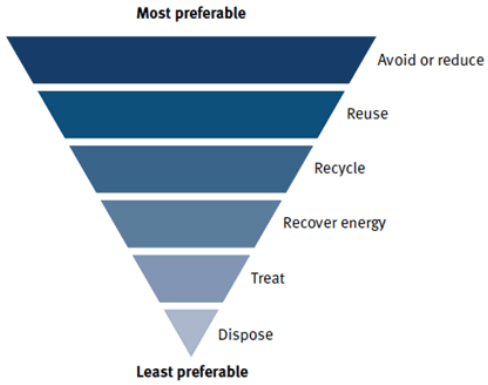

Figure 2.1 Waste Management Hierarchy (source: Queensland Waste Avoidance and Resource Productivity Strategy 2014)

2.2 Waste Avoidance

Waste Avoidance is an important step in the WMH and involves the prevention of waste material being created. Essentially, it involves changing the entire perspective of how the community looks at procuring commodities, in order to minimise the production of wastes. Some waste reduction initiatives that can be adopted by Management & staff of the proposed development are listed below:

- Adoption of a "Purchasing Policy" to drastically reduce the amount of waste being produced;
- A "Whole of Systems" review of each tenancy to assess waste generation and adopt sustainable and environmentally-friendly measures and practices to enable the reduction of wastes being generated;
- Ongoing auditing and monitoring of waste generation practices of each tenancy and data collection; and
- Education programs to educate and motivate Management / staff to avoid buying commodities and materials that are not necessary.

The development will be encouraged to adopt the WMH principles in relation to paper and cardboard. To ensure that no paper is landfilled, the following measures will be promoted:

- Avoid printing of unnecessary documents/emails;
- Use of 100% recycled paper;
- Use double-sided photocopies and use the reverse sides of scrap paper for notes and drafts; and
- Once paper is used on both sides, put it into the appropriate recycle bin.

Management and staff will be encouraged to buy products that use less packaging (economy sizes, refills or concentrates), reuse boxes and jars for storage as much as possible, and donating reusable items to charities or others. Furthermore, in order to decrease the amount of waste produced the following policies are recommended:

- Use mugs instead of paper or Styrofoam cups;
- Use washable cloths instead of paper towels; and
- Use cloths instead of paper napkins.

The unrecoverable wastes that can be landfilled are:

- Polystyrene;
- Plastic kitchenware, plastic wrap or plastic bags;
- Broken glass bottles, plates, cups, mirrors or window glass, light bulbs;
- Aluminium foil or foil trays;
- Waxed cartons, foil-lined cartons or tissues; and
- Oil-soaked cardboard.

2.3 Waste Reduction

Waste Reduction (or Waste Minimization) is the process and policy of reducing the amount of waste produced by a person or a society. Waste Minimization involves efforts to minimize resources and energy use during manufacture. For the same commercial output, usually the fewer materials used, the less waste is produced. Waste Minimisation usually requires knowledge of the production process, "cradle-to-grave analysis" (the tracking of materials from their extraction to their return to earth) and detailed knowledge of the composition of the waste.

Measures and initiatives for Waste Reduction include:

- Choosing products with minimal packaging and avoiding individually wrapped products;
- Reduce packaging by buying in bulk;
- Buying products with packaging that is reusable, recyclable or compostable;
- Encouraging avoidance activities; and
- Leading by example.

2.4 Waste Reuse

Waste Reuse is defined as "recovering value from a discarded item without remanufacturing or reprocessing".

Material Reuse can be practised at the proposed development in one or more of the following ways:

- Recovering and reusing construction, building and demolition materials;
- Reusing plastic bags;
- Reusing office paper for photocopying;
- Reusing old cutlery and crockery; and
- Reusing packaging materials.

2.5 Waste Recycling

Recycling is processing used materials (waste) into new products to:

- Prevent waste of potentially useful materials;
- Reduce the consumption of fresh raw materials;
- Reduce energy usage;
- Reduce air pollution (from incineration) and water pollution (from landfilling) by minimising the need for "conventional" waste disposal; and
- Lower greenhouse gas emissions as compared to virgin production.

Recycling is a key component of modern waste reduction and is the third component of the WMH. Table 2.1 details waste items that can be recycled.

Table 2.1 List of Recyclable and Non-Recyclable Materials

Recyclable Materials	Non-recyclable Materials
All office paper	Carbon paper
Cardboard Boxes	Tissue paper
Paper Packaging	Metal and plastic report binders
Fax and photocopy paper	Thermal fax paper
Cardboard milk cartons	Paper towels
Envelopes	Facial tissues
Manilla folders	Waxed paper
Phone books	Styrofoam
Shredded paper	Plastic Bags
Newspapers, magazines, brochures	Hose or pipe
HDPE Containers	Mirrors or plate glass
Glass Bottles	Electrical wiring
Glass Jars (lid removed)	
Steel Cans	
Aluminium Cans	
Empty Aerosols	

Source separation of wastes is important to be carried out in order to prevent the cross-contamination of wastes. Prior to the recycling of waste materials from the site, source separation would occur which would then increase the costs of processing and treatment.

Some common methods and practices used for source separation of wastes range from the use of separate colour coded bins and receptacles (for the separate collection of wastes) to the use of strategically placed patented devices. These devices act like “reverse vending machines” for the collection of bottles, cans, jars etc.

3. Operational Management Plan

This SWMP addresses the management of all solid wastes during the operational stage of the proposed development. For the purposes of this report 'wastes' have been divided into 'general and recyclable'.

The Waste Management Hierarchy (WMH) must be taken into account at all times. Reduce, reuse and recycle wastes wherever appropriate.

3.1 General and Recyclable Waste

The generation, storage and collection of the general and recyclable waste produced by the proposed development is detailed in this section of the report.

3.1.1 Waste Generation

The proposed tourist accommodation development will deliver a total of 136 tourist apartments, restaurants, a front of house office and ancillary and recreational facilities (gym, spa, pool and tennis court). Appendix A contains design drawings prepared by Jared Poole Design which details the number / type of units and the location of the front of house office, restaurants and recreational facilities.

Types of wastes expected to be generated from the commercial uses on site include:

- Recyclable wastes (cardboard, packaging etc.); and
- Other general waste.

An estimate of quantities of wastes expected to be generated from proposed activities on site during the operational phase of the development is shown in Table 3.1. These quantities have been estimated using Table 1 of the *Redland Planning Scheme Version 7.1: Planning Scheme Policy 9 – Infrastructure Works, Chapter 16 – Waste Management*. Required container sizes are calculated based on likely collection frequencies as described in Section 3.1.2 of this report.

It is important to note that waste generation calculations for recreational uses such as the tennis court and pool have not been included. This is due to these facilities being ancillary and the assumption that the waste generated as a result of these facilities would be relatively minor. It is anticipated that waste deposited in containers provided for each facility would be included within the waste generation rates allocated for each apartment / villa as prescribed by Table 1 of the *Redland Planning Scheme Version 7.1: Planning Scheme Policy 9 – Infrastructure Works, Chapter 16 – Waste Management*.

Additionally, for the purposes of this assessment the gym facility has been allocated a relatively low waste generation rate (20L/100m^2/day) as the facility is considered to be ancillary to that of the tourist accommodation and are not expected to generate large amounts of waste. The proposed spa component of the development has utilised the waste generation rate prescribed for a 'Shop' (50L/100m^2/day) based upon advice from Council officers.

Table 3.1 Quantities of Waste Generated

Use	Estimated Solid Waste Generation	Estimated Recycling generation	No. Units / GFA	Quantity of Solid Waste Produced/week	
				General Waste	Recyclable
Tourist Accommodation	60L/bed/week	20L/bed/week	136	8,160L	2,720L
Accommodation Sub-Total				*8,160L*	*2,720L*
Office / Reception	20L/100m²/day	20L/100m²/day	25.6m²	36L	36L
Refreshment Establishments	120L/100m²/day	120L/100m²/day	381.68m²	3,206.11L	3,206.11L
Gym	20L/100m²/day	20L/100m²/day	117.76m²	165.2L	165.2L
Spa	50L/100m²/day	50L/100m²/day	326.5m²	1,142.75L	1,142.75L
Central Facility Sub-Total				*4550.06L*	*4550.06L*
Development Total				***12,710.06L***	***7,270.06L***

As such, the calculated values contained in Table 3.2 are considered to be conservative and should to be used as a guide only. Waste generation should be continually monitored to ensure appropriate bin sizes and collection frequencies are maintained within the site.

3.1.2 Waste Storage

Sorting of all general waste into recyclables and general waste will be encouraged and actively promoted on site. The waste will be stored on site until removed by the appropriately licensed and authorised waste contractors (where legally required), either for recycling, landfilling or by other regulated means.

Based on the waste generation rates calculated within Tables 3.1 and Table 3.2, recommendations regarding the number, size and servicing requirements for general and recyclable waste are provided below in Table 3.3. Bin types and dimensions have been based upon *Table 1 – Typical Waste Generation Rates* of *Planning Scheme Policy 9 – Infrastructure Works, Chapter 16 – Waste Management*.

Table 3.2 Refuse Bin Summary

Type of Waste	Type of Bin	Size of Bin	Number of Bins	Collection Frequency (times/week)
General Waste	Bulk Bin	2,300L	2	3
Recyclables	Bulk Bin	1,500L	1	2
		2,300L	1	

Bulk bins are acceptable for the servicing of tourist accommodation developments. All bulk bins will be stored in the central waste storage area which is located in the basement of the central facility. The central waste storage area provides sufficient room for both general/recycled waste bulk bins. Figure 3.1 identifies the allocated central refuse storage area.

3.1.3 Accommodation Waste Storage

All accommodation facilities are to be provided with individual general and recyclable waste containers. Short stay accommodation (Apartment Villas, Ingenuity Apartments and Soul Rest residence) which do not contain cooking facilities, shall be provided with small waste containers (20L) within the accommodation unit itself. Each of the Banyan Tree residences (which include kitchen facilities) shall be provided with small internal waste containers (20L) and larger external general and recyclable waste containers (80L) to allow guests to deposit generated waste for collection by staff.

3.1.4 Central Waste Storage Area

As previously identified, the proposed development shall provide a central waste store room which shall house the required bulk bins prescribed within Table 3.2. Staff shall be responsible for the transfer of general and recyclable wastes generated by the central facility, ancillary recreational uses and all apartments, bungalows and villas to the central waste store room on an as needed basis.

The central waste store facility is to be designed in accordance with sections 9.16.4 (Waste Storage – Commercial Industrial and Other Uses) and 9.16.7 (Internal Waste and Recycling Storage Enclosures) of *Planning Scheme Policy 9 – Infrastructure Works, Chapter 16 – Waste Management.*

These sections of the planning scheme policy prescribe design requirements for waste storage areas. Design requirements prescribed include the provision of design details and materials, locational requirements, provision of clearance around waste containers, accessibility, manoeuvrability, ventilation, ceiling height and the provision of wash-down facilities (if intended to be included within the same structure) etc.

In relation to wash-down facilities, section 9.16.10 prescribes requirements for the provision of wash down facilities. These requirements include the provision of a drainage point connected to a trade waste outlet and the provision of a hosecock within the vicinity of the bin store. For further details regarding wash down are requirements, please refer section 9.16.10 of Planning Scheme Policy 9 – Infrastructure Works, Chapter 16 – Waste Management.

The location of the proposed central waste store facility is shown in Figure 3.1 below.

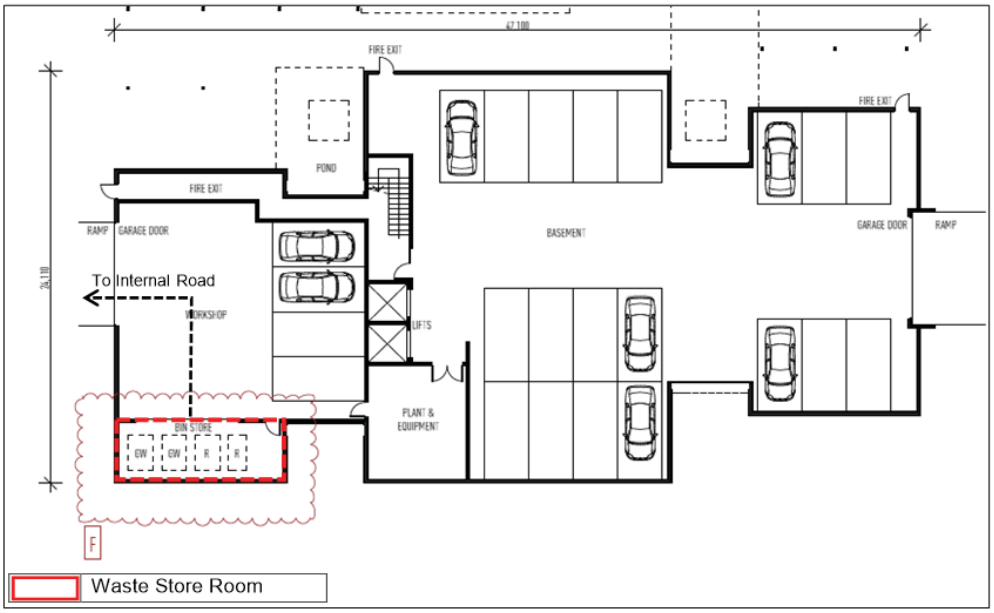

Figure 3.1 Proposed Central Bin Store Room (Ground) (Courtesy: Jared Poole Design)

3.1.5 Waste Collection

Section 9.16.9 of *Planning Scheme Policy 9 – Infrastructure Works* prescribes design requirements for waste servicing for new developments. In accordance with section 9.16.9 of *Planning Scheme Policy 9 – Infrastructure Works, Chapter 16 – Waste Management* the requirements for bulk bin servicing points are:

2) *For uses with greater than ten waste and ten recycle wheelie bins; or with bulk bins provide –*

   (a) off-street servicing points for the containers where the entire refuse collection vehicle is positioned within the site;

   (b) internal access roads that enable refuse collection vehicles to enter and exit the site in a forward gear and have adequate vertical clearance;

Note -

Ensuring that the waste collection vehicles enter and exit the site in a forward gear represents best practice waste collection.

   (c) maximum surface gradient of 1:20 (5%) for container servicing and refuse collection vehicle manoeuvring;

   (d) for wheelie bins, one metre of unobstructed internal kerbside length per wheelie bin, excluding driveways, carparks and landscaping;

(e) for bulk bins, and unobstructed internal servicing point that -

(i) is also a waste storage area; or

(ii) if bins 1.5m3 or less are used, is located within 20m of the waste storage area; or

(iii) has a hardstand surface for bin movement that is smooth in texture, not including asphaltic concrete.

The proposed central bin store room opens onto the paved surface of the central facilities basement and is connected to the temporary service location via the development's internal road network, allowing for bulk bins to be easily transferred from central waste store room to the temporary servicing point by management / staff. The paved path between the temporary bin servicing point and the bin store room is to be designed so that it is free of speed control devices and temporary service points are clearly identifiable and distinguishable from parking, loading bays.

As identified in Table 3.2 both general waste bulk bins will be required to be serviced three (3) times per week while recyclable waste bulk bins shall require servicing two (2) times per week by waste contractors. The design waste collection vehicle for both general / recyclable waste shall be a front loader refuse collection vehicle. As servicing of the proposed development is to occur from the internal road network, this servicing of the site is expected to have minimal impact upon the traffic flow of Rocky Passage Road.

It should be noted that due to the size of the required bulk bins (exceeding 1,100L), the transfer of waste containers between the central waste store room and temporary servicing point by management / staff will be required to be undertaken using a vehicle.

The location of the proposed development's central bin store room and servicing point are shown in Figure 3.2 below. For further details regarding the design of the proposed development, please refer to the architectural package prepared by Jared Poole Design contained in Appendix A.

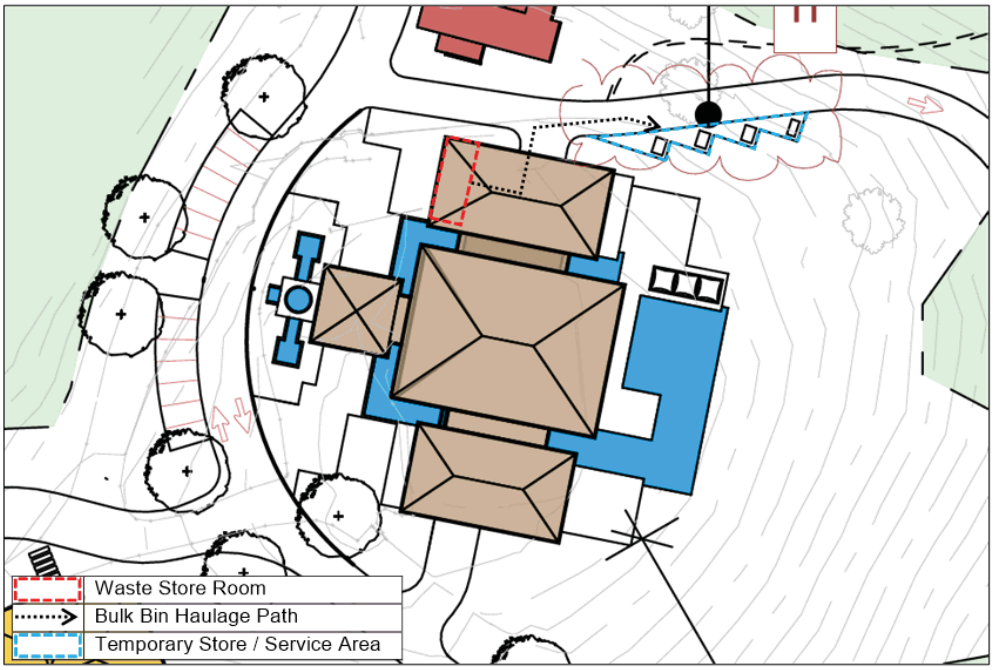

Figure 3.2 Proposed Bin Store Room and Temporary Store / Service Point (Courtesy: Jared Poole Design)

It is recommended that in the initial operational stages of the development, the waste management system be monitored closely to ensure that the number of bins provided on the site are suitable for the amount of waste generated. The waste generation calculations within this report are considered conservative, and therefore it is possible that a lesser servicing regime may be adequate to meet the needs of the development. If additional refuse storage is required, collection frequencies should be increased in accordance with the *Planning Scheme Policy 9 – Infrastructure Works, Chapter 16 – Waste Management.*

3.2 Servicing by Waste Vehicles

The proposed development is to be serviced via the internal road network by waste contractors. As illustrated within the Traffic Impact Assessment prepared by Rytenskild Traffic Group for the proposed development, the site is accessible by heavy rigid vehicles and allows sufficient space for manoeuvring.

This shall allow for service waste vehicles to enter, service and exit the proposed development under a forward gear in accordance with the provisions of section 9.16.9 of *Planning Scheme Policy 9 – Infrastructure Works, Chapter 16 – Waste Management*. Figure 3.3 below provides an extract of the swept path analysis completed for the waste service vehicle depicting the vehicle accessing and servicing bulk bins from the nominated waste servicing location (refer Figure 3.2).

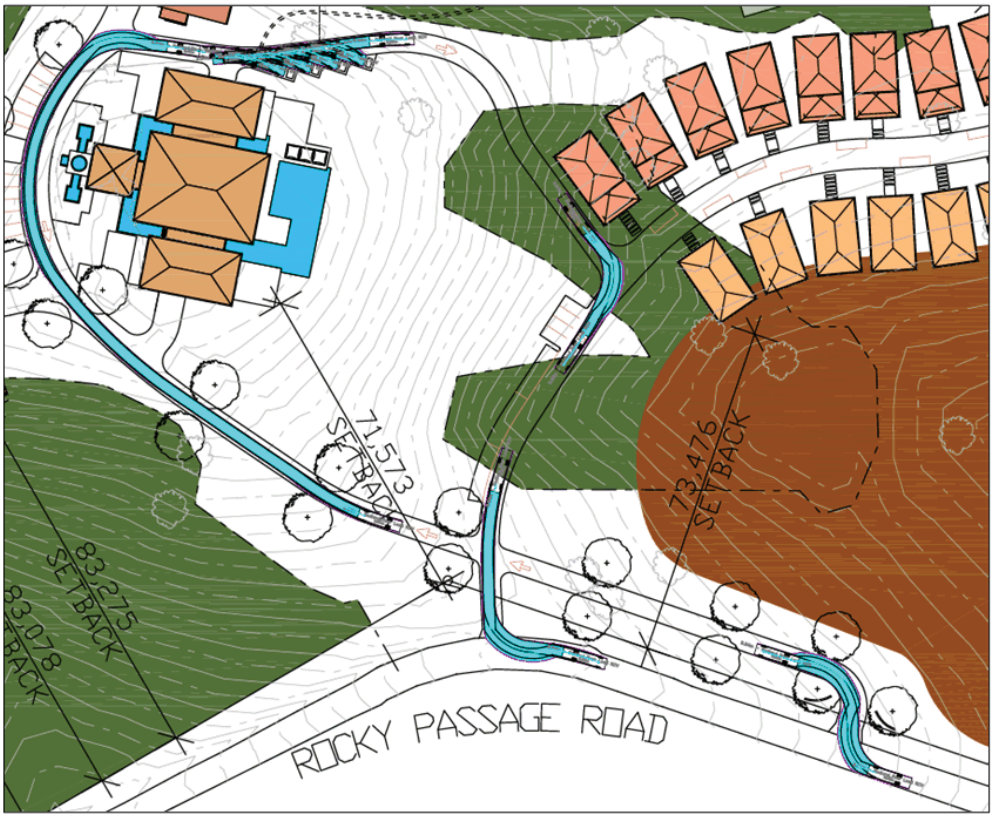

Figure 3.3 Design Service Vehicle Swept Path Analysis Extract (Courtesy: Rytenskild Traffic Group)

For further details regarding the completed swept path analysis, please refer relevant swept path diagrams extracted from the Rytenskild Traffic Group Traffic Impact Assessment contained within Appendix B of this report.

4. Monitoring

Facility Management should consider the adoption of a waste auditing and monitoring program to monitor and document:

- Quantity of wastes being produced;
- Quantity of waste materials being recycled and reused on site; and
- Ongoing performance of recycling and reuse programs.

Monitoring and auditing of these programs is expected to enable the client to assess the relative success or failure of such programs. In addition, by monitoring and auditing, the client can identify potential opportunities to improve processes and potential economic savings pertaining to these programs (i.e. reduce frequency of bin collection).

5. Conclusions

This report provides a Solid Waste Management Plan for the proposed tourist accommodation development located at 147-205 Rocky Passage Road, Redland Bay.

The following findings have been identified through this study:

- The proposed development will require the provision of two (2) general waste bulk bins (2 x 2,300L) in accordance with *Planning Scheme Policy 9 – Infrastructure Works, Chapter 16 – Waste Management*;
- The proposed development will require the provision of two (2) recycled waste bulk bins (1 x 2,300L and 1 x 1,500L) in accordance with *Planning Scheme Policy 9 – Infrastructure Works, Chapter 16 – Waste Management*;
- Individual villas / bungalows (where short stay scenarios are applicable and provide kitchen facilities) shall be provided with external general and recyclable waste bins (exclusive to each villa / bungalow) to allow guests to deposit waste during their stay;
- Staff shall be responsible for the transfer of waste from bins provided for each of the villas / bungalows to the central waste store facility;
- Apartments shall be serviced directly by staff on a daily basis;
- Facility staff shall be responsible for the collection and transfer of waste from individual accommodation and central facility to the central waste store facility;
- The development will need to be serviced by a licensed waste contractor three (3) times per week for general waste and two (2) times a week for recyclable waste;
- A waste monitoring and auditing program should be considered to identify opportunities for improvement;
- The adoption of an education program should be considered to educate management and staff on better waste management and the benefits of adopting sustainable waste management measures; and
- Detailed design of the proposed development should ensure that the requirements and recommendations of this Solid Waste Management Plan can be accommodated.

These findings will be implemented to ensure the efficient and safe operation of waste within the development.

6. References

1. *Planning Act 2016*, Queensland State Government.
2. *Environmental Protection Act 1994* – Queensland Government.
3. *Environmental Protection Regulation 2008*, Queensland Government.
4. *Environmental Protection (Waste Management) Policy 2000*, Queensland Government.
5. *Environmental Legislation Amendment and Repeal Regulation (No.1) 2014*, Queensland Government.
6. *Queensland's Waste Avoidance and Resource Productivity Strategy (2014-2024)*, Queensland Government.
7. Redland City Council. Redland Planning Scheme Version 7.1 (2016).
8. *Waste Reduction and Recycling Act 2011*, Queensland Government.

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Appendix A – Design Drawings

YEILD

	No. OF ACCOMMODATION BUILDINGS	No. OF UNITS/BUILDING	No. OF BEDROOMS/UNIT	TOTAL YIELD (ROOMS)
APARTMENT VILLA (4 PLEX)	4	4	2 BEDROOMS	32
BANYAN TREE - RESIDENCE	16	1	3 BEDROOMS	48
SOUL REST - RESIDENCE	8	1	4 BEDROOMS	32
INGENUITY APARTMENTS	2	12	STUDIO	24
COMMUNAL FACILITES	30			136

CONCEPT MASTER PLAN

SCALE 1:2000 @ A3

ISSUE	DATE	DESCRIPTION
A	06.11.14	PRELIMINARY ISSUE
B	09.12.17	CONSULTANT ISSUE
C	24.01.17	UPDATE RESIDENTIAL NAMES AND NUMBERS ON CONCEPT PLAN
D	13.03.17	SITE PLAN UPDATED WITH CONSULTANT INFORMATION
E	06.10.17	TENNIS COURT LOCATION UPDATED
F	30.01.18	MASTER PLAN AMENDED TO INCREASE SETBACKS TO MIN. 10m
G	04.05.18	SITE PLAN UPDATED TO SHOWS PARKING "UNMARKED" ADDED
H	30.01.19	BIN LOCATION BAY ADDED

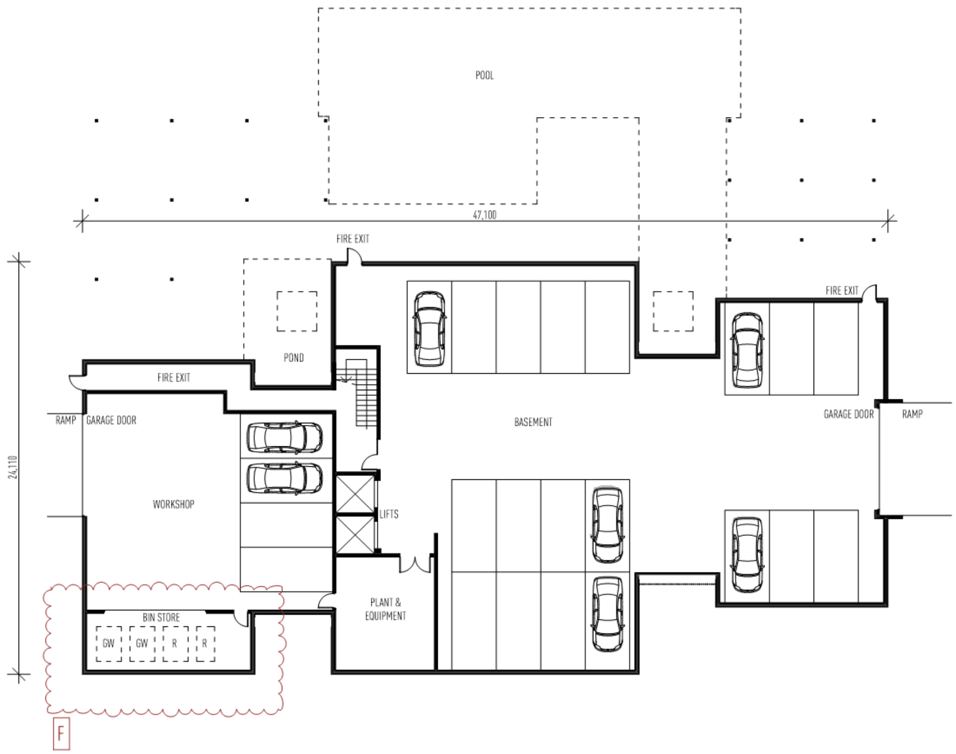
JAREDPOOLEDESIGN
LEVEL 1 33 ELKHORN AVENUE, SURFERS PARADISE, Q. 4217 AUSTRALIA
PO BOX 42, ELD OF CAPRI, Q. 4217 AUSTRALIA
TEL. 07 5527 5300 EMAIL INFO@JPD.COM.AU WEB JPD.COM.AU

NORTH

PROJECT
A PROPOSED NEW ECO DEVELOPMENT
AT
REDLAND BAY QUEENSLAND QLD
FOR
NEW LAND TOURISM PTY LTD

Soulitude HEALING RETREAT

DRAWING - CONCEPT MASTER PLAN
DRAWING No. BP783/4.01
ISSUE H
POOLE



CENTRAL FACILITY - BASEMENT PLAN

SCALE 1:250 @ A3

ISSUE	DATE	DESCRIPTION
A	06.12.16	PRELIMINARY ISSUE
B	09.02.17	CONSULTANT ISSUE
C	24.02.17	UPDATE RESIDENCE NAMES AND NUMBERS ON CONCEPT PLAN
D	13.03.17	SITE PLAN UPDATED WITH CONSULTANT INFORMATION
E	30.01.18	AMENDED LAYOUT
F	30.05.18	BIN STORE ADDED

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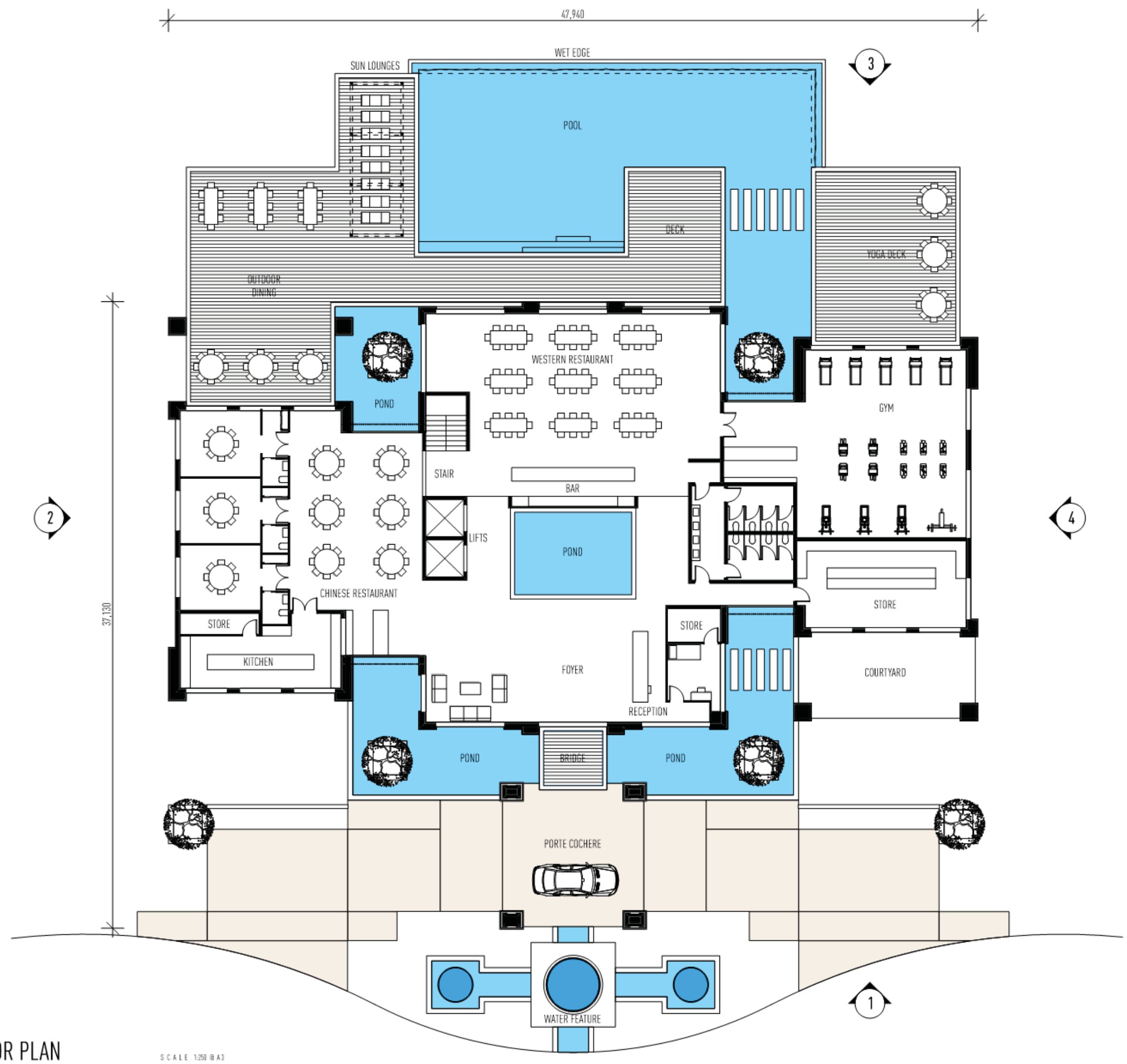
DRAWING - CENTRAL FACILITY - BASEMENT PLAN
DRAWING No. BP783/9.02
ISSUE F

POOLE



CENTRAL FACILITY - GROUND FLOOR PLAN

SCALE 1:250 @ A3

ISSUE	DATE	DESCRIPTION
A	06.12.16	PRELIMINARY ISSUE
B	09.02.17	CONSULTANT ISSUE
C	24.02.17	UPDATE RESIDENCE NAMES AND NUMBERS ON CONCEPT PLAN
D	13.03.17	SITE PLAN UPDATED WITH CONSULTANT INFORMATION

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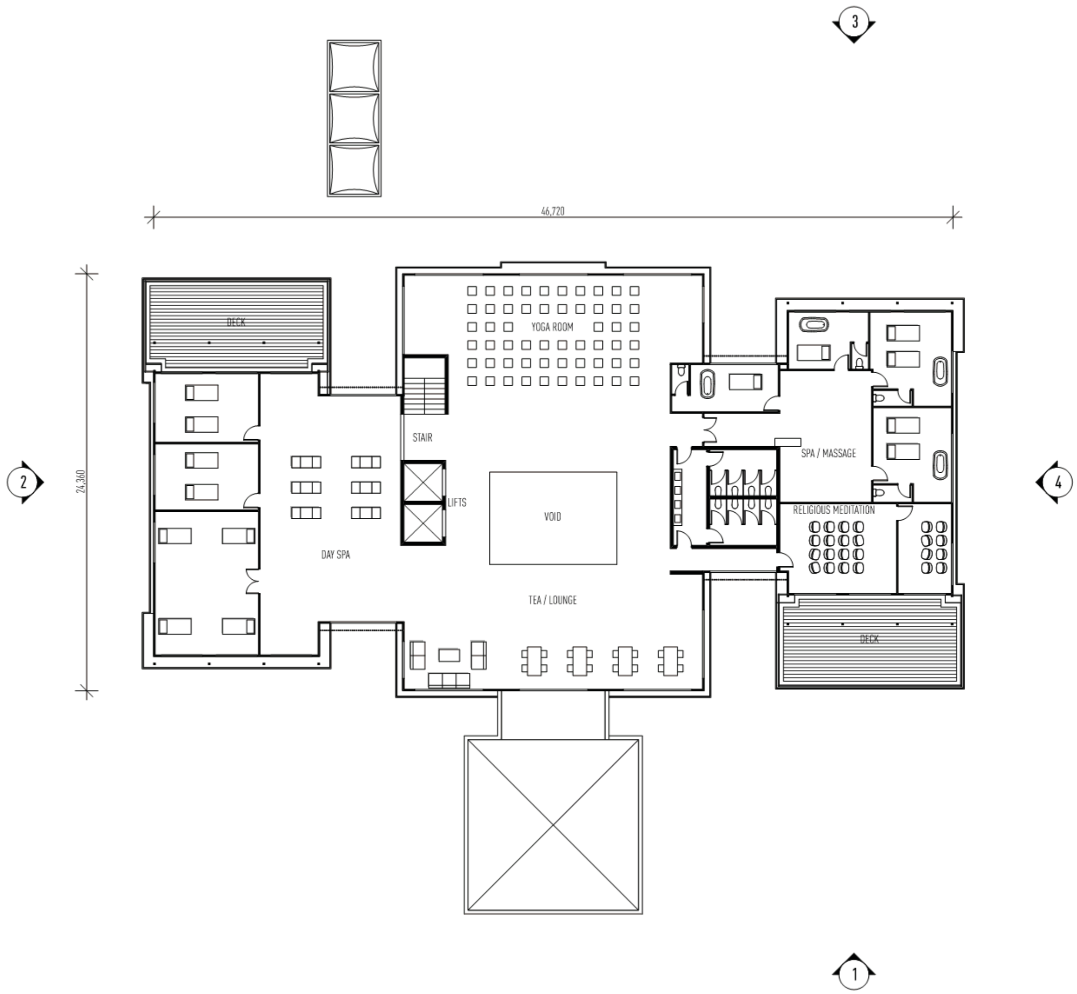
DRAWING - CENTRAL FACILITY - GROUND FLOOR PLAN
DRAWING No. BP783/9.03
ISSUE D

POOLE



CENTRAL FACILITY - FIRST FLOOR PLAN

SCALE 1:250 @ A3

ISSUE	DATE	DESCRIPTION
A	06.12.16	PRELIMINARY ISSUE
B	09.02.17	CONSULTANT ISSUE
C	24.02.17	UPDATE RESIDENCE NAMES AND NUMBERS ON CONCEPT PLAN
D	13.03.17	SITE PLAN UPDATED WITH CONSULTANT INFORMATION

JAREDPOOLEDESIGN

LEVEL 1 33 ELKHORN AVENUE, SURFERS PARADISE, Q. 4217 AUSTRALIA
PO BOX 42, ISLE OF CAPRI, Q. 4217 AUSTRALIA
TEL 07 5527 5300 EMAIL INFO@JPD.COM.AU WEB JPD.COM.AU

PROJECT
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FOR
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DRAWING - CENTRAL FACILITY - FIRST FLOOR PLAN
DRAWING No. BP783/9.04
ISSUE D

POOLE

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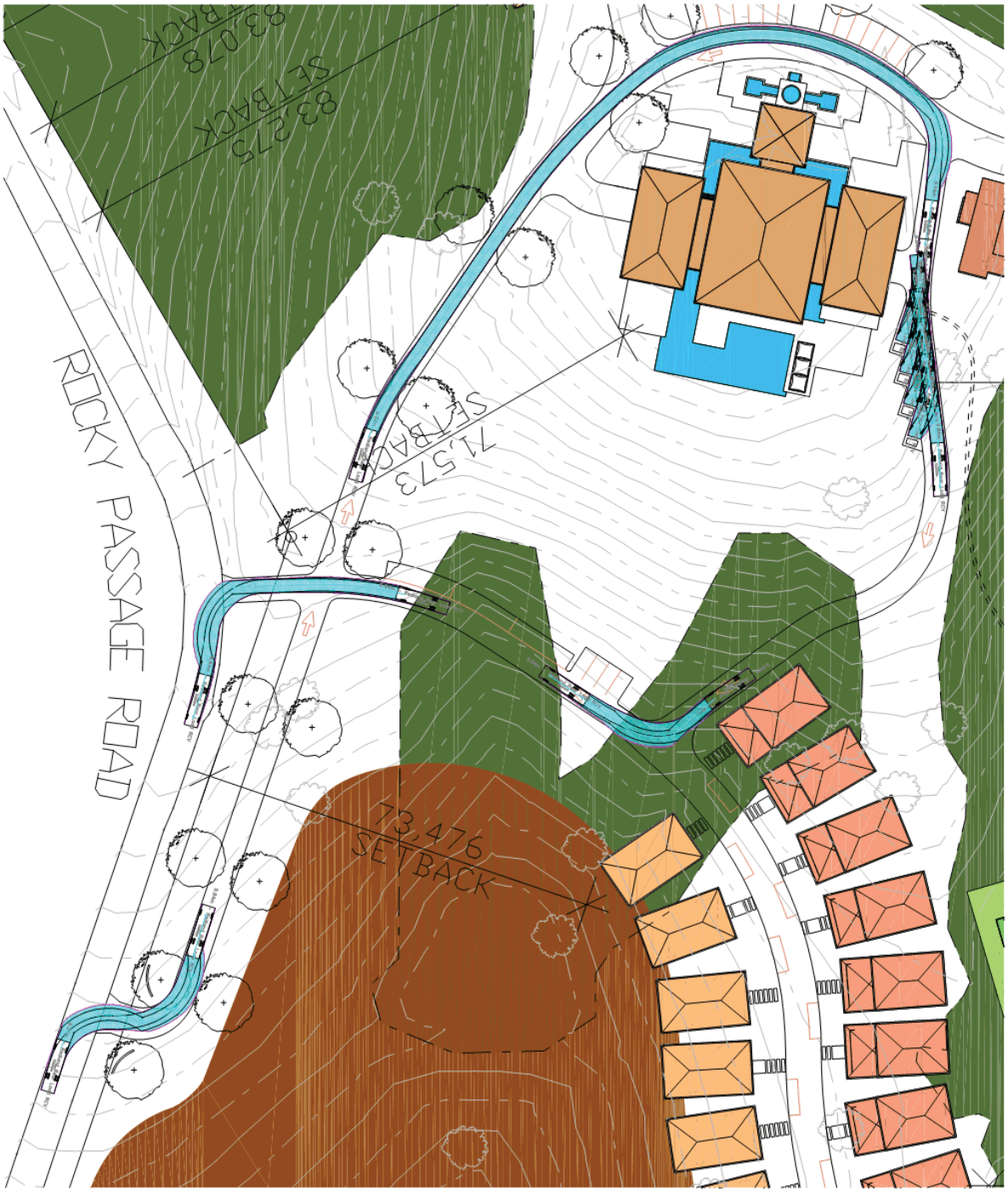
Appendix B – Swept Path Analysis Drawings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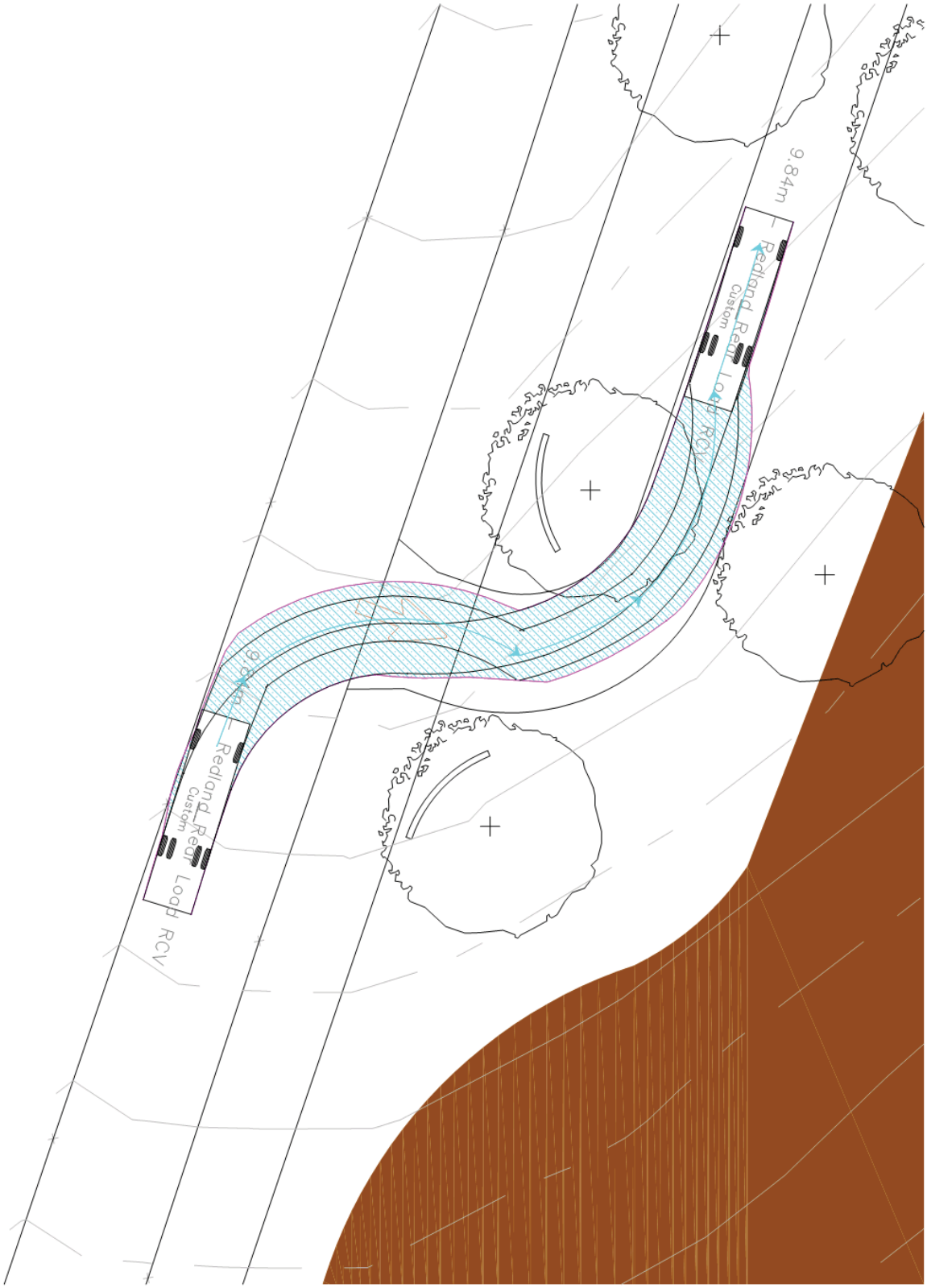
SETBACK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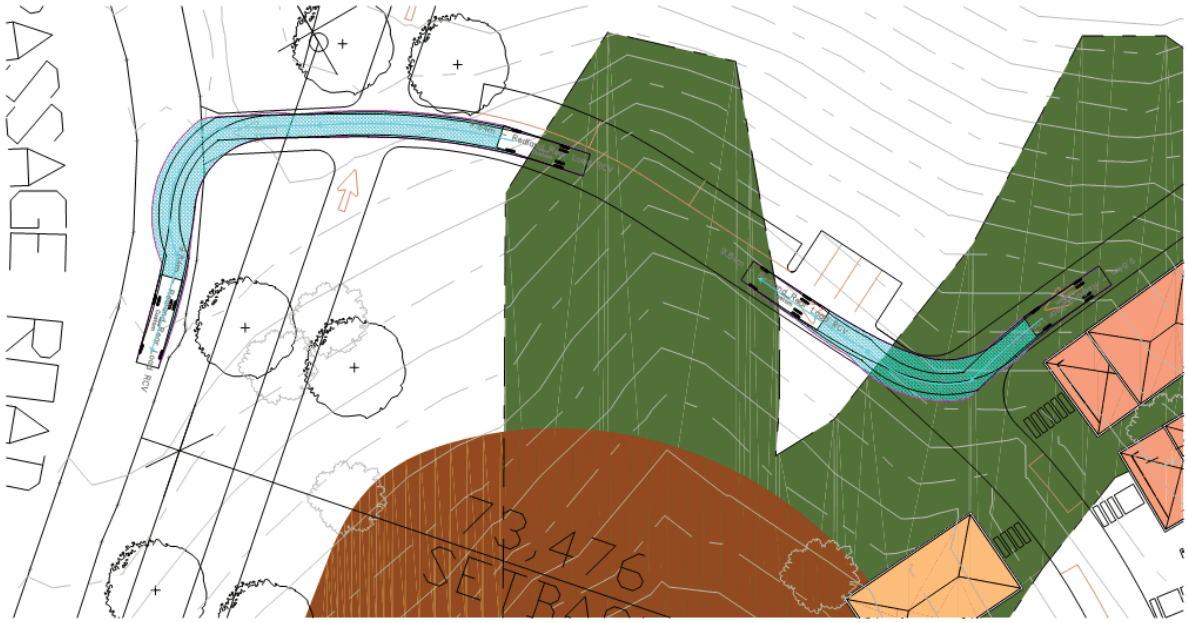
Redland_Regn_Loop_RCV
Custom
9.84m
Redland_Regn_Loop_RCV
Custom


ASSAGE RTAT
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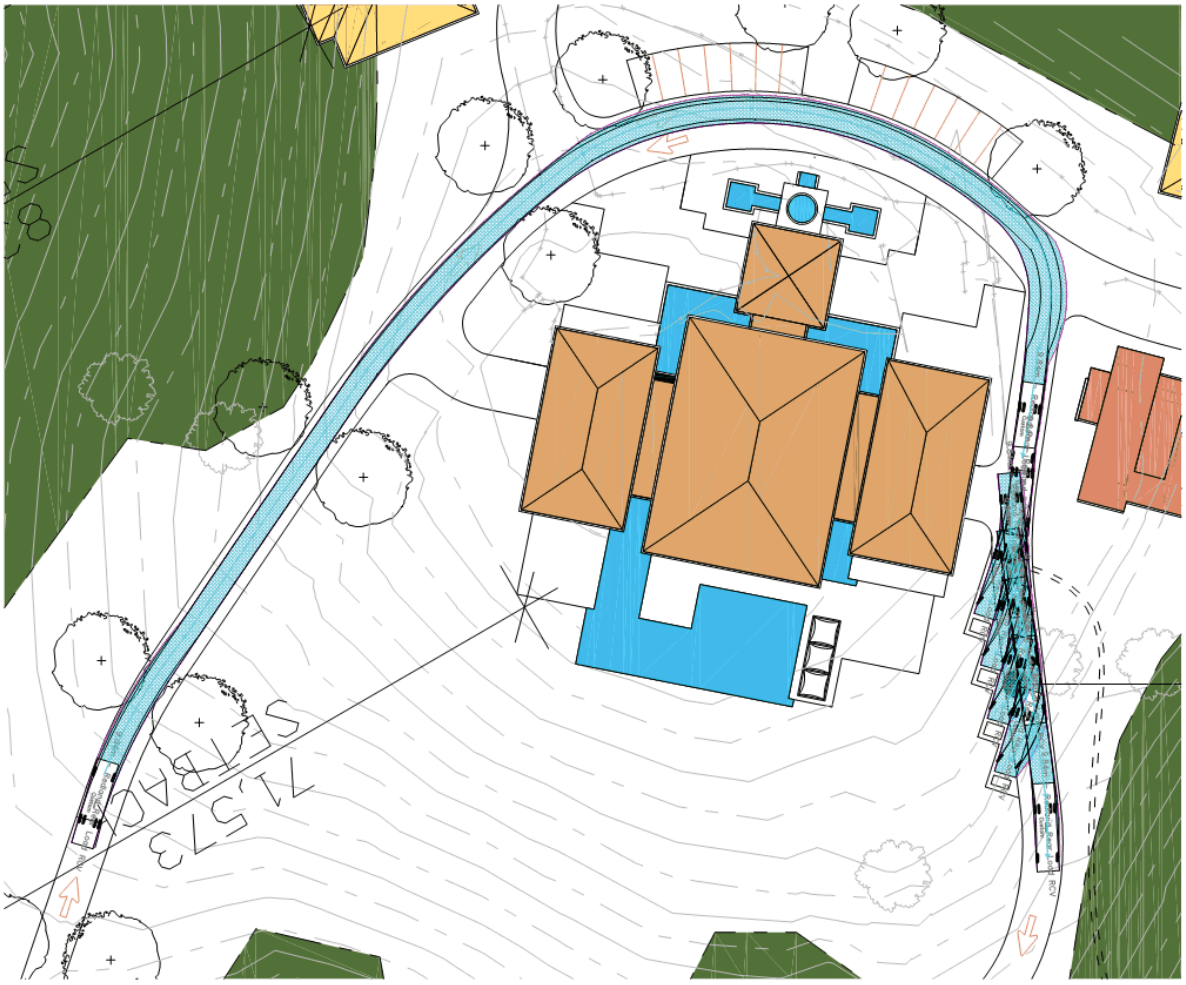
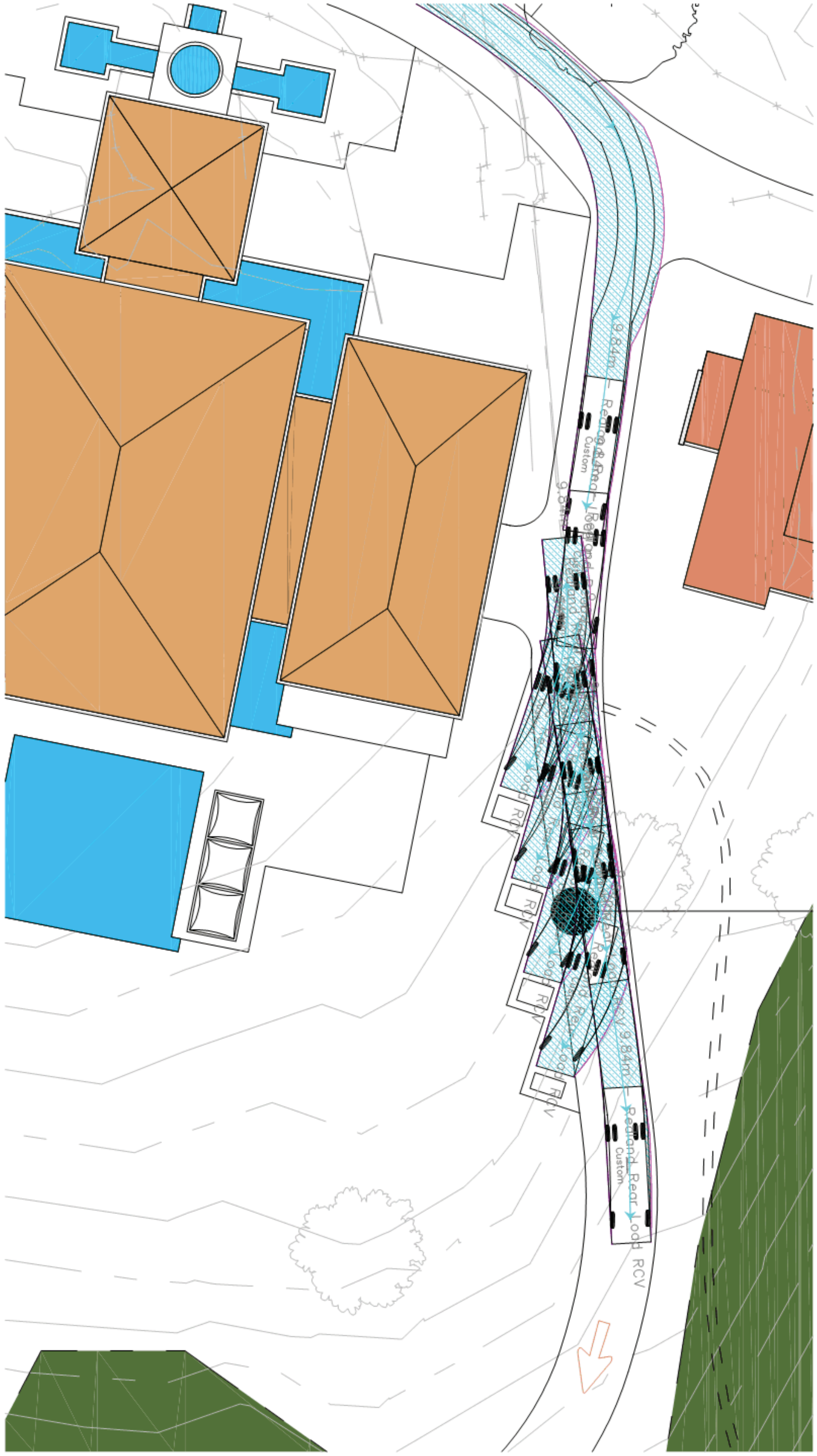




Queensland Government

Department of
State Development, Manufacturing, Infrastructure and Planning

Our reference: 1711-2566 SRA
Your reference: MCU17/0090

25 February 2019

The Chief Executive Officer
Redland City Council
PO Box 21
CLEVELAND QLD 4163

Via email: damailbox@redland.qld.gov.au

Dear Sir/Madam

Changed referral agency response—with conditions
(Given under section 28 of the Development Assessment Rules)

On 20 February 2019 the Department of State Development, Manufacturing, Infrastructure and Planning (the department) received notice of a change to the development application described below. The department has assessed the changes and now provides this changed referral agency response which replaces the response dated 4 December 2018.

Applicant details

Applicant name:	New Land Tourism Pty Ltd
Applicant contact details:	c/ - Arnold Development Consultants PO Box 1968 Milton QLD 4064 darcy.phelan@adcqld.com.au

Location details

Street address:	147-205 Rocky Passage Road, Redland Bay QLD 4165
Real property description:	Lot 3 on RP153333
Local government area:	Redland City Council

Application details

Development Permit for a Material change of use for a Tourist Accommodation

Referral triggers

The development application was referred to the department under the following provisions of the Planning Regulation 2017:

- Schedule 10, Part 16, Division 2, Subdivision 3, Table 1, Item 1 - SEQ regional landscape and rural production area or SEQ Rural living area - tourist activity or sport and recreation activity.

Planning and Development Services (SEQ South)
PO Box 3290
Australia Fair QLD 4215

Conditions

Under section 56(1)(b)(i) of Planning Act 2016 (the act), the conditions set out in Attachment 1 must be attached to any development approval.

Reasons for decision to impose conditions

The department must provide reasons for the decision to impose conditions. These reasons are set out in Attachment 2.

Approved plans and specifications

The department requires that the plans and specifications set out below and enclosed must be attached to any development approval.

Drawing/report title	Prepared by	Date	Reference no.	Version/issue
Aspect of development: Development Permit for Material Change of Use				
Concept master plan	Jared Poole Design	08.02.19	BP783/4.1	A-D
Central facilities – ground floor	Jared Poole Design	16.11.18	BP783/11.3	A-A
Central facility – first floor	Jared Poole Design	16.11.18	BP783/11.4	A-A

A copy of this response has been sent to the applicant for their information.

For further information please contact Isaac Harslett, Senior Planning Officer, on 07 5644 3222 or via email GCSARA@dsdmip.qld.gov.au who will be pleased to assist.

Yours sincerely

Gareth Richardson
Manager, Planning and Development Services (SEQ South)

cc: New Land Tourism Pty Ltd c/- Arnold Development Consultants, darcy.phelan@adcqld.com.au

enc Attachment 1—Changed conditions to be imposed
Attachment 2—Changed reasons for decision to impose conditions
Attachment 3—Changed advice to the assessment manager
Approved plans and specifications

Attachment 1—Changed conditions to be imposed

No.	Conditions	Condition timing
Development Permit for Material Change of Use		
1.	The development must be carried out generally in accordance with the following plans: • Concept master plan, prepared by Jared Poole Design, dated 08.02.19, reference BP783/4.1, issue A-D • Central facilities – ground floor, prepared by Jared Poole Design, dated 16.11.18, reference BP783/11.3, issue A-A • Central facility – first floor, prepared by Jared Poole Design, dated 16.11.18, reference BP783/11.4, issue A-A.	Prior to the commencement of use and to be maintained at all times
2.	The proposed central facilities are to be maintained for the sole use of guests staying in the tourist accommodation on site.	To be maintained at all times

Attachment 2—Changed reasons for decision to impose conditions

The reasons for this decision are:

- To ensure the development is carried out generally in accordance with the plans of development submitted with the application.
- To ensure that the proposed central facilities remain ancillary to the approved use of the site for tourist activity.

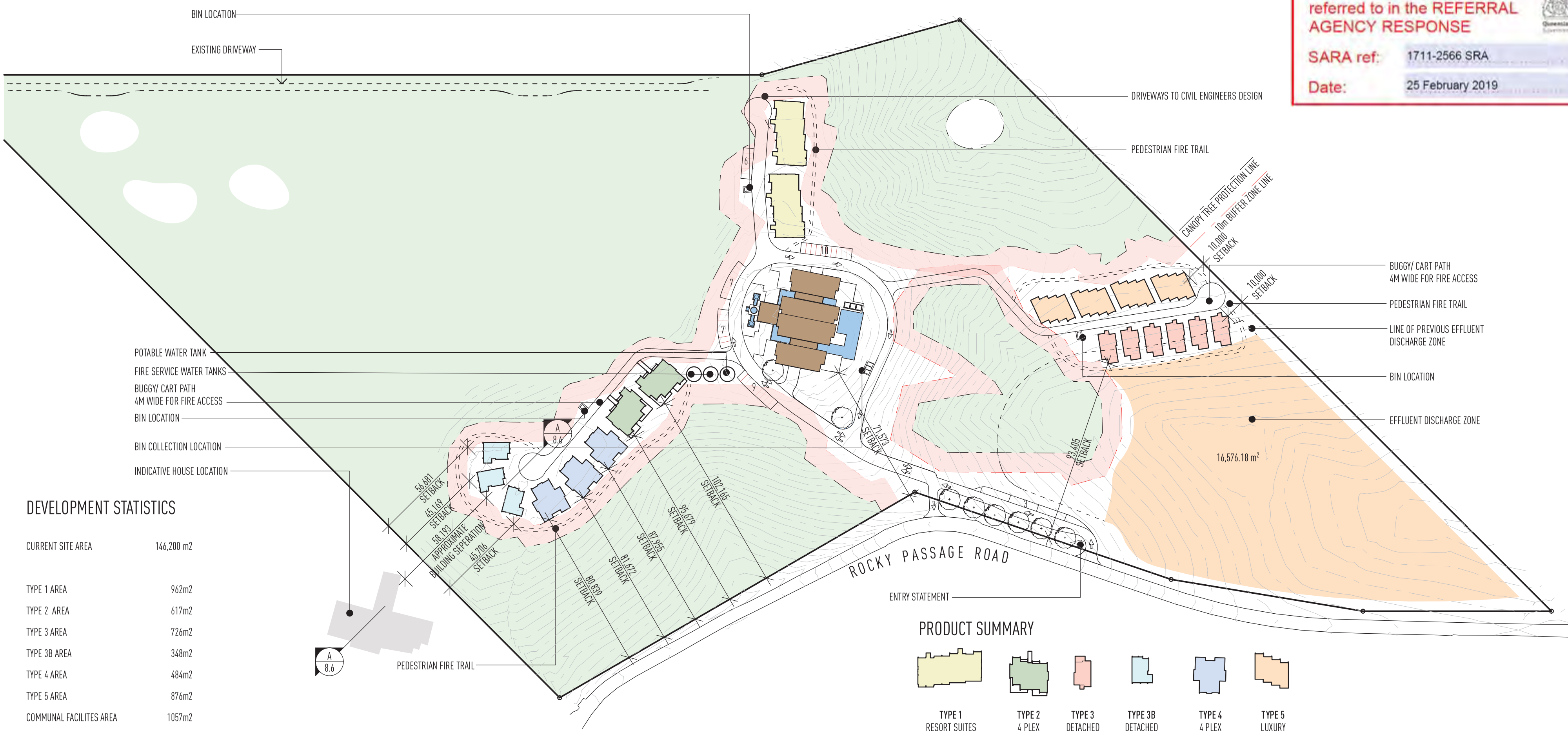
Attachment 3—Changed advice to assessment manager

General advice	
1.	If the central facilities are made available to the general public, they will not be considered ancillary to the central facilities and a material change of use approval for urban activities will be required. Where not ancillary to the tourist activity, these commercial facilities would be defined as 'urban activities' under the Planning Regulation 2017.
2.	Any reuse of the buildings and infrastructure on the site for residential purposes will be prohibited development under the Planning Regulation 2017. Likewise, reuse of the premises for another purpose such as a residential care facility would also likely be prohibited as it would exceed the relevant thresholds under the Regulation.

PLANS AND DOCUMENTS referred to in the REFERRAL AGENCY RESPONSE

SARA ref: 1711-2566 SRA

Date: 25 February 2019



DEVELOPMENT STATISTICS

CURRENT SITE AREA	146,200 m2	
TYPE 1 AREA	962m2	
TYPE 2 AREA	617m2	
TYPE 3 AREA	726m2	
TYPE 3B AREA	348m2	
TYPE 4 AREA	484m2	
TYPE 5 AREA	876m2	
COMMUNAL FACILITES AREA	1057m2	
SITE COVER	5,070m2	
SITE COVER PERCENTAGE	3.4 %	(5,070m2 / 146,200m2)

PRODUCT SUMMARY

TYPE 1 RESORT SUITES — TYPE 2 4 PLEX — TYPE 3 DETACHED DWELLING — TYPE 3B DETACHED DWELLING — TYPE 4 4 PLEX — TYPE 5 LUXURY RESORT SUITES

YEILD SUMMARY

YEILD	No. OF ACCOMMODATION BUILDINGS	No. OF UNITS/BUILDING	No. OF BEDROOMS/UNIT	TOTAL YIELD (ROOMS)
TYPE 1	2	16	1 BEDROOMS	32
TYPE 2	2	4	2 BEDROOMS	16
TYPE 3	6	1	3 BEDROOMS	18
TYPE 3B	3	1	3 BEDROOMS	9
TYPE 4	3	4	2 BEDROOMS	24
TYPE 5	4	4	2 BEDROOMS	32
TOTAL	20			131

CAR PARKING SCHEDULE

CARPARKING SPACE PROVIDED 65 (23 CENTRAL FACILITY BASEMENT)

(AS PER TRAFFIC ENGINEERS)

BIN COLLECTION

ON DAY OF BIN COLLECTION BINS WILL BE MOVED BY SITE MANAGER TO BIN COLLECTION LOCATION

CONCEPT MASTER PLAN

SCALE 1:2000 @ A3

ISSUE	DATE	DESCRIPTION
A-A	16.11.18	PROJECT REDESIGN IN RESPONSE TO INFORMATION REQUEST
A-B	22.01.19	TYPE 6 ADDED
		MASTER PLAN AMENDED
A-C	31.01.19	TYPE 1 AMENDED AND SUMMARIES UPDATED AS PER NEW PLANS FOR TYPE 1 AND 3
A-D	08.02.19	TYPE 3 AMENDED BACK AND TYPE 6 REPLACED BY AMENDED TYPE 3 (3B)

JAREDPOOLEDESIGN

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PO BOX 42, ISLE OF CAPRI, Q. 4217 AUSTRALIA
TEL 07 5527 5300 EMAIL INFO@JPD.COM.AU WEB JPD.COM.AU

NORTH

PROJECT
A PROPOSED NEW ECO DEVELOPMENT
AT
REDLAND BAY QUEENSLAND QLD
FOR
NEW LAND TOURISM PTY LTD

DRAWING - CONCEPT MASTER PLAN
DRAWING No. BP783/4.1
ISSUE A-D

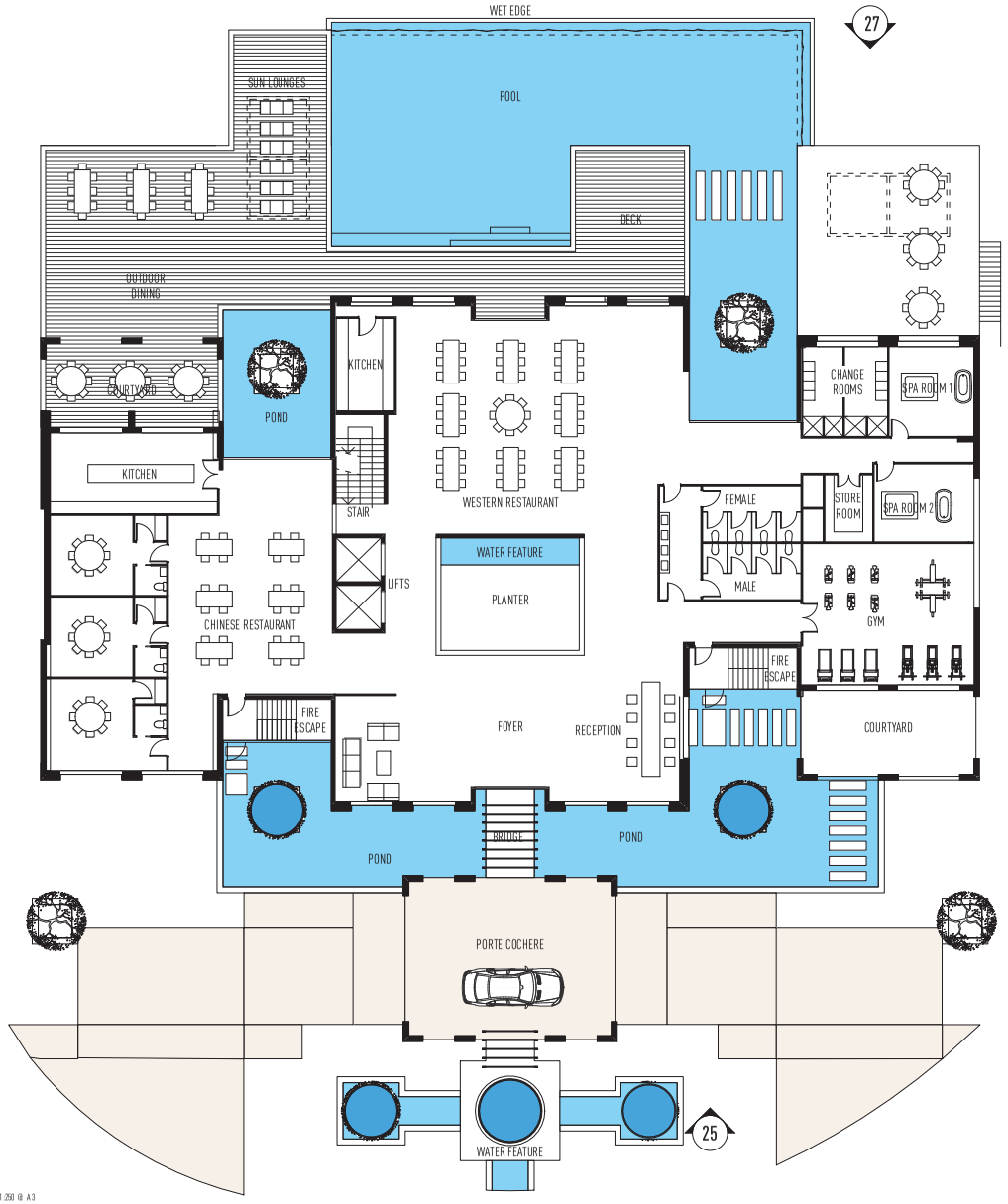
POOLE

PLANS AND DOCUMENTS referred to in the REFERRAL AGENCY RESPONSE

Queensland Government

SARA ref: 1711-2566 SRA

Date: 25 February 2019



AREA SCHEDULE

BASEMENT	921
GROUND FLOOR	946
OUTDOOR DECK	371
POOL	329
COURTYARD	42
PORTE COCHERE	70
FIRST FLOOR	907
BALCONY	83
TOTAL	3669 m²

CENTRAL FACILITIES - GROUND FLOOR

SCALE 1:250 @ A3

ISSUE	DATE	DESCRIPTION
A-A	16.11.18	PROJECT REDESIGN IN RESPONSE TO INFORMATION REQUEST

JAREDPOOLEDESIGN

LEVEL 1 33 ELKHORN AVENUE, SURFERS PARADISE, Q. 4217 AUSTRALIA
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PROJECT
A PROPOSED NEW ECO DEVELOPMENT
AT
REDLAND BAY QUEENSLAND QLD
FOR
NEW LAND TOURISM PTY LTD

DRAWING - CENTRAL FACILITIES - GROUND FLOOR
DRAWING No. BP783/11.3
ISSUE A-A

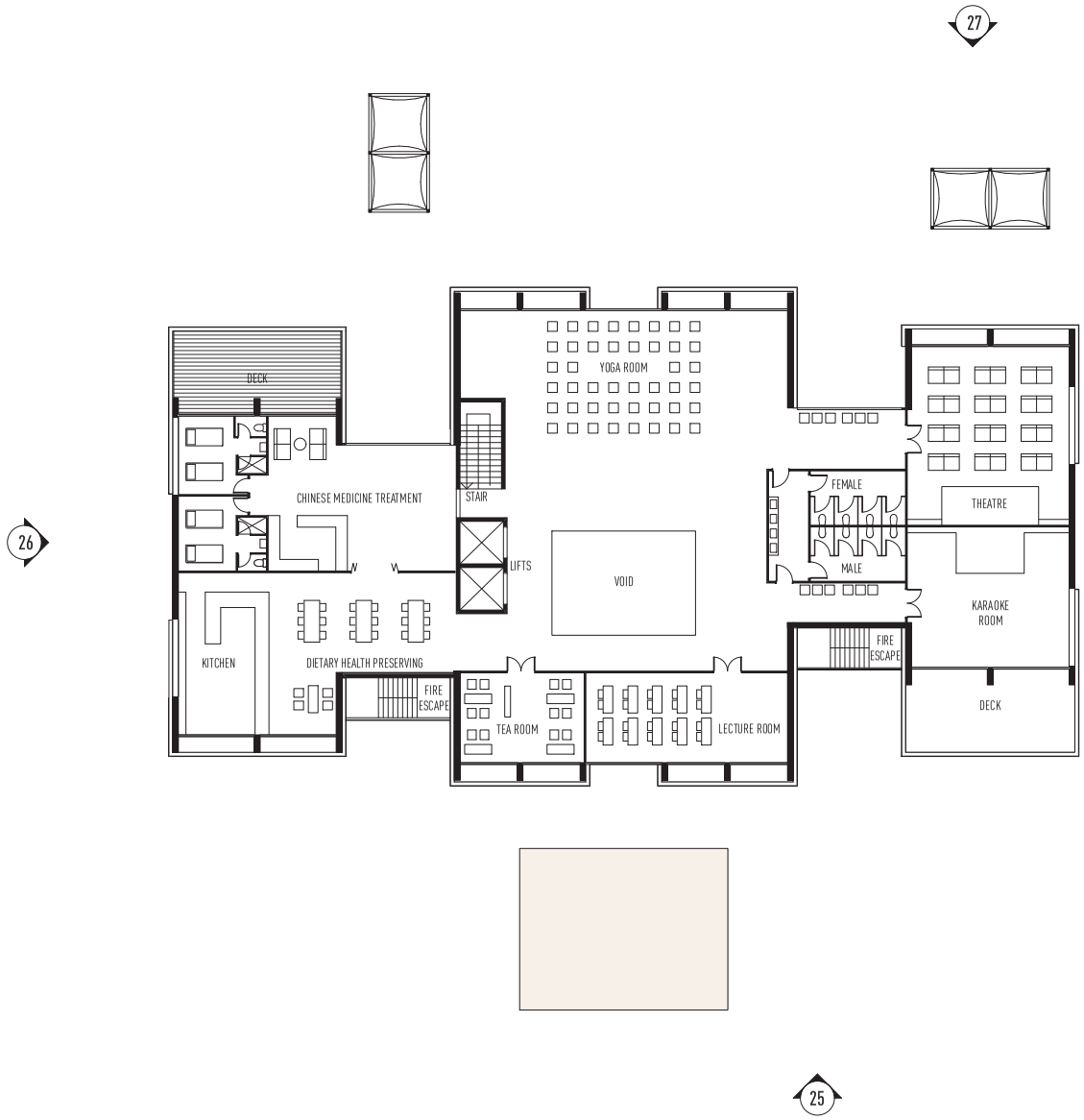
POOLE

PLANS AND DOCUMENTS
referred to in the REFERRAL
AGENCY RESPONSE

Queensland Government

SARA ref: 1711-2566 SRA

Date: 25 February 2019



CENTRAL FACILITY - FIRST FLOOR

SCALE 1:250 @ A3

ISSUE	DATE	DESCRIPTION
A-A	16.11.18	PROJECT REDESIGN IN RESPONSE TO INFORMATION REQUEST

JAREDPOOLEDESIGN

LEVEL 1 33 ELKHORN AVENUE, SURFERS PARADISE, Q. 4217 AUSTRALIA
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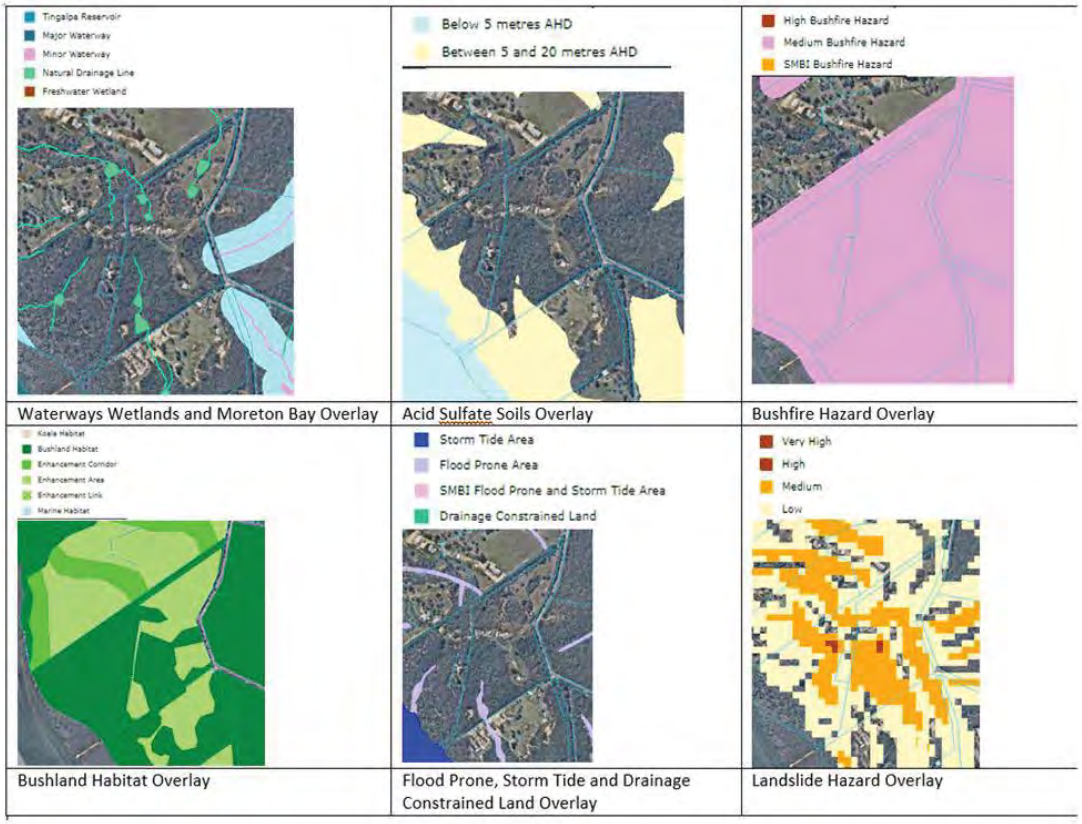
PROJECT
A PROPOSED NEW ECO DEVELOPMENT
AT
REDLAND BAY QUEENSLAND QLD
FOR
NEW LAND TOURISM PTY LTD

DRAWING - CENTRAL FACILITY - FIRST FLOOR
DRAWING No. BP783/11.4
ISSUE A-A

POOLE


REEDLAND BAY
Environmental Protection
Conservation



Waterways Wetlands and Moreton Bay Overlay	Acid Sulfate Soils Overlay	Bushfire Hazard Overlay
Bushland Habitat Overlay	Flood Prone, Storm Tide and Drainage Constrained Land Overlay	Landslide Hazard Overlay

14 REPORTS FROM INFRASTRUCTURE & OPERATIONS

14.1 AMITY POINT SHORELINE EROSION MANAGEMENT PLAN (SEMP)

Objective Reference:

Authorising Officer: **Peter Best, General Manager Infrastructure & Operations**

Responsible Officer: **Bradley Salton, Group Manager City Infrastructure**

Report Author: **Alistair Michell, Adviser - Marine Strategic Infrastructure Planning**
Michael Holland, Adviser Waterways and Shoreline Assets

Attachments: **1. FINAL Amity Point SEMP March 2019** ⇩

PURPOSE

The purpose of this report is to submit to Council the attached *Final Report: Amity Point Shoreline Erosion Management Plan (SEMP)* for adoption. The SEMP is a non-statutory planning document that sets out a framework and strategy to manage and respond to current or potential future erosion problems. It includes detailed investigation to establish the underlying causes of shoreline erosion, considers and specifies a number of management options and makes recommendations on the most suitable options.

Adoption of the SEMP will ensure it is recognised as Council's formal response to the erosion issues facing the vulnerable foreshore at Amity Point. Further, it will facilitate the development of an Implementation Plan to analyse and subsequently execute the recommended management options in the SEMP in consultation with key stakeholders and owners of public and private land.

BACKGROUND

Significant erosion has occurred along the Amity Point foreshore over a long period of time, which has resulted in the loss of public and private property. As a result, Amity Point is a declared Erosion Prone Area (EPA) under the *Coastal Protection and Management Act 1995*.

The shoreline erosion processes at Amity Point are characterised in the SEMP as episodic Retrogressive Flow Slide (RFS) 'events' that occur over relatively short periods of time (hours). An example of such an event occurred on public land at Amity Beach at the end of Millers Lane in September and November 2017.

Through development of Council's Coastal Adaptation Strategy (CAS) for current erosion hazards, and Council's CAS Steering Committee, Council initiated development of a Shoreline Erosion Management Plan (SEMP) for Amity Point, in FY2015-16. The Amity Point SEMP is the first SEMP produced by Redland City Council.

An engineering consultancy, Water Technology, was appointed to engage with stakeholders and produce the SEMP, generally following the guidelines provided by the Queensland Government Department of Environment and Science.

Development of the SEMP continued through FY2015-16 and FY2017-18, leading to production of a Final SEMP in September 2018. Key stakeholders were engaged in the process of SEMP development through a project-specific Community Reference Group.

The SEMP is considered a long-term strategy with a planning horizon of 20 years and recommendations will be progressively implemented over this timeframe.

ISSUES

Recommended Management Options

Recommendations within the SEMP consider three coastal reaches to determine appropriate erosion management options along the Amity Point shoreline. The three reaches are described below and shown in Figure 1.

Southern Reach – the foreshore frontage of the camping ground and boat ramp.
Central Reach – along the alignment of the rock armoured foreshore.
Northern Reach – the sandy foreshore of Amity Beach.

For each reach both structural and non-structural management strategies were considered and subject to a quadruple-bottom-line evaluation, to arrive at a recommended management option for each reach as summarised below.

Figure 1 Coastal Reaches of Amity Point Study Area

Table 1: SEMP recommended management strategies

Reach	Recommended strategy
Southern	• Undertake beach nourishment within each of the three existing beach compartments. • Construct cut-off seawalls behind each beach where an appropriate structure does not already exist.
Central	• Support and enhance the existing rock wall ('flow slide barrier'). • Carry out structural audit and survey.
Northern	• Further investigations required to better understand the local coastal processes on Amity Beach given erosion 'hotspots' that migrate along the shoreline. • Carry out three year monitoring program followed by Coastal Process Assessment.

Of particular focus in the SEMP is the Central Reach which is constrained by the deep water and migration of Rainbow Channel adjacent to the shoreline, increasing the complexity of management options in this reach. The SEMP identifies that the primary erosion hazard in the central reach is due to retrogressive flow slides.

Retrogressive flow slides (also known as retrogressive breach failures) are natural events which occur in sand deposits of many river, estuarine and coastal locations around the world. They can have a significant influence on the stability of coastal foreshores. The method to mitigate the threat of the flow slides, which occur along the eastern edge of Rainbow Channel, is to provide a physical barrier - a Flow Slide Barrier (FSB).

The informal rock armour protection by foreshore residents for more than 40 years has in effect provided this FSB which has, to date, prevented any significant or on-going shoreline recession. The local community responded to the threat of erosion over the years with armour defences constructed of rock and various readily-available materials.

It is, however, important to note that while emergency works (defined as work carried out in response to a situation endangering a person's life or health or a building's structural safety), can be undertaken pursuant to the *Planning Act 2016*, non-urgent / routine repairs of the FSB by foreshore property owners would be unlawful until such time as the existing FSB is approved. Obtaining such approval is a focal point of the Implementation Plan.

The SEMP states that the erosion protection provided by the existing FSB, however, is not necessarily ensured in future years. Evidence suggests the submerged eastern slopes of Rainbow Channel immediately offshore of the flow slide barrier are gradually steepening as the Channel slowly migrates eastward, and there is the potential risk of flow slides being initiated at lower levels on the changing channel slopes; and possibly undermining the existing flow slide barrier, highlighting the need for ongoing monitoring and structural audits.

Implementation of Management Options

The SEMP provides a detailed assessment of the erosion processes along the Amity Point coastline and makes numerous recommendations on how to manage the impacts created by these, however it is beyond its scope to detail the method by which they are applied. In order to clarify the process, costs and roles and responsibilities associated with the management options, an Implementation Plan will be developed.

There are various complex elements that the SEMP recognises but does not specifically address. These will be considered by the Implementation Plan, notably:

<u>Costs</u>

To date, the cost of constructing and intermittently repairing the flow slide barrier along the Central Reach has been met by individual property owners. The SEMP recommends that Council engage with other stakeholders, and obtain assistance and advice on legal issues as required, to determine an appropriate funding arrangement for future maintenance works to the rock-armoured flow slide barrier.

<u>Land Tenure</u>

Along the central reach, the flow slide barrier traverses various different land tenures (private, state and locally controlled public land, road and unallocated state land). This complicates the way by which it can be approved and raises issues of collective or individual management. That is, if the flow slide barrier was to be approved in its entirety, it would require the consent of all landowners and once approved there would be an obligation to carry out work and comply with conditions of the approval. Secondly, there is a need to ensure owners maintain their respective extent so as to avoid a lack of action resulting in damage or loss on neighbouring properties.

The implementation plan will include a high level of stakeholder engagement and consider the various options available, balancing the preferences of directly affected landowners. Any such arrangements would also need to be binding on successive owners.

Access

The ability to repair damaged sections of the flow slide barrier as soon as possible after each event in many cases relies on the goodwill of neighbouring residents. Whilst this informal arrangement is reputedly effective at present, there is no surety that it will remain so in the future. This situation adds further is merit to having a formal agreement or mechanism in place that will be binding on existing and future owners of their property.

Rock Supply

The supply of rock to carry out the repairs is a critical component of the Flow Slide Barrier management strategy. Issues regarding source and availability of rock (including sales permits), transport and stockpiling require clarification, with a particular focus on availability at short notice to respond to emergency events.

In the past, rock for repairs to the flow slide barrier along the Central Reach has been available from two quarry sources on North Stradbroke Island. However, since the 2011 native title consent determination there is ongoing dialogue with the relevant stakeholders and it will be necessary to establish administrative and financial structures to facilitate the supply of rock armour for Council projects and by Council to third parties.

To secure a long-term, sustainable and economic source of rock for repairs, a *Rock Armour Supply Study* will form part of the implementation plan to investigate and determine the procedures necessary to facilitate the appropriate sourcing and placement of rocks into an approved flow slide barrier along the Central Reach.

State Endorsement

Whilst relevant State Government departments were consulted throughout the development of the SEMP, formal endorsement was also sought from the Department of Environment and Science (DES) and Department of Agriculture and Fisheries (DAF) given their direct involvement in the approval processes required to implement the various management options.

Both departments have provided their support of the management strategies, recognising that the SEMP is a well-researched and comprehensive document that is appropriate in guiding coastal management at Amity Point. It is consistent with state coastal policy and will be of value for informing assessment of development applications in the area covered by the SEMP.

STRATEGIC IMPLICATIONS

Legislative Requirements

The SEMP is a non-statutory document, however given the approval processes required to carry out many of the management options, is closely aligned with the *Coastal Protection and Management Act 1995*, *Planning Act 2016* and *Marine Parks Act 2004*. In this regard, the SEMP has considered the various approval mechanisms so as to ensure management options are capable of approval. This has been reinforced by the State's acceptance of the SEMP, with the DES being a critical agency and will use the SEMP in the assessment of specific applications for Tidal Works along the Amity Point foreshore.

A detailed Planning and Legislation Review is provided in section 8 of the SEMP.

Risk Management

The SEMP fulfils an obligation to inform 'high risk' stakeholders at Amity Point of the hazards and risks they face from erosion and provides guidance as to potential mitigation options available to them. The Implementation Plan will manage any outstanding risks.

Financial

The SEMP provides estimated costs associated with implementation of the recommended erosion strategy for the three reaches:

Southern Reach - $275,000 with ongoing cost of $5,000 per year
Central Reach – Costs to Council will be determined through implementation planning
Northern Reach - $30,000 with ongoing monitoring costs of $5,000 per year

As the planning horizon for the SEMP is 20 years, budget will be sought through formal budget development processes for progressive roll out of works in the coming years and in conjunction with the outputs of the Implementation Plan.

People

The SEMP will assist asset managers and technical officers with assessing appropriate management options for erosion on Council controlled land. Development of the SEMP Implementation Plan will be carried out within existing staffing levels.

Environmental

The SEMP identifies the various environmental constraints and legislation applying to Amity Point and articulates the various approvals required for protection of the environment.

Social

The management options within the SEMP consider social impacts such as the loss of publicly accessible beach front (recreational value) and loss of visual amenity along the foreshore as a result of erosion. Further, the assessment of management options included a quadruple bottom line assessment – Environmental values, social values, economic considerations and legislative considerations.

Alignment with Council's Policy and Plans

Council's draft Coastal Adaptation Strategy (CAS), endorsed in 2016, carried out a review of the current coastal hazards facing the City. With Amity Point identified as a high risk locality, the development of a SEMP was initiated to conduct a detailed assessment of the issues and establish management options.

The SEMP also aligns with the following outcomes of Council's Corporate Plan 2018-2023:

Embracing the Bay - The benefits of the unique ecosystems, visual beauty, spiritual nourishment and coastal lifestyle provided by the islands, beaches, foreshores and water catchments of Moreton Bay will be valued, protected and celebrated.

3.3 Our community is ready for and adapting to changing coastlines, storm tide and severe weather.

3.4 Redland City's residents and visitors can easily access the foreshore and use recreation infrastructure for boating and non-boating activities.

CONSULTATION

Consulted	Consultation date	Comments/Action
Senior Management Accountant Business Partnering Unit	May 2019	Agree
Cr Peter Mitchell	Various	Cr Mitchell is the chair of the Community Reference Group.
The Coastal Adaption Strategy Steering Committee	Ongoing	Agree

Community Reference Group (CRG)	Ongoing	Agree

In addition to the consultation above, there has been extensive stakeholder engagement and consultation throughout the development of the SEMP. This has been in the form of (but not limited to):

- Establishment of a Community Reference Group (CRG). The CRG is chaired by Cr Mitchell (as Divisional Councillor) and includes members drawn from the affected property owners, local residents, community groups and professional members of the community. It also includes state government representatives. Several meetings and workshops have been held with the CRG where various feedback and input has been provided.
- The Coastal Adaption Strategy Steering Committee. Chaired by Mayor Williams, this committee oversees the SEMP reference groups and includes council officers, state government representatives, QYAC and an independent shoreline erosion expert nominated by the National Committee for Coastal and Ocean Engineers. The SEMP is a regular agenda item where updates are provided, dialogue with the State is established and strategic direction sought.
- Publishing regular project updates on a dedicated 'Your Say' webpage
- Release of the Draft Final SEMP for comment. The SEMP was placed on the Your Say page and open for comment from 4 to 17 April. During this period, two comments were received. A summary of the key issues raised is as follows:

Issue	Response
'Do Nothing' for Northern Reach is not acceptable and should be reviewed	The management strategy for the northern reach is to carry out monitoring and further investigations. Whilst the SEMP does not recommend any physical works in the short term, conducting targeted monitoring to inform the coastal process assessment will provide a detailed understanding of the issues facing this reach. This will allow consideration and implementation of appropriate mitigation measures. The northern reach also includes various land tenures adjacent to Amity Beach and the issues associated with this will be investigated through the development of the Implementation Plan which will include direct engagement with affected landowners.
Beach re-profiling should be carried out for properties on Old Ballow Street	The SEMP concludes that beach nourishment and re-profiling is not likely to be effective on its own without monitoring of natural beach processes. Short term benefits may be realised and this will be considered through the Implementation Plan process.
What happens if an erosion event occurs before the SEMP is implemented and who is liable?	Emergency work provisions under s166 of the *Planning Act 2016* will have effect despite the status of the SEMP or any work carried out as part of it. Individual landowners are responsible for the protection of their own property, noting any works carried out must be lawful and have the appropriate approvals.
Compensation for loss of land due to erosion	This is a legal consideration and the SEMP does not address compensation associated with historical erosion. Again, landowners are responsible for protecting and defending their own property within the provisions of the Planning Act.

OPTIONS

Option One

That Council resolves to adopt the Final Report: Amity Point Shoreline Erosion Management Plan.

Option Two

That Council resolves not to adopt the Final Report: Amity Point Shoreline Erosion Management Plan.

OFFICER'S RECOMMENDATION

That Council resolves to adopt the Final Report: Amity Point Shoreline Erosion Management Plan.

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Final Report

Amity Point Shoreline Erosion Management Plan

Redland City Council

March 2019

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Document Status

Version	Doc type	Reviewed by	Approved by	Date issued
V01	Draft Report	Christine Lauchlan Arrowsmith	Steve Clark	13Dec16
V02	Final Report	Christine Lauchlan Arrowsmith	Christine Lauchlan Arrowsmith	18Dec17
V03	Final Report	Paul O'Brien	Christine Lauchlan Arrowsmith	01May18
V04	Final Report	Christine Lauchlan Arrowsmith	Christine Lauchlan Arrowsmith	13June18
V05	Final Report	Paul O'Brien	Christine Lauchlan Arrowsmith	14Sep18
V06	Final Report	Astrid Stuer	Paul O'Brien	26Feb19
V07	Final Report	Astrid Stuer	Paul O'Brien	20Mar19

Project Details

Project Name	Amity Point Shoreline Erosion Management Plan
Client	Redland City Council
Client Project Manager	Rod Powell
Water Technology Project Manager	Paul O'Brien
Water Technology Project Director	Steve Clark
Authors	Paul O'Brien
Document Number	4193-01_R03v07

Redland CITY COUNCIL

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Certified System — Health & Safety AS 4801 SAI GLOBAL

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WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

20 March 2019

Rod Powell
Marine Projects
Redland City Council
Cnr. Middle and Bloomfield Streets
Cleveland QLD 4163

Dear Rod,

Amity Point Shoreline Erosion Management Plan

Attached please find our Final Report of the Shoreline Erosion Management Plan (SEMP) for Amity Point.

We would like to take this opportunity to once again sincerely thank the Amity Point community, the SEMP Reference Group and Council's project team for the invaluable assistance provided in developing the SEMP.

Yours sincerely,

Paul O'Brien
Senior Principal Engineer
Amity Point SEMP Study Manager
RPEQ No. 5638

p.obrien@watertech.com.au

WATER TECHNOLOGY

4193-01_R03v07

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

EXECUTIVE SUMMARY

Located on the north-west corner of North Stradbroke Island, the township of Amity Point enjoys a rich diversity of seascapes and landscapes - providing extensive recreational and lifestyle opportunities that are considerably enhanced by local cultural, heritage and environmental values.

The historical development of Amity Point has focused on the shoreline - as residents and visitors seek to enjoy the unique character of this coastal precinct. However, the dynamic nature of the coastal environment means that some local foreshores are experiencing erosion which is threatening these values, as well as endangering essential infrastructure.

The *Amity Point Shoreline Erosion Management Plan* will provide a framework for the sustainable use, development and management of this vulnerable foreshore.

Objectives of the Shoreline Erosion Management Plan

A Shoreline Erosion Management Plan (SEMP) is a non-statutory planning document that sets out an agreed framework and management strategy for responding to existing erosion problems and possible future erosion threats.

This is achieved by considering the physical coastal processes in conjunction with the environmental, cultural, social and economic values of the shoreline. The Amity Point SEMP will determine management goals agreed to by governments and the community. It will:

- Enable land owners to proactively plan for erosion management in vulnerable foreshore areas in a way that is consistent with community aspirations and the policies of the Commonwealth and State Governments, Redland City Council and the Quandamooka Yoolooburrabee Aboriginal Corporation (QYAC).
- Investigate and address the underlying causes of shoreline erosion and its likely future progression.
- Determine cost effective and sustainable erosion management strategies that maintain natural coastal processes and resources; and consider community needs in both the short- and long-term.
- Assist in defining the roles and responsibility of property owners, local government and traditional owners in relation to foreshore management.

It is important to appreciate that the SEMP has a planning horizon of 20 years, and as such is a medium-term management plan. Consequently, the recommended management strategies need to be adaptive and flexible according to the level of risk, and tailored to fit within the "pathways" approach to adaptation needs defined in Council's *Draft Coastal Adaptation Strategy*. Recommended options will be the most appropriate at this point in time, but may not be the optimum beyond the planning period for the SEMP.

WATER TECHNOLOGY
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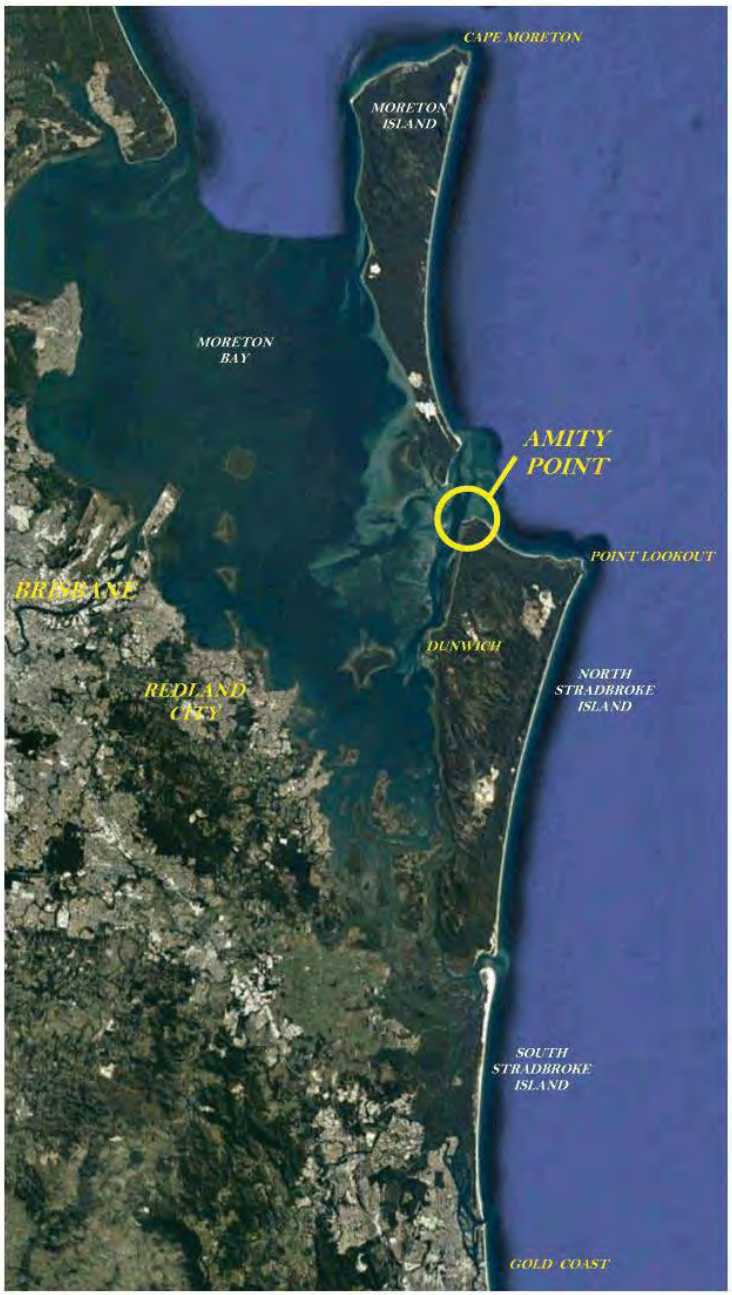

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WATER TECHNOLOGY
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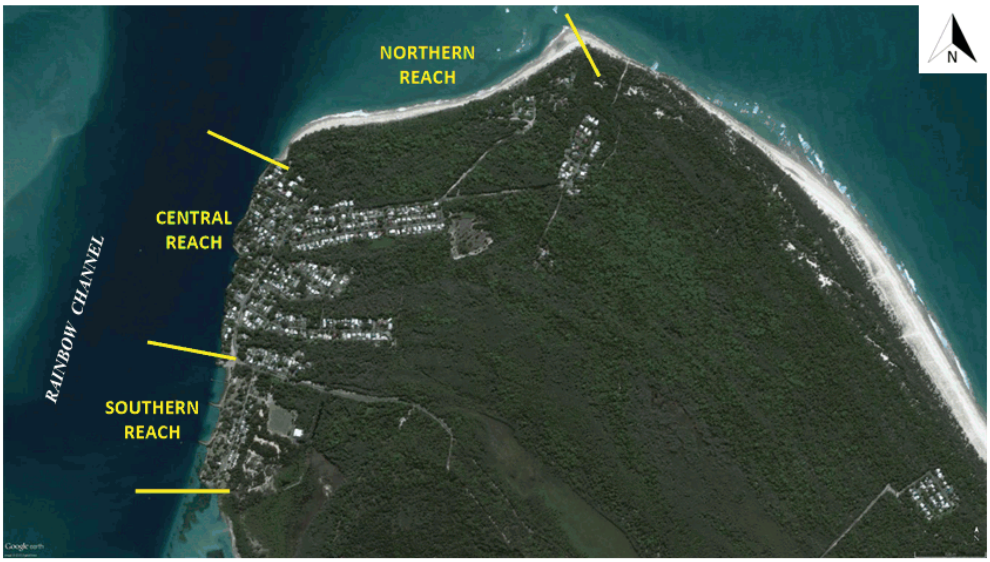
Erosion Threats to the Amity Point Foreshore

When considering appropriate erosion management options along the Amity Point shoreline it is evident that the shoreline can be considered in three coastal precincts, namely

- Southern Reach: the foreshore frontage of the camping ground and boat ramp;
- Central Reach: along the alignment of the rock armoured foreshore; and
- Northern Reach: the sandy foreshore of Amity Beach.

The locations of these coastal precincts are shown below. This partitioning lends itself to the development of viable erosion management strategies that integrate well over the entire Amity Point shoreline.



Southern Reach – Camping Ground Foreshore

Coastal Erosion

Numerical modelling of shoreline response indicates that in the event of storms having ARIs of 50 year, 100 year and 200 year; the corresponding shoreline recessions on the sand beaches would be approximately 15 metres, 18 metres and 21 metres respectively.

Such shoreline erosion would cause damage to trees and planted vegetation along the foreshore, but would not damage any significant infrastructure associated with the camping ground. An exception to this is likely damage to the unpaved car-park behind the swimming enclosure alongside the boat ramp; as well as a sealed roadway that runs close to the beach near the southern-most groyne.

It is expected that future climate change will exacerbate foreshore erosion along the Southern Reach.

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Flow Slides

The potential threat posed by retrogressive flow slides to the Southern Reach is expected to increase in coming years. This is because the submerged eastern side slope of Rainbow Channel is slowly migrating towards the foreshore, gradually becoming steeper as it does so. This steepening sand slope will likely experience increased occurrences of flow slides.

Despite understanding where retrogressive flow slides can occur on this submerged channel slope, it is not possible to determine to what size or extent they reach once triggered. At present, internationally available technical literature pertaining to retrogressive flow slides in this type of coastal environment offers no definitive method to determine where a specific event may terminate. Consequently, until a better understanding of such events is developed, it would be prudent when considering the possible landward extent of flow slide effects to base predictions on the extents of past events. The largest event captured on aerial photography occurred alongside the southern-most groyne of the Southern Reach. That event progressed to the toe of the beach at this location.

Consequently, it is conceivable that a future event could do the same. Furthermore, since the eastern side slope of the Rainbow Channel is slowly migrating towards the foreshore, flow slides may extend into the camping ground sometime within the 20 year planning horizon for this SEMP.

Central Reach – Rock Armoured Foreshore

Coastal Erosion

The foreshore of the Central Reach is armoured with rock. The considerable size, thickness, location and depth of the rock armouring (evident from the results of geophysical investigations) are adequate to structurally mitigate present-day and likely future wave-induced coastal erosion.

Flow Slides

The primary threat of shoreline recession along the Central Reach is the gradual eastern migration of Rainbow Channel, in conjunction with occurrences of retrogressive flow slides on the underwater side slopes of the channel.

In response to the historical threat of such events, foreshore property owners have been progressively placing rock armour on affected sections of their bay frontage. As part of technical work undertaken for this SEMP, a Concept Design for a flow slide barrier has been prepared. A structural audit of the rock placements along the Central Reach has also been undertaken so as to compare the existing rock placements with the structural concept of a flow slide barrier. That audit was informed by the results of geophysical investigations and a bathymetric survey of Rainbow Channel. The Concept Design for a flow slide barrier and the outcomes of the structural audit are reported in this SEMP.

An important finding of the geophysical investigations is that the existing rock placements along the foreshore of the Central Reach are consistent with the Concept Design for a flow slide barrier, confirming that it is indeed appropriate to consider the existing rock placements as being a flow slide barrier.

At present, the only location along the flow slide barrier where there is currently evidence that a flow slide might undermine and damage the barrier is on the foreshore opposite Old School House Park. This vulnerability is likely to change since the sandy side slopes of Rainbow Channel are slowly migrating towards Amity Point and are slowly becoming steeper - increasing the risk of flow slide occurrences and their potential impacts on the flow slide barrier.

Northern Reach – Amity Beach

Coastal Erosion

Erosion processes along Amity Beach are primarily due to the changing sediment transport regime driven by the local wave climate, in conjunction with the shifting and complex bathymetry of the South Passage Bar immediately offshore. It is expected that future climate change will exacerbate foreshore erosion.

The complexity of the nearshore bathymetry (including the dynamic sand spit and offshore sand banks), in conjunction with the complexity of the natural littoral transport processes, means that it is extremely difficult to predict future beach changes at a specific location – such as on the private property frontages of Amity Beach. A greater understanding of these local processes needs to be acquired.

Flow Slides

The only section of the Northern Reach vulnerable to flow slide events is at its western-most end, where the flow slide barrier of the Central Reach terminates. Due to the orientation of Rainbow Channel (in conjunction with the prevailing littoral processes of sand supply to this location) this area is particularly prone to flow slide events. This situation is likely to continue; and flow slides might in fact increase in frequency here as Rainbow Channel migrates eastward and comes up against the existing flow slide barrier of the Central Reach.

Recommended Shoreline Erosion Mitigation Strategies

Southern Reach – Camping Ground Foreshore

> *The recommended erosion mitigation strategy along the Southern Reach is to undertake beach nourishment within each of the three existing beach compartments; and to construct cut-off seawalls behind each beach where an appropriate structure does not already exist.*

The strategy for mitigating future erosion threats along the Southern Reach is shown summarised in the figure on the following page 10. It entails:

- Construction of approximately 165 metres of seawalls to be buried at the rear of the northern and southern beach compartments. This consists of approximately 55 metres along the northern compartment and 110 metres on the southern compartment. The characteristics of these two seawalls are to be determined by detailed coastal engineering design. It is likely that a rock armour sourcing study will need to be undertaken as part of the design stage.
- Placement of approximately 5,000 cubic metres of sand (of appropriate grading and size) within the existing three beach compartments. This consists of approximately 800 cubic metres along the northern compartment, approximately 1,700 cubic metres on the central compartment, and approximately 2,500 cubic metres on the southern compartment. The characteristics of the sand nourishment works are to be determined by detailed coastal engineering design. It is likely that a sand sourcing study will need to be undertaken as part of the design stage.
- Undertaking a structural audit of the existing rock-armoured seawall to the south of the three beach compartments to confirm its future effectiveness as a foreshore defence structure.
- Monitoring the performance of the beach nourishment by annual surveys of the foreshore profile.
- Undertake future beach renourishment campaigns to reinstate beach widths should sand losses result from severe storms and/or future climate change.

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- Since Rainbow Channel is migrating gradually towards Amity Point increasing the risk of flow slides adversely affecting the foreshore, it is also recommended that an annual bathymetric survey of Rainbow Channel be undertaken to provide a better understanding of how this potential risk is developing. This will determine the likelihood, the timescales and extent that the foreshores of the Southern Reach are becoming more vulnerable to future damage by flow slide events because of changing bathymetry in the migrating channel. This will allow for the planning of appropriate future strategies to mitigate the emerging threat.
- For the purposes of developing cost estimates, it is assumed that local sources of sand for beach nourishment and armour rocks for seawall construction are available on North Stradbroke Island. The table below provides a summary of the estimated costs to implement the recommended strategy. The estimate excludes any costs associated with establishing a local sand source.

Activity	Cost	Annual Cost
Project Design and Approvals		
Site survey	$5,000	
Sand sourcing study	$15,000	
Structural audit of existing seawall	$7,500	
Design of seawalls & beach nourishment	$30,000	
Obtain appropriate approvals	$17,500	
Construction Works		
Construct approx. 165m of buried rock seawall	$112,500	
Procure and place 5,000m^3 of sand	$87,500	
Allowance for annual renourishment		$5,000
Project Monitoring		
Annual survey of beach (additional to survey of Rainbow Channel)		$5,000
Annual bathymetric survey of Rainbow Channel side slopes	*refer costs for Central Reach*	
Totals	**$275,000**	**$10,000**

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Recommended erosion mitigation strategy for the Southern Reach

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Central Reach – Rock Flow Slide Barrier

The recommended erosion mitigation strategy for the Central Reach is to support and enhance the effectiveness of the current erosion management practice of repairing damage to the existing flow slide barrier whenever necessary following flow slide events - by placing additional rock armouring.

The threat of shoreline recession along the Central Reach is due the gradual eastern migration of Rainbow Channel, in conjunction with occurrences of retrogressive flow slides on the underwater side slopes of the channel. In recent times, the existing rock structure has been effective in preventing the development of retrogressive flow slides to damaging proportions. A related outcome of terminating flow slides in the submerged side slopes of Rainbow Channel is that in recent years maintaining and repairing the structure has also maintained the existing foreshore alignment - despite the eastward migration of the channel.

It is important to the continuing function of this coastal defence structure that it be repaired following any damage caused by retrogressive flow slides. This includes repairs and improvements to its northern-most end (at the confluence of the Central and Northern Reaches) whenever such events cause damage in this area.

Geophysical surveys of the buried rock along the foreshore of the Central Reach confirm that these rock placements conform to the requirements and characteristics of the structural concept of a flow slide barrier.

The recommended erosion mitigation strategy for the Central Reach basically entails:

- Adopting a flow slide barrier as the necessary coastal protection works required to manage the erosion threat along the Central Reach of Amity Point.
- Recognising that the existing rock placements along this shoreline are consistent with conceptual structural requirements for a flow slide barrier and to therefore seek formal approval of the existing barrier as substantially completed tidal works.
- Monitoring the continued structural adequacy of the existing flow slide barrier, through regular bathymetric surveys to identify emerging vulnerabilities to potential flow slides - and to inform structural reinforcement and repair needs.
- Formalising a maintenance regime of periodic "topping up" of rocks to maintain the effectiveness of the structure in mitigating the threat of flow slides. Where this is within the footprint of the approved structure it can be considered as maintenance works required to preserve the integrity and function of the flow slide barrier.

Structural audit of the flow slide barrier

A structural audit of the existing flow slide barrier has been undertaken as a component of the SEMP. The audit necessitated geophysical investigations comprising overwater and land-based geophysics techniques to identify the extent of rock and other materials buried in the foreshore as a result of the community's historical response to the threat of retrogressive flow slide events.

The geophysical data has been used in conjunction with surveyed bathymetry of Rainbow Channel, along with the known mechanisms of retrogressive flow slide events, to determine the effectiveness of the existing rock barrier. Important findings of the structural audit are:

- The existing rock placements along the foreshore of the Central Reach are consistent with the Concept Design for a flow slide barrier, confirming that it is appropriate to consider the existing rock placements as being a flow slide barrier.

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- There are many locations where flow slides could be initiated on the sandy eastern bank of Rainbow Channel in front of the flow slide barrier.
- Such locations are deep, typically at or below RL-10m AHD.
- The only location along the entire barrier where there is currently evidence that a flow slide might undermine and damage the barrier is on the foreshore opposite Old School House Park. There is merit in adopting a proactive strategy of reinforcing the flow slide barrier at this location - by placing approximately 45cu.m./m of rock either directly into the front upper slopes of the armoured foreshore above RL-5m AHD, or onto the seabed offshore at the RL-5m AHD depth contour approximately. Both of these options are consistent with maintaining conceptual requirements for a flow slide barrier.

These findings are based on bathymetric features identified in the survey completed in December 2015. Due to the dynamic nature of the side slopes of Rainbow Channel, it is possible that the vulnerability of the flow slide barrier could have changed since that time.

Approval for both the flow slide barrier and for its repair following damage

In the past, repairs to the flow slide barrier by foreshore property owners have been viewed as being unapproved (or unlawful) works in the context of Queensland's *Coastal Protection and Management Act 1995*. This is because it had not been approved as prescribed tidal work under the *Sustainable Planning Act 2009* (SPA).

To date, considerations for its approval have been based on the notion that this rock-armoured structure is a seawall. A seawall is a conventional response to conventional erosion processes – such as those caused by wave action and/or a deficit in the supply of littoral sand. Where such structures had formal approval under the SPA, repairs were authorised to be undertaken to reinstate their primary function whenever they were damaged.

The rock structure along the foreshore of the Central Reach currently does not have the status of approved tidal works. A requirement for the implementation of the recommended erosion mitigation strategy is that this physical barrier to retrogressive flow slides be formally approved under the *Planning Act 2016* (formerly SPA), thereby enabling its function to be maintained in the event of damage. This will require an application for prescribed tidal works relating to the flow slide barrier. The findings of this SEMP can be used to provide technical support for that application. It is expected that the conceptual design for the flow slide will need to be further refined by a subsequent detailed engineering design phase to also provide support to the approval application process.

However, Section 166 of the *Planning Act 2016* allows tidal works to be undertaken without a development approval in an emergency. Circumstances that constitute an emergency are provided in the *Planning Act 2016 Section 166* and include events that endanger the life or health of people; or that threaten the structural safety of buildings. Large retrogressive flow slides on the foreshores of Amity Point are likely to be considered as such an emergency.

An exemption for prior approval of repair works to the flow slide barrier applies - provided those repairs are in accordance with a *Safety Management Plan* and having formal endorsement by a Registered Professional Engineer of Queensland that the completed works are in a safe condition. However, as soon as "reasonably practicable after starting the emergency works", a development application is to be made. Should that development application be refused, then the emergency repair works must be removed.

Having a *Safety Management Plan* in place does not invalidate the fundamental need for development approval of the flow slide barrier. Nevertheless, a *Safety Management Plan* for emergency repairs to the existing flow slide barrier has been prepared as a component of this SEMP.

The challenge to the process of formal application and approval is that the flow slide barrier forms the bayside frontage of several private properties as well as public land. There are in total 34 land parcels having the flow slide barrier along their frontage. This includes four freehold parcels alongside Old Schoolhouse Park, each having a narrow reserve in front (varying between 2m and 6m width), but still with at least part of the buried structure within their boundaries.

Monitoring future effectiveness of the flow slide barrier

Given that Rainbow Channel is migrating towards Amity Point, it is recommended that a structural audit of the flow slide barrier be undertaken at least annually - using information from an annual bathymetric survey of the vulnerable side slopes of Rainbow Channel. This will determine whether (as a consequence of changing bathymetry in Rainbow Channel) sections of the existing structure are becoming more vulnerable to future damage. This will allow for the planning of structural reinforcement and/or repair campaigns to the flow slide barrier.

The annual bathymetric survey should comprise a full hydrographic survey of the channel bank using both multibeam and single beam sounders. The physical extent of the survey is to be no less than that covered by the survey undertaken in December 2015 (Port of Brisbane, 2015). Included in the deliverables of each annual survey is to be a comparison with previous surveys to clearly indicate the extent of changes to the local bathymetry of Rainbow Channel. Comparisons with earlier transect surveys is also to be undertaken - comparable in scope and detail to those undertaken for this SEMP.

Availability of suitable rock armour for repairs to the flow slide barrier

In the past, rock for repairs to the flow slide barrier along the Central Reach has been available from two quarry sources on North Stradbroke Island. However, since the 2011 native title consent determination there is ongoing dialogue with the relevant stakeholders, and it will be necessary to establish administrative and financial structures to facilitate the supply of rock armour for Council projects and by Council to third parties.

A critical aspect determining the effectiveness of repairs to the flow slide barrier is having rocks placed to recharge the upper slopes as soon as possible after each damaging event. Apart from having the appropriate approvals in place to undertake necessary repairs, this will require:

- Having a stockpile of suitable rock armour ready for the emergency repairs. This stockpile could be located at a location close to Amity Point;
- Having contracts and/or arrangements in place for the appropriate loading, carriage and placement of rocks into damaged areas of the barrier as soon as possible following an event. This could be through commercial arrangements with private earthmoving contractors based on North Stradbroke Island;
- Having contracts and/or arrangements in place for access and the initiation of repair works to damaged areas of the flow slide barrier where landowners immediately affected by the threat are not residing at Amity Point and/or may not be readily contacted;
- Having contracts and/or agreements in place for the payment of repairs to damaged areas of the flow slide barrier.

To secure a long-term, sustainable and economic source of rock for repairs, it is recommended that a *Rock Armour Supply Study* be commissioned by Council to investigate and determine the procedures necessary to facilitate the appropriate sourcing and placement of rocks into an approved flow slide barrier along the Central Reach.

Payment for repairs to the flow slide barrier

To date, the cost of constructing and intermittently repairing the flow slide barrier along the Central Reach has been met by the local foreshore property owners. It is recommended that Council engage with other

stakeholders (and obtain assistance and advice on legal issues as required) to determine an appropriate funding arrangement for future maintenance works to the rock-armoured flow slide barrier.

Access for facilitating repairs to the flow slide barrier

The availability of access for trucks carrying rocks to the foreshore along the alignment of the flow slide barrier is varied. In many cases the residential home on private properties is of a size or location that prevents vehicular access from the street-side entrance through to the foreshore. In such cases the only available access route for construction plant and equipment to effect repairs to a damaged section of the flow slide barrier is via a nearby property without that impediment, then along the foreshore. In the past, this has entailed removing fences; traversing lawns and gardens; and removing and/or pruning established trees of neighbouring properties.

There appears to be an informal agreement amongst the present owners of foreshore properties that such access ought to be available, but any damage caused by this traffic is to be rectified at no cost to the affected property owners.

The ability to repair damaged sections of the flow slide barrier as soon as possible after each event in many cases relies on the goodwill of neighbouring residents. Whilst this informal arrangement is reputedly effective at present, there is no surety that it will remain so in future. There is merit in having present foreshore property owners investigate and implement a more formal agreement for such access that will be binding on existing and future owners of their property. It is beyond the scope of this SEMP to determine the need, and the planning and legislative frameworks, for any such agreements.

Cost Estimate

It is beyond the scope of this SEMP to determine the procedures, scheduling and the costs associated with resolution of issues relating to:

- Obtaining development approval for the flow slide barrier;
- Securing an on-going cost-effective and sustainable source of rocks for any future repairs;
- Payment provisions for repairs; and
- The securing of formal agreements for access by construction equipment for repairs.

The estimated costs associated with implementation of the recommended erosion mitigation strategy along the Central Reach are summarised in the table below.

Activity	Initial Cost	Annual Cost
Structural Audit		
Annual bathymetric survey of Rainbow Channel side slopes		$17,500
Annual structural audit of flow slide barrier		$7,500
Totals	*nil*	**$25,000**

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Northern Reach – Amity Beach

The recommended erosion mitigation strategy along the Northern Reach is to maintain the existing strategy of non-intervention, but to monitor future shoreline behaviour.

The erosion threat to private landholdings with frontages on Amity Beach is caused primarily by erosion "hot-spots" that migrate along the shoreline. The extent, location and severity of such hot-spots is influenced by the extent of the changing sand spit that forms at the eastern end of the beach, in conjunction with the severity of future storm events.

Given the relationship between the erosion threat and the processes shaping the sand spit, there is considerable merit in further investigations to better understand the local coastal processes on Amity Beach and to therefore better predict emerging threats. Such investigations would require the establishment and operation of a Monitoring Survey Program.

Rather than just surveying along transects, recent developments in surveying technology now make it cost effective to obtain a full three-dimensional (3-d) representation of beaches utilising unmanned aerial vehicles (UAVs). This allows for more accurate calculations of changes in beach volumes over time. Repeated 3-d acquisition allows for accurate determinations of where, and how much, sand is being lost from the beach profile and where sand is accreting.

It is recommended that the following monitoring aspects be included in the strategy for mitigating the erosion threat on the Northern Reach:

- Monitoring Survey Program: Stage 1
  - The foreshore from 500 metres east of the sand spit (i.e. along the adjacent Flinders Beach) to a location at the northern end of the flow slide barrier of the Central Reach be captured by 3-d survey. This should be undertaken during a low spring tide to maximise the coverage of nearshore areas. It is to include the entire sand spit at the eastern end of Amity Beach.
  - Initially this 3-d survey should be undertaken at least twice yearly for three years, with extra surveys undertaken as soon as possible after major erosion events on Amity Beach.
- Coastal Processes Assessment
  - Upon completion of Stage 1 of the Monitoring Survey Program in three years' time, a *Coastal Processes Assessment* should be undertaken by suitably qualified coastal engineers/scientists to determine the erosion processes affecting Amity Beach. This would utilise the results of the Monitoring Survey Program to that time, in conjunction with analysis of aerial photographs, and reference to offshore waves measured by Queensland's Department of Environment and Science's directional Waverider station in deep water off Cape Moreton.
  - The requirements for further surveys under the Monitoring Survey Program would be determined by the Coastal Processes Assessment. However, this subsequent Stage 2 of the Monitoring Survey Program is likely to entail at least annual 3-d surveys.
  - The necessity for any erosion mitigation strategy for the Northern Reach would be addressed by the Coastal Processes Assessment.

The estimated costs associated with implementation of the recommended erosion mitigation strategy along the Northern Reach are summarised in the table below.

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Activity	Initial Cost	Annual Cost
Monitoring Survey Program		
Stage 1 : Initial year of survey (2No.), including establishing controls	$15,000	
Stage 1 : twice yearly thereafter for two years		$10,000
Stage 2 : assumed annually after initial 3 years		$5,000
Coastal Processes Assessment – in three years' time		
Analysis of aerial photographs	$7,500	
Analysis of wave records	$7,500	
Coastal Engineering Assessment & reporting	$20,000	
Totals	**$50,000**	**$10,000 then $5,000**

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GLOSSARY AND DEFINITIONS

accretion	The accumulation of beach sediment on a shoreline, having been deposited by natural processes.
AEP	Annual Exceedance Probability: The measure of the likelihood (expressed as a probability) of an event equalling or exceeding a given magnitude in any given year.
AHD	Australian Height Datum (AHD) is the geodetic datum for altitude measurement in Australia. The level of 0.0metres AHD approximately corresponds to mean sea level.
ARI	Average Recurrence Interval (ARI) is a statistical estimate of the average period in years between the occurrences of an event of a particular size. For example, a 100 year ARI event will occur on average once every 100 years. Such an event would have a 1% AEP (probability of occurring in any particular year)
angle of repose	The steepest angle at which a sloping surface formed of loose unconfined material is naturally stable.
astronomical tide	Water level variations due to the combined effects of the Earth's rotation, the Moon's orbit around the Earth and the Earth's orbit around the Sun. It excludes and oceanographic or meteorological influences.
bathymetry	The term bathymetry originally referred to the ocean's depth relative to sea level, although it has come to mean "submarine topography," or the depths and shapes of underwater terrain.
coastal processes	The physical processes that act to shape the coast and the landforms that make up the coast.
dilation	The observed tendency of a compacted granular soil (such as sand) to expand in volume as it is sheared.
exceedance probability	The probability of an extreme event occurring at least once during a prescribed period of assessment is given by the exceedance probability. The probability of a 1 in 100 year event (1% AEP) occurring during the first 25 years is 22%, during the first 50 years the probability is 39% and over a 100 year asset life the probability is 63%.
geophysical survey	A geophysical survey detects and maps subsurface features.

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HAT	Highest Astronomical Tide: the highest water level that can occur due to the effects of the astronomical tide in isolation from meteorological effects.
hydrographic survey	A hydrographic survey maps the features of the sea bottom.
intertidal	The area of a shoreline that is above water at low tide and under water at high tide (in other words, the area between the low & high tide levels).
littoral	Relating to (or situated on) the shore of the sea.
littoral drift	The natural geographical process that consists of the transportation of sediments along a coast.
longshore	In the direction along the shoreline (i.e. parallel to the coast).
MSL	Mean Sea Level (MSL) is the long-term average level of the sea surface.
neap tides	Neap tides occur when the gravitational influences of the sun and moon are not aligned, resulting in high and low tides that are not as extreme as those during spring tides.
significant wave height	Due to the random nature and size of waves, the term "significant wave height" is used by engineers and scientists to quantify wave heights in a sea state. It represents the average of all the third highest waves that occur over a particular timeframe.
spring tide	In a lunar month, the highest tides occur at the time of the new moon and the full moon (when the gravitational forces of sun and moon are in alignment). These are called "spring" tides and they occur approximately every 14 days.
storm surge	The meteorological component of the coastal water level variations associated with atmospheric pressure fluctuations and wind setup.
storm tide	Coastal water level produced by the combination of astronomical and meteorological (storm surge) ocean water level forcing.
subaerial	On the earth's surface, not underwater or underground.
subaqueous	Situated under water.

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1. INTRODUCTION

Located on the north-west corner of North Stradbroke Island, the township of Amity Point enjoys a rich diversity of seascapes and landscapes - providing extensive recreational and lifestyle opportunities that are considerably enhanced by local cultural, heritage and environmental values.

The historical development of Amity Point has focused on the shoreline - as residents and visitors seek to enjoy the unique character of this coastal precinct. However, the dynamic nature of the coastal environment means that some local foreshores are experiencing erosion which is threatening these values, as well as endangering essential infrastructure.

1.1 Background

As part of the early development of the *Amity Point Shoreline Erosion Management Plan*, Redland City Council previously commissioned a Shoreline Erosion Study (BMT WBM, 2013). At that time, it was envisaged the study would be one of several sources of information that would contribute to the development and adoption by Council of an implementation plan for future shoreline management.

That 2013 Shoreline Erosion Study investigated local coastal processes; assessed local social, environmental, cultural and economic values; appraised coastal risks and hazards; identified viable erosion management options; and then recommended mitigation strategies for various coastal reaches of Amity Point. The erosion mitigation strategies recommended by the Draft Report of the Shoreline Erosion Study were:

> ***Amity Township***
>
> *Firstly, the design and construction of a full rock revetment at an estimated cost of $15M with the expectation that this will need to be extended in the future as Rainbow Channel continues to realign.*
>
> *Secondly, planned retreat where the danger zone related to unforeseen slumping of the foreshore into Rainbow Channel is assessed by a Geotechnical Consultant and affected buildings and infrastructure is moved out of the nominated danger zone……*
>
> *…… Of these it is recommended that the planned retreat strategy be implemented as it has the highest likelihood of success, lower cost and will leave the foreshore in a natural state.*
>
> ***Amity Caravan Park***
>
> *After assessment of the management options, it is recommended that the beach nourishment option be implemented at this beach. The beach nourishment will provide added protection to the assets and minimise the need for other structural protection measures in the future. It will retain natural processes and provide an improvement to the beach amenity……..*
>
> ***Flinders Beach***
>
> *The recommended shoreline erosion management strategy for the communities of Geera Street and Providence Street is to "do nothing" at this time and monitor the location of the shoreline.*

The recommendation of the 2013 Draft Report for planned retreat along the frontage of Amity Township met with considerable opposition from the local community. Council has subsequently ensured that extensive consultations with key stakeholders has been an integral component of later phases of developing the SEMP.

To assist in guiding the SEMP process, Council established the Amity Point SEMP Reference Group. The Group is chaired by the Divisional Councillor and has members drawn from affected property owners; the Quandamooka Yoolooburrabee Aboriginal Corporation (QYAC), the local residential community; community groups across North Stradbroke Island and Council staff. The primary purpose of the reference group is to:

- Work with Redland City Council officers to contribute their expertise and knowledge to shoreline erosion planning for Amity Point; and
- Provide valuable local input to enable the delivery of a SEMP and Draft Implementation Plan that meets the current and long term needs of the community.

The Project Brief for this Amity Point SEMP has been prepared with the assistance of the SEMP Reference Group. The intent of the *Amity Point Shoreline Erosion Management Plan* (Amity Point SEMP) is to provide a framework for the sustainable use, development and management of this vulnerable foreshore.

1.2 Regional and Local Setting

Being approximately 275 km^2 in area, North Stradbroke Island is the second-largest sand island in the world. Along with Moreton and South Stradbroke Islands, it forms the eastern edge of Moreton Bay. North Stradbroke Island's regional setting is illustrated on Figure 1-1.

The island is located some 38kms from Brisbane's CBD; and is serviced by car and passenger ferries from Toondah Harbour at Cleveland in Redland City. This proximity to a major capital city means that tourism is a significant and growing industry on the island. There are three main settlements on North Stradbroke Island – Dunwich, from which the mainland ferries operate; Amity Point on the north-western tip of the island; and Point Lookout on the north-eastern tip.

North Stradbroke Island has three quite distinctive coastlines. The east to south-east facing ocean coast experiences persistent south-easterly swell and is distinguished by its 33km long Main Beach, having Point Lookout at its northern-most end. The northern shoreline of North Stradbroke Island experiences somewhat lower swell energy on its beaches, but it is nevertheless exposed to north-east fetches across which large waves from storms/cyclones can arrive. The western shores of the island front onto the calmer waters of Moreton Bay. As well as experiencing a mild wave climate, these western beaches are typically fronted by intertidal sand flats and tidal channels.

Being situated on the north-western tip of North Stradbroke Island, the foreshores of Amity Point are located within the dynamic region at the junction of ocean and bayside shorelines.

1.3 The Erosion Problem

A significant exchange of tidal waters occurs between Moreton Bay and the open ocean through the passage separating Moreton Island and North Stradbroke Island. This 3.5km wide passage consists of ever-changing sand banks and shoals as the complex flow regime shapes the seabed bathymetry and the adjacent shorelines of Moreton and North Stradbroke Islands.

The location, orientation and size of the various channels that meander through this dynamic setting vary considerably. Historically there have been two significant channels on the Moreton Bay side of the passage which carry most of the tidal flows eastward to the ocean. Rainbow Channel and Rous Channel join to the north of Amity Point to form the South Passage Channel on the ocean-side of the strait between the two islands.

Historical records and surveys document significant changes to these channels. Figure 1-2 shows historic variations to the main channels (on the left-hand side of that figure) and changes to shorelines (on the right-hand side). Figure 1-2 has been produced by modifying a figure from an earlier report (Eberhardt, 1978).

FIGURE 1-1 REGIONAL SETTING

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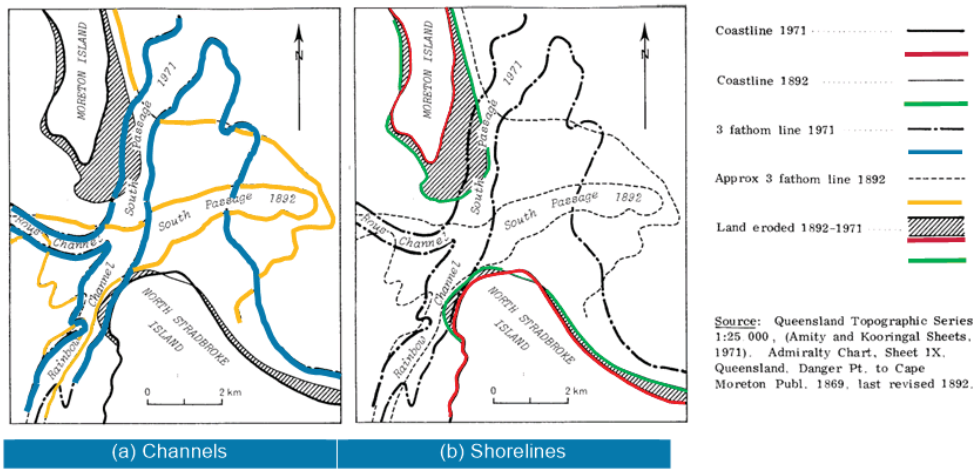

FIGURE 1-2 HISTORICAL CHANGES TO TIDAL CHANNELS AND SHORELINES

Figure 1-3 illustrates the current condition of the channels between Moreton and North Stradbroke Islands. The orientation of the South Passage Channel has changed significantly since it was first surveyed in 1892. In those earlier times, it was oriented almost east/west - with Rous Channel being the main navigable route for vessels entering Moreton Bay. Since then, the orientation of the South Passage Channel has become more north/south; and Rainbow Channel is now the more dominant of the two main channels inside of the Bay.

Since the scenario recorded in 1892, Rainbow Channel has slowly migrated eastward towards the north-west tip of North Stradbroke Island where Amity Point is located.

This eastward migration of Rainbow Channel - in conjunction with the changing bathymetry as many tidal channels meander and large sand shoals shift – has resulted in the north-west tip of North Stradbroke Island at Amity Point experiencing an erosion threat which has persisted for many decades.

1.4 Objectives of this Shoreline Erosion Management Plan

A Shoreline Erosion Management Plan (SEMP) is a non-statutory planning document that sets out an agreed framework and management strategy for responding to existing erosion problems and possible future erosion threats. This is achieved by considering the physical coastal processes in conjunction with the environmental, cultural, social and economic values of the shoreline. The Amity Point SEMP will determine management goals agreed to by governments and the community. It will:

- Enable land owners to proactively plan for erosion management in vulnerable foreshore areas in a way that is consistent with community aspirations and the policies of the Commonwealth and State Governments, Redland City Council and the Quandamooka Yoolooburrabee Aboriginal Corporation (QYAC);
- Investigate and address the underlying causes of shoreline erosion and its likely future progression;
- Determine cost effective and sustainable erosion management strategies that maintain natural coastal processes and resources; and consider community needs in both the short- and long-term.
- Assist in defining the roles and responsibility of property owners, local government and traditional owners in relation to foreshore management.

However, it is important to appreciate that the SEMP has a planning horizon of 20 years[1], and as such is a medium-term management plan. Consequently, the recommended management strategies need to be adaptive and flexible according to the level of risk, and be tailored to fit within the "pathways" approach to adaptation needs defined in Council's *Draft Coastal Adaptation Strategy*. Recommended options will be the most appropriate at this point in time, but may not be the optimum beyond the planning period for the SEMP.

FIGURE 1-3 PRESENT-DAY PASSAGE BETWEEN MORETON AND NORTH STRADBROKE ISLANDS

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[1] "*Project Brief – Amity Point Shoreline Erosion Management Plan*". Redland City Council, document number Q-1740-15/16-PRP. October 2015

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1.5 Structure of this Shoreline Erosion Management Plan

The Shoreline Erosion Management Plan for Amity Point has been structured as follows:

- This Section 1, which consists of an introduction and provides some background to the need and development of the Plan.
- Section 2 provides an assessment of the coastal environmental and social values of Amity Point which might be compromised by on-going erosion.
- Then in Section 3 the natural physical processes that shape the project shoreline are discussed.
- This is followed in Section 4 by a discussion of the risks that these various natural processes represent to local coastal values and infrastructure. It includes a structural audit of the existing rock-armoured foreshore.
- Section 5 then offers several potential strategies that could mitigate these risks.
- Section 6 provides an assessment of the various management strategies - leading to the establishment of a preferred erosion management strategy.
- Section 7 provides background as to the stakeholder consultation and engagement undertaken in the development of the preferred mitigation strategies.
- An outline of the commonwealth, state and local government planning and legislative framework affecting the implementation of the Plan is offered in Section 8.
- Following consideration of all aspects investigated and discussed in preceding sections of the report, Section 9 then presents the preferred shoreline erosion management plan for locations along the shoreline of Amity Point.
- Appendices to support the technical content of the Plan are included.

WATER TECHNOLOGY
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2. COASTAL VALUES

2.1 Indigenous Cultural Heritage Values

Amity Point (originally known as Pulan Pulan) is the traditional home of the Nunukul people, a clan of the Quandamooka Peoples. The location of Pulan Pulan within Quandamooka Country is shown in Figure 2-1.

Prior to contact with Europeans, the Quandamooka people maintained significant trade and ceremonial networks, sophisticated systems of territorial and political affiliation, complex language patterns and intricate but flexible social relationships (Whalley, 1987). For over 50,000 years, the Quandamooka people have maintained a strong connection to land, water, sea, air, flora, fauna and other natural resources.

This deep and intrinsic connection is expressed by Robert Anderson, Gheebelum, Ngugi, Mulgumpin - a Ngugi Elder of Mulgumpin in Quandamooka Country.

> *"The vision of my country, the way I view or see my country, the way I talk or sing up my country, the way I talk of the stories of my country and talk about my Elders and Ancestors, this is my cultural heritage. The way I call their names as I walk the sacred places of my country and the way I remember their brave deeds on my land is my cultural heritage. My spiritual connection with the land is my cultural heritage. All these things are a part of my cultural heritage.*
>
> *To walk my country, to gather the shell fish from the ocean beaches and the bay side beaches, is part of my cultural heritage. To see the changing nature of the flora with the seasons, to gather the wild flowers and to eat the berries and fruits of my country, reminds me of my mother and her connection to this my cultural heritage. To observe the birds, their migratory flight patterns, and nesting habitats, to understand how their presence fertilises, pollinates and regenerates the plant growth; how they herald the arrival of the deep-sea mullet, the whales and other sea inhabitants, for seasonal sustenance. This is the cultural heritage of my country.*
>
> *To be with my family and community people walking the country together, making that strong spiritual connection with the land is my cultural heritage. To continue to walk the bora ground and practice my cultural rights and responsibilities, as well as acknowledge the importance of this continuation on my country, is my cultural heritage.*
>
> *If we do not have access to our land, we are denied the right to maintain our practices that protect, preserve and nurture our land and our cultural heritage." (Peacock, 2001).*

A native title consent determination was made in 2011 recognising the Quandamooka People's cultural heritage, and as native title holders of areas of national park, reserve, unallocated state land and other leases on and surrounding North Stradbroke Island (National Native Title Tribunal, 2011).

The determination finalised two claims lodged in 1995 and 1999 by the Quandamooka people. The Quandamooka Yoolooburrabee Aboriginal Corporation (QYAC) is the Prescribed Body Corporate that manages the native title rights on behalf of the native title holders. The determination covers exclusive rights to about 2,264 hectares of land and non-exclusive rights to about 22,639 hectares of onshore areas and about 29,505 hectares of offshore areas.

The rights protected by the determination include the right to live and be present in the areas; conduct ceremonies; to maintain places of importance and areas of significance; and to take, use, share and exchange traditional natural resources and seawater for any non-commercial purpose.

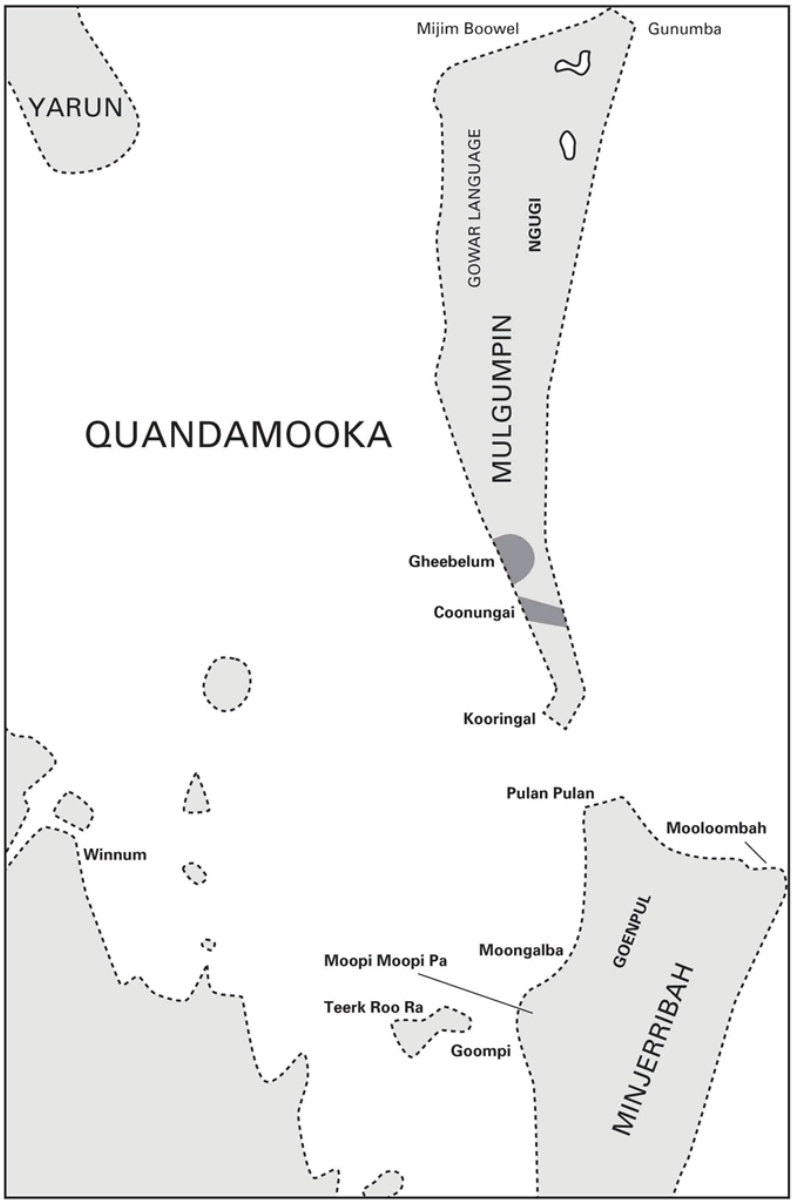

FIGURE 2-1 THE REGIONAL SETTING WITHIN QUANDAMOOKA COUNTRY[2]

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[2] Figure 2-1 has been reproduced from Peacock, 2001. Copyright is acknowledged.

2.2 Post-European Heritage Values

The North Stradbroke Island Historical Museum was founded at Dunwich in 1987 to curate the history of North Stradbroke Island. The substantial collection of documents, images and records within the Museum attest to the significant cultural and historical values of North Stradbroke Island - both prior to, and following European contact with the Quandamooka people. Most of the information presented in this Section 2.2 of the SEMP has been obtained from sources within that much-valued collection.

In 1770 Captain James Cook made the first documented European sighting of North Stradbroke Island whilst sailing northward in *HMS Endeavour*. However, a landing was not made on the island at that time. The first significant contact between Europeans and the local Aboriginal people is thought to have occurred in 1803, when Matthew Flinders and his crew of *HMS Investigator* landed in search of fresh water whilst undertaking Flinder's renowned circumnavigation of Australia. Contact between Europeans and the Aboriginal peoples of North Stradbroke Island was first officially recorded in April 1823 when three timber-getters were shipwrecked in Moreton Bay. Shortly thereafter, Pulan Pulan was renamed Amity - after the Surveyor General, John Oxley's ship of the same name.

In 1825 a pilot station was established at Amity Point to guide ships through the hazardous South Passage between Moreton and Stradbroke Islands to the newly established Moreton Bay penal settlement. This was the first European settlement on Stradbroke Island. In those days, Stradbroke Island was just the one single landmass - whereas today it consists of North and South Stradbroke Islands, with their separation occurring at Jumpinpin during a cyclone in 1896.

In March 1847 whilst navigating South Passage the ship *SS Sovereign* sank, and many lives were lost. A group of Moreton Island and Stradbroke Island Aboriginal men nevertheless rescued ten passengers and were rewarded at that time for their efforts by the State Government. A plaque commemorating this rescue was unveiled in 2002 on the Amity Point foreshore at Cabarita Park (just to the north of the existing boat ramp).

As a result of that shipwreck, an alternative pilot station was opened at the northern end of Moreton Island; and the North Passage became the main navigable entry into Moreton Bay rather than South Passage. The pilot station at Amity was therefore closed in the 1840s, and its original site has since been lost to coastal erosion.

Other historic sites at Amity Point lost to coastal erosion include a racecourse, the original jetty, and a kiosk located next to the jetty (built by Hayles Cruises in 1935 as the landing place for launch operations to the island) and the original site of the explorer and noted local historian Thomas Welsby's cottage. Timbers from Welsby's cottage were reputedly used to re-build the kiosk as "Cabarita" in 1947. Cabarita has since been relocated several times over the years to avoid the threat of foreshore erosion. It is now privately owned and located on Ballow Street, approximately 80 metres landward of the rock-armoured foreshore.

A fishing community became established at Amity Point in the 1880s. The size and permanence of the community has fluctuated since that time. A school operated at Amity Point from 1919 to 1920, then from 1937 to 1938 and again from 1951 until 1961 (when it was last closed due to low enrolment numbers). Amity Point's Old Schoolhouse Park is the site of the last school and is located on the immediate foreshore. The school building was relocated to Dunwich State School in 1965.

The Amity Point Public Hall is located on Ballow Street some 200 metres inland of the rock-armoured foreshore. It was built in 1950 by the Amity Point Progress Association by relocating a former ward of the Dunwich Benevolent Asylum. The hall was used for social activities such as dances and community meetings, and was also the site of a provisional school from 1951 until 1954. The hall remains a significant centre for the local community to this day; and the Amity Point Progress Association remains very active.

When considering appropriate erosion management strategies at Amity Point, it is necessary to consider the valuable and much esteemed role that Amity Point has played in the historical development of the wider Moreton Bay region.

2.3 The Marine Environment

The waters off Amity Point lie within the Moreton Bay Marine Park; and have been mapped as an area of conservation significance under the Moreton Bay Marine Park Management Plan. The location is shown in Figure 2-2 as being a *Conservation park zone*. Such designated zones are deemed areas of high conservation value for habitat and wildlife, nevertheless they allow for limited recreational and commercial uses such as fishing and crabbing.

Rainbow Channel is aligned alongside the Amity Point shoreline. The seabed drops steeply from shore to approximately 20 metres depth of water at the channel bed. Whilst the channel itself is not designated an important fish habitat area, the Myora-Amity Banks on the western side of the channel; and the shoreline to the immediate south of the Amity Point SEMP area are each declared a Fish Habitat Area[3] (refer Figure 2-3).

FIGURE 2-2 MARINE PARK ZONING

Declared Fish Habitat Areas are areas of high-value fish habitat which are safeguarded from physical disturbance associated with coastal development. They are declared under Queensland's *Fisheries Act 1994*. Fish Habitat Areas are a key element of the State government's strategy for sustaining fish stocks and fisheries. More broadly, they are recognised as part of Australia's *Nationally Representative System of Marine Protected Areas*, and fit within the *International Union for the Conservation of Nature's* (IUCN's) "Protected Area Management Category VI - Protected area with sustainable use of natural resources".

[3] "*Myora-Amity Banks Fish Habitat Area Outer Boundary*". Plan number FHA-017.
Originally prepared in 1999 by Queensland Department of Primary Industries. Published online at:
https://www.npsr.qld.gov.au/managing/pdf/myora.pdf

Seagrass meadows have been identified and mapped off Amity Point (refer to Figure 2-4) and these occur near the shoreline along the southern part of the SEMP area. Benthic assemblages occur in these areas.

Whilst the foreshores of Amity Point themselves do not fall within a declared Fish Habitat Area, their very close proximity to such areas means that any erosion mitigation strategies implemented under this SEMP must be carefully considered so as not to adversely affect these important marine areas.

FIGURE 2-3 FISH HABITAT

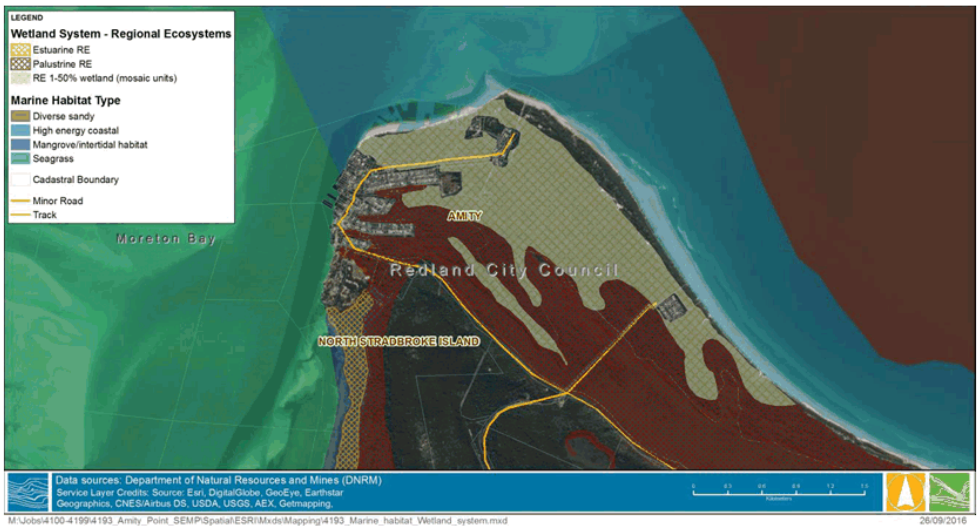

FIGURE 2-4 WETLAND AND MARINE HABITAT

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On the foreshore of Amity Point, the rock-armoured subaqueous slope of Rainbow Channel hosts a diverse assemblage of marine life, including corals (Tibbets and Townsend, 2010; Tibbets, pers. comm.[4]; Townsend, pers. comm.[5]; Burns, pers. comm.[6]). This results in the wall being much utilised for recreational diving, spear fishing, recreational line fishing and indigenous fishing.

The hard rock surfaces along this foreshore provide "*algal turf substrates and excellent cover for fishes, which may well have contributed to the high diversity and abundance of grazers at (this) site*" (Tibbetts and Townsend, 2010).

Any erosion mitigation strategies implemented under this SEMP must seek to preserve the unique marine environment of the Amity Point foreshore and to not adversely affect these important marine values.

2.4 The Terrestrial Environment

Vegetation communities throughout Queensland are characterised and mapped by a procedure known as *Regional Ecosystems*. A Regional Ecosystem is a specific vegetation community occurring in conjunction with a particular combination of geology, soil type and landform within a specific bioregion of Queensland.

Many people would have a colloquial name for the vegetation type on their properties (such as open scrub, or coastal vine thicket) and know the land type (e.g. floodplains or rocky slopes). A Regional Ecosystem basically defines a grouping of land types and vegetation. Defining Regional Ecosystems assists in classifying biodiversity, ecological processes and vegetation communities on a landscape scale. They are used to provide a consistent approach to planning, vegetation management and legislation across Queensland.

Each Regional Ecosystem (RE) is classified by a three-part code (e.g. 12.2.5). The first number of the RE classification is the bioregion, the second part signifies the geology, soil and landform, while the third part refers to the vegetation. The grouping of these three factors produces a Regional Ecosystem.

As noted above, the first part of the RE classification is the bioregion. Queensland has been divided into thirteen different bioregions which are based on broad landscape patterns that indicate major differences in climate, geology, animals and plants across Queensland. South-East Queensland (of which Amity Point is a part) is designated as bioregion number 12.

The second number of a RE is the land zone. Twelve land zones have been defined in Queensland. Land zones represent considerable differences in geology, landforms and soil types. Land zones largely match broad geological types, and can therefore be identified using geological maps. The area of Amity Point covered by the SEMP is typically either:

- Land zone 1 – which is land that is subject to tidal inundations (e.g. mangroves, beaches, tidal flats) or
- Land zone 2 - such as coastal dunes, coastal lakes and swamps that do not get inundated by seawater.

The third number of a RE describes the vegetation type. A Regional Ecosystem describes vegetation by its structure (e.g., grassy woodland, open forest or wet heathland), the dominant plants in the canopy, and associated plants in the understorey. Scientific names are used since common plant names vary from one locale to another; and can sometimes be unreliable.

---

[4] Telephone discussions with Dr. Ian Tibbetts (Associate Professor, School of Biological Sciences Faculty of Science, University of Queensland) with P.L. O'Brien of Water Technology Pty Ltd. 04th February 2016.

[5] Telephone discussions with Dr. Kathy Townsend (Lecturer/ Education Officer, Moreton Bay Research Station, University of Queensland) with P.L. O'Brien of Water Technology Pty Ltd. 04th February 2016.

[6] Interview with Darren Burns (Land and Sea Management Coordinator, Quandamooka Yoolooburrabee Aboriginal Corporation) with P.L. O'Brien of Water Technology Pty Ltd. 26th February 2016.

Amity Point township is closely surrounded by high-value remnant terrestrial ecosystems of state significance (refer to Figure 2-5). Regional ecosystems around the township include:

- 12.1.3 - Mangrove shrubland to low closed forest on marine clay plains and estuaries;
- 12.2.5 - Corymbia intermedia +/- Lophostemon confertus +/- Banksia spp. +/- Callitris columellaris open forest on beach ridges - usually in the southern half of the bioregion;
- 12.2.6 - Eucalyptus racemosa subsp. racemosa open forest on dunes and sand plains. Usually deeply leached soils;
- 12.2.7 - Melaleuca quinquenervia or rarely M. dealbata open forest on sand plains;
- 12.2.14 - Foredune complex;
- 12.2.16 - Sand blows largely devoid of vegetation;
- 12.2.18 - Abutilon albescens +/- Wollastonia biflora low shrubland. Restricted to coral, shingle and sand cays.

As illustrated in Figure 2-5, the area directly surrounding the residential area is designated Essential Habitat under the *Vegetation Management Act 1999*. The Essential Habitat protects three vulnerable frog species, the Wallum Rocketfrog (*Litoria freycineti*), the Wallum Froglet (*Crinia tinnula*) and the Wallum Sedgefrog (*Litoria olongburensis*). The species occur in freshwater swamps, sedgelands, lakes and creeks; heathlands; wallum (Banksia aemula shrubland/woodland) or Melaleuca open forest; and adjacent Eucalyptus racemosa forest.

Significant palustrine (e.g. vegetated swamps in dune swales) and estuarine (e.g. mangroves, salt flats and estuaries) wetland ecosystems surround Amity Point township (again refer to Figure 2-5). Segments of these wetlands and shoreline areas surrounding Amity Point are part of the Moreton Bay Ramsar Site and are protected as wetlands of international importance for migratory shorebirds.

Koalas occur on North Stradbroke Island, which is included in the South-East Queensland Koala Protection Area. Amity Point is surrounded by a large contiguous area of medium value bushland habitat for koalas (refer to Figure 2-6). The koala populations of Queensland, New South Wales and the Australian Capital Territory are listed as *Vulnerable* under national environment law. Consequently, erosion of their bushland habitat along the Amity Point foreshore represents a significant threat to these important koala communities.

FIGURE 2-5 TERRESTRIAL VEGETATION

FIGURE 2-6 KOALA HABITAT

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2.5 The Social Environment

Amity Point is a residential area comprising mainly low density residential development, with some area reserved for commercial, community, recreation and open space land uses (refer to Figure 2-7). The area surrounding the township is mainly reserved for conservation.

At the time of the 2011 census, Amity Point had a population of 348, including 6 persons who identified themselves as being Aboriginal and Torres Strait Islander people. The population is ageing with a median age of 53 years, compared to a Queensland state average of 36 (Australian Bureau of Statistics, 2011).

A general store in Ballow Street provides fuel, food and postal services. Other commercial activity includes a cafe, community club, and holiday accommodation including cottage-style accommodation and a camping ground. The largest industries of employment are hospitality, cleaning / pest control / gardening services, accommodation, fishing and grocery stores (Australian Bureau of Statistics, 2011).

Community facilities in Amity Point include a community hall, library, auxiliary fire station, recreation reserve and several foreshore parks and reserves. The Amity Point boat ramp, beach and jetty provide access for residents and visitors to the waters of Moreton Bay for boating, fishing and bathing.

FIGURE 2-7 LAND ZONING, COMMUNITY AND EMERGENCY FACILITIES

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3. PHYSICAL PROCESSES ANALYSIS

3.1 Local Bathymetry

The natural processes shaping the foreshores of Amity Point are considerably influenced by the changing morphology of Rainbow Channel. To better appreciate the extent of changes to Rainbow Channel near Amity Point, in November 1970 Queensland's Beach Protection Authority (BPA) initiated a monitoring program consisting of surveyed profiles on several transects across Rainbow Channel and the Amity Point foreshore.

Transect surveys were undertaken intermittently by the BPA until that Authority was disbanded - at which point Redland City Council took on responsibility for the survey monitoring program. Intermittent transect surveys have continued over the years, with the latest being commissioned by Council in December 2015 to inform the preparation of this SEMP (Port of Brisbane, 2015). That most-recent survey was not just a transect survey, but was a multibeam sonar survey that captured the entire seabed bathymetry for approximately 200 metres offshore and along approximately 1.93kms of foreshore. The extent of the survey is shown on Figure 3-1.

Council subsequently commissioned the Hydrographic Survey Section of the Port of Brisbane Pty Ltd (PBPL) to undertake a comparison of all surveys undertaken since November 1970 - across a total of nine foreshore/channel transects. The historical cross sections produced by PBPL for each of these transects are included in Appendix A. The location of the nine transects used in the analysis are also shown on Figure 3-1.

These surveys offer the opportunity to determine the rate that the submerged eastern bank of Rainbow Channel has been migrating towards the Amity Point foreshore.

Appendix B presents plots of the distance that the RL 0.0m AHD, RL-4.0m AHD and RL-8.0m AHD contours on the eastern submerged bank of Rainbow Channel are offshore of the Amity Point shoreline. Deeper contour lines were not considered since there are quite large mobile sand waves moving across the seabed of Rainbow Channel that could lead to erroneous conclusions. Since the crest levels of the sand waves are typically below RL-9.0m AHD, the decision was made to only consider the channel side-slopes above that level when determining channel migration rates. The nearshore sand wave features are shown in Figure 3-2.

The results of an analysis of changes to the position of contours along the eastern side slopes of Rainbow Channel are presented in Table 3-1. This analysis indicates that:

- The eastern submerged slope of Rainbow Channel is indeed migrating towards Amity Point.
- The migrating rate on average has been around 1.8 metres/year along the entire length of the surveyed Channel, with rates being slightly higher at the southern end of the study foreshore.
- The rate has been reasonably constant over the years of 1970 to 2015, with no periods of notable quickening or slowing down.
- Since about 2002, as well as migrating eastward the northern part of the surveyed Channel has been steepening.

FIGURE 3-1 LOCATION OF HISTORICAL SURVEY TRANSECTS ON AMITY POINT FORESHORE

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TABLE 3-1 MIGRATION RATES OF RAINBOW CHANNEL

		Offset Distance									
Cross Section	Contour	1970	1982	1983	1984	1987	1997	2002	2015	Avg change (m/year)	Avg change (m/year)
1	0m	132	110		99	87	78	78	54	2.3	
	-4m	148	138		129	122	98	92	71	2.1	**2.3**
	-8m	165	170		157	148	114	112	92	2.4	
2	0m	106	91	84	84	69	44	36	27	2.6	
	-4m	129	111	106	102	96	65	71	59	2.2	**2.8**
	-8m	148	130	124	115	102	94	78	72	3.6	
3	0m	88	83	81	81	70	75	75	72	0.8	
	-4m	100	99	97	95	85	88	93	87	0.9	**0.9**
	-8m	116	129	121	127	113	110	118	98	0.8	
4	0m	37	17		17	10	15	13	16	0.6	
	-4m	42	40		27	23	22	23	21	1.3	**1.1**
	-8m	61	56		43	40	40	41	36	1.4	
5	0m	46	30		30	25	17	18	14	0.7	
	-4m	63	46		38	29	26	27	21	1.5	**1.3**
	-8m	91	54		47	39	35	35	31	1.7	
6	0m	44	28		12		17	16	18	1.8	
	-4m	53	45		23		25	24	21	2.4	**2.0**
	-8m	62	66		52		41	39	29	1.7	
7	0m	53	37		33		24	3	6	1.6	
	-4m	72	54		47		35	19	11	1.9	**2.1**
	-8m	93	80		64		48	45	17	2.6	
8	0m		57		46		41	46	20	1.7	
	-4m		82		70		62	52	27	2.6	**2.2**
	-8m		113		107		78	67	42	2.3	
9	0m						100	103	75	0.8	
	-4m						124	116	88	1.9	**1.8**
	-8m						153	134	112	2.7	
									Avg: 0m	1.4	
									Avg: -4m	1.9	**1.8**
									Avg: -8m	2.1	

Tidal flows in Rainbow Channel are strongest on the ebb tide (i.e. on the falling/outgoing tide). It is likely to be these ebb tide currents that are generating the formation and slow movement of sand waves on the seabed of Rainbow Channel. The extent to which these sand wave features are changing can only be determined by comparisons with future bathymetric surveys.

The depth of water immediately offshore of the Amity Point foreshore (and in particular at the bottom of the rock-armoured foreshore slope) is determined to a large extent by the location of the sand waves. As these seabed features slowly move, the locations where their crests and troughs intersect the rock-armoured wall also move along the wall. This means that the passage of the deeper troughs along the structure results in localised deepening at the toe of the wall as they pass.

This localised deepening (and possible steepening) of the channel side slopes needs to be considered when assessing processes that might threaten the integrity of the rock-armoured structure.

3.2 Local Coastal Processes

The term "coastal processes" refers to the complex interaction of ocean water levels, currents and waves that drive the transport of coastal sediments and consequently shape shorelines. Some discussion of each of these individual influences at Amity Point is offered in the following sections.

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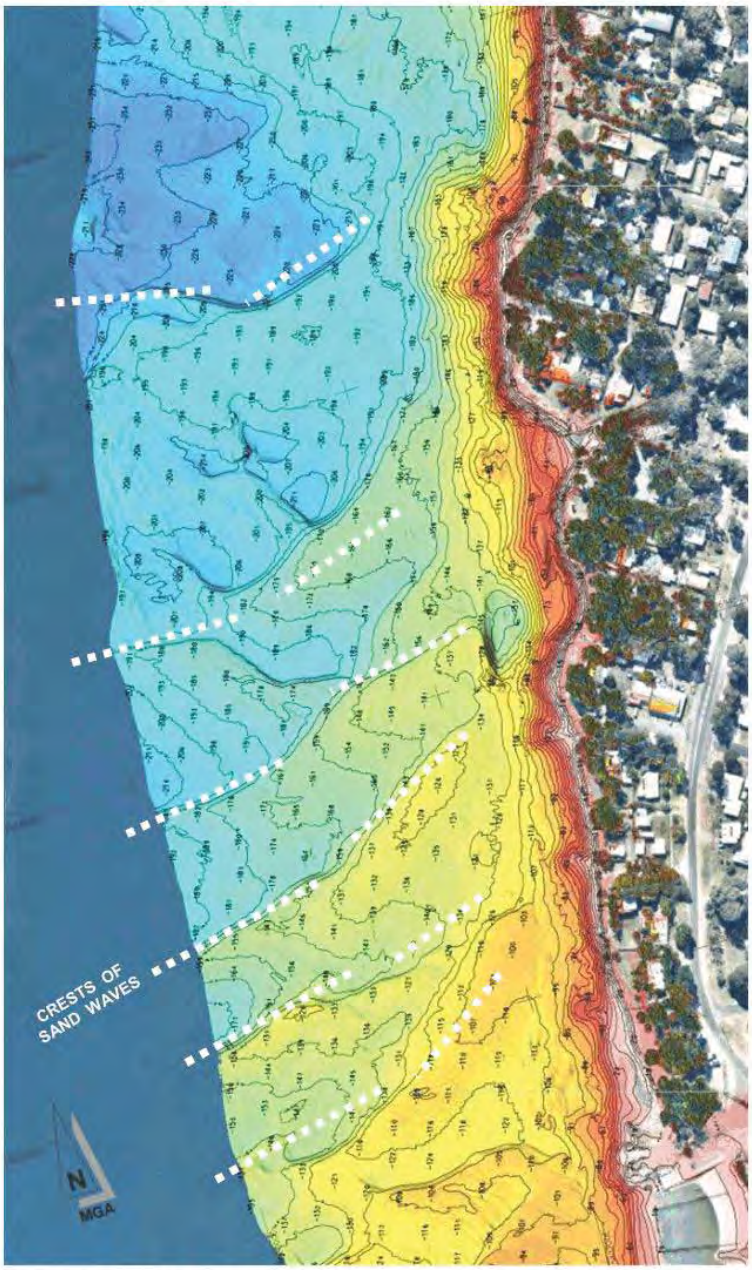

FIGURE 3-2 SAND WAVES ON THE SEABED IN RAINBOW CHANNEL OFF AMITY POINT

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3.2.1 Ocean Water Levels

When considering the processes that shape shorelines it is necessary to consider the ocean water levels that prevail from time to time. This appreciation not only relates to the day-to-day tidal influences, but also to the storm surges which occur as a result of extreme weather conditions. The expected impacts of climate change on sea levels also need to be considered.

As ocean waves propagate shoreward into shallower water, they begin to "feel" the seabed. The decreasing depths cause the waves to change direction so as to become aligned to the seabed contours and to also shoal up in height until such time as they may break - dissipating their energy as they do so. Just how much wave energy reaches the shoreline is therefore determined largely by the depth of water over the seabed approaches. Ocean water levels and the seabed bathymetry are important aspects in this process of wave energy transmission.

Consequently, it is necessary to have a thorough understanding of the following ocean levels on local foreshores:

- *Astronomical Tides* - this is the "normal" rising and falling of the oceans in response to the gravitational influences of the moon, sun and other astronomical bodies. These effects are predictable and consequently the astronomical tide levels can be forecast with confidence.
- *Storm Tides* - this is the combined action of the astronomical tide and any storm surge that also happens to be prevailing at the time. Surge is the rise above normal water level as a consequence of surface wind stress and atmospheric pressure fluctuations induced by severe synoptic events (such as tropical cyclones).

Astronomical tides

The tidal rising and falling of the oceans is in response to the gravitational influences of the moon, sun and other astronomical bodies. Whilst being complex, these effects are nevertheless predictable, and consequently past and future astronomical tide levels can be forecast with confidence at many coastal locations. Tidal planes have been published for Amity Point (Department of Transport and Main Roads, 2018) and these are summarised in Table 3-2.

TABLE 3-2 TIDAL PLANES AT AMITY POINT

Tidal Plane	to AHD	to Chart Datum
Highest Astronomical Tide (HAT)	1.22 metres	2.24 metres
Mean High Water Springs (MHWS)	0.76 metres	1.78 metres
Mean High Water Neaps (MHWN)	0.44 metres	1.46 metres
Mean Sea Level (MSL)	0.07 metres	1.09 metres
Mean Low Water Neaps (MLWN)	-0.40 metres	0.62 metres
Mean Low Water Springs (MLWS)	-0.72 metres	0.30 metres
Lowest Astronomical Tide (LAT)	-1.02 metres	0.00 metres

In a lunar month, the highest tides occur at the time of the new moon and the full moon (when the gravitational forces of sun and moon are in alignment). These are called "*spring*" tides and they occur approximately every 14 days. Conversely "*neap*" tides occur when the gravitational influences of the sun and moon are not aligned, resulting in high and low tides that are not as extreme as those during spring tides.

As can be seen in Table 3-2, the maximum possible astronomical tidal range at Amity Point is 2.24 metres, with an average range during spring tides of 1.48 metres and 0.84 metres during neap tides.

Spring tides tend to be higher than normal around the time of the Christmas / New Year period (i.e. December - February); and in mid-year (i.e. around May - July). The various occurrences of particularly high spring tides are often referred to in lay terms as "*king tides*" - in popular terminology meaning any high tide well above average height.

The widespread notion is that king tides are the very high tides which occur around Christmas or in the New Year. However, equally high tides occur in the winter months, but these are typically at night and therefore are not as apparent as those during the summer holiday period - which generally occur during daylight hours.

Since tidal predictions are computed based on astronomical influences only, they inherently discount any meteorological effects that can also influence ocean water levels from time to time. When meteorological conditions vary from the average, they can cause a difference between the predicted tide and the actual tide. This occurs within the Moreton Bay region to varying degrees. The deviations from predicted astronomical tidal heights are primarily caused by strong or prolonged winds, and/or by uncharacteristically high or low barometric pressures.

Differences between the predicted and actual times of low and high water are primarily caused by wind. A strong wind blowing directly onshore will "pile up" the water and cause tides to be higher than predicted, while winds blowing off the land can have the reverse effect. Clearly the occurrence of storm surges associated with severe storms can significantly influence ocean water levels.

Storm tides

The level to which ocean water can rise on a foreshore during the passage of an extreme storm event or a cyclone is typically a result of several different effects. The combination of these various effects is known as *storm tide*. Figure 3-3 illustrates the primary water level components of a storm tide event. A brief discussion of each of these various components is offered below.

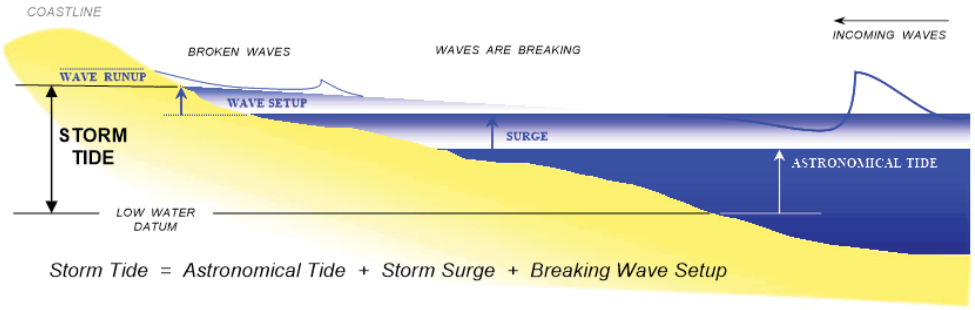

FIGURE 3-3 COMPONENTS OF A STORM TIDE EVENT

- Astronomical Tide

As discussed earlier, the astronomical tide is the normal day-to-day rising and falling of ocean waters in response to the gravitational influences of the sun and the moon. The astronomical tide can be predicted with considerable accuracy. Astronomical tide is an important component of the overall storm tide because if the peak of the storm were to coincide with a high spring tide for instance, severe flooding of low lying coastal areas can occur and the upper sections of coastal structures can be subjected to severe wave action.

- Storm Surge

This increase in the ocean water level is caused by the severe atmospheric pressure gradients and the high wind shear induced on the surface of the ocean by a severe storm or tropical cyclone. The magnitude of the surge is dependent upon several factors such as the intensity of the storm, its overall physical size, the speed at which it moves, and if associated with a cyclone - the direction of its approach to the coast, as well as the specific bathymetry of the coastal regions affected.

To predict the height of storm surges, these various influences and their complex interaction are typically replicated by numerical modelling techniques using computers.

- Breaking Wave Setup

The strong winds associated with severe storms generate waves which themselves can be quite severe. As these waves propagate into shallower coastal waters, they begin to shoal and will break as they encounter the nearshore region. The dissipation of wave energy during the wave breaking process induces a localised increase in the ocean water level shoreward of the breaking point which is called *breaking wave setup*.

Through the continued action of many breaking waves, the setup experienced on a foreshore during a severe wave event can be sustained for a significant timeframe and needs to be considered as an important component of the overall storm tide on a foreshore.

- Wave Runup

Wave runup is the vertical height above the local water level up to which incoming waves will rush when they encounter the land/sea interface. The level to which waves will run up a structure (or a natural foreshore) depends significantly on the nature, slope and extent of the land boundary, as well as the characteristics of the incident waves. For example, the wave runup on a gently sloping beach is quite different to that of say a near-vertical concrete seawall.

Since this component is very dependent upon the local foreshore type, it is not normally incorporated into the determination of the storm tide height. Nevertheless, it needs to be considered separately during the assessment of the storm tide vulnerability of Amity Point foreshores.

Storm Tide Levels at Amity Point

A storm tide study has previously been undertaken for Redland City (Cardno Lawson & Treloar, 2009 and Cardno, 2011). That study also addressed the effect of future climate change on sea level rise and tropical cyclone occurrences.

The storm tides reported by that regional study have been used in the preparation of this SEMP and are summarised in Table 3-3 for the present-day climate scenario. These levels are without the effects of wave runup, since this component varies along the length of the Amity Point foreshore.

The duration of the storm tide is also a critical consideration when determining effects on sandy shorelines in Moreton Bay. The surge component of the storm tide typically builds quickly to a peak over several hours, then drops away over a similar or even shorter timeframe as storm/cyclone influences pass.

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TABLE 3-3 STORM TIDE LEVELS AT AMITY POINT

Average Recurrence Interval[7]	RL to AHD without Breaking Wave Setup	RL to AHD with Breaking Wave Setup
50 years[8]	1.77 metres	1.89 metres
100 years	1.79 metres	1.95 metres
200 years	1.81 metres	2.01 metres
500 years	1.83 metres	2.08 metres
1,000 years	1.85 metres	2.34 metres

3.2.2 Ocean Currents

Several investigations and modelling studies have been undertaken in recent years regarding the ocean current regime near Amity Point (WBM, 1998 and BMT WBM, 2013). Numerical modelling of the local ocean current regime in Rainbow Channel using the TUFLOW FV proprietary software was undertaken as part of the 2013 study. That modelling exercise investigated tidal currents in Rainbow Channel off Amity Point for a typical spring tide in Moreton Bay. The modelling identified peak ebb (i.e. outgoing/falling) tide velocities of around 1.8m/sec, and somewhat lower peak flood (i.e. incoming/rising) tide velocities of approximately 1.4m/sec. These velocities are above the threshold that causes local sand to be entrained in the flow and to be moved along the seabed by tidal currents. Consequently, tidal flows are shaping the seabed bathymetry of Rainbow Channel near Amity Point.

During the flood tide phase the strongest currents off Amity Point occur on the western edge of Rainbow Channel (i.e. on the opposite side of the Channel to the township). These flood tide currents carry sand southward along this part of the Channel, sculpting the complex bathymetry of Amity Bank, Pelican Bank and the shoals around Welsby Light. During ebb tides, the strongest currents are on the eastern edge of Rainbow Channel against the Amity Point foreshore. These currents sweep any sand that is deposited into the Channel (by the prevailing westward littoral drift to Amity Point) northwards towards South Passage Bar.

3.2.3 Wave Climate

The wave climate on the bayside foreshores of Amity Point is dominated by waves that are generated by winds blowing across the fetches within Moreton Bay, with negligible open ocean swell penetrating to these foreshores. The length and depth of the fetches are limited by the many shoals and islands within the Bay, resulting in a mild to moderate wave energy climate at Amity Point.

The sandy foreshore of Amity Beach (refer to Figure 1-3 and Figure 3-1 for its location) is more exposed to swell wave energy. Nevertheless, the significant shoals of South Passage Bar still afford some protection by causing large waves in the sea state to break offshore before reaching that shoreline.

Numerical modelling of the local wave climate on the bayside foreshores of Amity Point has previously been undertaken using the SWAN proprietary modelling software (BMT WBM, 2013). Wind data recorded by the

[7] Average Recurrence Interval (ARI) is a statistical estimate of the average period in years between the occurrences of an event of a particular size. For example, a 100 year ARI event will occur on average once every 100 years. Such an event would have a 1% probability of occurring in any particular year.

[8] For ARI of around 50 years and less, the maximum local storm tide level may not necessarily be associated with cyclones. Other more frequent meteorological or synoptic events may combine with high spring tides to result in potentially greater levels than that listed here for 50 year ARI.

Bureau of Meteorology weather station at the Cape Moreton Lighthouse during the period of 1996 to 2010 was used as input to that SWAN wave model. The wave model generated wave height/direction recurrence frequencies for an offshore location in approximately 16 metres depth of water in Rainbow Channel, to the north-west of Amity Point. The results reported by that earlier numerical modelling work (BMT WBM, 2013) are reproduced in Table 3-4 below. The wave heights reported are the *significant wave heights*[9].

TABLE 3-4 ANNUAL AVERAGE WAVE HEIGHT & DIRECTION OCCURENCES

Wave Direction (degrees from north)											
H_s (metres)	**0°**	**30°**	**60°**	**90°**	**120°**	**150°**	**180°**	**210°**	**240°**	**270°**	**Total**
0.1 – 0.3	1.9%	8.8%	24.0%	5.1%			9.5%	10.7%	6.9%	2.8%	69.8%
0.3 – 0.5	0.5%	2.5%	2.1%				1.7%	4.9%	0.3%	0.2%	12.2%
0.5 – 0.7	0.0%	0.1%	0.1%				0.2%	0.6%	0.0%	0.0%	1.1%
>0.7		0.0%	0.0%				0.0%	0.0%			0.0%
Total	**2.4%**	**11.4%**	**26.2%**	**5.1%**	**0.0%**	**0.0%**	**11.4%**	**16.2%**	**7.3%**	**3.0%**	**83.2%**

Note : Calms (with Hs < 0.1 metres) = 16.8%

It is evident from the summary provided in Table 3-4 that the wave climate on the bayside foreshores of Amity Point is mild.

It is pertinent to note that the wave occurrences from the north-east and south-east quadrants (i.e. from 0° to 180°) in Table 3-4 represent waves occurring offshore in the Channel that would not propagate onto the foreshores of Amity Point. Therefore, for only around 26.5% of the time are there waves greater than 0.1 metres occurring on the bayside foreshores of Amity Point.

Rarely does the significant wave height exceed 0.5 metres during these times. The largest of such waves occur from the south-west sector (i.e. 180° to 270°). These occur for less than 1% of the time and are typically due to discrete storm events having strong south-westerly winds.

3.2.4 Sediment Supply and Transport Mechanisms

Waves and tidal currents are the primary processes driving the supply and transport of littoral sand at Amity Point. There is a net supply of littoral sand from the east along the northern coast of North Stradbroke Island towards the Amity Point area.

The eastern and northern shores of North Stradbroke Island experience quite strong wave energy. The prevailing south-easterly waves in the open ocean create a northerly littoral drift along the island's ocean-side Main Beach. Sand is transported along Main Beach towards Point Lookout primarily by longshore wave processes. In the vicinity of Point Lookout, it accumulates in offshore shoals from where waves and currents disperse it towards Moreton Island and the northern shores of North Stradbroke Island. Some of the sand is moved directly along the island's northern shoreline through Deadman's, Cylinder, Home and Flinders Beaches.

Waves arriving from the north-east quadrant (i.e. from north around to east) are the main cause of this transport along the northern shoreline, although there is also a contribution by south-easterly waves refracting around

[9] Due to the random nature and size of waves, the term *"significant wave height"* is used by engineers and scientists to quantify wave heights in a sea state. It represents the average of all the third highest waves that occur over a particular timeframe. It is typically written as H_s. It is important to appreciate that in deep offshore waters the largest individual wave in the sea state may be around twice the significant wave height.

Point Lookout. Sand arriving at the north-west corner of North Stradbroke Island in the general vicinity of Amity Point then comes under the additional influence of the tidal flows between Moreton and North Stradbroke Islands.

Whilst these regional sediment transport processes have remained somewhat regular, there have been significant changes to the natural sand transport regime on the local foreshores of Amity Point since the township was first founded. Historical photographs, surveys and written records indicate that the bay-side foreshore of Amity Point once consisted of a wide sandy beach with a well-established vegetated dune system. As discussed in Section 3.1, local shorelines and the bathymetry of the main tidal channels between Moreton and North Stradbroke Islands have been changing quite considerably.

In earlier times, the westward supply of littoral sand to the north-west corner of North Stradbroke Island would have continued around onto the western-facing sandy beach fronting Amity Point township – being transported by ocean waves refracting and diffracting around Amity Point itself. However, the gradual migration of Rainbow Channel towards Amity Point and its increasing dominance as the main tidal channel, has seen this once sandy foreshore become eroded. Channel migration is accompanied by retrogressive flow slides in the submerged channel side slopes (refer subsequent discussions in Section 3.3), and indeed such events are likely to be a contributing process to this migration of the channel.

As well as causing erosion of the foreshore, the increasing proximity of Rainbow Channel to Amity Point has intercepted the sand that once supplied the bay-side foreshore south of Amity Point. Sand is instead deposited directly into Rainbow Channel (from where the dominant ebb tide carries it northward towards South Passage Bar and Moreton Island), or is carried directly northward across South Passage Bar by ebb tide flows passing through the passage.

In response to the diminishing longshore supply of sand, groynes were constructed on the bay-side foreshores around 1955 (Eberhardt, 1978) to retain sand on the foreshore for longer periods. Additional rock-armoured groynes were constructed and upgraded several times in recent years, with a total of ten groynes having been constructed by the 1970's. There are still three of these in place on the foreshore frontage of the camping ground. These three groynes contain beach compartments that provide an erosion buffer to the local foreshore, as well as offering an enhanced beach amenity much-used by residents and visitors.

A consequence of the complex interaction of waves and currents that are shaping the local littoral sand transport regime has been the loss of foreshore land at Amity Point. This has included land subdivided based on the shoreline position that existed in 1886. Figure 3-4 has been reproduced directly from Eberhardt (1978)[10] and shows the historical changes to the shoreline at Amity Point between the years of 1886 and 1976. Up to 300 metres foreshore recession occurred in that period.

3.3 Retrogressive Flow Slides

Retrogressive flow slides (also known as *retrogressive breach failures*) are natural events which occur in sandy deposits of many river, estuarine and coastal locations around the world. They can have a significant influence on the stability of river banks, as well as estuarine and coastal foreshores.

They have also been responsible for levee collapses along the lower reaches of the Mississippi River that have resulted in adverse flooding and damage to essential infrastructure. In the Netherlands, retrogressive flow slides have been recognised for many years as being a threat to the vital flood and sea defences along that country's coastline and riverbanks.

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[10] Eberhardt (1978) quotes the original source of the drawing as the Beach Protection Authority's map number SC881.

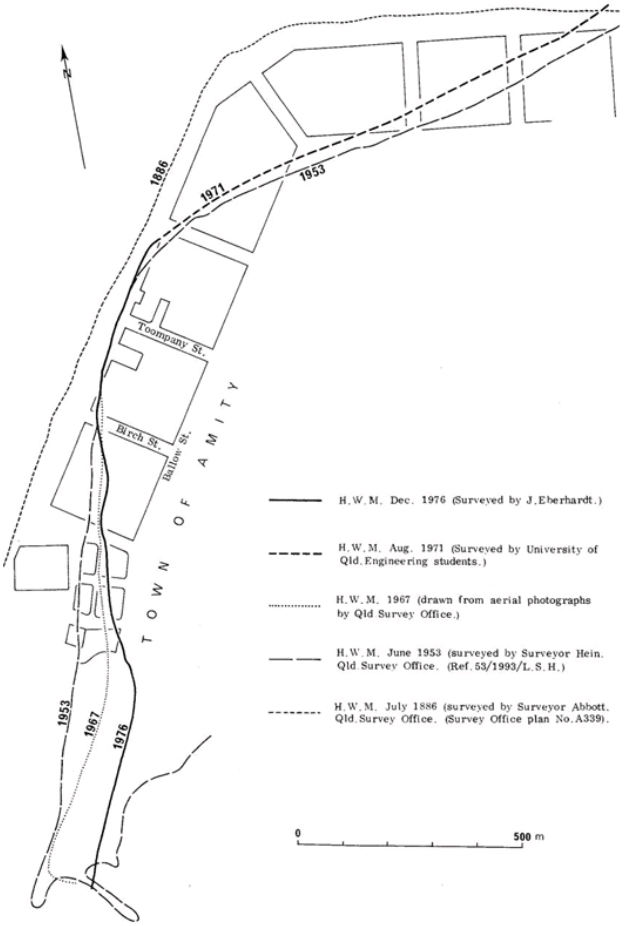

FIGURE 3-4 HISTORICAL CHANGES TO THE SHORELINE AT AMITY POINT

Due to their potentially catastrophic consequences, considerable research effort has been applied to understand retrogressive flow slides. Consequently, there is a significant body of technical literature available that describes the geomorphological mechanisms associated with retrogressive flow slide failures, as well as measures for either preventing their initiation or inhibiting their development to destructive scales.

Figure 3-5 shows images of a retrogressive flow slide underway at Amity Point[11].

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[11] Images in Figure 3-5 are reproduced from *Beinssen et al, 2014*. Copyright is acknowledged.

FIGURE 3-5 A RETROGRESSIVE FLOW SLIDE UNDERWAY AT AMITY POINT

The processes associated with a retrogressive flow slide can be summarised as follows:

- They occur on densely packed subaqueous sand slopes, such as those that exist along the underwater edge of tidal channels and river banks. At Amity Point they occur just offshore, on the submerged side slopes of Rainbow Channel.
- A triggering mechanism develops a localised scour somewhere on the submerged slope, which can then progress to a shear failure should the disturbed area exceed the stable angle of repose for the sand.
- The sand grains remaining on the sheared face of the slope are unsupported, and will consequently move apart - increasing the void ratio (this is called *dilation*) which temporarily decreases pore pressures within the face of the slope. The lower pore pressures (compared to the surrounding hydrostatic water pressures) cause individual sand grains near the face to be "sucked" together for a short time. This enables the sand body to resist further collapse and for a near-vertical face to develop.

- The lower pore pressures at the near-vertical sand face are quickly dissipated - by the surrounding water infiltrating the voids. The unconfined grains at the face then detach and fall from the wall, generating a density current of entrained sand which carries the falling sand away into deeper water. The process continues on the newly exposed sand grains in the near-vertical face, increasing the momentum of the event.
- The density currents carry the removed sand away from the failure zone and beyond the immediate toe of the near-vertical face, allowing it to remain steep and high. This dispersion of sand away from the base of the breach can be further assisted by tidal currents flowing in the channel itself.
- In other words, the mechanism of flow slide development is driven by short-lived density currents that entrain sand off the near-vertical wall of a shoreward moving failure plane, causing sand grains to continually cascade off this advancing face. This process is classed as *retrogressive breaching failure*.
- As the advancing sand wall grows in height, wedges of sand can also collapse off the vertical face - breaking up as they fall and then mix with water, thereby enhancing the density current. Dilation in the sand face immediately behind the collapsing wedge temporarily stabilises the wall until retrogressive breaching restarts.
- Retrogression continues, creating a deep bowl-shaped scour feature in the submerged side slope of the tidal channel or river bank (as seen in Figure 3-5). Typically, as the event grows, this then becomes more of an amphitheatre-shaped characteristic with a narrower throat at its deeper offshore end.
- The base of the retrogressing sand wall propagates into the sand slope slightly upwards on an approximate angle of 1 vertical : 15 horizontal.
- The event ceases when the density current can no longer entrain sand from the retrogressing near-vertical face. This occurs either because there is no longer any sand available within the profile of the submerged slope to sustain the process; or the volume of sand being removed from the breaching face becomes so great as to "choke" the flow of entrained sand out of the bowl-shaped feature.
- Whilst they proceed entirely underwater, such events typically cannot be seen. It is only when they emerge above the waterline onto exposed beaches or sand banks that they can be detected by eye.

The occurrence of a retrogressive flow slide has three pre-condition requirements. These being:

- Requirement 1: The sand in the slope must be dense and fine- to medium-grained, typically with an average grain size between approximately 0.15mm and 0.25mm.
- Requirement 2: The sand slope must be steeper than 1 vertical to 3 horizontal (i.e. 18.4° above the horizontal) over a minimum vertical height of 5 metres.
- Requirement 3: A "triggering" mechanism is needed to initiate the event by disturbing the sand slope in such a way as to create a localised over-steepening of the slope - which can then develop into a retrogressive flow slide.

The mechanisms that can trigger a retrogressive flow slide are not particularly well understood at present. Technical investigations and studies suggest that it can be because of almost any local change in internal stresses within the susceptible sand slope. Silvis and de Groot (1995) postulate that it could be

> *"…….a sudden, local change in water pressure due to waves from a passing ship or a wind wave, an increase in outflowing groundwater during an extreme low tide, a quickly changing soil pressure due to a local shear failure or due to dredging activities, vibrations by pile driving, and so on."*

3.4 Future Climate Change

Climate change as a consequence of enhanced Greenhouse gas emissions will cause environmental changes to ocean temperatures, rainfall, sea levels, wind speeds and storm systems. If climate changes develop as predicted, the foreshores of Amity Point will be subjected to potentially greater storm and cyclone energy, higher waves, stronger winds and increased water levels.

To assist local government, business, industry and communities in understanding the risks and to better prepare for the impacts of climate change, the State Government has developed regional climate change projections for 13 Queensland regions. A *Climate Change in Queensland* map application[12] and regional climate change impact summaries[13] are based on the CSIRO and Bureau of Meteorology's Climate Change in Australia data.

These future climate projections use both low- and high-emissions futures modelling. The high emissions future (RCP 8.5) assumes "business as usual" or no future curbing of greenhouse gas emissions. A lower emissions future (RCP 4.5) assumes a reduction in greenhouse gas emissions achieved by application of some mitigation strategies and technologies. The regional climate change impact summaries show climate change projections for the years 2030 and 2070 at a state-wide level and for the 13 Queensland regions - including South-East Queensland.

The projected sea level rise currently adopted for planning purposes in Queensland is 0.8 metres by the year 2100.

In addition to sea level rise, there is opinion that the intensity of tropical cyclones may increase - although it is also acknowledged that there is a possibility of the overall number of cyclones affecting coastal regions decreasing. However, estimating any changes to the intensity and occurrence of cyclones is particularly problematic since their formation and subsequent track are dependent upon the complex interaction of several natural phenomena (such as the El Nino - Southern Oscillation) which themselves are not yet well understood.

Of significant uncertainty is the effect of future climate change on the complex tidal hydrodynamics and shifting bathymetry of the passage between Moreton and North Stradbroke Islands.

In summary, it is expected that future climate change will exacerbate foreshore erosion and increase the risk of coastal hazards associated with the changing morphology of Rainbow Channel. Given the present uncertainties associated with the extent and nature of future climate change, when developing and assessing appropriate erosion mitigation strategies there is considerable merit in applying strategies that are flexible and can be tailored to suit impacts as they gradually evolve.

3.5 Coastal Reaches of Amity Point

When considering appropriate erosion management options along the Amity Point shoreline it is evident that the shoreline can be considered in three coastal precincts, namely

- Southern Reach: the foreshore frontage of the camping ground and boat ramp;
- Central Reach: along the alignment of the rock armoured foreshore; and
- Northern Reach: the sandy foreshore of Amity Beach.

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[12] Available at : http://qgsp.maps.arcgis.com/apps/MapJournal/index.html?appid=1f3c05235c6a44dcb1a6faebad4683fc

[13] At : https://www.qld.gov.au/environment/climate/projections/

This separation into coastal reaches does not imply that the coastal processes within each are in any way compartmentalised. They are by no means isolated or discrete sections of shoreline, since the processes affecting each can have an influence on the others. However, this partitioning lends itself to the development of viable erosion management strategies that integrate well over the entire Amity Point coastal reach.

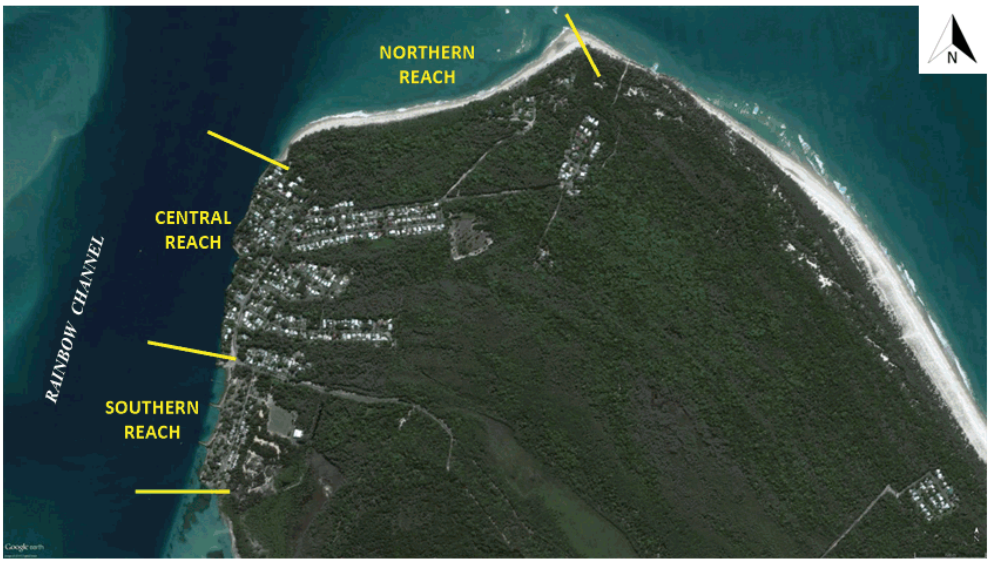

FIGURE 3-6 COASTAL REACHES OF AMITY POINT STUDY AREA

3.5.1 Southern Reach - Camping Ground Foreshore

As shown on Figure 3-7 the southern precinct consists of an approximately 355 metre long beach frontage to the camping ground; and a 215 metre long rock-armoured seawall bordering the southern part of the reserve. The natural sand transport regime has resulted in beach fillets forming against the northern side of the groynes, and beaches being eroded on the southern sides of groynes. The reduced beach buffer to the south of each groyne has necessitated the construction of rock-armoured seawalls to mitigate further erosion in these areas.

The flat intertidal zone between the camping ground and Rainbow Channel consists of fine-grained sediments in front of a steeper sloped beach of coarser grained sand perched at the landward edge of this zone. The intertidal area is around RL-0.5m AHD, and the sand beach slopes at approximately 1-in-8 up to the level of the camping ground at approximately RL+3.0m to RL+3.5m AHD.

The foreshore has the very distinct morphological characteristics of a tide-dominated beach, with the beach sub-type defined as *Beach and Sand Flats* (ie . B+SF) under the Australian Beach Systems classification (Short, 2006). The B+SF classification is assigned specifically to the camping ground foreshore by Short (2000).

FIGURE 3-7 SOUTHERN REACH – CAMPING GROUND FORESHORE

In response to the diminishing longshore supply of sand, groynes were constructed on the bay-side foreshores of Amity Point around 1955 (Eberhardt, 1978) to retain sand on the foreshore for longer periods. Additional rock-armoured groynes have been constructed and upgraded several times in recent years, with a total of ten groynes having been constructed by the 1970's. There are still three on the foreshore frontage of the camping ground. As can be seen in Figure 3-7, these groynes create three beach compartments.

3.5.2 Central Reach - Flow Slide Barrier

The Central Reach consists of the existing rock wall frontage extending approximately 955 metres northwards from the boat ramp at Claytons Road, to near the northern end of Millers Lane (refer to Figure 3-8). As discussed in Section 3.3, this rock structure is a flow slide barrier that has been progressively reinforced by local property owners over many years.

The erosion threat along this Central Reach is due to the natural processes causing Rainbow Channel to slowly migrate eastward, in conjunction with occurrences of retrogressive flow slides.

3.5.3 Northern Reach - Amity Beach

The Northern Reach consists of the sandy Amity Beach foreshore extending from the northern-most end of the Central Reach's flow slide barrier, to the sand bar feature at the western end of Flinders Beach (refer to Figure 3-9).

As will be discussed in the later Section 4.6, this sand spit plays a significant role in the erosion and accretion processes affecting Amity Beach.

FIGURE 3-8 CENTRAL REACH – ROCK WALL FRONTAGE

FIGURE 3-9 NORTHERN REACH – AMITY BEACH

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4. RISK ASSESSMENT

4.1 Erosion Threat

The threat of shoreline erosion along the foreshores of Amity Point varies depending upon location. However, it is typically a consequence of the following:

- Coastal Erosion
  - Short-term episodic erosion on sandy foreshores caused by the strong waves and elevated ocean water levels that occur during severe storm events; and/or
  - Long-term on-going erosion to sandy foreshores as a consequence of an imbalance in the littoral transport regime.
- Retrogressive Flow Slides
  - Retrogressive flow slides events occurring on the underwater eastern side slopes of Rainbow Channel, with the threat exacerbated by the slow eastward migration of the Channel towards Amity Point.

4.1.1 Coastal Erosion

In the past, coastal development has occurred throughout Queensland within areas vulnerable to erosion. Such development often constitutes significant private and public investment. However coastal protection works for the built environment are costly, and can have adverse implications to coastal resources and their values. Consequently, the concept of having undeveloped erosion buffers along the coastline is an intrinsic part of the coastal management policy of the Queensland State Government, and indeed has been since the state's Beach Protection Authority was established in 1968.

In July 2015, the then Department of Environment and Heritage Protection (now gazetted as the Department of Environment and Science) declared new erosion prone areas for the Queensland coastline. The new erosion prone areas re-introduce climate change factors (including a sea level rise factor of 0.8 metres) in new ways; and updates the position of the state's shoreline.

Erosion Prone Areas are widths of the Queensland coast considered as being vulnerable to inundation and coastal erosion. The determination of an erosion prone area width at any particular location is based on considerations of:

- Short-term erosion - caused by extreme storm/cyclone events;
- Long-term erosion - where gradual on-going shoreline recession is occurring, typically this is due to a deficit of natural sediment supply, or gradual changes to nearshore bathymetry;
- Dune scarp collapse - where slumping of a beach erosion scarp occurs following storm erosion events;
- Added risk of erosion due to future climate change influences – due to permanent inundation of land by tidal water and/or the morphological response of the coast to a rise in sea levels; and
- An allowance for a 40% safety factor.

Statutory erosion prone areas have been declared by the Department of Environment and Science (DES) under section 70 of the *Coastal Protection and Management Act 1995* (Coastal Act). Such declarations are made by referencing erosion prone area plans prepared for all local government areas throughout Queensland. These plans are used for development assessment purposes, and to inform the preparation of planning instruments such as planning schemes and regional plans under the *Planning Act 2016*.

The objective of designated erosion prone areas is to set aside undeveloped buffer zones, thereby implementing a philosophy that biophysical coastal processes should be accommodated rather than prevented. The most basic form of accommodation is to avoid locating development and vital infrastructure within dynamic coastal areas affected by the natural processes of shoreline erosion and accretion.

An adequate buffer zone allows for the maintenance of coastal ecosystems (including within littoral and sublittoral zones), visual amenity, public access and the impacts of natural processes - without the high cost and potentially adverse effects of property protection works.

The statutory erosion prone area plan of relevance to Amity Point is *REC3A Map 3*[14]. A copy of that plan and its related definitions and clarifications is included as Figure 4-1. The definition of the Erosion Prone Area as it applies to coastal land throughout Queensland is provided on all erosion prone area plans, as well as on *REC3A Map 3*, and is stated as follows:

1. *Erosion prone areas are deemed to exist over all tidal water to the extent of Queensland Coastal Waters and on all land adjacent to tidal water.*
2. *Erosion prone areas include areas subject to inundation by the highest astronomical tides (HAT) by the year 2100 or at risk from sea erosion.*
3. *On land adjacent to tidal water the landward boundary of the erosion prone area shall be defined by whichever of the following methods gives the greater erosion prone area width:*
    a. *a line measured 40 metres landward of the plan position of the present day HAT level except where approved revetments exist in which case the line is measured 10 metres landward of the upper seaward edge of the revetment, irrespective of the presence of outcropping bedrock;*
    b. *a line located by the linear distance shown on Table 1 and measured, unless specified otherwise, inland from:*
        i. *the seaward toe of the frontal dune (the seaward toe of the frontal dune is normally approximated by the seaward limit of terrestrial vegetation or, where this cannot be determined, the level of present day HAT); or*
        ii. *a straight line drawn across the mouth of a waterway between the alignment of the seaward toe of the frontal dune on either side of the mouth*
    c. *the plan position of the level of HAT plus 0.8 m vertical elevation.*

Except:

- i. *where the linear distance specified in 3b is less than 40 metres, in which case section 3a. does not apply and the erosion prone area width will be the greater of 3b and 3c; or*
- ii. *where outcropping bedrock is present and no approved revetments exist, in which case the line is defined as being coincident with the most seaward bedrock outcrop at the plan position of present day HAT plus 0.8m; or*
- iii. *in approved canals in which case the line of present day HAT applies, irrespective of the presence of approved revetments or outcropping bedrock.*

4. *Erosion prone areas defined in accordance with the above are deemed to exist throughout all the local government areas, irrespective of whether the entire local government area is depicted on erosion prone area plans for the area.*

As shown on Figure 4-1, the designated width of the erosion prone area throughout the Amity Point SEMP study area is 145 metres.

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[14] *Erosion Prone Area Redland City Local Government Area - REC3A*. Date of erosion prone declaration, 8th July 2015. Available online: https://www.ehp.qld.gov.au/coastal/development/assessment/pdf/redland-erosion-prone-area-plan.pdf.

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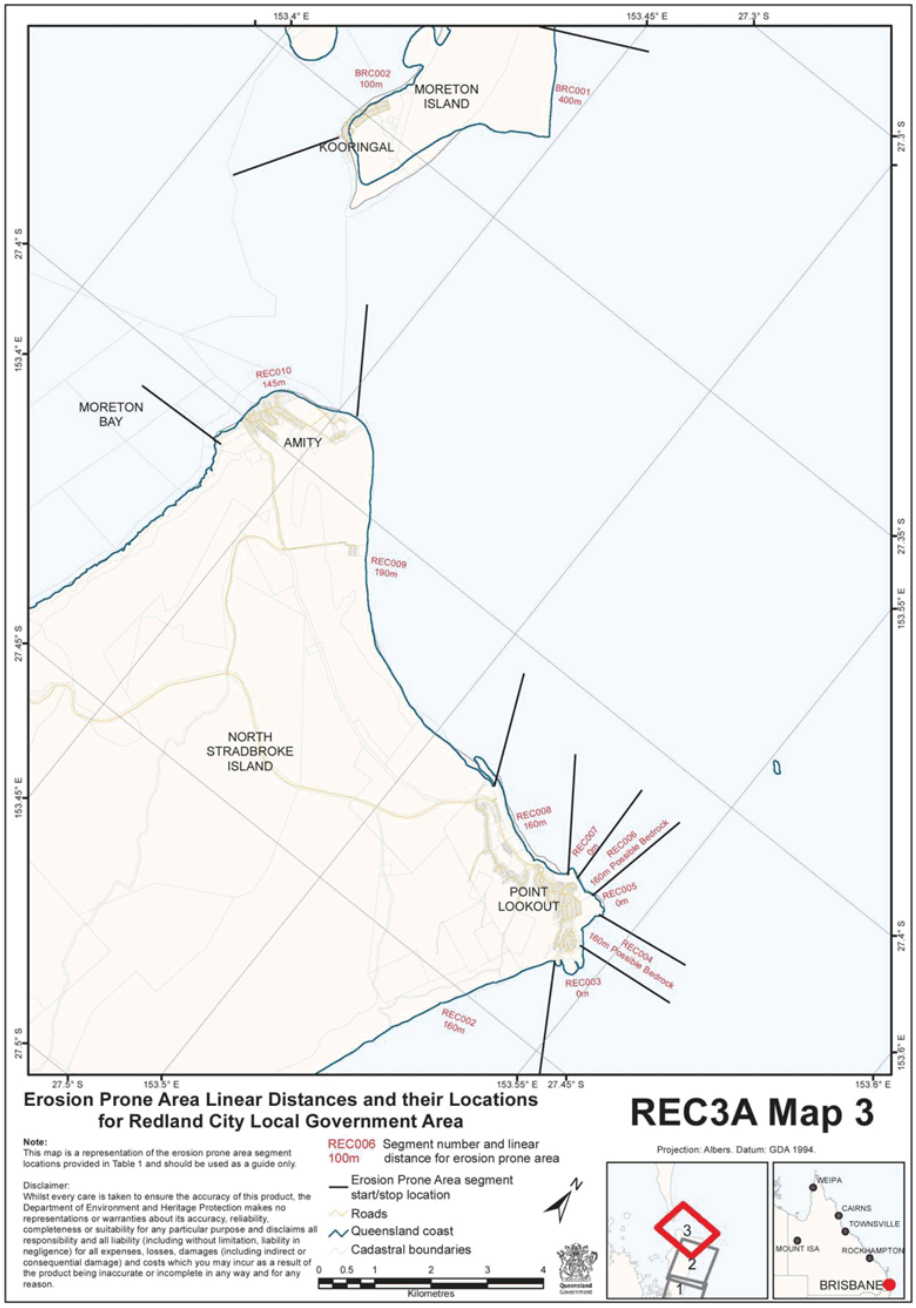

FIGURE 4-1 EROSION PRONE AREA MAP

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4.1.2 Retrogressive Flow Slides

It is apparent from the historical record that retrogressive flow slides have been occurring along the eastern edge of Rainbow Channel for over one hundred years, and probably longer. Renowned local historian Thomas Welsby wrote in 1913 (Thomson, 1967) of his recollections prior to that time of many "large slips" occurring at Amity Point which swept away "tons of sand". His observations dating back to the late 1800's indicate the occurrence of retrogressive flow slides and their adverse impacts on local foreshores and sand shoals at that time.

Since then there have been numerous such events, many of which can be recalled by long-term residents[15] and are recorded in photographs dating back to the 1940's. Residents of Amity Point have historically (and still today) refer to retrogressive flow slides as "sink holes". There is wide-spread understanding in the local community that such events occur regularly at Amity Point and that they represent a threat - not only to foreshore properties, but potentially to the township itself.

The response of the local community to the threat of retrogressive flow slides have been varied over the years. These have included sea defences constructed of timber piles salvaged from an abandoned WW2 anti-submarine netting project, large ti-tree mats, and cement stabilisation (G. Litherland 2015 pers. comm.). Prior to the opening of a quarry on North Stradbroke Island in the 1970's, fill comprising large tree trunks, old car bodies and other such materials (including the *Bandicoot*, a decommissioned steam launch previously used as a dredge tender) were placed as emergency works by the community at locations of retrogressive flow slides.

Large rocks became available from the island's quarry around the mid-1970's. As a consequence, foreshore property owners have more recently used this material to armour their properties. Typically, this entails the placement of large volumes of rock into any areas of foreshore adversely affected by retrogressive flow slides. When a retrogressive flow slide undermines previously placed armour, those rocks slump or collapse into the eroded shoreline. Residents would then place additional rocks to "top-up" the slumped armour. This would generally occur as soon as possible after each event.

In effect this is progressively building a rock barrier to retrogressive flow slides, since each local undermining occurrence results in deeper foundations and a recharging of the reserves of rock higher in the structure by residents.

Investigations regarding the phenomenon of retrogressive flow slides at Amity Point have previously been undertaken (Beinssen, et. al., 2014 and Beinssen & Neil, 2015). They have included almost daily field monitoring of the at-risk beach and Rainbow Channel slope immediately to the north of the existing flow slide barrier for a period of 26 months. Sand on the side slopes of Rainbow Channel in this area typically have an average grain size (i.e. D_{50} value) of around 0.22mm, which meets the pre-condition requirement for a retrogressive flow slide – namely an average grain size between approximately 0.15mm and 0.25mm

Monitoring was carried out from July 2012 to August 2014. In that period, 52 retrogressive flow slides were recorded. This averages approximately one every fortnight. A summary of other findings are as follows:

- On no occasion was the approach of a subaqueous retrogressive flow slide evident on the surface of the water. Such events only became visible when they reached the beach.

[15] G.&L. Litherland, 16/12/2015 pers. comm.; D. & E. Cilento 15/01/2016 pers. comm.; C. & M. McIllwain, 15/12/2015 pers. comm.; J. & L. Walker 12/01/2016 pers. comm.; K. Norris 10/01/2016 pers. comm.; I. Panebianco 15/01/2016 pers. comm.; B. Hoare 13/06/2016 pers. comm.; G. Nankervis 13/06/2016 pers. comm.

- The morphology of each event was amphitheatre-shaped as it progressed up the beach slope. Whilst sand grains could be seen cascading down the near-vertical face below the waterline, occasionally wedges of sand above the waterline sheared off the top of the wall and sank vertically down its face.
- The speed of the retrogressing near-vertical sand face in all cases was approximately 0.8 metres / minute. However, this rate reduced as the event reached the upper beach area and began to diminish.
- The height of the subaqueous sand wall was measured on six occasions to be around 6m to 7m.
- Following each retrogressive flow slide event, the longshore littoral supply of sand from the north-west (supplied from Amity Beach) filled the bowl-shaped erosion feature within one day to several weeks – depending upon the size of the retrogressive flow slide.
- Of the 52 events recorded, 48 were identified as having encroached onto the flow slide barrier - but none caused significant structural damage.

Whilst there has been intermittent damage to the flow slide barrier by deep retrogressive flow slides that have required placement of additional armour rocks to reinstate its alignment and effectiveness, this flow slide barrier has prevented any significant or on-going shoreline recession for more than 40 years. This is apparent from the historical foreshore surveys that have been undertaken since 1970 (refer discussions in Section 3.1).

However, such protection is not necessarily ensured in future years. Retrogressive flow slides are initiated on the submerged eastern slopes of Rainbow Channel immediately offshore of the flow slide barrier. Since these slopes are gradually steepening as the Channel slowly migrates eastward, there is the potential risk of flow slides being initiated at lower levels on the changing channel slopes; and possibly undermining the existing flow slide barrier.

As discussed in Section 3.3, a pre-condition for the initiation of a flow slide on the submerged sand side slopes of Rainbow Channel is that the gradient of the slope needs to be steeper than 1 vertical : 3 horizontal over a vertical height of 5 metres. As Rainbow Channel slowly migrates eastward, it encounters the mostly buried rock barrier that has been built progressively in response to historical flow slides on the channel's submerged bank. This submerged sandy bank is tending to become steeper, increasing the possibility of retrogressive flow slides being triggered.

This presents a potential threat to the ability of the buried rock barrier along the Central Reach frontage to prevent any development of future flow slides to destructive scales. To investigate this risk, a Concept Design for a flow slide barrier has been developed as part of technical investigations for this SEMP, and a structural audit of the existing flow slide barrier along the Central Reach has been undertaken to compare it with the Concept Design.

4.2 Concept Design of a Flow Slide Barrier

As discussed in the preceding Section 3.3, there is a significant body of technical literature available that describes the geomorphological mechanisms associated with retrogressive flow slide failures, as well as measures for either preventing their initiation or inhibiting their development to destructive scales.

As part of technical work undertaken for this SEMP, a Concept Design for a flow slide barrier has been developed. The Concept Design has been completed by drawing on the various findings of international research into retrogressive flow slide processes. It has also been informed by the many observed interactions between flow slides that have occurred along the Coastal Reach of Amity Point and the rock armour placements along that foreshore.

The Concept Design for a flow slide barrier is shown on Figure 4-2 and is included as Appendix H.

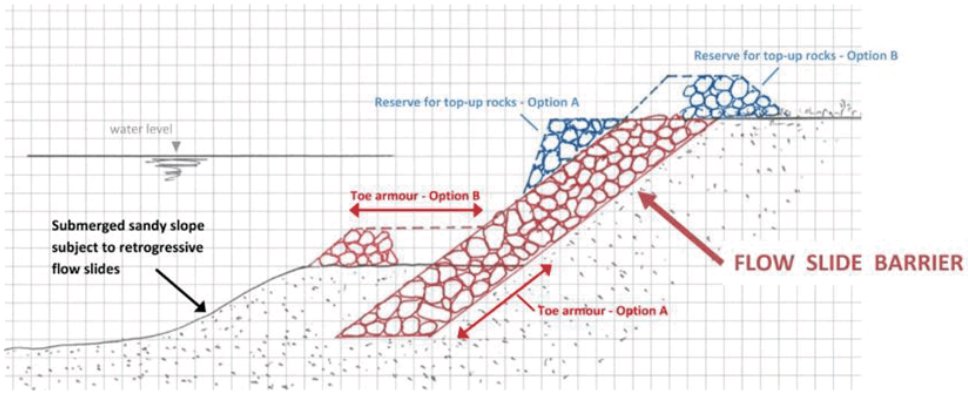

FIGURE 4-2 CONCEPT DESIGN FOR A FLOW SLIDE BARRIER

The structural concept includes the following important features:

- All armour rocks used in the flow slide barrier are to have a nominal weight that will withstand the largest tide/flood currents washing against and along the structure. In those parts of the structure exposed to wave action, rock characteristics must also accommodate large storm tides and severe storm wave action - comparable to the design standards for rock-armoured seawalls in Queensland. This will include the determination of minimum and maximum weights of individual rocks to ensure tight interlocking of all rocks within the armour matrix.
- The thickness of the flow slide barrier is to be such as to prevent the unrestricted growth of any flow slide that develops on the adjacent seabed slope. The minimum thickness is to be at least ten times (x10) the dimension of the smallest allowable rock armour size.
- The gradient of all exposed rock slopes are to be no steeper than 1 horizontal to 1.33 vertical.
- Two options are shown in Figure 4-2 as acceptable arrangements for the placement of rocks in the lower toe area of the Flow Slide Barrier. The intent is to ensure that there are adequate rocks in this toe area to provide protection for the maximum expected scour level of adjacent seabed/channel features. In the case of Option A, this is achieved by armouring down to at least the expected level of seabed scour/lowering. In the case of Option B, this is achieved by having an adequate volume of rock to self-armour the slope below in the event of undercutting of this reserve of rocks as the seabed level drops.
- Two options are also shown in Figure 4-2 as acceptable arrangements for the placement of rocks in the upper area of the flow slide barrier that provide a reserve of top-up rocks. Such reserves are to mitigate any slumping or structural damage to lower regions of the barrier that may be initiated by a flow slide. The intent is to ensure that there is a sufficient volume of top-up rocks to reinstate the form and function of the flow slide barrier during and following any such slumping/damage.

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4.3 Structural Audit of the Flow Slide Barrier Along the Central Reach

To determine the extent of rock buried within the foreshore along the Central Reach of Amity Point, extensive geophysical investigations were commissioned by Council to map the extent of the buried rock in the foreshore.

The geophysical investigations (Golder & Associates, 2016 & 2017) utilised the combined findings of land-based survey methods of Multi-Channel Analysis of Surface Waves (MASW), Electromagnetic (EM), and Ground Penetrating Radar (GPR), as well as the overwater survey techniques of Sub-Bottom Profiling (SBP) and Side Scan Sonar (SSS). A summary of the findings of these investigations is presented as cross sections in Appendix F.

As discussed in the preceding Section 4.1.2, foreshore property owners along the Central Reach have for many years used rocks to armour the foreshores of their properties. This involves the placement of large volumes of rock into any areas of foreshore adversely affected by flow slides. When a flow slide undermines previously placed armour, those rocks slump or collapse into the eroded shoreline. Residents would then place additional rocks to "top-up" the slumped armour. Basically this has been progressively building a barrier to flow slides, since local undermining occurrences result in deeper foundations and a recharging of the reserves of rock higher in the structure.

The results of the geophysical investigations indicate that the rocks that have been progressively placed along the foreshore of the Central Reach in response to flow slides collectively take a structural form consistent with the Concept Design for a flow slide barrier shown in Figure 4-2. This confirms that it is indeed appropriate to consider the existing rock placements along the Central Reach as being a flow slide barrier.

4.3.1 Performance of the Existing Flow Slide Barrier

The results of the geophysical investigations can also be used in conjunction with the surveyed bathymetry of the side slopes of Rainbow Channel, and the known mechanisms of retrogressive flow slide events, to determine the current effectiveness of the existing flow slide barrier.

The threat of shoreline recession along the Central Reach is due to the eastward migration of Rainbow Channel - in conjunction with the occurrences of retrogressive flow slides on the underwater side slopes of the channel. Whilst there is considerable uncertainty regarding when and how flow slide events might be triggered, it is nevertheless possible to determine where along Rainbow Channel they could form.

A pre-condition for the initiation of retrogressive flow slides in Rainbow Channel is that the sand slope must be steeper than 1 vertical to 3 horizontal (i.e. steeper than 18.4° above the horizontal) over a minimum height of 5 metres (refer to more detailed discussions in Section 3.3). An analysis of digital bathymetric survey files of Rainbow Channel (Port of Brisbane, 2015) indicates that there are several such vulnerable locations along the bay-side frontage of the Central Reach.

Should a retrogressive flow slide develop on the submerged sandy slopes at one of these locations, the event would progress until it encounters the buried rocks of the existing flow slide barrier, at which point it would terminate.

As a retrogressive flow slide erodes into the subaerial sand slope, the floor of the evolving feature is not horizontal, but is on an upward angle of around 1 vertical to 15 horizontal (i.e. approximately 3.8° above the horizontal). Should this failure plane encounter the buried rock of the flow slide barrier, the flow slide will terminate.

Alternatively, should it pass below the rocks buried within the sand slope, it will either partially or completely undermine the barrier. In either of these two scenarios, rocks will collapse down the near-vertical retrogressing

sand face. Depending on the scale of undermining and the amount of rock in the barrier above it, this will either terminate the flow slide, or it will continue into the sand slope emerging on the surface behind the barrier.

There are therefore three levels of risk associated with a retrogressive flow slide initiated on the underwater side slopes of Rainbow Channel:

- No damage to the structure – where the developing retrogressive flow slide encounters the buried rock of the flow slide barrier and stops;
- Damage to the structure – where the base of the flow slide barrier is undermined and rocks collapse down the near-vertical sand face, causing the retrogressive flow slide to terminate;
- Failure of the structure – where the extent of undermining is such that the collapsing rocks are unable to disrupt the density current driving the retreating sand face and it continues into the sand slope emerging on the surface behind the barrier.

A critical consideration in determining the risk of such events to the Central Reach is ascertaining whether the retrogressing sand wall of a flow slide will encounter buried rocks.

To determine the extent of rock buried within the foreshore, extensive geophysical investigations were commissioned by Council to map the extent of the buried rock in the foreshore. The geophysical investigations (Golder & Associates, 2016 & 2017) utilised the combined findings of land-based survey methods of Multi-Channel Analysis of Surface Waves (MASW), Electromagnetic (EM), and Ground Penetrating Radar (GPR), as well as the overwater survey techniques of Sub-Bottom Profiling (SBP) and Side Scan Sonar (SSS).

The results of the geophysical investigations can be used in conjunction with the surveyed bathymetry of the side slopes of Rainbow Channel, and the known mechanisms of retrogressive flow slide events, to determine the current effectiveness of the existing flow slide barrier.

The bathymetric survey of Rainbow Channel (Port of Brisbane, 2015) has been investigated to identify locations where the channel side slopes are steeper than 1:3 over a 5 metre height - since such locations represent a location where a flow slide could start. These locations are shown highlighted in red and orange on Figure 4-3. It is important to appreciate that the bathymetry of Rainbow Channel is very dynamic, and the survey data used for this assessment was captured in December 2015 – so the vulnerable areas shown on Figure 4-3 may have changed since that time.

The potential locations for the initiation of flow slides is shown mapped in Figure 4-4 as a continuous red line along the surveyed channel slopes. Should a flow slide event occur in front of the flow slide barrier, it would start at a location somewhere along that line and would progress with the base of the retrogressing sand wall propagating into the sand slope slightly upwards on an approximate angle of 1 vertical : 15 horizontal.

The geophysical survey has identified the extent of buried rock within the sand slope (i.e. the extent of the flow slide barrier). It is therefore possible to identify where and how a developing flow slide would interact with the barrier. This can be done at cross sections along the entire length of the flow slide barrier frontage of the Central Reach. By way of example, reference is made to Figure 4-5, which shows a cross-section at a location on the foreshore defined as Chainage 1300m (which is at the end of Birch Street). Figure 4-4 shows the location of the various cross sections discussed.

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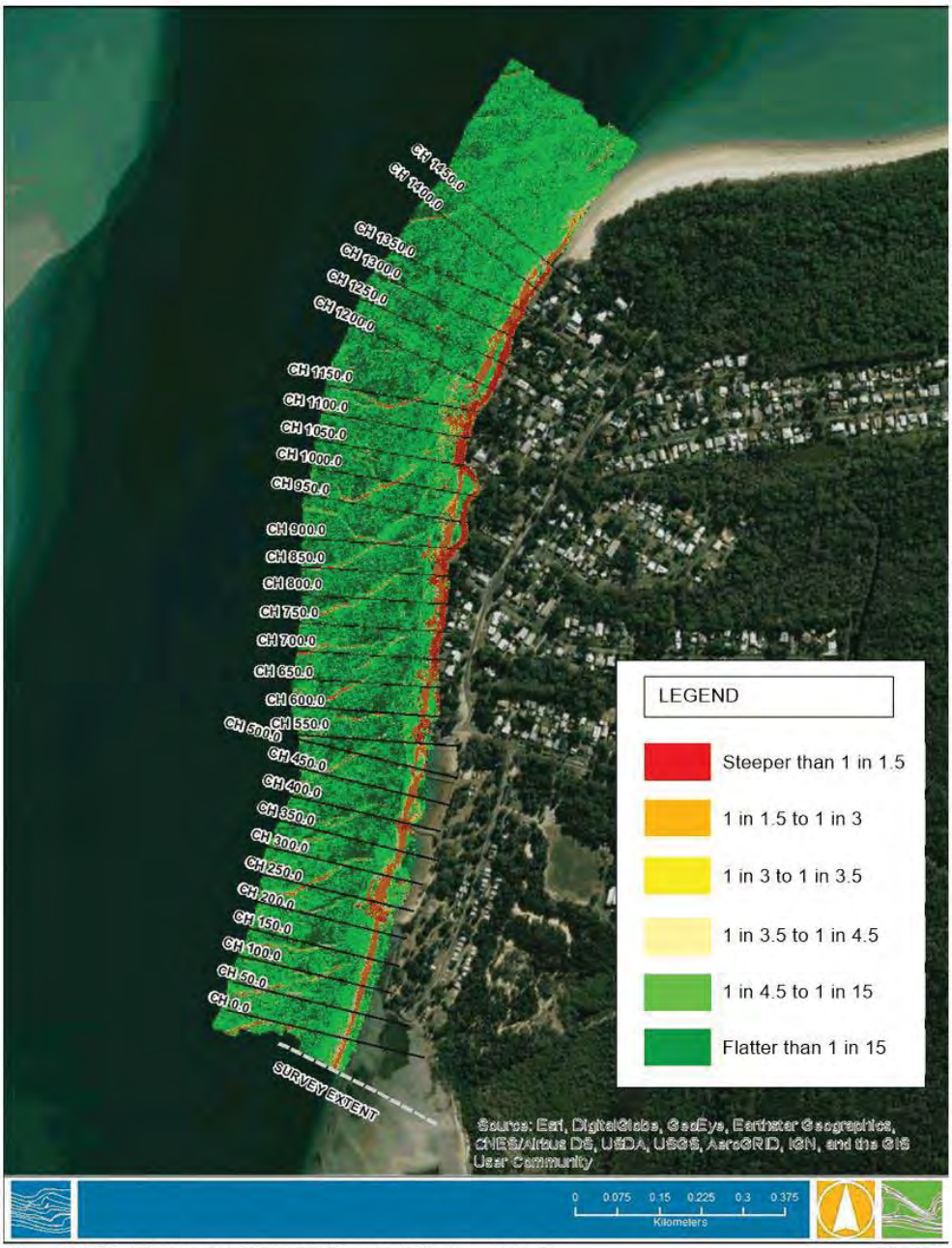

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FIGURE 4-3 SLOPE ANALYSIS OF RAINBOW CHANNEL, HIGHLIGHTING AREAS AT RISK OF FLOW SLIDES

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FIGURE 4-4 POTENTIAL LOCATIONS FOR INITIATION OF RETROGRESSIVE FLOW SLIDES

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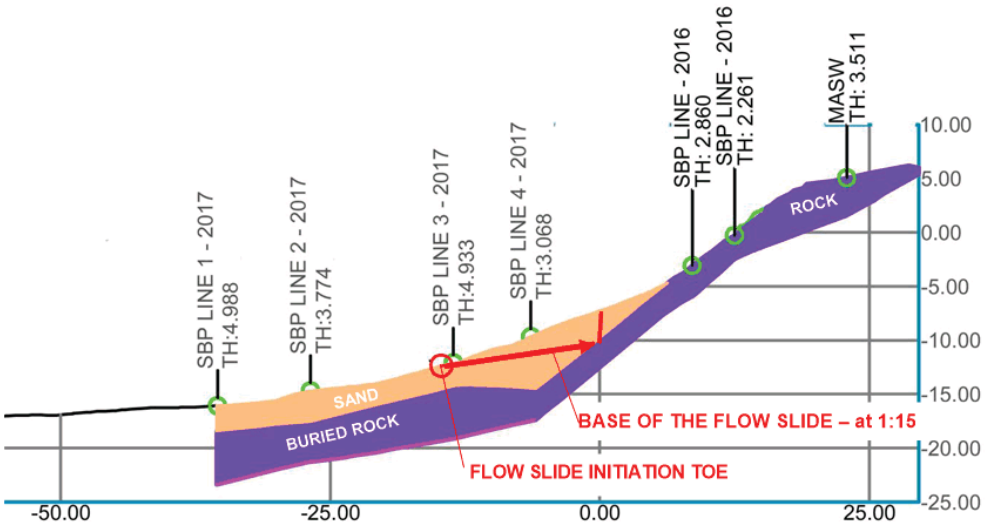

FIGURE 4-5 EXAMPLE OF INTERACTION OF FLOW SLIDE WITH BARRIER – CHAINAGE 1300M

For the location at Chainage 1300, the critical gradient of 1vert : 3horiz on the submerged sand slope of the Rainbow Channel is seen in Figure 4-5 as at approximately RL-12.5m AHD. If a flow slide is triggered in Rainbow Channel near Chainage 1300, it would be at this level on the submerged sand slope. It would erode into the sandy slope as it developed, but would encounter the buried rock of the flow slide barrier at around RL-10m AHD (refer Figure 4-5 above). Once the flow slide reaches the rock, the event ceases. This is because the density current driving the flow slide can no longer entrain sand from the retrogressing near-vertical face. This is because there is no longer any sand available within the profile of the submerged slope to sustain the process – only rocks.

Such an event is very likely to go unnoticed because it happens in deep water, and it does not reach the surface, and it has no adverse effects on the buried rock structure. That might not be the case if the advancing near-vertical wall of the shoreward moving failure plane didn't encounter rock (because such rock did not extend down deep enough). In which case the rock structure would be undermined, collapsing into the flow slide.

An analysis of where flow slides could be initiated on the submerged eastern bank of Rainbow Channel, and how they might then interact with the buried flow slide barrier along the Central Reach, has been undertaken. The results are summarised in Appendix F, which shows the cross-sections (at 50m intervals) extracted from the geophysical survey[16] overlain with the locations and development path of potentially triggered flow slide events.

It is pertinent to note that the thickness of rock forming the flow slide barrier along the frontage of Old School House Park (at approximate location of Chainage 1000 in Appendix F) is quite sparse at the location where a flow slide might encounter buried rock. A flow slide event occurred opposite Old School House Park on 18th January 2011. As shown in Figure 4-6, it undermined the flow slide barrier at this location - causing the structure to collapse, and the flow slide itself emerged on the foreshore.

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[16] Digital file of Golders Associates Drawing No. 1650770-004-F-001_005, dated August 2017.

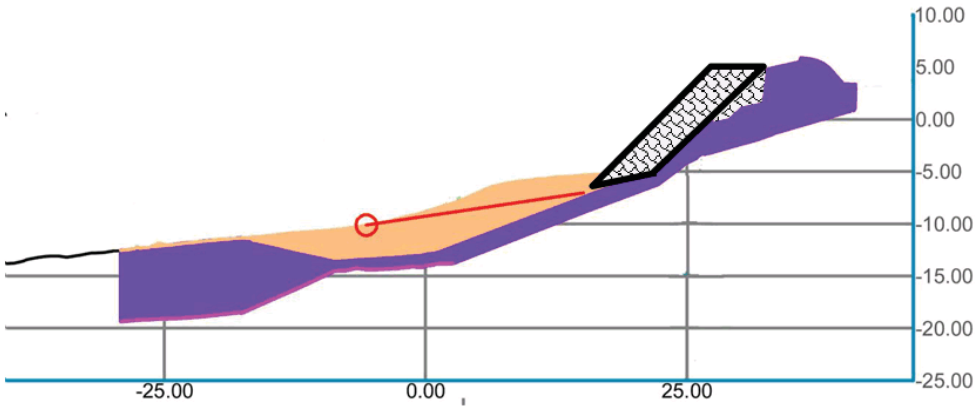
FIGURE 4-6 FLOW SLIDE EMERGING ON THE FORESHORE AT OLD SCHOOL HOUSE PARK, JANUARY 2011

A large volume of rock was subsequently placed into the foreshore immediately after this event ceased - as has been the community's response to such events in the past. Coastal processes have since partially filled the flow slide "hole" in the seabed immediately offshore with sand. It is evident from the results of the recent geophysical survey that the rocks that were armouring the upper part of the foreshore opposite Old School House Park at that time collapsed down into the deep bowl of the flow slide as it was occurring, and were spread thinly across the floor of the flow slide. The subsequent placement of rock in the foreshore has resulted in a substantial reserve of rock in the upper foreshore above approximately RL-5m AHD.

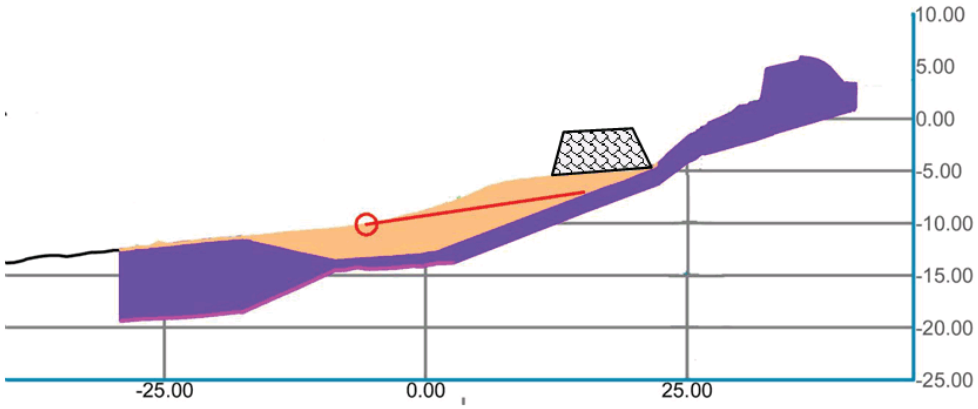
Should another flow slide event occur at this location, then the thin layer of rock it will encounter between depths of RL-5m AHD and RL-10m AHD may not be sufficient to stop the flow slide immediately. It is possible (indeed somewhat likely) that it will undermine some of the rock dispersed deeply after the January 2011 event, causing these rocks to slump down into the developing flow slide. Given the significant volume of new rock placed in the upper foreshore above approximately RL-5m AHD, it is very likely that these rocks collapsing into the advancing flow slide will disrupt the density current driving the advancement of the near-vertical retrograding sand face, thereby halting the event.

Nevertheless, some visible slumping of the rock armour of the existing flow slide barrier opposite Old School House Park could occur. This would require topping-up of rock following such an event to reinstate the function of the flow slide barrier at this location.

Alternatively, as a more proactive management approach, the reserves of rock currently in the flow slide barrier fronting Old School House Park could be augmented by the placement of approximately 45cu.m./m of rock in anticipation of another retrogressive flow slide event occurring. The additional rock could either be placed directly into the front upper slopes of the armoured foreshore above RL-5m AHD as shown on Figure 4-7(a), or onto the seabed offshore between RL-5m AHD and RL-10m AHD, as shown on Figure 4-7(b). Both options are consistent with the Concept Design for a flow slide barrier – as presented in Figure 4-2.



(a) Concept showing placement against existing front slope (above. RL-5m AHD). Not to scale.



(b) Concept showing placement on seabed (above RL-5m AHD). Not to scale.

FIGURE 4-7 OPTIONS TO REINFORCE THE FLOW SLIDE BARRIER OPPOSITE OLD SCHOOL HOUSE PARK

4.3.2 Summary of the Structural Audit

Important findings of this structural audit of the flow slide barrier are:

- The existing rock placements along the foreshore of the Central Reach are consistent with the Concept Design for a flow slide barrier, confirming that it is appropriate to consider the existing rock placements as being a flow slide barrier.
- There are many locations where flow slides could be initiated on the sandy eastern bank of Rainbow Channel in front of the flow slide barrier.

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- Such locations are deep, typically at or below RL-10m AHD.
- The only location along the entire barrier where there is evidence that a flow slide might undermine and damage the barrier is on the foreshore opposite Old School House Park. There is merit in adopting a proactive strategy of reinforcing the flow slide barrier at this location - by placing approximately 45cu.m./m of rock either directly into the front upper slopes of the armoured foreshore above RL-5m AHD, or onto the seabed offshore at the RL-5m AHD depth contour approximately. Both of these options are consistent with the structural requirements and physical characteristics of a conceptual flow slide barrier.
- These findings are based on bathymetric features identified in the survey completed in December 2015. Due to the dynamic nature of the side slopes of Rainbow Channel, it is possible that the vulnerability of the flow slide barrier could have changed since that survey. As will be discussed in the following sections of this report, a recommendation of this SEMP is to undertake regular bathymetric surveys and to subsequently undertake a check on whether there are implications to how retrogressive flow slides might affect the buried flow slide barrier.

4.4 Erosion Threat at the Southern Reach - Camping Ground Foreshore

4.4.1 Coastal Erosion

In earlier times, the natural transport of littoral sand from Flinders Beach to the Amity Point area would have continued around onto the western-facing sand beaches fronting Amity Point township – being transported by ocean waves refracting and diffracting around Amity Point itself. However, the gradual eastward migration of Rainbow Channel towards the north-west corner of North Stradbroke Island (and its increasing dominance as the main tidal channel), has seen this once sandy foreshore become eroded.

The increasing proximity of Rainbow Channel to Amity Point has intercepted littoral sand that once supplied the bay-side foreshores of the Southern Reach. Sand carried by the prevailing coastal processes towards the north-west point of North Stradbroke Island is instead now deposited directly into Rainbow Channel - from where the dominant ebb tide carries it northward towards South Passage Channel and Moreton Island. It can also be carried directly northward across South Passage Bar by ebb tide flows passing through the passage.

In response to the diminishing longshore supply of sand to the Southern Reach, groynes were constructed on the bay-side foreshores around 1955 (Eberhardt, 1978). The likely intent of that work being to retain sand on the foreshore for longer periods. Approximately ten rock-armoured groynes were constructed by the 1970's, some along the Southern Reach and some along the Central Reach. Of those there are only three still left, all of them being on the foreshore of the Southern Reach.

As shown previously on Figure 3-7, the three groynes have created three beach compartments along the foreshore of the Southern Reach. The prevailing coastal processes along this coastal precinct are such that the naturally preferred plan orientation of the beaches between the existing groynes is for them to face north-west towards a bearing of approximately 312°. Consequently, sand has built up against the northern side of each groyne so as to form a triangular-shaped fillet at the southern end of each beach compartment. However, the northern part of the beach compartment has eroded so it too can achieve the preferred plan alignment of approximately 312°. But this results in localised erosion of the foreshore – which has been addressed by construction of a riprap armoured seawall in some locations, and geotextile sand containers in others.

The three beach compartments are relatively "closed" beach systems - in that they have very little natural supply of sand by the prevailing coastal processes. However, despite the effectiveness of the three groynes, they do lose sand from time to time as a consequence of storms. This steady loss of sand from the beaches and its association with shoreline recession has resulted in at least one sand re-nourishment campaign being undertaken in recent years.

Retrogressive flow slides occasionally occur at the western edge of the intertidal flats, since this is also the top of the subaqueous side slopes of Rainbow Channel. The morphological signatures of these events tend to remain observable for quite long periods. For example, a large eroded amphitheatre-shaped feature left by a retrogressive flow slide which occurred sometime prior to October 2004 (near the southern-most groyne) is still evident on aerial photographs some 12 years later.

These scour features are long-lived because there is no longer a supply of littoral sand from a sandy shoreline to the north to fill them. As discussed, the combined effect of the eastern migration of Rainbow Channel in conjunction with armouring of that adjacent shoreline by a flow slide barrier, has removed the longshore sediment supply which once naturally nourished the foreshores of the Southern Reach.

These seabed scour features act as a "sink" for any sand that is moved offshore from the nearby beaches by the cross-shore sand transport processes that typically occur during severe storm events. This slow filling of past retrogressive flow slide scour features represents a slow on-going loss of sand from the beach fillets between the groynes. As a result, the beaches have been diminishing and storm erosion can now encroach further into the camping ground. However not all of the Southern Reach is at the same risk of storm erosion. The foreshore south of the southern-most groyne is armoured by a rock seawall which has been successfully performing the task of mitigating shoreline recession. It is uncertain at this point whether it will continue to serve that purpose for a changing future climate.

Likewise, there is a rock-armoured seawall at the rear of the beach in the centre beach compartment. The toe level and underlayer arrangements of this structure are unknown, so it is not possible to determine whether it would be undermined by severe storms or would be an effective long-term erosion mitigation structure.

Technical work undertaken for this SEMP included application of the SBEACH proprietary mathematical model to predict the response of the beach profiles along the Southern Reach to several different storm scenarios. The fundamental approach to this beach response modelling has been to:

- Utilise wave information for the deeper waters in Rainbow Channel offshore of the Southern Reach - using the maximum average wave conditions presented previously in Table 3-4. No attempt was made to assign average recurrence intervals to wave parameters;
- Utilise storm tide levels for extreme events which have previously been determined by extensive numerical modelling of storm tides in the Moreton Bay and Redland City regions (refer to discussions in Section 3.2.1 and levels reported in Table 3-3); then
- Apply the above extreme wave / storm tide conditions in conjunction with the most recent beach transect surveys as input to the SBEACH model to determine the eroded post-storm profile. The profiles representative of the beaches of the Southern Reach are Transects C2 and C3 (refer Figure 3-1 and Appendix A for their locations).

Figure 4-8 illustrates a typical outcome of the SBEACH modelling, namely the pre-storm profile and post-storm profiles for the beach at Transect C2 for the selected range of storm scenarios.

It indicates that in the event of storms having ARIs of 50 year, 100 year and 200 year; the corresponding shoreline recessions on the sand beaches would be approximately 15 metres, 18 metres and 21 metres respectively. Figure 4-9 shows the extent of such recession along the sand beaches of the Southern Reach.

Such shoreline erosion would cause damage to trees and planted vegetation along the foreshore, but would not damage any significant infrastructure associated with the camping ground. An exception to this is the likely damage to the unpaved car-park behind the swimming enclosure alongside the boat ramp; as well as a sealed roadway that runs close to the beach near the southern-most groyne.

The SBEACH model was also run for an arrangement where there are existing rock seawalls along the immediate foreshore. This was done to investigate the possible performance of the rock seawall beyond the

southern-most groyne, as well as that within the central of the three beach compartments. The results indicate that these two seawalls need to be founded at around RL+0.1m AHD so as not to be undermined by severe storms of approximately 100 year ARI. However, it is not known whether this is the case.

A structural audit of the walls would be required to ascertain toe/foundation levels. The audit would need to incorporate excavation of sections of armour along their length to identify primary armour, underlayer and foundation arrangements - with subsequent rebuilding of the examined sections. The need for any upgrading works for the existing seawalls could then be determined.

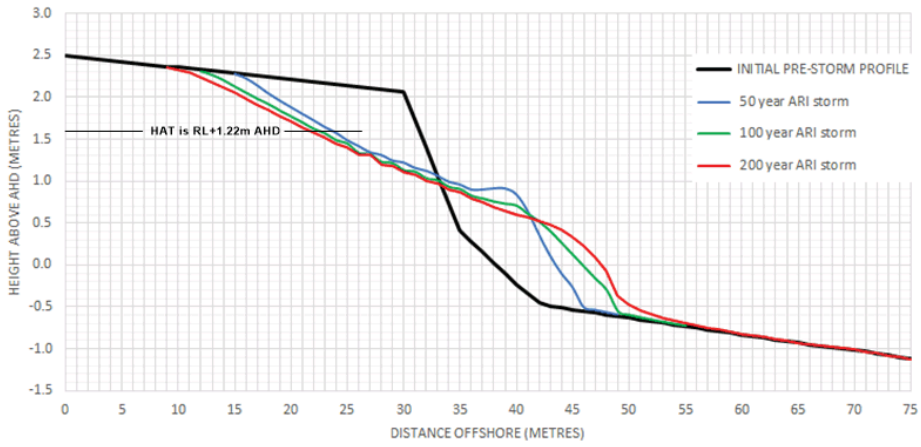


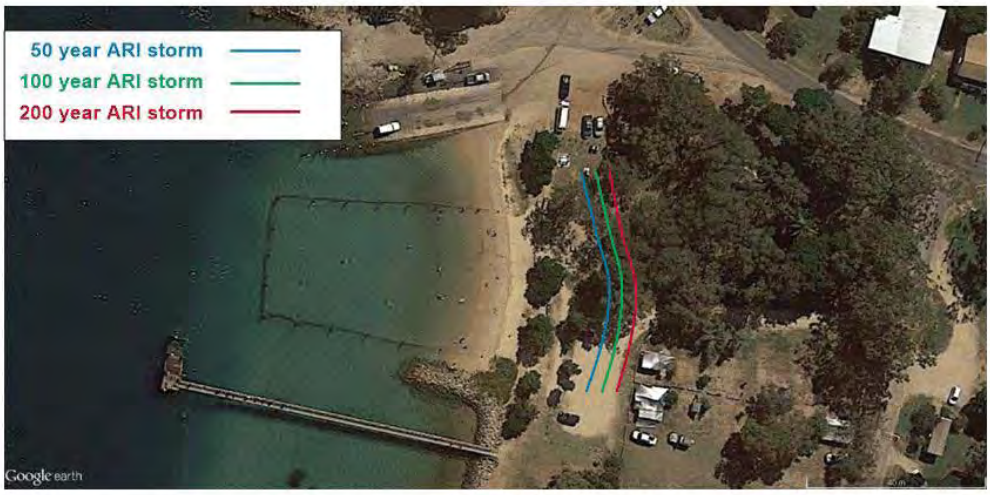
FIGURE 4-8 PREDICTED BEACH RESPONSE ALONG THE SOUTHERN REACH FOR VARIOUS STORM EVENTS

4.4.2 Retrogressive Flow Slides

Figure 4-4 shows locations along the submerged eastern bank of Rainbow Channel where flow slide events could be triggered. Reference to that figure shows that they can occur in the channel opposite the Southern Reach. Indeed, there are anecdotal reports[17] of such events occurring regularly in the past. Aerial photographs show the signature of past events in the morphology of the intertidal flat opposite the camping ground. These can be seen in the images of Figure 4-10.

The deep areas created in the nearshore area of the Southern Reach by retrogressive flow slides tend to remain for quite some time. This is because there is not significant longshore sand transport in this area to fill these depressions with sand (refer to Section 3.2.4 for a more detailed discussion of coastal processes). The morphological signature of an event evident in the aerial image of Figure 4-10 dated 17th June 2009 is still evident in the image dated 18th August 2014. Indeed, it still is evident in the 2015 bathymetric survey and the most recent aerial photographs (mid-2017).

[17] G.&L. Litherland, 16/12/2015 pers. comm.; D. & E. Cilento 15/01/2016 pers. comm.; C. & M. McIllwain, 15/12/2015 pers. comm.; J. & L. Walker 12/01/2016 pers. comm.; K. Norris 10/01/2016 pers. comm.; I. Panebianco 15/01/2016 pers. comm.; B. Hoare 13/06/2016 pers. comm.; G. Nankervis 13/06/2016 pers. comm.



(a) Recession Lines on northern-most beach compartment – Southern Reach

(b) Recession Lines on southern-most beach compartment – Southern Reach

FIGURE 4-9 EXTENT OF COASTAL EROSION THREAT ALONG THE SOUTHERN REACH

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(a) Google Earth Image dated 17 June 2009

(b) Google Earth Image dated 18 August 2014

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FIGURE 4-10 EVIDENCE OF PAST FLOW SLIDE EVENTS OPPOSITE THE SOUTHERN REACH

The potential threat posed by retrogressive flow slides to the Southern Reach is expected to increase in coming years. This is because the submerged eastern side slope of Rainbow Channel is slowly migrating towards the foreshore, gradually becoming steeper as it does so. This steepening sand slope will likely experience increased occurrences of flow slides.

Despite understanding where retrogressive flow slides can occur on this submerged channel slope, it is not possible to determine to what size or extent they reach once triggered. As noted previously (refer discussions in Section 3.3), a flow slide event will stop when the density current which drives the event is unable to continue to transport sand away from the retrogressing sand face; and it builds up at the base of the sand face - leading to the breakdown of the density current.

At this stage, internationally available technical literature pertaining to retrogressive flow slides in this type of coastal environment offers no definitive method to determine where a specific event may terminate. Consequently, until a better understanding of such events is developed, it would be prudent when considering the possible landward extent of flow slide effects to base predictions on the extents of past events. The largest event captured on aerial photography is that shown alongside the southern-most groyne of the Southern Reach. That event progressed to the toe of the beach at this location.

Consequently, it is conceivable that a future event could do the same, and given that the eastern side slope of the Rainbow Channel is slowly migrating towards the foreshore, may even extend into the camping ground sometime within the 20 year planning horizon for this SEMP.

4.5 Erosion Threat at the Central Reach - Flow Slide Barrier

4.5.1 Coastal Erosion

The foreshore of the Central Reach is armoured with rock. The considerable size, thickness, location and depth of the rock armouring evident from the results of the geophysical investigations are adequate to structurally mitigate wave-induced coastal erosion. The primary erosion hazard is due to retrogressive flow slides.

4.5.2 Retrogressive Flow Slides

The threat of shoreline recession along the Central Reach is due to the eastward migration of Rainbow Channel in conjunction with occurrences of retrogressive flow slides on the underwater side slopes of the Channel .

In response to the historical threat of such events, a rock flow slide barrier has been progressively built by the local community. As part of the technical work undertaken for this SEMP, a structural audit of the flow slide barrier has been undertaken. That audit was informed by the results of the geophysical investigations (Golder & Associates, 2016 & 2017), in conjunction with a bathymetric survey of Rainbow Channel (Port of Brisbane, 2015). The outcomes of the structural audit are reported previously in Section 4.3 of this SEMP.

The only location along the flow slide barrier where there is currently evidence that a flow slide might undermine and damage the barrier is on the foreshore opposite Old School House Park.

4.6 Erosion Threat at the Northern Reach - Amity Beach

4.6.1 Coastal Erosion

Erosion processes along Amity Beach are primarily due to the changing sediment transport regime driven by the local wave climate, in conjunction with the shifting and complex bathymetry of the South Passage Bar immediately offshore. As discussed in Section 3.2.4, sand is transported towards Amity Beach from the east.

Longshore sand transport sweeps sand westward along nearby Flinders Beach, where it accumulates in the sand spit at the eastern end of Amity Beach. The spit increases in length, width and height until such time as storm waves from the north-east sector sweep sand off the spit onto and along Amity Beach.

This delivery of sand from the spit onto the beach during predominantly north-easterly sea conditions can occur over quite short timeframes. It can result in almost complete removal of the spit - with a corresponding and considerable increase to the width of sand on the beach.

As the sand spit then begins to redevelop, it creates a "wave shadow" on the eastern end of Amity Beach. This is perhaps best explained by reference to Figure 4-11 below. Due to the diminished wave energy in the lee of the growing spit, there is no longshore transport of sand westward to the downdrift part of the beach. However just beyond the influence of the wave shadow, the arriving wave energy can sweep sand alongshore towards Amity Point. But since there is no longshore supply of sand out of the wave shadow to compensate for this westward moving sand, the shoreline will erode at this location. Such erosion "hotspots" therefore tend to migrate along Amity Beach in response to the changing characteristics of the sand spit.

The complexity of the nearshore bathymetry (including the dynamic sand spit and offshore sand banks), in conjunction with the complexity of the natural littoral transport processes, means that it is extremely difficult to predict future beach changes at a specific location – such as on the private property frontages of Amity Beach. A greater understanding of these local processes needs to be acquired.

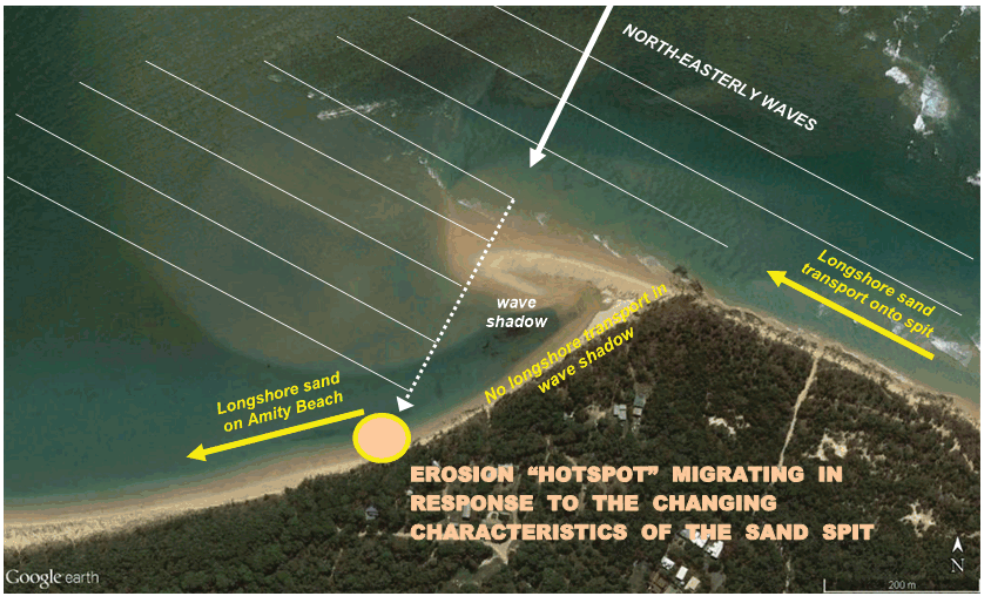

FIGURE 4-11 EROSION PROCESSES ON THE NORTHERN REACH – AMITY BEACH

4.6.2 Retrogressive Flow Slides

The only section of the Northern Reach vulnerable to flow slide events is at its western-most end, where the flow slide barrier of the Central Reach terminates (refer Figure 3-9). Indeed, due to the orientation of Rainbow

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Channel (in conjunction with the prevailing littoral processes of sand supply to this location) this area is particularly prone to flow slide events. This situation is likely to continue; and flow slides might in fact increase in frequency here as Rainbow Channel migrates eastward and comes up against the existing flow slide barrier of the Central Reach. It is pertinent to note however that due to the longshore supply of sand from the east, the foreshore and nearshore bathymetry at this location are soon reinstated following flow slide events.

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5. SHORELINE EROSION MANAGEMENT OPTIONS

5.1 Guiding Principles

When preparing this SEMP, a number of strategies and generic solutions have been considered for mitigating the erosion threat on local foreshores. Specific mitigation options have been developed for each of the coastal reaches covered by the SEMP based on the following management approaches:

- ***DEFEND***: Protect sectors of the coastal hazard area with either hard or assimilating coastal engineering structures to reduce or remove storm tide inundation or the erosion risks. Defend strategies may include maintaining the existing use or even intensifying development on the land. Coastal protection may combine long-term strategies for defence and maintenance including regenerative and structural options such as beach nourishment, dune construction, seawalls and storm tide barriers.
- ***ACCOMMODATE***: Maintain the current level of use within coastal hazard areas and raise the tolerance to periodic storm tide inundation or erosion events by means of innovative designs for buildings and infrastructure. This entails undertaking actions that will reduce the impacts from coastal hazards to an acceptable level. Actions can generally be broken into two categories:
  - Works that will allow current use to continue; or
  - Physical works and legislative amendments that provide for more appropriate future use of the land that can tolerate a higher level of risk (i.e. changing the zoning of the land from residential to open space), or operational works to raise the height of developable land above the height of potential sea level rise.

  In the context of this SEMP, *Accommodate* has been classified as supplementing or enhancing the effectiveness of existing erosion management practices and strategies.
- ***RETREAT***: Entails implementing actions to withdraw from the coastal hazard impacts through relocation or abandonment. This approach involves removing vulnerable uses from the identified coastal hazard and this can be achieved by relocating the community (i.e. land swap arrangement) or abandoning the area (e.g. buy back mechanism or rezoning of land to a more suitable use).
- ***RE-PURPOSE***: Focuses on long term planning as a mechanism to reassess existing land uses. This approach evaluates the vulnerability of land impacted by coastal hazards to determine if the land is suitable to be reused for an alternative purpose. The decision to repurpose an identified hazard area could be a result of managing community expectations of an already popular destination. Key elements that need to be considered when determining an area for repurpose is:
  - The vulnerability to coastal hazards
  - Current level of development and population
  - Possibility to achieve desired outcomes through land use criteria
  - Projected population growth and presence of critical infrastructure and services
- ***MAINTAIN STATUS QUO***: Allows for the continuation of the existing use in an area but prevents any further intensification of those uses. The decision to maintain the status quo demonstrates a clear intention that intensification of development will not occur in identified areas, but without creating a community expectation that a particular action (defend, retreat, accommodate) will be undertaken at a future date. If supported by public education on the risks associated with coastal hazards, it enables the community to understand, better prepare and be proactive .

This approach may be appropriate where there is a low level of infrastructure or assets and further intensification is unlikely to occur. Or, in locations where other management choices, such as defend or retreat, are not cost effective or technically feasible. It does not prohibit land owners from defending their own land (e.g. collaboratively with adjoining landowners) or to *accommodate* the impact of coastal hazards.

5.2 Generic Erosion Management Options

Applying the above management principles to the consideration of all shoreline erosion management options identifies two fundamental strategic approaches, namely:

- Non-structural (or "soft") measures; and
- Structural (or "hard") measures.

Given the variability of local coastal processes, foreshore uses, and the physical nature of existing foreshores types along the Amity Point shoreline, it is likely that the optimum management strategy will include a combination of non-structural and structural solutions

5.2.1 Non-structural Erosion Management Options

These erosion management options allow the shoreline to adapt naturally to the prevailing coastal processes. This restores and/or preserves the natural character, response and values of the coastal system – but could be at the expense of existing land and infrastructure assets.

Non-structural solutions would typically include:

DO NOTHING

A "do nothing" strategy of coastal management can be appropriate where foreshore land is undeveloped, or assets and property are of only limited value. It allows local coastal processes to take their natural course while accepting the resulting losses.

It is well suited to situations where available erosion buffers are sufficient to accommodate long-term and short-term erosion over the nominated planning period. However, on foreshores where existing development and infrastructure is threatened by erosion, the high social and financial costs associated with their loss are generally unacceptable.

Indeed, it is the threat of such loss along the shores of Amity Point that has necessitated significant intervention in recent years - by way of Council's beach nourishment alongside the boat ramp, emergency foreshore stabilisation works at the camping ground, and local foreshore property owners armouring their properties following flow slide events.

AVOIDING DEVELOPMENT

Along sections of foreshore that remain substantially undeveloped, a key objective would be to prevent an erosion problem from occurring by allowing the natural coastal processes of erosion and accretion to occur unimpeded. This would also preserve the natural ecosystem, amenity and character of the foreshore.

The implementation of such a strategy requires appropriate planning controls to prevent future development and infrastructure occurring in these areas. However, such instruments are already in place on the foreshores of Amity Point – either through local or state planning schemes.

PLANNED RETREAT

Removing the erosion threat by relocating existing development away from vulnerable areas of coastal precincts can require the acquisition of privately owned properties. In Queensland, land can be acquired either by agreement between the relevant government entity and the private owner, or through a compulsory

acquisition process[18]. The acquisition legislation allows local governments as well as state agencies to acquire land for specific purposes - including the "*management, protection or control of the seashore…*"[19] which also includes implementing works to achieve that purpose. Acquisitions must be compensated at the market value of the property at the time of the acquisition.

Although a planned retreat strategy involving land acquisition may be technically feasible, there are a number of practical considerations which affect the viability of such a management option at Amity Point. These include:

- Budgetary constraints regarding compensation at market value for many expensive foreshore properties;
- Implications to the disruption of a long-established and close-knit community which has previously regarded this option as a harsh and ill-considered response;
- Since only the amount of land required to fulfil the stated purpose of the acquisition can be resumed, where the risk is uncertain acquisitions are likely to be subjected to legal challenge;
- The implied determination that the existing flow slide barrier is inadequate (and hence will likely fail or be substantially damaged) necessitates its physical removal so as to mitigate any adverse implications to public safety.

A strategy of Planned Retreat was recommended previously for Amity Point (BMT WBM, 2013) and was met with significant opposition by the local community. Should such a strategy be progressed as a foreshore management option, it is likely that it would be challenged in the courts.

BEACH NOURISHMENT

A strategy of beach nourishment entails the placement of sand directly onto a foreshore - either by using conventional earthmoving techniques or by pumping - so as to restore an adequate erosion buffer on the foreshore. The advantages of beach nourishment as an erosion management strategy are that it has no adverse impacts on adjacent foreshores, and it restores and maintains the beach amenity.

It is generally regarded as being the most desirable solution to erosion problems on foreshores where a suitable and economic source of sand is available.

A frequent community criticism of beach nourishment projects is that it does not provide a permanent solution to persistent long-term erosion problems since it requires an on-going commitment to further renourishment. Nevertheless, most other forms of direct intervention (even those of a "hard" structural nature) also require maintenance and a commitment to future costs. When all impacts and costs are taken into account, the requirement for future nourishment campaigns often does not detract from the cost/benefit advantage of a beach nourishment strategy.

However, the ability to immediately replace sand lost in a storm to provide continual protection by an adequate buffer is often a challenging issue under this strategy. This is particularly the case given that there can be several storms or cyclones in any one season; and means that sand may need to be placed on the beach more than once in any storm season to be completely effective.

Sand used for nourishment should be sourced from outside of the active beach system to exclude any possibility that the benefit to the nourished foreshore is achieved at the expense of beach erosion elsewhere. This places a constraint on prompt restoration of buffers depleted by storm events if such sources are not readily to hand.

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[18] The *Acquisition of Land Act 1967*.
[19] Ibid, Schedule 1, Part 2. *Purposes relating to the environment*.

The requirements for an effective beach nourishment strategy are determined by the local sediment transport regime. The objectives of such a strategy are to establish and maintain adequate erosion buffers. Local cross-shore sand transport processes dictate the overall volume of sand required in the buffer to accommodate a particular storm ARI. On the other hand, longshore transport processes determine the average rate at which sand needs to be added periodically to the buffers so that they are maintained in the long-term.

BEACH RE-PROFILING

The concept of beach re-profiling (or "beach scraping") entails moving sand from lower levels of the cross-shore beach profile (typically from tidal flats immediately in front of a beach) up onto the beach slope or into the dune system.

In essence it is simply redistributing sand that is already within the active beach profile and as such does not provide a net long-term benefit unless it is undertaken frequently.

Beach re-profiling can be beneficial in reinstating or reshaping the dune following a storm event, thereby assisting and accelerating natural processes that would otherwise rebuild the eroded dune system over much longer timeframes. However, since significant re-profiling lowers the seabed in front of the beach, it allows slightly increased wave energy to reach shore, offsetting to some degree the benefits achieved by reinforcing the beach face and/or dune.

CHANNEL RELOCATION

In some cases, foreshore erosion can be attributed in varying degrees to the dynamic nature of tidal channels. The sandbanks and shoals of these local coastal systems can affect tidal currents and/or wave patterns which can have an adverse effect on nearby sandy shorelines. In some of those instances the problem can be alleviated somewhat by the planned relocation of the main channel flow. Given that the changing morphology of Rainbow Channel represents a significant threat to Amity Point foreshores, such an option must be considered.

5.2.2 Structural Erosion Management Options

These erosion management options entail engineering works which either form a physical barrier to maintain the existing shoreline position, or alter the nearshore wave climate that is contributing to the erosion problem.

FLOW SLIDE BARRIER

In the Netherlands, flow slides on the extensive levee systems that protect vast areas of the country have been extensively researched and numerous mitigation measures proposed, implemented and monitored (Silvis and de Groot; 1995). Initially the focus of mitigation measures was on engineering works that prevented the flow slides from occurring. In the early part of the nineteenth century, a strategy was adopted of constructing groynes underwater to protect submerged sandy slopes from slide failures by directing the flow of water away from the slope. This proved to be unsuccessful in preventing many flow slide failures.

Over time the approach adopted in the Netherlands has evolved so as to include armouring of the at-risk slope itself - through the placement of layers of rubble/rock. This is not only an attempt to prevent flow slides from being initiated on submerged sand slopes, but also to prevent their propagation to damaging proportions if they do occur. It is widely acknowledged that the presence of hard material/layers (such as rock) interrupts the processes causing the near-vertical sand face of a flow slide from progressing (Mastbergen; pers. comm.[20]).

[20] Email from D.R. Mastbergen (Senior Adviseur/Onderzoeker, Department of Marine and Coastal Systems, Deltares) regarding "*retrogressive breach failures – mitigation works*" to P.L. O'Brien of Water Technology Pty Ltd. 06 January 2016.

This blockage of potential flow slide failures by rock overburden was also identified as a mitigation measure in early studies undertaken by the U.S. Army Corps of Engineers (Banks, et. al.; 1965 and Torrey, et. al.; 1988) on flow slide failures in levees of the Mississippi River.

An option to mitigate the threat that the flow slides (or, as they are also called, retrogressive breach failures) which occur along the eastern edge of Rainbow Channel is to provide a physical barrier. Indeed, this has been the intent of ad-hoc works undertaken by the local community in response to flow slide events along the Central Reach foreshore ever since the threat of flow slides first emerged at Amity Point many years ago.

SEAWALLS

Rock armouring is commonly used to provide a physical barrier to continuing shoreline recession along sandy foreshores. Properly designed and constructed seawalls can be effective in protecting foreshore assets by stopping any further recession. However, on sandy foreshores seawalls significantly interfere with natural beach processes by separating the active beach from sand reserves stored in beach ridges and dunes. In other words, seawalls can protect property behind the wall, but they do not prevent in any way the erosion processes continuing on the beach in front of them. In fact, they very often exacerbate and accelerate the erosion.

Typically, the effect of seawall construction on actively eroding shores is for the level of the beach in front of the structure to steadily lower - until the beach reaches a new equilibrium profile.

This lowering is primarily caused by wave action washing against the wall causing a high degree of turbulence in front of the structure - which scours the beach material. Wave energy reflected from the seawall also contributes to these scour and beach lowering processes. In many cases this lowering continues until the level of the beach is below prevailing tide levels, in which case the ocean simply washes against the face of the seawall and there is no beach for part (or possibly for all) of the tide cycle. The amenity of the beach and foreshore is therefore significantly degraded in order for the seawall to protect the area behind it.

This lowering of the sand level in front of seawalls can also present problems for the overall stability of the structure. Unless appropriate foundation and toe arrangements are constructed, the seawall can fail by undermining. Even if only damaged, it is extremely difficult and very expensive to repair existing seawalls that have been damaged by undermining. Indeed, frequently the most cost-effective solution is to demolish the structure and rebuild it with deeper and more robust foundations.

Another typically adverse impact of seawalls is that the original erosion problem that they were meant to solve is simply relocated further along the shore. Natural beach processes can no longer access the sand reserves in the upper part of the active beach that are behind the seawall. Consequently, this sand cannot be moved downdrift by longshore sand transport processes to replenish the sand that these same processes are moving along the shoreline beyond the end of the seawall.

The deficit in sand supply to these downdrift sections initiates greater erosion there, ultimately requiring extension of the seawall along the entire downdrift shoreline to protect it.

Seawalls have an effect on the visual amenity of a shoreline, and this can be quite adverse if the wall is high - or if it becomes so as a consequence of natural beach lowering in front of it. Such walls also inhibit easy public access across the foreshore onto the beach. Typically access stairways or ramps need to be provided on seawalls to ensure the safety of beach access by pedestrians.

Appropriately designed and constructed seawalls are relatively expensive and they do not always compare favourably with the cost of other alternatives. However, many seawalls constructed in Queensland have been built of rock during or immediately following severe sea conditions and significant cyclone erosion events.

Under such circumstances appropriate design and construction of these walls may not have been implemented. Consequently, most of the seawalls constructed in this manner require significant maintenance to prevent structural failure and the subsequent re-establishment of the original erosion problem.

Despite their disadvantages, rock seawalls are probably the most commonly used method in Queensland for protecting foreshore assets against the threat of erosion. This can probably be attributed to their versatility. They are relatively easy to construct using conventional earthmoving plant and equipment; and this is often accomplished by simply dumping rock on a prepared slope rather than applying more appropriate construction practises to create a robust structure that can accommodate the adverse effects of severe storm/cyclone waves.

Such ad-hoc methods can be used to not only protect long sections of foreshore, but also individual private properties. The substantial and solid appearance of rock walls can provide owners of foreshore assets with a sense of security - which can be misguided given the often-inadequate design and construction of these structures. Their subsequent failure or damage can not only lead to the re-establishment of the original erosion problem, but the scattering of removed rocks can adversely affect foreshore use and visual amenity.

SEAWALLS WITH BEACH NOURISHMENT

To mitigate some of the disadvantages of seawalls, beach nourishment can also be undertaken to create a beach amenity in front of the structure. This sand placement also provides a reservoir of sand to feed the downdrift foreshore which would otherwise be starved of sand by the wall.

The seawall structure still serves as the primary defence against erosion, particularly during severe storm events, so must be designed and constructed accordingly. The amount of sand initially placed as beach nourishment will depend on the extent of the amenity to be provided.

Nevertheless, regular sand placement by way of renourishment campaigns would be required to maintain the beach amenity, as well as prevent migration of the initial erosion problem along the downdrift shore. This intermittent renourishment would need to at least match the average net longshore sand transport rate.

GROYNES

The longshore transport of sand on an eroding shoreline can be impeded by constructing groynes across the active beach. A groyne functions as a physical barrier by intercepting sand moving along the shore. Sand is gradually trapped against the updrift side of the structure, resulting in a wider beach on this "supply-side" of the structure. However, the downdrift beach is deprived of the sand trapped by the groyne and therefore it erodes.

This process of updrift entrapment and downdrift erosion continues until such time as sand has accumulated on the updrift side of the groyne to the extent that it starts to feed around its seaward end. Sand supply is then reinstated to the downdrift foreshore. However, this then simply maintains the shoreline on its eroded alignment.

Groynes cannot prevent the significant cross-shore erosion that typically occurs during severe storms. Nevertheless, they have an indirect effect in that by having trapped sand on their updrift side, they have created a wider beach and an enhanced erosion buffer on that section of foreshore. However, on the depleted downdrift side, the foreshore is more susceptible to cyclone erosion due to the depleted beach/buffer width. Consequently, the construction of a groyne does not in itself resolve the erosion problem, but merely transfers it further along the beach.

The same effect of impeding the longshore transport of sand by a groyne can also be achieved by a structure built offshore of the beach, but not connected to it. Such structures a called *offshore breakwaters* and function by casting a "wave shadow" onto the shoreline in its lee.

The reduced wave energy landward of the offshore breakwater means that the ability of the waves to keep moving sand along the shoreline is reduced. Consequently, the supply of sand from the updrift shoreline is greater than that at which it can be moved out of the wave shadow. Sand therefore accumulates in the lee of the structure. However, as is the case with a conventional groyne, the shoreline downdrift of the wave shadow is deprived of sand and therefore erodes.

GROYNES WITH BEACH NOURISHMENT

The downdrift erosion caused by groynes can be compensated to a large extent by incorporating beach nourishment into the strategy. This is achieved by placing sand against the updrift side of the groyne immediately after it is constructed so that it is "filled". Any additional sand moved against this side of the structure by natural processes can therefore be carried around the end of the groyne to supply the downdrift shoreline.

The length of updrift shoreline that benefits from such groyne and beach nourishment is somewhat limited. Therefore, if long sections of shoreline require protection then several groynes can be built at intervals along the shoreline. This is typically called a *groyne field*.

The length and spacing of such groynes depend to a large degree on the local longshore sand transport regime; and in particular, the naturally preferred stable orientation of the beach. Their length and spacing are also somewhat dependent upon each other. Under any given longshore transport regime, it is possible to achieve a similar degree of protection by using short closely spaced groynes, or longer more widely spaced structures. Such issues can only be resolved by further detailed study and design.

Nevertheless, such intervention will have a significant impact on the visual amenity of foreshores. Structures such as groynes that cross the shore can also have an adverse impact on beach use since walking along the beach will entail crossing over the groynes. This experience is also potentially marred by the different beach levels on the updrift and downdrift sides. It is for these reasons that a management strategy that entails a groyne field rarely has appeal.

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6. ASSESSMENT OF SHORELINE MANAGEMENT OPTIONS

As discussed previously in Section 3.5, when considering appropriate erosion management options along the Amity Point shoreline it is evident that the shoreline can be considered in three coastal precincts, namely

- Southern Reach: the foreshore frontage of the camping ground and boat ramp;
- Central Reach: along the alignment of the rock flow slide barrier; and
- Northern Reach: the sandy foreshore of Amity Beach.

The three coastal reaches are shown on the preceding Figure 3-6. This separation into coastal reaches does not imply that the coastal processes within each are in any way compartmentalised. They are by no means isolated or discrete sections of shoreline, since the processes affecting each can have an influence on the others. However, this partitioning lends itself to the development of viable erosion management strategies that integrate well over the entire Amity Point coastal reach.

An assessment of potential management strategies for each of these three coastal precincts is presented in the following sections.

6.1 Southern Reach - Camping Ground Foreshore

Due to the different type and orientation of the shoreline at the southern-most end of this foreshore (towards the end of Basin Drive), there is scope to further refine the partitioning within this precinct. As shown previously on Figure 3-7, the southern reach consists of an approximately 355 metre long beach frontage to the camping ground; and a 215 metre long rock-armoured seawall bordering the southern part of the reserve.

As noted in Section 4.1.2, the primary threat to the foreshores of the Southern Reach is storm-induced erosion. This will be exacerbated by future climate change.

6.1.1 Non-structural Management Options

DO NOTHING

Intermittent beach erosion due to storms, in conjunction with the on-going long-term erosion trend at this location means that the existing sandy beach frontage will continue to be eroded. This will:

- Detract from the local beach amenity;
- Detract from the visual amenity of the foreshore;
- Potentially lead to damage/collapse of the existing rock groynes, and sections of seawall at the back of the beach;
- Continued loss and damage to long-established foreshore trees;
- Adverse implications to the camping ground, including loss of available land.

These outcomes are considered unacceptable, as evidenced by recent works undertaken by Council to armour the eroded upper beach with sand-filed geotextile bags.

Further south where there is a rock-armoured seawall, the implications of a Do Nothing strategy is possibly an acceptable strategy. The structure has performed its intended role of mitigating any erosion of this section of foreshore without any obvious signs of structural damage to date. It is possible that this may change in future

years should the long-term deficit in longshore sand supply to this area result in a lowering of the seabed at the toe of the seawall - leading to its undermining.

The potential vulnerability of the seawall to undermining depends upon the depth that the toe of the armoured slope is buried below the seabed surface. A structural audit of the seawall at this location (which includes intrusive testing to excavate to the toe level) would provide greater certainty to a Do Nothing strategy along this southern section.

AVOID DEVELOPMENT

This option is not applicable. The foreshore has already been developed, but is designated by the Department of Natural Resources, Mines and Energy (DNRME) formerly Department of Natural Resources and Mines, as a Reserve for community or public purpose. In November 2011, this area was declared under the *Recreational Areas Management Act 2006* as being part of the *Minjerribah Recreational Area*. Straddie Camping now administers the area under a new management framework operated by Indigenous Business Australia in conjunction with the Quandamooka People. Regulations apply under the Act to the entire Minjerribah Recreational Area to ensure that the island's foreshores, dune systems, bushland and freshwater systems are appropriately cared for to maintain their visual amenity, and to protect the island's unique natural and Aboriginal cultural heritage.

PLANNED RETREAT

The scale of the erosion along this reach is such that infrastructure associated with the camping ground is not significantly threatened. Given the high socio-economic values associated with the camping ground, there is no merit in relocation (either partially or wholly) of this approximately 6-hectare facility to another foreshore location.

BEACH NOURISHMENT

Under a beach nourishment strategy, the width and height of the beach slope fronting the camping ground would be increased. Apart from increasing the resilience to erosion, the benefit to the area is that the overall amenity of this much-valued foreshore would be enhanced for residents and visitors.

Sand brought in for placement on the foreshore should have the same (or slightly larger) grain size as that on the existing beach. It should also be of uniform grading - this being a physical characteristic of naturally occurring beach sand.

The prevailing coastal processes along the southern reach of Amity Point are such that the naturally preferred plan orientation of beaches between the existing groynes is for them to face north-west towards a bearing of approximately 312°. This means that sand placed along the foreshore will be moved southward against each groyne so as to adopt this natural plan alignment. As a consequence, sand builds up against each groyne to form a triangular-shaped fillet on the southern end of the beach compartment. However, the northern part of the beach compartment will gradually become depleted of sand, thereby negating any benefit of beach nourishment at those particular locations. This will require either further local renourishment, or another form of protection (such as a seawall) in these northern pockets of each beach compartment.

BEACH RE-PROFILING

The intertidal flats immediately in front of the beaches at this location consist of fine-grained sediments that are quite different in characteristics to the sand forming the beach itself. Any redistribution by scraping of this material onto the beach slopes would degrade the beach amenity and (due to being fine-grained) would provide minimal protection as a beach buffer.

CHANNEL RELOCATION

As discussed in the preceding Sections 3 and 4, the eastward migration of Rainbow Channel represents a significant threat to the Amity Point area. Perhaps the most obvious options to mitigate this threat is to either relocate this channel by dredging, or to undertake such dredging as might be required to prevent further migration. There are several very significant impediments to such a management approach.

The physical scale of the required dredging works would be enormous. A special large dredge would need to be commissioned from overseas at considerable cost, as there are no dredges currently based in Australia that could undertake such major works. Leaving aside the issue of cost, the works would have to be undertaken within the Moreton Bay Marine Park and would have significant environmental impacts on areas designated as *Conservation Park Zone* and *Habitat Protection Zone* within the Park.

There would also be major changes to the hydrodynamics of Moreton Bay - since Rainbow Channel plays an important role in the tidal exchange of water between the ocean and the Bay through South Passage. Any dredged changes to the complex bathymetry of South Passage are unlikely to remain permanent.

Given these various implications of cost and adverse environmental impacts, a management strategy of redirecting Rainbow Channel to alleviate the erosion threat to Amity Point is not feasible.

6.1.2 Structural Management Options

FLOW SLIDE BARRIER

Whilst flow slides are known to occur regularly on the submerged slopes of Rainbow Channel further north within the Central Reach (Beinssen et. al., 2014 and Beinssen & Neil, 2015), an analysis of recent and historical bathymetric surveys suggests that they have been less frequent on the channel sides of the Southern Reach. This is because the channel side slopes are not as steep or as high as they are further north, meaning they are less susceptible to flow slide events. Nevertheless as discussed in Section 4.4.2, they may still happen.

Because of the shallower depth of Rainbow Channel along this precinct, in conjunction with its distance offshore, any flow slides that do develop are unlikely to significantly threaten the sandy foreshore of the Southern Reach at present.

As discussed in Section 3.1, Rainbow Channel is nevertheless migrating eastward towards the Southern Reach foreshore at an average rate of between 0.9metres/year and 2.8metres/year. As well as the edge of Rainbow Channel moving closer to the shore, the side slopes are becoming steeper – thereby increasing the risk of retrogressive flow slides developing.

If a flow slide barrier was to be adopted along the Southern Reach at some point in the future, it would require the placement of very large volumes of rock directly onto the submerged channel bank, possibly also as a thick layer along the seaward edge of the intertidal flats. This would be an undertaking to replicate the construction of the flow slide barrier constructed intermittently by foreshore property owners along the Central Reach.

There seems little merit in considering a flow slide barrier as the primary means of mitigating the threat of foreshore erosion along the Southern Reach at present, since this is mainly due to storm wave action. Nevertheless, there is considerable merit in regularly monitoring changes to the submerged side slopes of Rainbow Channel by way of regular bathymetric surveys to identify the emerging risks of flow slides to the Southern Reach.

SEAWALLS

There are already rock-armoured seawalls protecting sections of foreshore along this precinct. These have been constructed for short lengths - along the foreshore immediately south of the jetty, as well as along the southern-most end of the foreshore. Both have proven to be effective means of mitigating the local erosion

threat. However, a natural consequence of seawall construction on these two foreshores is that in each case the beach immediately in front of them has been degraded.

SEAWALLS WITH BEACH NOURISHMENT

This option would entail utilising the benefits of both a beach nourishment strategy along with that of seawalls.

In this case, sand would be placed on the foreshores between each groyne so as to create a stable triangular-shaped fillet against the groyne at the southern end of each beach compartment. However, any sand placed on the northern part of each beach compartment would tend to be moved southwards towards the groyne due to the prevailing coastal processes on this precinct.

This natural gradual migration of placed sand would manifest itself as erosion in the northern pockets of each beach compartment. For this mitigation option, a seawall would be built on the alignment of the acceptable limit of shoreline recession. This section of seawall could be initially covered over with sand to create a larger beach amenity. But as stated, the placed sand would gradually migrate southwards towards the next groyne where it would contribute to the sand fillet that accumulates there.

A strategy of intermittent "back-passing" campaigns could be implemented, whereby sand could be collected from within the accumulating reserves at each groyne; and placed back on the northern section. This could be readily undertaken using small earth-moving equipment such as a front-end loader and trucks operating over a period of 1 to 2 days. Back-passing is a common means of erosion mitigation and amenity improvement on many foreshores around the world.

GROYNES

There are already two long groynes and one short groyne constructed on the foreshore of the Southern Reach. These were initially constructed to capture sand being moved southward by the naturally prevailing littoral drift. However, as discussed in Section 3.5.1, there is no longer any significant longshore supply of sand to this foreshore due to Rainbow Channel having migrated against the rock wall of the Central Reach and thereby intercepting any littoral sand supply.

Neither enhancing the characteristics of the existing groynes nor the construction of additional groynes will be effective in mitigating foreshore erosion of the Southern Reach.

GROYNES WITH BEACH NOURISHMENT

Since there are already three groynes on the foreshore of the Southern Reach, this option entails placing sand into the beach compartments between the groynes by way of a beach nourishment campaign. However, (as discussed for the *Beach Nourishment* option) the naturally preferred orientation of any sand beach is such that over time the northern end of each compartment will become depleted of sand.

This could be mitigated if the triangular-shaped fillet of sand that forms against each groyne was large enough to cover the full length of shoreline within each beach compartment. But for this to occur the groynes would need to be much longer than they are at the moment. However, it is not possible to lengthen the groynes as their offshore ends are already close to the edge of Rainbow Channel. Any extension would intrude into the deep waters of the Channel, and this is not technically feasible.

Another option involving groynes and beach nourishment is to construct additional groynes between those that are existing - so as to create more (but shorter) beach compartments. However, the quantity of rock required to construct the additional groynes would be much greater than that for the *Seawalls with Beach Nourishment* option, and also have a more adverse impact on visual amenity and foreshore use.

6.2 Central Reach - Flow Slide Barrier

The Central Reach consists of the existing rock armoured frontage extending northwards from the boat ramp at Claytons Road to near the northern end of Millers Lane (refer to earlier Figure 3-8). The rock structure is a flow slide barrier that has been progressively reinforced by local property owners over many years. The erosion threat along this Central Reach is primarily a consequence of discrete flow slides (or retrogressive breach failures) in conjunction with the processes causing Rainbow Channel to slowly migrate eastward.

When assessing the viability of strategies to mitigate the threat of shoreline recession along the Central Reach, it is necessary to consider the ability of each option to prevent, impede or accommodate future flow slides.

6.2.1 Non-structural Management Options

DO NOTHING

A do-nothing strategy on this precinct would result in future flow slide events that occur on the submerged edges of Rainbow Channel potentially damaging the existing flow slide barrier. This would compromise the barrier's effectiveness in impeding the development of each event to damaging proportions. In the past, whenever the barrier has been damaged by a flow slide, the response of the local community has been to reinstate the barrier's effectiveness by recharging the reserves of rock armour in the upper regions of the barrier's profile (refer discussions in Section 4.5).

A do-nothing strategy of preventing any such future reinstatement of the barrier's purpose could result in an on-going deterioration of its function. This would increase the threat of shoreline recession, not mitigate it. A do-nothing strategy is therefore not a viable option to manage the threat of flow slides and the associated shoreline recession along the Central Reach.

AVOID DEVELOPMENT

This is not relevant since the Central Reach is already developed. There is nevertheless merit in maintaining a planning strategy of not allowing any future development on existing land parcels to be any further seaward than at present.

PLANNED RETREAT

Council currently has a policy of planned retreat at Amity Point, which is reflected in the zoning for the area. This policy has been in place for some time and has been adopted in response to the historic loss of significant areas of foreshore land and infrastructure.

The urban residential area of Amity Point (west of Ballow Street) is zoned as sub-area UR3 (*Redlands Planning Scheme* - Version 7.1). In this sub-area, all future buildings and structures are to be demountable and capable of removal. Furthermore, structures or infrastructure associated with other development or use must not extend any further seaward than existing development and uses on the site. This forms part of a strategic plan of retreat adopted by Council, whereby the line of foreshore development will retreat as shoreline erosion continues, rather than allow future development within the erosion prone area.

The strategy of planned retreat was recommended by the Draft Shoreline Erosion Study (BMT WBM, 2013) which met with considerable opposition by the local community of Amity Point. The extent of that opposition indicates that a retreat strategy is viewed as a significant disruption of a long-established and close-knit community. Should such a strategy be progressed as a foreshore management option, it is evident from stakeholder engagement activities undertaken for this SEMP, that it would be challenged in the courts by Amity Point residents - either collectively or individually.

Apart from the social dislocation of the Amity Point community, the acquisition costs associated with a planned retreat strategy would be considerable. Council has previously determined[21] that such a strategy "*is likely to be an expensive option and unlikely to be either technically or financially feasible without State or Federal Government support*".

A requirement of any acquisitions under the *The Acquisition of Land Act (1967)* is that it must be compensated at the market value of the properties. There are 34 separate land parcels of mixed tenure along the foreshore of the Central Reach. Many of these properties have quite substantial homes built on them. Recent property sales along this foreshore have been in the range of $1 million to $2million - so acquisition costs would be very high.

The implied determination that the existing flow slide barrier is ineffectual (and hence will likely fail or be substantially damaged) necessitates its physical removal to mitigate any adverse implications to public safety. As noted in Section 4.5, the existing flow slide barrier consists of a very considerable volume of rock. The removal of that material, even progressively should future flow slides damage the structure, represents a significant engineering and earthmoving exercise with large associated costs.

It is pertinent to note that a planned retreat strategy (in conjunction with removal of the existing rock flow slide barrier) may necessitate further planned retreat campaigns at Amity Point. This is because the interrupted eastward migration of Rainbow Channel and potentially damaging flow slides will instead be unchecked by an effective flow slide barrier.

BEACH NOURISHMENT

Given the proximity of the very wide and deep Rainbow Channel to the foreshore, in conjunction with the significant tidal flows that the channel carries, means that any strategy that relies on placing a sufficient volume of sand to create a natural sandy foreshore as a buffer to erosion is not technically feasible. It would not inhibit flow slides nor prevent the eastward migration of Rainbow Channel.

BEACH RE-PROFILING

This option is not relevant since there is no existing beach along the Central Reach.

CHANNEL RELOCATION

The discussion in Section 6.1.1 regarding the viability of this option for mitigating the erosion threat along the Southern Reach is relevant to the Central Reach as well. A management strategy of redirecting Rainbow Channel to alleviate the erosion threat along the Central Reach is not environmentally nor financially feasible.

6.2.2 Structural Management Options

FLOW SLIDE BARRIER

As noted previously in this report, the primary threat to the foreshores of the Central Reach are retrogressive flow slides. Such phenomena have been extensively researched overseas – particularly in The Netherlands where they represent a significant threat to vital flood and sea defences along that country's coastline and riverbanks. Consequently, there is a significant body of technical literature available that describes the morphological mechanisms associated with flow slide failures, as well as measures for either preventing their initiation or inhibiting their development to destructive scales.

[21] Document 9240G-Amity-Erosion-question-sheet-A4.pdf, titled "Shoreline Erosion Amity Point, North Stradbroke Island – Questions & Answers". https://yoursay.redland.qld.gov.au/10540/documents/21042. Accessed 30th November 2017.

The mechanism of flow slide development is driven by short-lived density currents that entrain sand off the near-vertical wall of the shoreward moving failure plane, causing sand grains to cascade off the advancing failure face. Measures to prevent flow slides from being triggered on submarine sand slopes can be difficult and costly to implement, often with only limited effectiveness. Therefore, a significant focus of overseas research has been directed to identifying submarine sand slopes that are susceptible to flow slides; and to then devise the means to prevent them from developing into large scale failures.

For strategies that seek to prevent further development of an initiated flow slide, the primary objective is to disrupt or completely dissipate the density currents which entrain sand on the near-vertical failure plane. Blocking of flow slide development occurs when:

- The advancing near-vertical sand wall encounters non-erodible material within the sand body. In which case, there is no longer sand available to sustain the momentum of the density currents driving the growth of the flow slide event;
- Non-erodible layers present in the sand slope above the point of flow slide initiation become undermined and collapse in sufficient quantity down into the bowl-shaped failure area - thereby diffusing the density currents and armouring the near-vertical advancing sand wall.

As noted in Appendix F, the geophysical survey results indicate that there is a very large volume of rock (and other non-erodible material) placed by foreshore property owners into the shoreline of the Central Reach in recent decades. Even though Rainbow Channel has been migrating eastward towards Amity Point, resulting in deeper and steeper seabed slopes in front of the foreshore (with resulting greater vulnerability of the foreshore to flow slides), there have been fewer large failure events in recent years. This is very likely due to the blocking effect of the rock barrier that has been progressively reinforced by foreshore property owners.

In the past, whenever a flow slide event occurring on the submerged sand slopes of Rainbow Channel undermines any rocks placed previously, the buried rock mass slumps or collapses into the active flow slide region bringing the processes to an end. This typically manifests itself as a settling or dislodgement of rocks at the top of the slope. The response of local property owners is to then (and as soon as possible after the event) place additional rocks in the upper part of the collapsed rock slope. Consequently, the flow slide barrier made of rock has been progressively built along the foreshore of the Central Reach over many years. Each undermining event caused by deep flow slides locates the foundations of the barrier deeper; whilst the reserve of rocks higher in the structure (to accommodate any future slumping) is recharged by local property owners.

It is apparent from the structural audit of the flow slide barrier (refer outcomes in 4.3) that the depth of rock placement in the northern part of the Central Reach is such as to block the development of the flow slides that frequently occur immediately alongside. This is perhaps best illustrated by reference to Figure 6-1.

The flow slide event depicted in the figure has developed and penetrated into the unprotected sand foreshore to the north, but the existing rock barrier that has been progressively built on the frontage of the adjacent private property has prevented the flow slide developing into the land behind and on top of it. It is evident that the existing flow slide barrier is effective in limiting the development of the frequent flow slides that occur on the submerged side slopes of Rainbow Channel from developing into destructive events.

The flow slide barrier would only continue to be an effective means of mitigating the effects of flow slides if a process is formalised that enables recharging the upper sections of the structure with rock whenever it is locally undermined by a flow slide event.

FIGURE 6-1 EXISTING FLOW SLIDE BARRIER INHIBITING DEVELOPMENT OF FLOW SLIDES

SEAWALLS

The existing rock flow slide barrier at Amity Point has at times been referred to as a "seawall". This is not strictly correct, as a seawall is typically a foreshore protection structure having the intended purpose of providing defence against adverse erosion by waves. A seawall is a conventional response to conventional erosion processes. The rock within and along the foreshore of the Central Reach does provide protection against severe wave action. However, its' primary function is not to protect the foreshore from waves, but rather to prevent flow slides on the side slopes of Rainbow Channel from developing to destructive proportions.

Consequently, a seawall along the foreshore of the Central Reach (as opposed to a flow slide barrier) is not a relevant strategy.

SEAWALLS WITH BEACH NOURISHMENT

The depth of water in Rainbow Channel immediately in front of the existing flow slide barrier prohibits any strategy relying on beach nourishment to prevent or inhibit the cause of the erosion threat on the Central Reach – namely flow slides.

GROYNES

The construction of groynes (either submerged or otherwise) along this foreshore will neither prevent nor inhibit flow slides.

GROYNES WITH BEACH NOURISHMENT

As discussed above, neither the construction of groynes (either submerged or otherwise) or beach nourishment along this foreshore will not prevent nor inhibit flow slides. A strategy combining both options is also not viable.

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6.2.3 Further Research and Investigation

The underlying causes of shoreline erosion and its likely future progression require further investigations. To address this an assessment of groundwater flows and their potential, or actual contribution to shoreline erosion events and risks will be undertaken.

Council and the University of Queensland (UQ) are looking to invest in a future body of work examining possible trigger mechanisms and recovery processes associated with retrogressive slope failures. Studies are proposed to be carried out in the 2019/20 financial year. Through field investigations and modelling, UQ would investigate and understand the natural processes occurring at Amity Point which are contributing to the flow slide events, with the prospect of developing the capability of predicting such events and the processes and timescales involved in recovery.

Investigations to understand the local subsurface hydrological conditions including groundwater investigations needs to be carried out during the development of the SEMP Implementation Plan. Findings from further research and investigations carried out at Amity Point would be used to update, review and inform the current and proposed future management options.

6.3 Northern Reach - Amity Beach

As discussed in Section 4.6, the primary threat of shoreline recession to property fronting Amity Beach is the erosion that occurs because of the migrating erosion hot-spots induced by the changing morphology of the eastern sand spit. The complexity of the nearshore bathymetry (including the dynamic sand spit and offshore sand banks), in conjunction with the complexity of the natural littoral transport processes, means that it is extremely difficult at present to predict future beach changes at a specific location – such as on the private property frontages of Amity Beach.

6.3.1 Non-structural Management Options

DO NOTHING

A "do-nothing" strategy is somewhat aligned to one of maintaining the status quo. There have been no significant interventions undertaken to address the natural cycles of erosion and accretion of this foreshore. However, some local property owners in Old Ballow Street have undertaken vegetation planting and dune enhancement activities (such as using cut vegetation as barriers to mitigate wind-blown sand losses). These measures assist in stabilising a sand dune at the rear of sections along this beach, which in turn adds to the resilience of the foreshore to accommodate storm-induced erosion.

A strategy of maintaining the status quo on this coastal precinct entails letting natural coastal processes continue to shape this foreshore; and accepting that sections will erode from time to time. However, it is pertinent to note that this north-west corner of North Stradbroke Island has experienced considerable erosion in the past. The most adverse erosion phase occurred when the dynamic South Passage had quite a different morphological and bathymetric regime than at present.

The shifting bathymetry of South Passage, in conjunction with any variability in the natural supply of littoral sediments from Flinders Beach, means that the local foreshore will always experience the vagaries of natural long-term erosion and accretion processes that shape Amity Beach. At the moment, there are no significant erosion threats to private infrastructure, but that could change. Future monitoring of the behaviour of Amity Beach would assist considerably in better understanding beach performance and identifying any emerging erosion threats.

AVOID DEVELOPMENT

Statutory erosion prone areas are declared under section 70 of the *Coastal Protection and Management Act 1995* (Coastal Act) by reference to specific erosion prone area plans produced by the Department of Environment and Heritage Protection (recently gazetted as the Department of Environment and Science). The plans are used for development assessment purposes, and to inform the preparation of planning instruments, such as planning schemes and regional plans under the *Planning Act 2016*.

There is currently a 145-metre-wide erosion prone area designated along Amity Beach[22]. The Coastal Protection (Erosion Prone Areas) overlay of Council's *City Plan* incorporates this buffer. Development for a dwelling house, dual occupancy or community residence on affected land is code assessable, to ensure that this area is not inappropriately developed.

[22] "*Erosion Prone Area Linear Distances and their Locations for Redland City Local Government Area*". REC3A Map 3 Segment Number 010. https://www.ehp.qld.gov.au/coastal/development/assessment/pdf/redland-erosion-prone-area-plan.pdf. Accessed September 2016.

PLANNED RETREAT

At the moment, the extent of foreshore erosion processes is such that there is no merit in considering relocation of private or public infrastructure along the Northern Reach.

BEACH NOURISHMENT

The foreshore of the Northern Reach is subjected to quite significant erosion and accretion processes. The scale of local natural short-term and long-term sand transport processes are considerable. Any sand placement undertaken by beach nourishment campaigns would be ineffectual unless they encompassed the entire length of this Northern Reach. This would require extremely large sand volumes. Consequently, the very high cost of beach nourishment, along with its transient benefits, means that it is not a viable strategy for the Northern Reach.

BEACH RE-PROFILING

As discussed in Section 4.6, the erosion threat along the Northern Reach is heightened at migrating erosion "hot-spots". These are related primarily to the changing morphology of the sand spit that occurs at the eastern end of this coastal reach. When circumstances result in an erosion hot-spot moving onto the foreshores of local properties, beach profiling could provide some short-term benefit to foreshore properties that experience significant erosion during severe storms.

Reinstating sand reserves in local sand dunes improves their natural resilience and effectiveness to act as erosion buffers. However due to the large scale of natural coastal processes shaping this shoreline, such dune reinforcement would be short-lived – as the sand would soon be dispersed throughout the active beach system of the Northern Reach and beyond.

Nevertheless, beach scraping could provide an effective means of reinforcing natural dune buffers in anticipation of an erosion hot-spot migrating onto local properties. This would require monitoring of natural beach processes so as to better understand and predict localised erosion threats on Amity Beach.

CHANNEL RELOCATION

The discussion in Section 6.1.1 regarding the viability of this option for mitigating the erosion threat along the Southern Reach is relevant to the Northern Reach as well. A management strategy of redirecting the Rous and Rainbow Channels to mitigate the erosion threat along Amity Beach is not environmentally nor financially feasible.

6.3.2 Structural Management Options

FLOW SLIDE BARRIER

The only section of the Northern Reach vulnerable to flow slide events is at its western-most end, where the flow slide barrier of the Central Reach terminates (refer Figure 3-9). Indeed, due to the orientation of Rainbow Channel (in conjunction with the prevailing littoral processes of sand supply to this location) this area is particularly prone to flow slide events. This situation is likely to continue; and flow slides might in fact increase in frequency here as Rainbow Channel migrates eastward and comes up against the existing flow slide barrier of the Central Reach.

It is pertinent to note however that due to the longshore supply of sand from the east, the foreshore and nearshore bathymetry at this location are soon reinstated following flow slide events.

Provided the existing flow slide barrier to the immediate south is maintained so as to continue its function of inhibiting development of destructive failures, then it will tend to restrict the scale of any flow slide events that might occur on the sandy foreshore of Amity Beach immediately alongside it.

If the beach at the western-most end of the Northern Reach is to be immediately protected from the fluctuations induced by frequent flow slides, then a rock barrier comparable in scale to that along the Central Reach would need to be buried within this section of foreshore as well. This would entail significant construction works (at very significant cost) if such a structure was to be built in one construction campaign.

Furthermore, given the large scale of those works it is likely that the construction activity would require considerable vegetation clearing. This could result in a greater impact on local terrestrial values (including local koala communities) than flow slides - at least until appropriate revegetation following completion of the barrier's construction matures. Elsewhere along Amity Beach there is no need for a flow slide barrier, as there is no threat posed by such events.

SEAWALLS

As noted elsewhere, Amity Beach is subjected to quite significant erosion and accretion processes. The scale of local natural short-term and long-term sand transport processes are very considerable. A seawall to protect the foreshore would need to be a large robust structure buried at the back of the existing beach alignment. As most of this foreshore is State Land and zoned as *Conservation* by Redland City Council, approval for such major protection works would not be forthcoming. The Queensland Government maintains a policy of not protecting unallocated state land with seawalls.

Local residents could elect to build a buried seawall completely within their property and immediately alongside their seaward boundaries. However, such works would prove to be largely ineffective should the foreshore of Amity Beach recede during a major storm event, unless it was properly designed and constructed so as to also protect sections of side boundaries. Leaving aside the issue of unlikely approval for a seawall to protect State Land, the enormous cost of the structure means that it is not a viable strategy for the Northern Reach.

SEAWALLS WITH BEACH NOURISHMENT

This option is not viable for the reasons given above for each of the seawall and beach nourishment options.

GROYNES

As noted elsewhere, Amity Beach is subjected to quite significant erosion and accretion processes. The scale of local natural short-term and long-term sand transport processes are very considerable. The construction of groynes alone would not offer any long-term benefits to this foreshore.

GROYNES WITH BEACH NOURISHMENT

This option is not viable for the reasons given above for each of the groyne and beach nourishment options.

6.4 Assessment Methodology

6.4.1 Values to Guide the Assessment

In order to assess all of the various erosion management strategies that could be applied to each of the three coastal reaches, a methodology has been applied which rates their impacts and implications against environmental, social, economic and legislative principles and values. Each of these four important criteria are considered of equal value in the assessment of the erosion management options.

- *Environmental Values*: This consideration relates to the importance of biological diversity and ecological integrity of the local coastal environment of Amity Point. It considers the abundance, diversity, physical distribution and the productivity of terrestrial and marine flora and fauna - at both species and ecosystem levels. The maintenance of these values can be achieved by appropriate avoidance or management of adverse impacts.

- *Social Values*: The concept of social values has a very broad definition, but in the context of the Amity Point SEMP it encompasses the sense of community; connectedness; along with the personal and community health and wellbeing felt by all residents. This includes the indigenous and non-indigenous members of the Amity Point community and the wider North Stradbroke Island community.
- *Economic Considerations*: Implementation of erosion mitigation strategies will invariably involve financial implications. These will include the direct costs of initial expenditure; subsequent maintenance and/or upgrading costs; as well as any offsets by the indirect financial benefits that may flow through to the local community by the implementation of a particular strategy.
- *Legislative Considerations:* To ensure that erosion mitigation strategies are consistent with planning and legislative requirements of Commonwealth, State and Local governments it is necessary to have appropriate regard for the full range of legislation that controls activities in the coastal zone. The extent to which such strategies comply with such requirements varies and is an important consideration when selecting the preferred option.

6.4.2 Assessment Criteria

Within each of the above categories, several assessment criteria have been assigned. These are presented in Figure 6-2. A further refinement is made to this rating methodology by giving each of the assessment criteria within a particular category a weighting. The weighting reflects the relative importance of each to the others.

This application of a weighting methodology is perhaps best explained by reference to Figure 6-2. For example, the *Social* category has three assessment criteria namely: maintaining social values; visual amenity; and foreshore access and amenity.

A weighting of 75%, 10% and 15% has been applied to those criteria respectively. This is in recognition that maintaining social values (that for instance include a strong and robust connectedness with the Amity Point community, along with a shared sense of place and belonging) rates far more importantly than providing an erosion mitigation strategy that is visually appealing (visual amenity) or provides for ready access and use of the immediate foreshore (foreshore access and amenity).

The various weightings were determined by consideration of the feasibility and technical merits of each option; along with regard to issues identified as being important to all stakeholders. This later aspect was achieved by way of the following:

- Discussions with members of the Project Reference Group, both collectively and individually;
- One-on-one meetings or telephone interviews with occupants and owners of foreshore homes;
- One-on-one meetings with residents of Amity Point who responded to offers of engagement;
- Feedback captured during discussions with (and in written responses offered by) attendees at the project's Open House community engagement event at Amity Point Community Hall in April 2016;
- Meetings and discussions with relevant Redland City Council officers; and
- Meetings and discussions with relevant State Government agencies.
- The assessment methodology, weightings and outcomes of the MCA were endorsed at an *Amity Point SEMP Community Reference Group Workshop* held at Cleveland on 01st September 2016.

	category weighting	Assessment Criteria	criteria weighting
environmental	*1*	Maintaining coastal processes	*0.40*
		Maintenance of Marine Values	*0.30*
		Maintenance of Terrestrial Values	*0.30*
social	*1*	Maintenance of Social Values	*0.75*
		Visual amenity	*0.10*
		Foreshore access and amenity	*0.15*
economic	*1*	Planning & design costs	*0.10*
		Initial implementation cost (direct & indirect)	*0.67*
		Ongoing financial cost (direct & indirect)	*0.23*
legislative	*1*	Compliance with State Coastal Policy	*0.50*
		Compliance with other legislation/policies	*0.20*
		Complexity of approval (inc. costs)	*0.30*

FIGURE 6-2 ASSESSMENT CRITERIA AND WEIGHTING

In order to rate the various erosion mitigation, for each a score is intuitively assigned to each of the assessment criteria using a numerical scale as follows:

- 0 = unacceptable
- 1 = very poor
- 2 = poor
- 3 = neutral
- 4 = good
- 5 = very good

That is, the higher the score, the more appropriate or desirable is the option's outcome. Should an erosion mitigation strategy score a zero (i.e. *unacceptable*) against any of the criteria whatsoever, that strategy is deemed unacceptable.

An overall weighted score for each mitigation option is obtained by multiplying the individual scores by their assigned criteria weighting; and then adding them all together for that option. The preferred erosion mitigation option then emerges as that having the highest overall weighted score.

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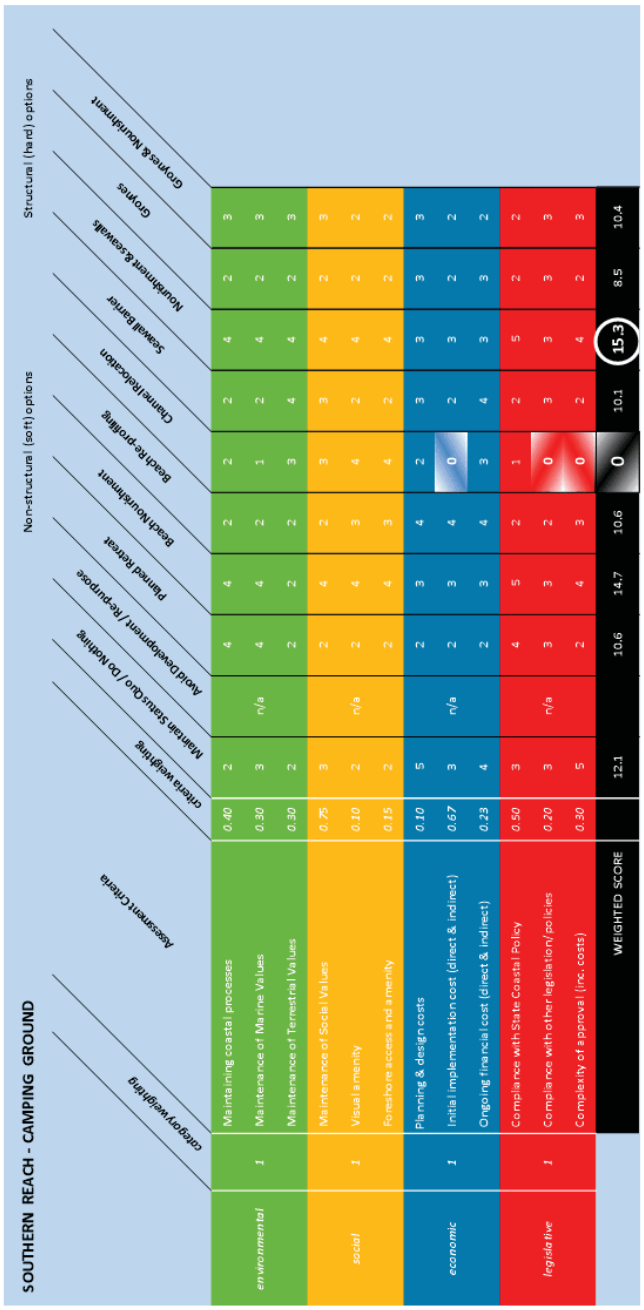

FIGURE 6-3 ASSESSMENT FOR THE SOUTHERN REACH – CAMPING GROUND

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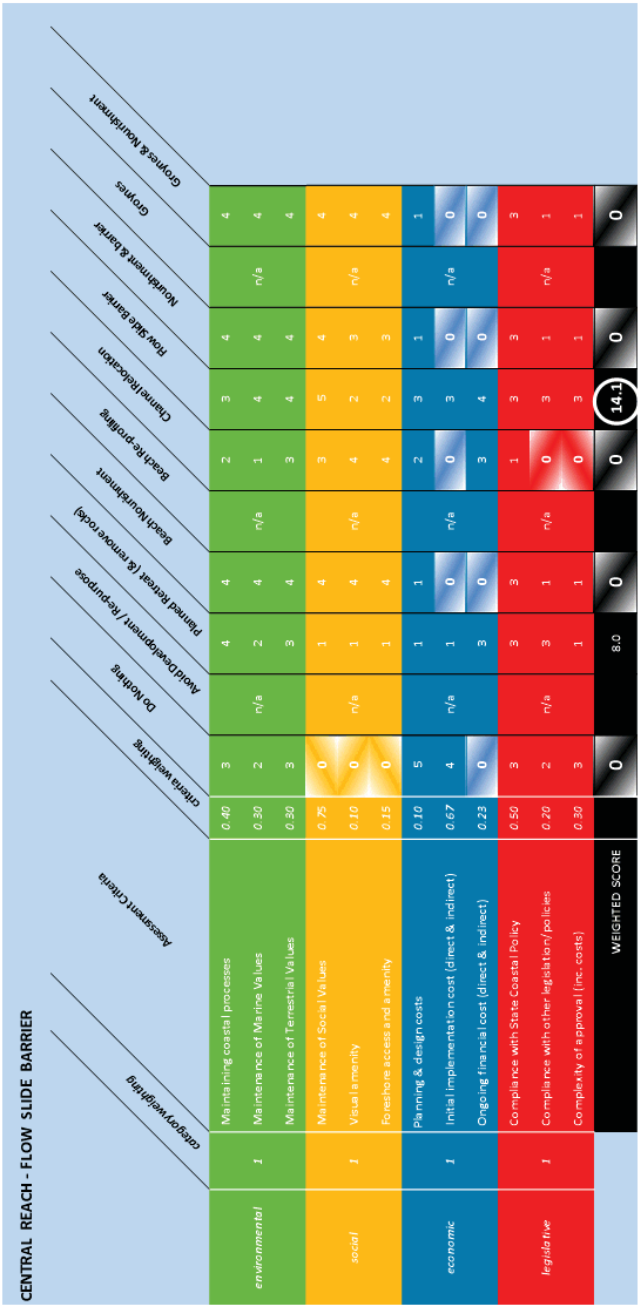

FIGURE 6-4 ASSESSMENT FOR THE CENTRAL REACH – FLOW SLIDE BARRIER

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FIGURE 6-5 ASSESSMENT FOR THE NORTHERN REACH – AMITY BEACH

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6.4.3 Assessment Outcomes

The outcome of this assessment methodology is the emergence of the following preferred erosion management strategies:

- For the Southern Reach: Figure 6-3 : Beach nourishment with a seawall
- For the Central Reach: Figure 6-4 : Flow Slide Barrier
- For the Northern Reach: Figure 6-5 : Maintain the existing strategy of non-intervention, but monitor future shoreline behavior.

Each of these preferred strategies are discussed in more detail in Section 9 of this report.

7. STAKEHOLDER CONSULTATION AND ENGAGEMENT

7.1 Methodology

Extensive consultation with stakeholders formed an important component in the development of the Amity Point Shoreline Erosion Management Plan.

Consultation with the local Amity Point community was identified by Redland City Council as a critical component in the determination of an appropriate SEMP and was written into the Terms of Reference for the study. To assist in this consultation process, and to contribute expertise and local knowledge to shoreline erosion planning for Amity Point, Council facilitated the establishment of the *Amity Point SEMP Community Reference Group* (Reference Group). The Reference Group consists of local community members and groups who expressed an interest in the SEMP process and nominated to become a member.

It includes members drawn from foreshore property owners, the local residential community, the wider North Stradbroke Island community, the Quandamooka Yoolooburrabee Aboriginal Corporation (QYAC), various community groups and Council officers. Its role is defined in the specific Terms of Reference as follows:

> *"Members of this reference group will:*
>
> - *Be briefed on Council and State policy requirements for coastal protection and management, and the three-stage consultation and engagement process during the completion of the SEMP, including preparation of a Draft Implementation Plan;*
> - *Contribute advice, information and insight on shoreline erosion and practical management options based on personal and professional knowledge and experience of local conditions and community economic, cultural, historical and environmental considerations;*
> - *Independently review and comment on existing technical data, and any further shoreline erosion research, as it becomes available;*
> - *Share information and reports on the progress and direction of the SEMP action planning process to relevant community networks. "*

Several formal meetings of the Reference Group and the SEMP Study Team were convened during the study which assisted in the development of the SEMP. However, members also contributed individually throughout the study.

The SEMP Study Team also engaged with the local Amity Point community by way of:

- One-on-one meetings with occupants and owners of foreshore homes, either at Amity Point or on the mainland (for non-resident property owners);
- Telephone interviews with non-resident property owners;
- One-on-one meetings at Amity Point with residents and other interested people who responded to offers of engagement, often meeting several times with individuals;
- Discussions with (and in written responses offered by) attendees at the project's Open House community engagement event at Amity Point Community Hall in April 2016.

Redland City Council commissioned the preparation of the Amity Point Shoreline Erosion Management Plan and as such provided essential input and guidance to the SEMP Study Team. This was facilitated by many formal and informal meetings, discussions and an internal Council workshop.

During the preparation of the SEMP, various state government departments and agencies were consulted and kept informed of emerging outcomes as the SEMP was developed. On 12th December 2017 the Queensland State Government gazetted some new Departmental name changes. The key agencies that were consulted during the preparation of this SEMP are listed below under their previous Departmental names, with reference made to the new Departmental names:

- Queensland Department of Environment and Heritage Protection (now Department of Environment and Science)
- Queensland Department of National Parks, Recreation, Sport and Racing (now abolished, with relevant responsibilities with the Department of Environment and Science)
- Queensland Department of Science, Information Technology and Innovation (now abolished, with relevant responsibilities with the Department of Environment and Science)
- Queensland Department of Agriculture and Fisheries (this Departmental name is retained)
- Queensland Department of Natural Resources and Mines (now Department of Natural Resources, Mines and Energy)

7.2 Community Response

It was very evident that there is considerable interest in the development of the Amity Point Shoreline Erosion Management Plan. This includes members of the Amity Point community who are not part of the SEMP Reference Group, as well as people from elsewhere on North Stradbroke Island.

There is significant enthusiasm in the Amity Point community with regard to being involved in strategic planning projects within their township - which reaffirms the value and importance of engaging with the community during the development of this Shoreline Erosion Management Plan.

Appendix C provides a summary of the Open House engagement that took place on Saturday 23 April, 2016 at the Amity Point Community Hall. It captures the issues of most concern to the local community, namely:

- There is a considerable erosion threat, and that this is not only to the existing foreshore, but to the wider environs of Amity Point.
- The erosion threat is a consequence of complex and dynamic natural processes.
- There is a need to protect existing private and public assets.
- There is a need to provide an enduring solution to the erosion threat.
- The cost of any mitigation strategy should be shared equitably by those who benefit.

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8. PLANNING AND LEGISLATION REVIEW

8.1 Background

The *Amity Point Shoreline Erosion Management Plan* sits within the context of Commonwealth and State legislation and Redland City Council's local planning policies. This section provides a summary of the key legislative and planning requirements that may impact how coastal erosion is managed in the study area, and how the recommendations of the SEMP are affected by those requirements.

The basis and control of management of Queensland's coast is governed by the *Coastal Protection and Management Act 1995* (Coastal Act) and the *Planning Act 2016*. Under these Acts, the Coastal Management Plan (CMP), the Coastal Protection State Planning Regulatory Provision (Coastal SPRP), the State Planning Policy (SPP) and the State Development Assessment Provisions (SDAP) are the primary statutory planning instruments for development planning and assessment.

Legislation and policies considered in this SEMP require consideration of issues including, but not limited to:

- The use of coastal structures for property protection,
- Protection of species listed under State and Commonwealth legislation and conservation of their habitat,
- Management of shoreline erosion in a manner that is not detrimental to the adjacent Moreton Bay Marine Park, and
- The maintenance of local biodiversity.

These legislative and policy considerations are described in more detail in the following sections.

8.2 Coastal Protection and Management Act 1995

The *Queensland Coastal Protection and Management Act 1995* (Coastal Act) governs the way coastal land is managed in Queensland. The main objects of this Act are to:

- Provide for the protection, conservation, rehabilitation and management of the coastal zone, including its resources and biological diversity; and
- Have regard to the goal, core objectives and guiding principles of the National Strategy for Ecologically Sustainable Development in the use of the coastal zone; and
- Ensure decisions about land use and development safeguard life and property from the threat of coastal hazards; and
- Encourage the enhancement of knowledge of coastal resources and the effect of human activities on the coastal zone.

The primary means of achieving these management objectives under the Coastal Act is through regulation of developments and allocations, and the preparation of management plans.

The coastal zone includes Queensland's coastal waters (to 3 nautical miles from the coast); as well as land and waters landward of coastal waters to a limit of 5 km from the coast, or to 10 m AHD elevation, whichever is further inland. The entire study area of the Amity Point SEMP is within the coastal zone.

A coastal management district (CMD) has been declared under the *Coastal Act* over lots which are likely to be subject to inundation by tidal water or increased coastal erosion under future climate change. The CMD defines an area in which the Department of State Development, Manufacturing, Infrastructure, and Planning (DSDMIP) has assessment manager or referral agency powers and responsibilities to assess certain development

applications. The Department of Environment and Science (DES) is a technical advice agency to DSDMIP for development proposals in coastal management districts.

Coastal Management Districts are shown on development assessment maps held by DSDMIP, as well as on coastal hazard maps prepared by DES. The coastal hazard maps of relevance to Amity Point are included in Appendix D of this SEMP. The CMD at Amity Point incorporates many landholdings within the township, including all lots with coastal frontage.

Erosion prone areas are also declared over land vulnerable to short-term and long-term coastal erosion and tidal inundation. Such declarations are made under Part 4, section 70 of the *Coastal Act* by reference to erosion prone area plans that have previously been prepared by EHP (now DES). A 145-metre-wide erosion prone area has been declared over the entire Amity Point coastline under the *Coastal Act*. The statutory erosion prone area plan of relevance to the Amity Point SEMP is *REC3A Map 3*[23], which is also included in Appendix D.

The Queensland Government currently manages the coastal zone using the Coastal Management Plan (CMP) and the State Planning Policy (SPP). The Coastal Management Plan (prepared under the *Coastal Act* and commenced in 18 March 2014) provides non-regulatory policy guidance to coastal land managers (primarily local government) for the management of the coastal zone and works that are not assessable development under the *Planning Act 2016*.

The State Planning Policy (SPP) provides State interests with policies to be considered by land managers particularly when preparing planning schemes. State interests include the coastal environment, biodiversity and natural hazards (i.e. coastal erosion). In addition, the SPP also provides development assessment criteria. The policy applies to a range of interests relevant to the SEMP, including coastal protection, water quality, native vegetation clearing, Queensland heritage, wetlands and environmentally relevant activities.

8.3 Planning Act 2016

In July 2017, Queensland began operating under new planning legislation – the *Planning Act 2016*, which replaced the *Sustainable Planning Act 2009* (SPA). Development within the coastal zone is regulated under the *Planning Act 2016*. The Act provides a framework to integrate planning and development assessment so that development and its effects are managed in a way that is ecologically sustainable.

The *Planning Act 2016* mandates a state-wide, applicant-driven development assessment system, by which local governments (and state agencies in some circumstances) assess and make decisions on the various land-use and development proposals.

The *Planning Act 2016* provides for the crafting of documents that guide strategic planning and development throughout Queensland. The foremost document is the planning scheme, which is created by local government taking into account the aspirations of their communities and the state's interests. Each scheme specifies the levels of assessment for all defined land uses, and the assessment requirements for each. The local planning scheme identifies what development and land-use proposals require an approval from council and what proposals do not need an approval.

The *Planning Regulation 2017* supports the principal legislation by outlining the mechanics for the operation of the Planning Act. It deals with practical matters such as: how development is categorised, who will assess a development application, and the state interest matters for development. In most cases, local government is the assessment manager. However, where the state identifies that it has a particular interest through the

[23] *Erosion Prone Area Redland City Local Government Area - REC3A*. Date of erosion prone declaration, 8th July 2015. Available online: https://www.ehp.qld.gov.au/coastal/development/assessment/pdf/redland-erosion-prone-area-plan.pdf.

Planning Regulation, the state assesses those aspects of the development through the State Assessment and Referral Agency (SARA).

There are two statutory state planning instruments. These being:

- State Planning Policy (SPP) This instrument sets out the state planning matters considered as crucial to responsible land-use planning and development across the state. Councils must consider the state interests that apply to their local government areas when making, amending and implementing their planning schemes.
- Regional Plans. A regional plan focuses on the growth and development of a specific part of Queensland. Regional planning matters are identified in collaboration with local governments, key industry groups and the wider community. Where a regional plan exists, the local government must consider it when making or amending its planning scheme. The *South-East Queensland Regional Plan 2017* (DILGP, 2017) includes the local government area of Redland City Council, including Amity Point.

A summary of the Queensland planning framework is shown in Figure 8-1 (reproduced from Figure 28 of DILGP, 2017).

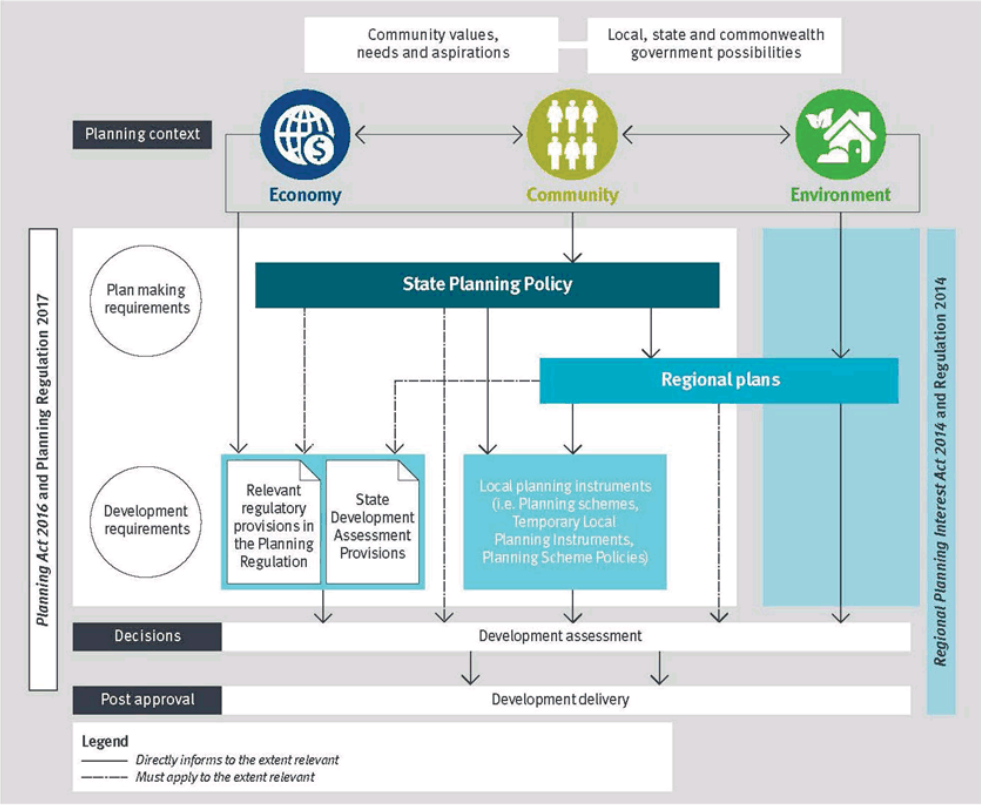

FIGURE 8-1 QUEENSLAND'S PLANNING FRAMEWORK

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8.3.1 State Planning Policy (SPP) 2017

A new State Planning Policy (SPP) was introduced in July 2017 to replace a number of former state planning policies and instruments. The SPP is a statutory instrument which defines the Queensland Government's policies about matters of state interest in land use planning and development.

The SPP includes 17 state interests that must be considered in every planning scheme across Queensland. Each of the 17 state interests in the SPP is supported by guidelines which help councils to implement the SPP provisions. State interests are arranged under five broad themes. Those relating to the Amity Point SEMP include:

Environment and heritage

- *Biodiversity*
  - *Matters of environmental significance are valued and protected, and the health and resilience of biodiversity is maintained or enhanced to support ecological integrity*
- Coastal environment
  - *The coastal environment is protected and enhanced, while supporting opportunities for coastal-dependent development, compatible urban form, and maintaining appropriate public use of and access to (and along) state coastal land.*
- Cultural heritage
  - *The cultural heritage significance of heritage places and heritage areas, including places of Aboriginal and Torres Strait Islander cultural heritage, is conserved for the benefit of the community and future generations.*
- Water quality
  - *The environmental values and quality of Queensland waters are protected and enhanced.*

Safety and resilience to hazards

- Natural hazards, risk and resilience
  - *The risks associated with natural hazards, including the projected impacts of climate change, are avoided or mitigated to protect people and property and enhance the community's resilience to natural hazards.*

Liveable communities and housing

- Liveable communities
  - *Liveable, well-designed and serviced communities are delivered to support wellbeing and enhance quality of life.*

The Department of State Development, Manufacturing, Infrastructure, and Planning (DSDMIP) provides mapping that spatially represents matters of state interest in the planning system. This is provided by way of two GIS (Geographic Information Systems) platforms: the *State Planning Policy Interactive Mapping System* (SPP IMS), which is a standalone mapping system, and the *Development Assessment Mapping System* (DAMS), which incorporates mapping used for a number of different functions in development assessment.

Both the SPP IMS and DAMS are updated as required to reflect the latest information and any relevant government policy and legislative changes.

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8.3.2 State Development Assessment Provisions

Development applications concerning certain matters of interest to the state are referred to the State Assessment and Referral Agency (SARA). In assessing applications, the state refers to both the SPP and the State Development Assessment Provisions (SDAP). The SDAP is a statutory instrument prescribed by the Planning Regulation 2017, which sets out the matters of interest to the State government when assessing a development application as either an assessment manager or a referral agency for a development application. The state uses SDAP to deliver a coordinated, whole-of-government approach to the state's assessment of development applications.

State Code 8: Coastal development and tidal works of the SDAP provides a state code for development in the coastal management district or for tidal works. The criteria outlined in State Code 8 will need to be followed in a development application for coastal erosion protection works, as such works will be located within the coastal management district. The assessment criteria in relation to erosion prone areas generally emphasise avoiding new development and intensification, avoiding disruption to existing coastal processes and adopting "soft" solutions to coastal protection in preference to "hard" erosion control structures. Relevant performance outcomes (assessment criteria) include:

- Natural processes and the protective function of landforms and vegetation are maintained in coastal hazard areas.
- Erosion prone areas in a coastal management district are maintained as development free buffers, or where permanent buildings or structures exist, coastal erosion risks are avoided or mitigated.
- Development avoids or minimises adverse impacts on coastal resources and their values, to the maximum extent reasonable.
- Coastal protection work is undertaken only as a last resort where erosion presents an imminent threat to public safety or permanent structures.
- Development avoids adverse impacts on matters of state environmental significance, or where this is not reasonably possible, impacts are minimised and an environmental offset is provided for any significant residual impacts to matters of state environmental significance that are prescribed environmental matters.

Coastal protection work is only to be undertaken to protect permanent structures which cannot reasonably be relocated or abandoned from imminent adverse coastal erosion impacts. Coastal protection work should involve beach nourishment as a first priority. The construction of an erosion control structure should only be considered if it is the only feasible option for protecting permanent structures from coastal erosion and those structures cannot be abandoned or relocated. Coastal protection work to protect private structures should be located on private land where possible and should not increase the coastal hazard risk for adjacent areas.

8.3.3 SEQ Regional Plan

Statutory regional planning in South East Queensland (SEQ) has been accompanied by regulatory provisions since October 2004. The *South-East Queensland Regional Plan 2017* (also referred to as *ShapingSEQ*) sets out the strategic directions, principles and policies to manage regional growth and change in the most sustainable way – to protect and improve the quality of life in South-East Queensland.

As noted above, the State Planning Policy (SPP) sets out the Queensland Government's interests in planning and development for Queensland. *ShapingSEQ* refines these state interests to provide the planning and decision-making framework for how the SPP will be applied cross the twelve local government areas in South-East Queensland (SEQ) to achieve desired planning outcomes.

Under the Planning Act 2016, the SPP prevails where there is any inconsistency with a regional plan. *ShapingSEQ's* strategies and sub-regional directions are consistent with the SPP. The SPP and *ShapingSEQ*

perform complementary roles - where *ShapingSEQ* provides the basis for prioritising, qualifying or resolving the state interests in SEQ. As such, *ShapingSEQ* advances the SPP in response to the region's projected growth, community expectations, values, opportunities and constraints.

The Plan is perhaps best defined as follows[24] :

ShapingSEQ sits within Queensland's planning framework and informs:

- *the making and amending of local government planning schemes*
- *infrastructure planning, prioritisation and funding decisions made by state and local government, and other infrastructure agencies*
- *other plans and programs, including non-statutory processes, that may influence change and growth management in SEQ, including natural resource management*
- *the assessment of certain development applications made under the Planning Act 2016*
- *the assessment of certain types of resource activities or regulated activities as defined under the Regional Planning Interests Act 2014.*

ShapingSEQ advances a range of state interests defined in the State Planning Policy (SPP) by providing a spatial context, defining key outcomes, and establishing planning strategies and directions to achieve these outcomes in response to SEQ's unique values, drivers, expectations, projections and constraints.

The Planning Regulation 2017 contains SEQ regulatory provisions to ensure that particular forms of development in SEQ are consistent with ShapingSEQ policy.

Regulation plays a critical role in ensuring *ShapingSEQ* policy is delivered through development assessment. In the recently superseded South-East Queensland Regional Plan 2009-2031, regulation was delivered through the state planning instrument known as State Planning Regulatory Provisions (SPRP). With the adoption of the Planning Act 2016 on 3 July 2017, SPRPs were repealed and their regulatory provisions transitioned into the Planning Regulation 2017. The Planning Regulation 2017 now contains the regulatory provisions for *ShapingSEQ*.

8.4 Coastal Management Plan

The Coastal Management Plan (CMP) seeks to manage all coastal land and coastal resources within the coastal zone as defined by the *Coastal Act*. It applies to all management planning, activities, decisions and works that are not assessable development under the SP Act, including the development of a SEMP.

The guiding principle for the management of coastal landforms and processes is to preserve the long-term stability of dunes and other natural coastal landforms; and to allow physical coastal process including erosion, accretion and the movement of sediment to occur without interruption. However, the plan acknowledges that erosion can threaten communities and infrastructure. In this case, the CMP specifically calls for a shoreline erosion management plan (SEMP) to deliver a science-based solution to the erosion problem that considers social, environmental and economic issues.

Other matters on which the CMP provides policy guidance include:

- Conserving matters of state environmental significance (MSES),
- Maintaining and enhancing the connection of Aboriginal People and Torres Strait Islanders to coastal and marine resources,

[24] Refer to https://dilgpprd.blob.core.windows.net/general/shapingseq.pdf, accessed 18th December 2017.

- Maintaining and enhancing public access and use of the coast,
- Ensuring continuous improvement in management outcomes through planning, monitoring, reporting and review, and
- Sharing knowledge of coastal resources and management with the community and engaging the community in decision making processes.

8.5 Other Legislation and Approvals

8.5.1 Commonwealth Legislation

EPBC Act

The *Environment Protection and Biodiversity Conservation Act 1999* (*EPBC Act*) is the Federal Government's key piece of environmental legislation. It is designed to protect matters of national environmental significance (MNES). Within the study area of Amity Point, MNES in the SEMP study area include:

- Moreton Bay Wetlands (wetlands of international importance under the Ramsar Treaty)
- Listed threatened species
- Migratory species

The fifty listed threatened species and the seventy-two listed migratory species protected by the *EPBC Act* within the study area are listed in Appendix E. Approval from the Minister responsible for the *EPBC Act*[25] is required to take any action (e.g. project, development, activity) that is likely to result in a significant impact on a MNES.

Native Title Act 1993

The *Native Title Act 1993* provides for the recognition and protection of native title in Australia. It is a recognition by Australian law that indigenous people have rights and interests to their land that derive from their traditional laws and customs. Native title determinations are undertaken in the Federal Court, upon application by a native title claimant.

The Quandamooka People filed applications in 1995 and 1999 for recognition of native title rights interest over land and waters on and surrounding North Stradbroke Island, and some islands in Moreton Bay. A consent determination on both submissions was made in July 2011 and recognised the Quandamooka People's native title rights and interest to 54,408 hectares of land and waters, including areas of national parks, reserves, unallocated State land and other leases. The determinations recognise the Quandamooka people's rights amongst others to:

- live and be present on the determination areas;
- conduct traditional ceremonies;
- take, use, share and exchange traditional natural resources;
- conduct burial rites, teach about the physical and spiritual attributes of the area; and
- maintain places of importance and areas of significance.

The area includes exclusive native title rights to 2,264 hectares of land; and non-exclusive native title rights to 22,639 hectares of land and 29,505 hectares of offshore areas

[25] Currently administered by the Commonwealth Department for the Environment and Energy.

The exercise of native title rights in the exclusive-use areas is subject to the traditional laws and customs practised by the Quandamooka people. The Quandamooka people therefore have exclusive rights to possess, occupy, use and enjoy the area to the exclusion of all others. Such exclusive use areas are also subject to all other Australian laws including underlying land tenure and related building, planning and environmental regulations and the local laws that cover North Stradbroke Island. Only some of those rights are recognised in non-exclusive native title areas.

Figure 8-2 below shows the areas[26] near Amity Point on which consent determinations for Exclusive Use native title have been made. This includes land within the Northern Reach of the SEMP study area, including part of the ocean frontage along Amity Beach.

Figure 8-3 shows the areas[27] near Amity Point on which consent determinations for Non-exclusive Use native title have been made. This includes land within the Southern Reach, including the ocean frontage of the camping ground (although this is not shown in its entirety on Figure 8-3).

The Quandamooka Yoolooburrabee Aboriginal Corporation (QYAC) is the Registered Prescribed Body Corporate (PBC) under the *Native Title Act 1993* which manages the native title rights and interests of the Quandamooka People. Indigenous Land Use Agreements (ILUA) have been negotiated with the State of Queensland and Redland City Council to govern the management and use of land and waters within the native title claim areas.

The *Native Title Act 1993* sets out procedures for dealing with "future acts", which are proposals to use land or change administration or legislative arrangements in a way that affects native title rights and interests. Examples include grazing, horticulture, water diversion and mining licences and construction of public infrastructure. The procedures for future acts depend on the nature of the act, and generally require more consultation and negotiation for acts that have higher impact on native title rights and interests.

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[26] Extract from Federal Court Order No. QUD6024/1999, dated 04th July 2011. Prepared in the Queensland District Registry, Federal Court Of Australia, Harry Gibbs Commonwealth Law Courts Building, Level 6, 119 North Quay, BRISBANE QLD 4000, Telephone 07 3248 1100.

[27] Extract from Federal Court Order No. QUD6010/1998, dated 04th July 2011. Prepared in the Queensland District Registry, Federal Court Of Australia, Harry Gibbs Commonwealth Law Courts Building, Level 6, 119 North Quay, BRISBANE QLD 4000, Telephone 07 3248 1100.

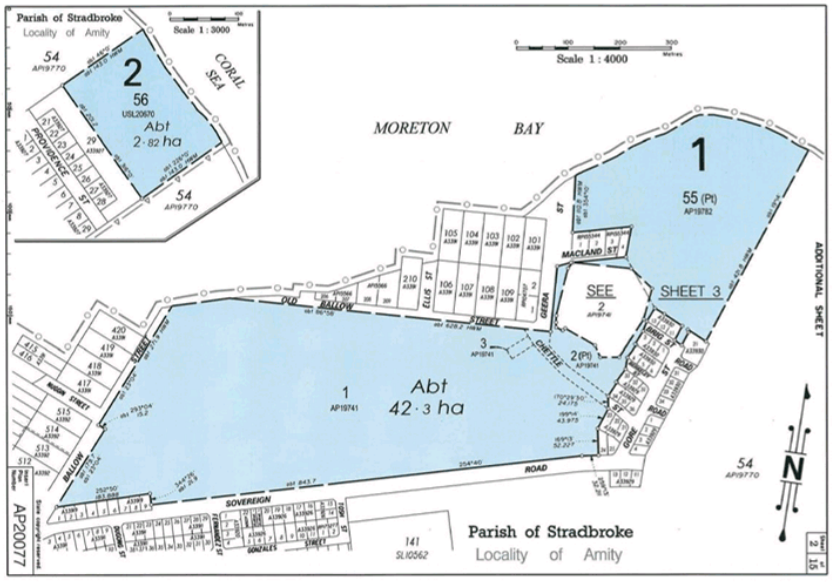

FIGURE 8-2 AREAS OF NATIVE TITLE DETERMINATION AT AMITY POINT - *EXCLUSIVE USE*

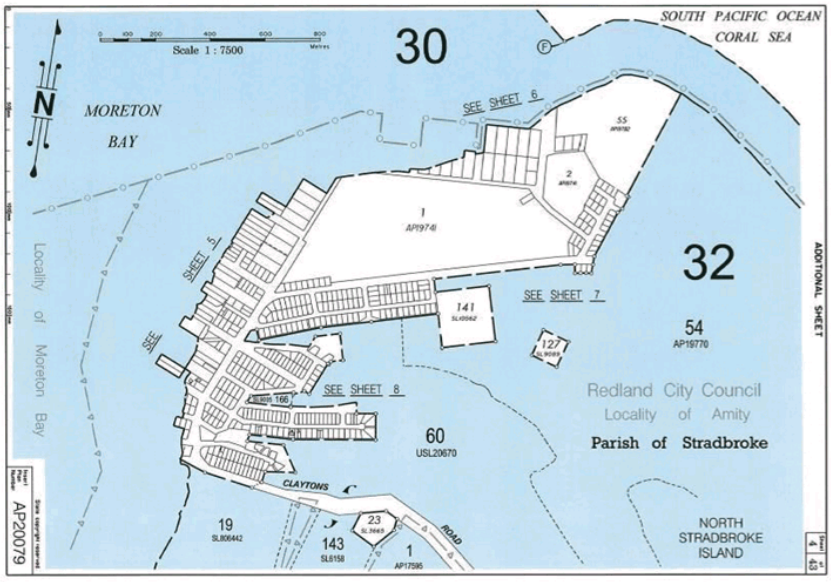

FIGURE 8-3 AREAS OF NATIVE TITLE DETERMINATION AT AMITY POINT - *NON-EXCLUSIVE USE*

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8.5.2 State Legislation and Instruments

Matters of State Environmental Significance

Matters of State Environmental Significance (MSES) are a component of the state's biodiversity interests that are defined under the State Planning Policy. MSES includes certain environmental values that are protected under Queensland legislation, including the:

- Protected areas (including all classes of protected area except coordinated conservation areas) under the *Nature Conservation Act 1992*.
- Marine parks and land within a 'marine national park', 'conservation park', 'scientific research', 'preservation' or 'buffer' zone under the *Marine Parks Act 2004*.
- Areas within declared fish habitat areas that are management A areas or management B areas under the *Fisheries Regulation 2008*.
- Threatened wildlife under the *Nature Conservation Act 1992* and special least concern animal under the Nature Conservation (Wildlife) Regulation 2006.
- Regulated vegetation under the *Vegetation Management Act 1999* that is:
  - Category B areas on the regulated vegetation management map, that are 'endangered' or 'of concern' regional ecosystems;
  - Category C areas on the regulated vegetation management map that are 'endangered' or 'of concern' regional ecosystems;
  - Category R areas on the regulated vegetation management map;
  - Areas of essential habitat on the essential habitat map for wildlife prescribed as 'endangered wildlife' or 'vulnerable wildlife' under the *Nature Conservation Act 1992;*
  - Regional ecosystems that intersect with watercourses identified on the vegetation management watercourse map;
  - Regional ecosystems that intersect with wetlands identified on the vegetation management wetlands map.
- High preservation areas of wild river areas under the *Wild Rivers Act 2005*.
- Wetlands in a wetland protection area or wetlands of high ecological significance shown on the Map of Referable Wetlands under the *Environmental Protection Regulation 2008*.
- Wetlands and watercourses in high ecological value waters as defined in the *Environmental Protection (Water) Policy 2009, Schedule 2*.
- Legally secured offset areas.

MSES mapping represents the definition for MSES under the SPP. The mapping generates individual layers using information from data including, but not limited to:

- marine parks
- fish habitat areas
- regulated vegetation mapping
- Queensland wetland mapping
- protected areas
- legally secured offsets included in the 'offsets register'.

The State Government's MSES mapping product[28] is a guide to assist planning and development assessment decision-making. Its primary purpose is to support implementation of the SPP biodiversity policy. While it supports the SPP, the mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations. Similarly, the SPP biodiversity policy does not override or replace specific requirement of other Acts or regulations.

Nature Conservation Act 1992

The *Nature Conservation Act 1992* (the NC Act) relates to the protection of native flora and fauna and the declaration of protected areas. There are no protected areas designated under the Nature Conservation (Protected Areas) Regulation 1994 within the SEMP area.

The removal or destruction of native flora or fauna is unlawful unless it is authorised by a permit. If vegetation clearing is necessary for the purposes of implementing coastal protection works (including clearing to gain foreshore access) an appropriate permit under the NC Act must first be obtained. However, this does not apply to flora protected under the provisions of other Acts (e.g. marine plants).

Any clearing of koala habitat trees must be in accord with the *Nature Conservation (Koala) Conservation Plan 2006*.

Environmental Protection Act 1994

The *Environmental Protection Act 1994* (the EP Act) and the *Environmental Protection Regulation 2008* provide the main framework for controlling environmental harm and pollution resulting from development.

The EP Act establishes an environmental duty requiring entities to not cause adverse environmental effects unless all reasonable and practicable measures are undertaken to avert or lessen such harm. In the context of this SEMP, Redland City Council is under an obligation to not undertake any activities that cause, or are likely to cause, environmental harm unless it takes reasonable and practicable measures to prevent or minimise harm. Environmental protection policies (EPPs) are also prepared under the EP Act to protect Queensland's environment. The objective of an EPP is to protect the environmental values and quality objectives for several attributes of the environment - including water, noise, air and waste management.

Environmental values and water quality objectives within the *Environmental Protection (Water) Policy 2009* are defined in the specific plan titled *Moreton Bay environmental values and water quality objectives*[29].

Marine Parks Act 2004

The *Marine Parks Act 2004* (MP Act) establishes a framework for protecting the marine environment through the declaration of state marine parks. The Moreton Bay Marine Park has been declared by the MP Act as being over tidal waters and over tidal land up to the level of Highest Astronomical Tide. As noted in Section 3.2.1 of this SEMP, the level of Highest Astronomical Tide at Amity Point is RL+1.22m AHD.

The Moreton Bay Marine Park is managed under the *Marine Parks (Moreton Bay) Zoning Plan 2008*. The SEMP proposes works within a conservation zone of the Marine Park. While such works are not prohibited by the *Marine Parks (Moreton Bay) Zoning Plan 2008,* they will nevertheless require a marine park permit. Permits are obtained for such works from the Department of Environment and Science. The various zones near Amity Point are shown on Figure 8-4. Details regarding their objectives are provided in Table 8-1.

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[28] Refer online at https://www.ehp.qld.gov.au/maps-imagery-data/online/

[29] Environmental Protection (Water) Policy 2009. *South-east Queensland Map Series Plan No. WQ1441*, dated July 2010. Available online at : https://www.ehp.qld.gov.au/water/policy/pdf/plans/moreton-bay-ev-plan-2010.pdf.

FIGURE 8-4 DESIGNATED ZONES OF THE MARINE PARK AT AMITY POINT

TABLE 8-1 OBJECTIVES OF MARINE PARK ZONES WITHIN THE SEMP AREA

Zone	Areas	Objectives
Conservation park (green)	Amity Point foreshore and Rainbow Channel	■ To provide for the conservation of the areas of the marine park within the zone ■ To provide opportunities for reasonable use and enjoyment, including, for example, limited extractive uses, of the areas.
Habitat protection (yellow)	Flinders Beach	■ To provide for the conservation of the areas of the marine park within the zone through the protection and management of sensitive habitats that are generally free from potentially damaging activities. ■ To provide opportunities for reasonable use of the areas.
Marine national park (aqua)	South of the foreshores of Amity Point Township	■ To provide for the protection of the natural integrity and values of the areas of the marine park that are generally dree of extractive activities. ■ To provide opportunities for particular activities, including, for example, the presentation of the values of the marine park, to be undertaken in relatively undisturbed areas within the zone.

Any application for works within the marine park must include other options that have been considered and the reasons they are not preferred. The assessment of shoreline erosion management options undertaken for this SEMP provides such rationale and can be used to support permit applications for the SEMP's recommended works within the Moreton Bay Marine Park.

Sections 43 and 44 of the *Marine Parks Regulation 2017* provide for the permittee to authorise another person to conduct an activity that is authorised under the permission, provided the permit has a condition to this effect. This would allow a marine park permit to be issued to Council for works within the marine park at Amity Point and for Council to authorise landowners to carry out the works when necessary.

As noted above, the boundary of the marine park is generally HAT with freehold land excluded. Works to protect private structures should be within the freehold land where possible. While the extension of works from freehold land (e.g. the toe of a seawall) into the marine park can be considered, reclamation extending into the marine park is not supported.

Recreational Areas Management Act 2006

Queensland has seven recreational areas established under the *Recreational Areas Management Act 2006,* including parts of North Stradbroke Island. In declared recreation areas, nature-based recreation is encouraged but is carefully planned and managed to protect these places for conservation. The Act outlines best practice whilst in a Recreation Area, as well as the penalties that apply for non-compliance.

In November 2011, those areas which had previously been managed under the Act by Redland City Council were declared the *Minjerribah Recreational Area*. Straddie Camping now manages these areas under a new management framework operated by Indigenous Business Australia in conjunction with the Quandamooka People. The Recreational Areas Management regulations apply to the Minjerribah Recreational Area to ensure that the island's foreshores, dune systems, bushland and freshwater systems are appropriately cared for to maintain their visual amenity, and to protect the island's unique natural and Aboriginal cultural heritage.

Those parts of the Minjerribah Recreational Area within the Amity Point SEMP area are shown in Figure 8-5. They include the Amity Point Camping Ground (south of the existing boat ramp), and the foreshore of Amity Beach down to Low Water Mark.

FIGURE 8-5 DESIGNATED MINJERRIBAH RECREATIONAL AREA

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Fisheries Act 1994

The *Fisheries Act 1994* sets out Queensland's Department of Agriculture and Fisheries responsibilities for the economically viable, socially acceptable and ecologically sustainable development of Queensland's fisheries resources. A fish habitat area (FHA) is declared over the Myora-Amity Banks area - covering coastal waters offshore (adjacent to Rainbow Channel) and to the south of Amity Point. These areas are shown in Figure 8-6. Seagrass beds occur in these areas.

FIGURE 8-6 FISH HABITAT AREAS

All marine plants are protected under Queensland law through provisions of the *Fisheries Act 1994*. Approval is required under the *Planning Act 2016* for removal of marine plants and works in a declared fish habitat area.

The area of Amity Point prone to coastal erosion is not directly adjacent to the FHA or mapped seagrass areas. However marine plants may grow locally and will need to be assessed where works recommended under this SEMP occur.

Forestry Act 1959

Under the provisions of the *Forestry Act 1959,* the Department of Agriculture and Fisheries sells quarry material from land where such material has been reserved to the State - including in State forests, timber reserves, forest entitlement areas and State plantation forests. Sales permits are issued by the Department to enable local authorities, government agencies and private sector quarry operators to utilise State-owned quarry material.

Because the definition of 'mineral' in the *Mineral Resources Act 1989* excludes most materials used for construction purposes, quarry sites are mostly assessed, approved and administered by local government authorities. The *Planning Regulations 2017 - Schedule 10 (Environmentally relevant activities)* states that dredging or extracting more than 10,000 tonnes of material a year from the North Stradbroke Island Region is Prohibited Development.

Native Title (Queensland) Act 1993

The *Native Title (Queensland) Act 1993* is a state act which ensures that Queensland law is consistent with the Commonwealth *Native Title Act 1993* and validates pre-existing rights of the state. Certain past acts of the state, such as freehold grants, some leasehold grants, and public works are validated, such that they extinguish native title in relation to the land or waters concerned. Other rights such as existing ownership of natural resources, water and fishing access rights and public access to and enjoyment of beaches and other public places are confirmed by the act. Native title determinations and ILUAs made under the commonwealth's *Native Title Act 1993* are valid under this state Act.

Aboriginal Cultural Heritage Act 2003

In proclaiming the *Aboriginal Cultural Heritage Act 2003*, the state government provided statutory protection to all of Queensland's Aboriginal cultural heritage, irrespective of whether or not that heritage is known to land users.

To achieve this outcome, a formal statutory "duty of care" by which anyone carrying out any activity on any land (including freehold) anywhere in Queensland is required by law to take all reasonable and practicable measures to ensure their activity does not harm Aboriginal cultural heritage. Aboriginal cultural heritage values should not be confused with native title. As with non-Aboriginal heritage values, Aboriginal cultural heritage can exist on an area regardless of the nature of land tenure. The existence of Aboriginal cultural heritage in an area does not mean that native title exists over that area.

Compliance with the *Aboriginal Cultural Heritage Act 2003* should be determined at the planning stage of any coastal protection works. Guidelines relating to the duty of care required under the Act have been published by the Department of Aboriginal and Torres Strait Islander Partnerships[30].

Land Act 1994

The *Land Act 1994* regulates the management of non-freehold land for the benefit of the people of Queensland. The Act invokes principles of sustainable resource use and development, consideration of land capability, allowing sustainable development in the context of the State's planning framework, ensuring land is allocated to people or bodies who will facilitate the most appropriate use for the benefit of the people of Queensland, retention of land for community purposes, and protection of environmentally and culturally valuable and sensitive areas and features.

In coastal areas, this means that any development of land other than private freehold land must demonstrate a clear public benefit, or demonstrate resource allocation.

Vegetation Management Act 1999

The *Vegetation Management Act 1999* prohibits clearing of regional ecosystems (i.e. native vegetation communities) unless it is for a relevant purpose. Clearing may be exempt from the approval process where listed under Schedule 24 of the SP Regulation.

Mapping of regional ecosystems and remnant vegetation for Amity Point shown in Figure 8-7 and Figure 8-8. This shows that almost all the freehold land at Amity Point is either cleared or is non-remnant vegetation. Land further inland and along the Northern Reach behind Amity Beach is marked as essential habitat for protected species. This restricts clearing of vegetation in this area under any development approval.

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[30] Aboriginal Cultural Heritage Act 2003. Duty of Care Guidelines. Gazetted date: 16 April 2004. Prepared by the Department of Aboriginal and Torres Strait Islander Partnerships. Available online at: https://www.datsip.qld.gov.au/resources/datsima/people-communities/cultural-heritage/duty-of-care-guidelines.pdf

FIGURE 8-7 REMNANT VEGETATION

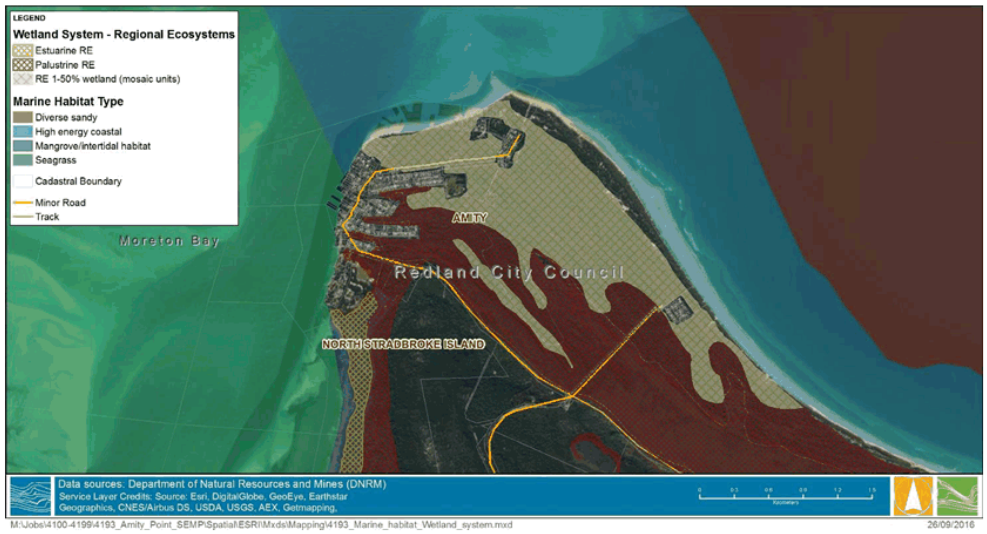

FIGURE 8-8 WETLAND AND MARINE REGIONAL ECOSYSTEMS

Queensland Heritage Act 1992

The object of the *Queensland Heritage Act 1992* is to provide for the conservation of Queensland's cultural heritage for the benefit of the community and future generations. This is achieved in part by the establishment of a register of places and areas of State cultural heritage significance called the Queensland Heritage Register. Any development that will occur in (or in association with) a heritage place listed on the Register by

the Queensland Heritage Council requires assessment. However, no State heritage places have been identified with the SEMP study area.

State Planning Policy 2/10 Koala Conservation in South-East Queensland

State Planning Policy 2/10 (SPP 2/10): Koala Conservation in South-East Queensland aims to ensure that Koala habitat conservation is taken into account during planning processes in South-East Queensland. Where the recommendations of this SEMP have consequences for the existing koala habitat in the Amity Point area, the requirements of SPP 2/10 need to be taken into account in the SEMP.

As shown in Figure 8-9, much of the SEMP area is mapped as having koala habitat values. It is therefore important to avoid disturbing areas marked as having bushland or rehabilitation value for koalas. This may apply in terms of erosion mitigation strategies that require clearing of these areas for activities such as accessing or installing erosion protection development works.

FIGURE 8-9 KOALA HABITAT CATEGORIES

8.5.3 Other Considerations

Consultation with the following agencies may be required regarding the legislation detailed previously:

- Department of Environment and Science (DES) for matters concerning foreshore protection works, conservation values, tidal quarry material allocations, management under the QCP; marine parks and NC Act permits;
- Department of Natural Resources, Mines and Energy (DNRME) for matters concerning the allocation and use of State Land, vegetation management, Indigenous cultural issues and land title;
- Department of Agriculture and Fisheries (DAF) for matters concerning fisheries resources, marine plants, FHAs, and quarry operations.

8.6 Local Government

The Amity Point SEMP lies within the local government jurisdiction of Redland City Council. Under *the Local Government Act 2009* (LG Act) this jurisdiction extends offshore to the high tide mark. However, Council also has jurisdiction for development assessment over its local tidal area. The LG Act permits local governments to acquire jurisdiction from the State Government over the foreshore between the low water and high water lines for special purposes such as foreshore protection works.

Redland City Council controls land use and activities under the local planning scheme (under the SP Act) and Local Laws (LG Act).

8.6.1 Redlands Planning Scheme

The current *Redlands Planning Scheme* (Version 7.1) came into effect on the 17th June 2016. It is the primary local planning instrument governing all planning and development with the Redland City Council area.

Codes, zones and overlays are used to achieve the outcomes identified in the Planning Scheme. The relevant Planning Scheme map for North Stradbroke Island is shown in Figure 8-10.

The urban residential area of Amity Point (which includes locations along the alignment of the existing flow slide barrier in the Central Reach and west of Ballow Street) has been zoned as sub-area UR3. Within this area, future buildings and structures are to be demountable and capable of being removed. All buildings, structures or infrastructure associated with the use or other development should not extend any further seaward than existing uses and development of the site.

8.6.2 Other Local Government Instruments and Strategies

When determining appropriate erosion mitigation strategies for this SEMP, other relevant planning instruments have been considered. These have included:

Redlands 2030 Community Plan. The Redlands 2030 Community Plan sets out Council's long term vision and outlines eight vision outcomes for Redland City.

Corporate Plan 2015 – 2020. The Corporate Plan guides how Council will direct planning and resources to deliver outcomes consistent with the *Redlands 2030 Community Plan*. It informs annual operational planning and budget, and provides a road map against which Council's performance will be measured. Amongst other outcomes it aims to ensure the City's community is ready for (and adapting to) changing coastlines, storm tides and severe weather; and that the City's residents and visitors can easily access local foreshores and use recreational foreshore infrastructure for boating and non-boating activities.

North Stradbroke Island Economic Transition Strategy, 2016. In May 2016, the Queensland Parliament passed legislation that will substantially cease sand mining on the island by 2019. The strategy sets out the Queensland Government's plan for transitioning the island to become an eco-tourism hub. The strategy was released on 01st September 2016 following stakeholder and community consultation.

Confronting Our Climate Future. 2010. A strategy to the year 2030 for Redland City to reduce greenhouse gas emissions, respond to climate change, and achieve energy transition. It includes mitigation and adaptation strategies regarding coastal erosion and storm tide / sea level inundation.

Biodiversity Strategy, 2008 – 2012. The biodiversity strategy highlights the extent and quality of the local biodiversity and threatening processes. It outlines key actions to address long-term protection and enhancement.

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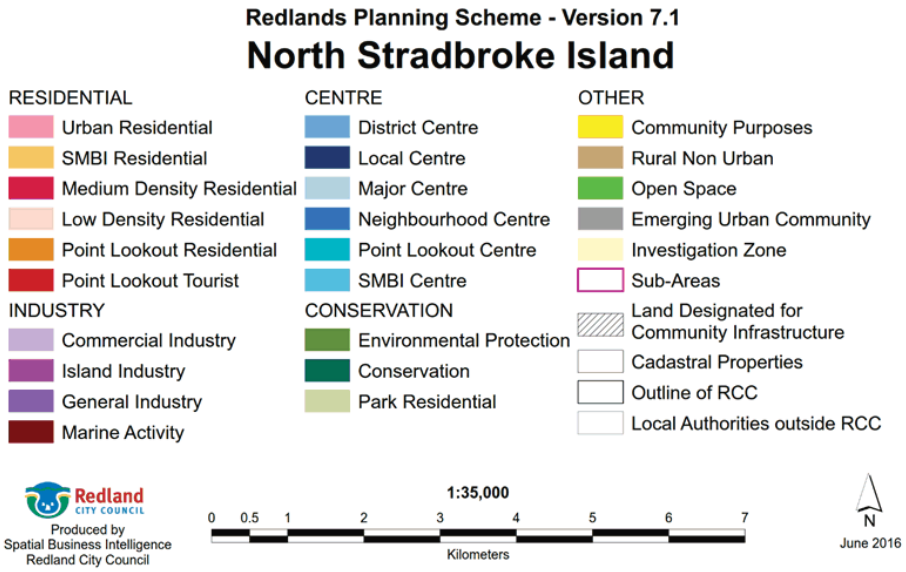

FIGURE 8-10 REDLANDS PLANNING SCHEME MAP – NORTH STRADBROKE ISLAND, AMITY POINT INSET

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9. RECOMMENDED SHORELINE EROSION MANAGEMENT

9.1 Southern Reach - Camping Ground Foreshore

9.1.1 Recommended Strategy

The recommended erosion mitigation strategy along the Southern Reach is to undertake beach nourishment within each of the three existing beach compartments; and to construct cut-off seawalls behind each beach where an appropriate structure does not already exist.

Under a beach nourishment strategy, the width and height of the beach slope fronting the camping ground will be increased. Apart from increasing the resilience to erosion, the benefit to the area is that the overall amenity of this much-valued foreshore would be enhanced for residents and visitors.

The volume of sand required to create an adequate erosion buffer along this foreshore is primarily determined by the length of the existing groynes which can contain the naturally preferred characteristics of each triangular-shaped sand fillet. There is no scope to increase the length of the existing groynes (and therefore the volume/length of retained beach) since each groyne already extends out to near the edge of Rainbow Channel.

Sand brought in for placement on the foreshore should have the same grain size (or slightly larger) as that currently on the beach. It must also be of uniform grading - this being a physical characteristic of naturally occurring beach sand.

The prevailing coastal processes along the southern precinct of Amity Point are such that the naturally preferred plan orientation of beaches between the existing groynes is for them to face north-west towards a bearing of approximately 312°. This means that additional sand placed along the foreshore will be moved southward against each groyne to adopt this natural plan alignment. As a consequence, sand builds up against each groyne so as to form a triangular-shaped fillet on the southern end of each beach compartment. However, the northern part of the beach compartment will gradually become depleted of sand, thereby negating any benefit of beach nourishment at those particular locations. This will require a seawall in the northern pockets of each beach compartment to mitigate further erosion at those places.

The beach nourishment and required seawalls will need to be designed by appropriately qualified coastal engineers as part of the implication of this strategy. Nevertheless, approximate requirements are presented in Table 9-1. The recommended erosion mitigation strategy is summarised in Figure 9-1.

TABLE 9-1 CHARACTERISTICS OF RECOMMENDED STRATEGY FOR SOUTHERN REACH

Location	Approximate sand volume	Approximate seawall length
Northern-most of the three beach compartments	800 m^3	55 metres
Central of the three beach compartments	1,700 m^3	n/a
Southern-most of the three beach compartments	2,500 m^3	110 metres
Totals	**5,000 m^3**	**165 metres**

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FIGURE 9-1 RECOMMENDED EROSION MITIGATION STRATEGY – SOUTHERN REACH

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The strategy for mitigating future erosion threats along the Southern Reach is as follows:

- Construction of approximately 165 metres of seawalls to be buried at the rear of the northern and southern beach compartments. This consists of approximately 55 metres along the northern compartment and 110 metres on the southern compartment. The characteristics of these two seawalls are to be determined by detailed coastal engineering design. It is likely that a rock armour sourcing study will need to be undertaken as part of the design stage.
- Placement of approximately 5,000 cubic metres of sand (of appropriate grading and size) within the existing three beach compartments. This consists of approximately 800 cubic metres along the northern compartment, approximately 1,700 cubic metres on the central compartment, and approximately 2,500 cubic metres on the southern compartment. The characteristics of the sand nourishment works are to be determined by detailed coastal engineering design. It is likely that a sand sourcing study will need to be undertaken as part of the design stage.
- Undertake a structural audit of the existing rock-armoured seawall to the south of the three beach compartments to confirm its future effectiveness as a foreshore defence structure.
- Monitor the performance of the beach nourishment by annual surveys of the foreshore profile.
- Undertake future beach renourishment campaigns to reinstate beach widths should sand losses result from severe storms and/or future climate change.
- Since Rainbow Channel is migrating gradually towards Amity Point increasing the risk of flow slides adversely affecting the foreshore, it is also recommended that an annual bathymetric survey of Rainbow Channel be undertaken to provide a better understanding of how this potential risk is developing. This will determine the likelihood, the timescales and extent that the foreshores of the Southern Reach are becoming more vulnerable to future damage by flow slide events because of changing bathymetry in the migrating channel. This will allow for the planning of appropriate future strategies to mitigate the emerging threat.

9.1.2 Cost Estimate

Seawalls

Whilst the structural form of the seawalls needs to be determined by detailed coastal engineering design during the implementation phase of this SEMP, experience suggests it is likely that the most cost effective outcome will be rock-armoured structures rather than sand-filled geotextile bags or pre-cast concrete units. That being the case, it is estimated that approximately 475 cubic metres (around 850 tonnes) of rock will be required to construct the seawalls.

The strategy for mitigating the erosion threat on the Central Reach also involves a requirement for rock armour. Therefore, for the purposes of preparing cost estimates for seawall construction on the Southern Reach, it is assumed that the necessary procedures would be implemented for rocks to be commercially available from the same local source rather than be imported from the mainland to construct the seawalls.

Sand for beach nourishment

A previous beach nourishment exercise was undertaken on the foreshore frontage of the camping ground. Sand was supplied from a commercial source at Ningi near Bribie Island. Whilst that may have been an appropriate source at that time, other viable sources may now be available.

For example, meetings with the Department of Agriculture and Fisheries and the Department of Natural Resources Mines and Energy (pers. comm. 13th January, 2016) indicate that Redland City Council acts as Trustee for an approximately 4-hectare sand reserve on Fisherman's Track. Whilst this is reputedly undeveloped at present, it may be a viable source of sand for the approximately 5,000 cubic metres needed for beach nourishment on the Southern Reach.

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Alternatively, a viable source for beach nourishment purposes might be sand dredged by the Port of Brisbane which is currently stockpiled within the Port's Fisherman Island precinct. That sand could be loaded onto an appropriate barge, transhipped to Amity Point then offloaded directly onto the foreshore for subsequent placement into the existing beach compartments along the Southern Reach.

It is recommended that a Sand Sourcing Study be commissioned by Redland City Council as part of the detailed design phase of the SEMP's implementation to determine an appropriate sand source for beach nourishment.

Estimated Cost of Implementation

For the purposes of developing cost estimates, it is assumed that local sources of sand for beach nourishment and armour rocks for seawall construction are available on North Stradbroke Island. Table 9-2 below provides a summary of the estimated costs to implement the recommended strategy for mitigating the erosion threat along the Southern Reach. The estimate excludes any costs associated with establishing the local sand source and any upgrading of Fisherman's Track required for construction access.

TABLE 9-2 COST ESTIMATE FOR RECOMMENDED MITIGATION STRATEGY – SOUTHERN REACH

Activity	Cost	Annual Cost
Project Design and Approvals		
Site survey	$5,000	
Sand sourcing study	$15,000	
Structural audit of existing seawall	$7,500	
Design of seawalls & beach nourishment	$30,000	
Obtain appropriate approvals	$17,500	
Construction Works		
Construct approx. 165m of buried rock seawall	$112,500	
Procure and place 5,000m^3 of sand	$87,500	
Allowance for annual renourishment		$5,000
Project Monitoring		
Annual survey of beach (additional to survey of Rainbow Channel)		$5,000
Annual bathymetric survey of Rainbow Channel side slopes	*refer costs for Central Reach*	
Totals	**$275,000**	**$10,000**

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9.1.3 Implementation Schedule

The various tasks associated with the implementation of the recommended strategy are shown in Table 9-3.

TABLE 9-3 SOUTHERN REACH – IMPLEMENTATION SCHEDULE

Activity	Month						
	1	2	3	4	5	6	7
Project Design and Approvals							
Site survey	■						
Sand sourcing study	■						
Structural audit of existing seawall	■						
Design of seawalls & beach nourishment	■	■					
Obtain appropriate approvals			■	■			
Construction Works							
Tender for Works					■		
Construct approx. 165m of buried rock seawall						■	
Procure and place 5,000m^3 of sand							■

9.2 Central Reach - Flow Slide Barrier

9.2.1 Recommended Strategy

As discussed in earlier sections of this SEMP, in recent times the existing flow slide barrier has been effective in preventing the development of retrogressive flow slides to damaging proportions. A related outcome of terminating flow slides in the submerged side slopes of Rainbow Channel is that the structure has also maintained the existing foreshore alignment despite the eastward migration of the channel.

Therefore, it is important to the continuing function of this coastal defence structure that it be repaired following any damage caused by retrogressive flow slides. This includes repairs and improvements to the northern-most end of the flow slide barrier (at the confluence of the Central and Northern Reaches) whenever such events cause damage in this area.

The recommended erosion mitigation strategy for the Central Reach is to support and enhance the effectiveness of the current erosion management practice of repairing damage to the existing flow slide barrier and reinstating the foreshore whenever necessary following flow slide events - by placing additional rock armouring.

This basically entails:

- Adopting a flow slide barrier as the necessary coastal protection works required to manage the erosion threat along the Central Reach of Amity Point.
- Recognising that the existing rock placements along this shoreline are consistent with conceptual structural requirements for a flow slide barrier and to seek formal approval of the existing barrier as substantially completed tidal works.

- Monitoring the continued structural adequacy of the flow slide barrier, through regular bathymetric surveys to identify emerging vulnerabilities to potential flow slides - and to inform structural reinforcement and repair needs.
- Formalising a maintenance regime of periodic "topping up" of rocks to maintain the effectiveness of the structure in mitigating the threat of flow slides. Where this is within the footprint of the approved structure it can be considered as maintenance works required to preserve the integrity and function of the flow slide barrier.

The only location along the entire barrier where there is currently evidence that a flow slide might undermine and damage the barrier is on the foreshore frontage of Old School House Park. There is merit in adopting a proactive strategy of reinforcing the flow slide barrier at this location - by placing approximately 45cu.m./m of rock either directly into the front upper slopes of the armoured foreshore above RL-5m AHD, or onto the seabed offshore at around the RL-5m AHD depth contour. Both of these options are consistent with maintaining conceptual requirements for a flow slide barrier.

Approval for both the Flow Slide Barrier and for its repair following damage

In the past, repairs to the flow slide barrier by foreshore property owners have been viewed as being unapproved (or unlawful) works in the context of Queensland's *Coastal Protection and Management Act 1995*. This is because it had not been approved as prescribed tidal work[31] under the *Sustainable Planning Act 2009* (SPA).

To date, considerations for its approval have been based on the notion that this rock-armoured structure is a seawall. A seawall is a conventional response to conventional erosion processes – such as those caused by wave action and/or a deficit in the supply of littoral sand. Where such structures had formal approval under the SPA, repairs were authorised to be undertaken to reinstate their primary function whenever they were damaged.

The rock structure along the foreshore of the Central Reach currently does not have the status of approved tidal works. A requirement for the implementation of the recommended erosion mitigation strategy is that this physical barrier to retrogressive flow slides be formally approved under the *Planning Act 2016* (formerly SPA), thereby enabling its function to be maintained in the event of damage. This will require an application for prescribed tidal works relating to the flow slide barrier. The findings of this SEMP can be used to provide technical support for that application. It is expected that the conceptual design for the flow slide will need to be further refined by a subsequent detailed engineering design phase to also provide support to the approval application process.

Nevertheless, Section 166 of the *Planning Act 2016* allows tidal works to be undertaken without a development approval in an emergency[32]. Circumstances that constitute an emergency are provided in Section 166 of the *Planning Act 2016* , and include events that endanger the life or health of people; and that threaten the structural safety of buildings. Large retrogressive flow slides on the foreshores of Amity Point are likely to be considered as such an emergency.

An exemption for prior approval of repair works to the flow slide barrier applies provided those repairs are in accordance with a Safety Management Plan, and having formal endorsement by a Registered Professional Engineer of Queensland that the completed works are in a safe condition. However, as soon as "reasonably

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[31] Prescribed tidal work is defined in s.14 and 15 of the *Coastal Protection and Management Regulation 2003*.

[32] *Necessary operational work that is tidal works - Guideline (version 3)*. Document issued by Queensland Department of Environment and Science regarding the processes and requirements for emergency tidal works under s.166 of the *Planning Act 2016*. Publication number ESR/2016/2045, version 3, dated 03 July 2017.

practicable after starting the emergency works", a development application is to be made. Should that development application be refused, then the emergency repair works must be removed.

So simply having a Safety Management Plan in place does not invalidate the fundamental need for development approval of the flow slide barrier. Nevertheless, a Safety Management Plan for emergency repairs to the existing flow slide barrier has been prepared as a component of this SEMP. That document is included as Appendix G.

The challenge to the process of formal application and approval is that the flow slide barrier forms the bayside frontage of several private properties as well as public land. There are in total 34 land parcels having the flow slide barrier along their frontage. This includes four freehold parcels alongside Old Schoolhouse Park, each having a narrow reserve in front (varying between 2m and 6m width), but still with at least part of the buried structure within their boundaries.

The allocation of foreshore lengths to the various land tenures along the Central Reach is presented below in Table 9-4.

TABLE 9-4 LAND TENURE ALONG THE ALIGNMENT OF THE EXISTING FLOW SLIDE BARRIER

Tenure	No. of land parcels	Foreshore Length	Foreshore Length (%)
Freehold	23	526 metres	55.8%
State Land	5	141 metres	15.0%
Reserve	2	168 metres	17.8%
end of public roads	4	107 metres	11.4%
Totals	34	942 metres	100%

Monitoring future effectiveness of the flow slide barrier

Given that Rainbow Channel is migrating towards Amity Point, it is recommended that a structural audit of the flow slide barrier be undertaken at least annually - using information from an annual bathymetric survey of the vulnerable side slopes of Rainbow Channel. This will determine whether (as a consequence of changing bathymetry in Rainbow Channel) sections of the existing structure are becoming more vulnerable to future damage. This will allow for the planning of structural reinforcement and/or repair campaigns to the flow slide barrier.

The annual bathymetric survey should comprise a full hydrographic survey of the channel bank using both multibeam and single beam sounders. The physical extent of the survey is to be no less than that covered by the survey undertaken in December 2015 (Port of Brisbane, 2015). Included in the deliverables of each annual survey is to be a comparison with previous surveys to clearly indicate the extent of changes to the local bathymetry of Rainbow Channel. Comparisons with earlier transect surveys is also to be undertaken - comparable in scope and detail to those in Appendix A.

Availability of suitable rock armour for repairs to the flow slide barrier

In the past, rock for repairs to the flow slide barrier along the Central Reach has been available from two quarry sources on North Stradbroke Island. However, since the 2011 native title consent determination there is ongoing dialogue with the relevant stakeholders; and it will be necessary to establish administrative and financial structures to facilitate the supply of rock armour for Council projects and by Council to third parties..

A critical aspect determining the effectiveness of repairs to the flow slide barrier is having rocks placed to recharge the upper slopes as soon as possible after each damaging event. Apart from having the appropriate approvals in place to undertake necessary repairs, this will require:

- Ensure availability and access to a suitable source of rock, with the intent being to create a stockpile of rock ready for emergency repairs. This stockpile could be located at a location near Amity Point;
- Having contracts and/or arrangements in place for the appropriate loading, carriage and placement of rocks into damaged areas of the barrier as soon as possible following an event. This could be through commercial arrangements with private earthmoving contractors based on North Stradbroke Island;
- Having contracts and/or arrangements in place for access and the initiation of repair works to damaged areas of the flow slide barrier where landowners immediately affected by the threat are not residing at Amity Point and/or may not be readily contacted;
- Having contracts and/or agreements in place for the payment of repairs to damaged areas of the flow slide barrier.

To secure a long-term, sustainable and economic source of rock for repairs, it is recommended that a *Rock Armour Supply Study* be commissioned by Council to investigate and determine the procedures necessary to facilitate the appropriate sourcing and placement of rocks into an approved flow slide barrier along the Central Reach.

Payment for repairs to the flow slide barrier

To date, the cost of constructing and intermittently repairing the flow slide barrier along the Central Reach has been met by the local foreshore property owners. It is recommended that Council engage with other stakeholders (and obtain assistance and advice on legal issues as required) to determine an appropriate funding arrangement for future maintenance works to the rock-armoured flow slide barrier.

Access for facilitating repairs to the flow slide barrier

The availability of access for trucks carrying rocks to the foreshore along the alignment of the flow slide barrier is varied. In many cases the residential home on private properties is of a size or location that prevents vehicular access from the street-side entrance through to the foreshore. In such cases the only available access route for construction plant and equipment to effect repairs to a damaged section of the flow slide barrier is via a nearby property without that impediment, then along the foreshore. In the past, this has entailed removing fences; traversing lawns and gardens; and removing and/or pruning established trees of neighbouring properties.

There appears to be an informal agreement amongst the present owners of foreshore properties that such access ought to be available, but any damage caused by this traffic is to be rectified at no cost to the affected property owners.

The ability to repair damaged sections of the flow slide barrier as soon as possible after each event in many cases relies on the goodwill of neighbouring residents. Whilst this informal arrangement is reputedly effective at present, there is no surety that it will remain so in future. There is merit in having present foreshore property owners investigate and implement a more formal agreement for such access that will be binding on existing and future owners of their property. It is beyond the scope of this SEMP to determine the need, and the planning and legislative frameworks, for any such agreements.

9.2.2 Cost Estimate

The estimates presented in this SEMP do not include costs associated with:

- Obtaining development approval for the flow slide barrier;
- Securing an on-going cost-effective and sustainable source of rocks for any future repairs;
- Payment provisions for repairs; and

- The securing of formal agreements for access by construction equipment for repairs.

The estimated costs associated with implementation of the recommended erosion mitigation strategy along the Central Reach are summarised below in Table 9-5.

TABLE 9-5 COST ESTIMATE FOR RECOMMENDED MITIGATION STRATEGY – CENTRAL REACH

Activity	Initial Cost	Annual Cost
Annual bathymetric survey of Rainbow Channel side slopes		$17,500
Annual structural audit of flow slide barrier		$7,500
Totals	*nil*	**$25,000**

9.3 Northern Reach - Amity Beach

9.3.1 Recommended Strategy

The recommended erosion mitigation strategy along the Northern Reach is to maintain the existing strategy of non-intervention along Amity Beach, but to monitor future shoreline behaviour.

As discussed in Section 4.6, the erosion threat to private landholdings with frontages on Amity Beach is caused primarily by erosion "hot-spots" that migrate along the shoreline. The extent, location and severity of such hot-spots is influenced by the extent of the changing sand spit that forms at the eastern end of the beach, in conjunction with the severity of future storm events.

Given the relationship between the erosion threat and the processes shaping the sand spit, there is considerable merit in further investigations to better understand the local coastal processes on Amity Beach and predict emerging threats. Such investigations would require the establishment and operation of a Monitoring Survey Program.

Rather than just surveying along transects, recent developments in surveying technology now make it cost effective to obtain a full three-dimensional (3-d) representation of beaches utilising unmanned aerial vehicles (UAVs). This allows for more accurate calculations of changes in beach volumes over time. Repeated 3-d acquisition allows for accurate determinations of where, and how much, sand is being lost from the beach profile and where sand is accreting. It is recommended that the following monitoring aspects be included in the strategy for mitigating the erosion threat on the Northern Reach:

- Monitoring Survey Program: Stage 1
  - The foreshore from 500 metres east of the sand spit (i.e. along the adjacent Flinders Beach) to a location at the northern end of the flow slide barrier of the Central Reach be captured by 3-d survey. This should be undertaken during a low spring tide to maximise the coverage of nearshore areas. It is to include the entire sand spit at the eastern end of Amity Beach.
  - Initially this 3-d survey should be undertaken at least twice yearly for three years, with extra surveys undertaken as soon as possible after major erosion events on Amity Beach.
- Coastal Processes Assessment
  - Upon completion of Stage 1 of the Monitoring Survey Program in three years' time, a *Coastal Processes Assessment* should be undertaken by suitably qualified coastal engineers/scientists to determine the erosion processes affecting Amity Beach. This would utilise the results of the Monitoring Survey Program to that time, in conjunction with analysis of aerial photographs, and

reference to offshore waves measured by DES's directional Waverider station in deep water off Cape Moreton.

- The requirements for further surveys under the Monitoring Survey Program would be determined by the Coastal Processes Assessment. However, this subsequent Stage 2 of the Monitoring Survey Program is likely to entail at least annual 3-d surveys.
- The necessity for any erosion mitigation strategy for the Northern Reach would be addressed by the Coastal Processes Assessment.

9.3.2 Cost Estimate

The estimated costs associated with implementation of the recommended erosion mitigation strategy along the Northern Reach are summarised below in Table 9-6.

TABLE 9-6 COST ESTIMATE FOR RECOMMENDED MITIGATION STRATEGY – NORTHERN REACH

Activity	Initial Cost	Annual Cost
Monitoring Survey Program		
Stage 1: Initial year of survey (2No.), including establishing controls	$15,000	
Stage 1: twice yearly thereafter for two years		$10,000
Stage 2: assumed annually after initial 3 years		$5,000
Coastal Processes Assessment – in three years' time		
Analysis of aerial photographs	$7,500	
Analysis of wave records	$7,500	
Coastal Engineering Assessment & reporting	$20,000	
Totals	**$50,000**	**$10,000 then $5,000**

4193-01_R03v07

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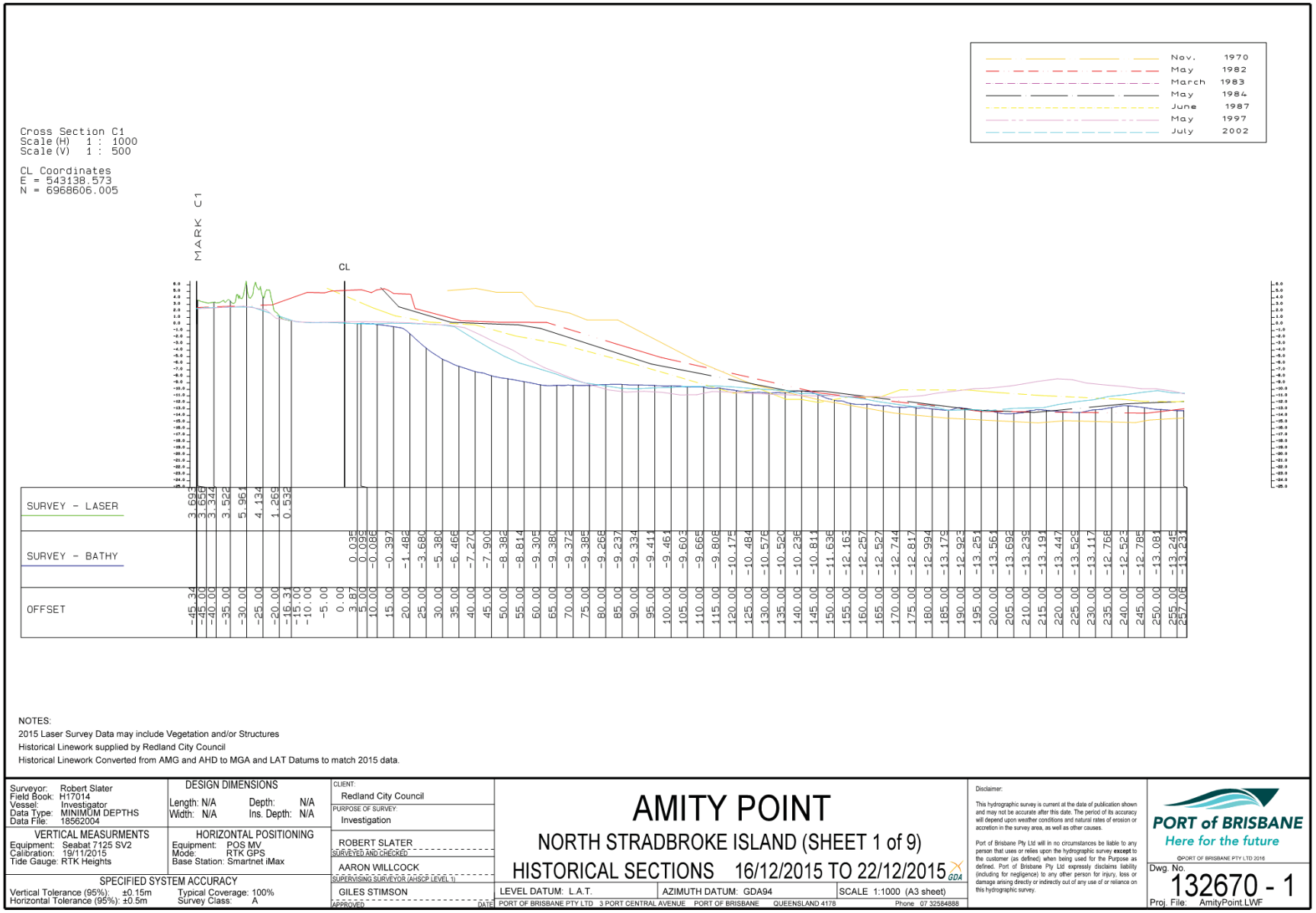
APPENDIX A
COMPARISON OF HISTORICAL TRANSECT SURVEYS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May 1982
March 1983
May 1984
June 1987
May 1997
July 2002
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Scale(V) 1 : 500
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N = 6968606.005
MARK C1
CL
SURVEY - LASER
SURVEY - BATHY
OFFSET
NOTES:
2015 Laser Survey Data may include Vegetation and/or Structures
Historical Linework supplied by Redland City Council
Historical Linework Converted from AMG and AHD to MGA and LAT Datums to match 2015 data.
Surveyor: Robert Slater
Field Book: H17014
Vessel: Investigator
Data Type: MINIMUM DEPTHS
Data File: 18562004
DESIGN DIMENSIONS
Length: N/A Depth: N/A
Width: N/A Ins. Depth: N/A
VERTICAL MEASURMENTS
Equipment: Seabat 7125 SV2
Calibration: 19/11/2015
Tide Gauge: RTK Heights
HORIZONTAL POSITIONING
Equipment: POS MV
Mode: RTK GPS
Base Station: Smartnet iMax
SPECIFIED SYSTEM ACCURACY
Vertical Tolerance (95%): ±0.15m
Horizontal Tolerance (95%): ±0.5m
Typical Coverage: 100%
Survey Class: A
CLIENT: Redland City Council
PURPOSE OF SURVEY: Investigation
ROBERT SLATER
SURVEYED AND CHECKED
AARON WILLCOCK
SUPERVISING SURVEYOR (AHSCP LEVEL 1)
GILES STIMSON
APPROVED DATE
AMITY POINT
NORTH STRADBROKE ISLAND (SHEET 1 of 9)
HISTORICAL SECTIONS 16/12/2015 TO 22/12/2015 GDA
LEVEL DATUM: L.A.T.
AZIMUTH DATUM: GDA94
SCALE 1:1000 (A3 sheet)
PORT OF BRISBANE PTY LTD 3 PORT CENTRAL AVENUE PORT OF BRISBANE QUEENSLAND 4178 Phone 07 32584888
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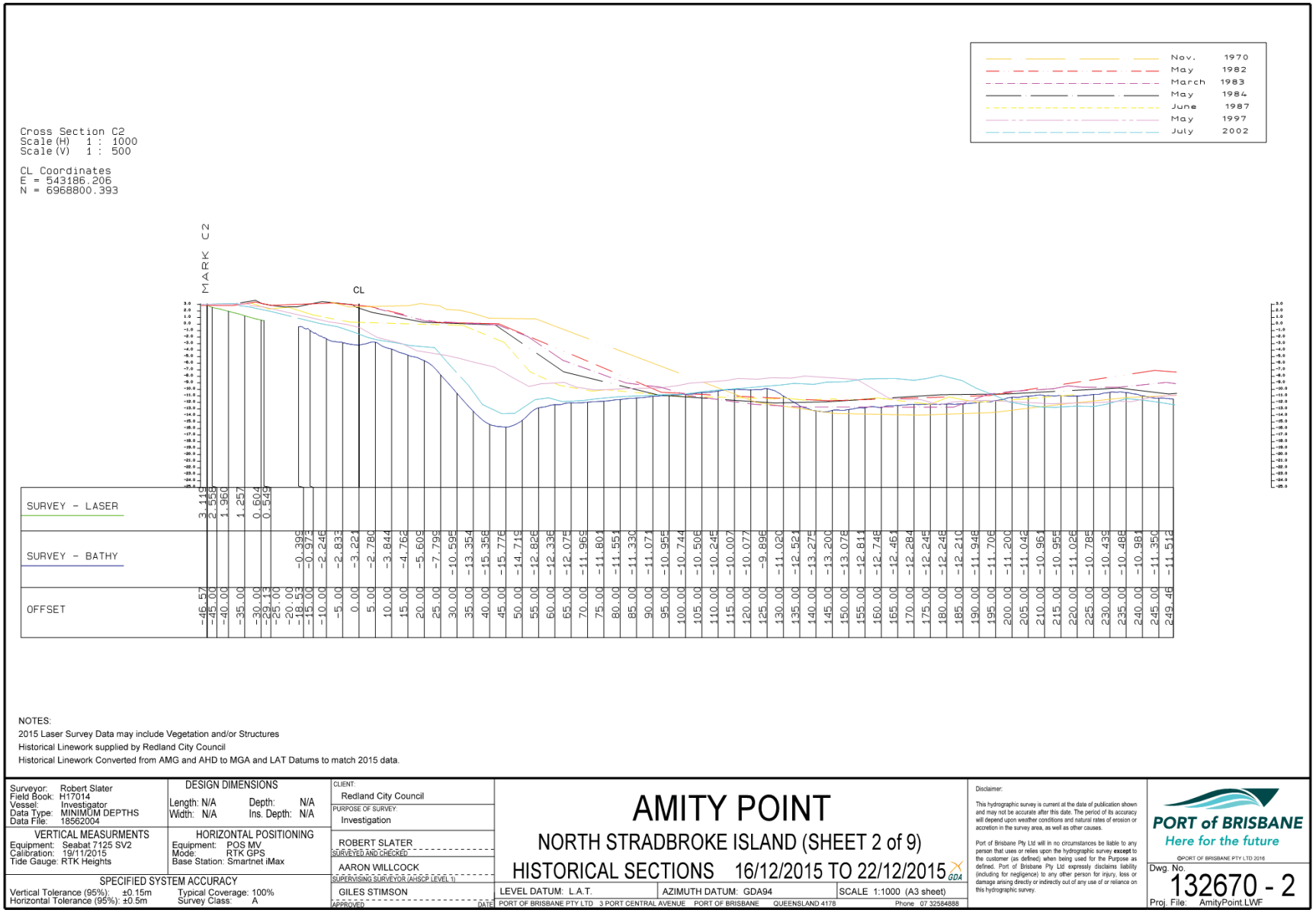

NOTES:
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Historical Linework supplied by Redland City Council
Historical Linework Converted from AMG and AHD to MGA and LAT Datums to match 2015 data.

Surveyor: Robert Slater
Field Book: H17014
Vessel: Investigator
Data Type: MINIMUM DEPTHS
Data File: 18562004

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Tide Gauge: RTK Heights

HORIZONTAL POSITIONING
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Mode: RTK GPS
Base Station: Smartnet iMax

SPECIFIED SYSTEM ACCURACY
Vertical Tolerance (95%): ±0.15m Typical Coverage: 100%
Horizontal Tolerance (95%): ±0.5m Survey Class: A

CLIENT: Redland City Council
PURPOSE OF SURVEY: Investigation
ROBERT SLATER SURVEYED AND CHECKED
AARON WILLCOCK SUPERVISING SURVEYOR (AHSCP LEVEL 1)
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NORTH STRADBROKE ISLAND (SHEET 2 of 9)
HISTORICAL SECTIONS 16/12/2015 TO 22/12/2015 GDA

LEVEL DATUM: L.A.T. AZIMUTH DATUM: GDA94 SCALE 1:1000 (A3 sheet)

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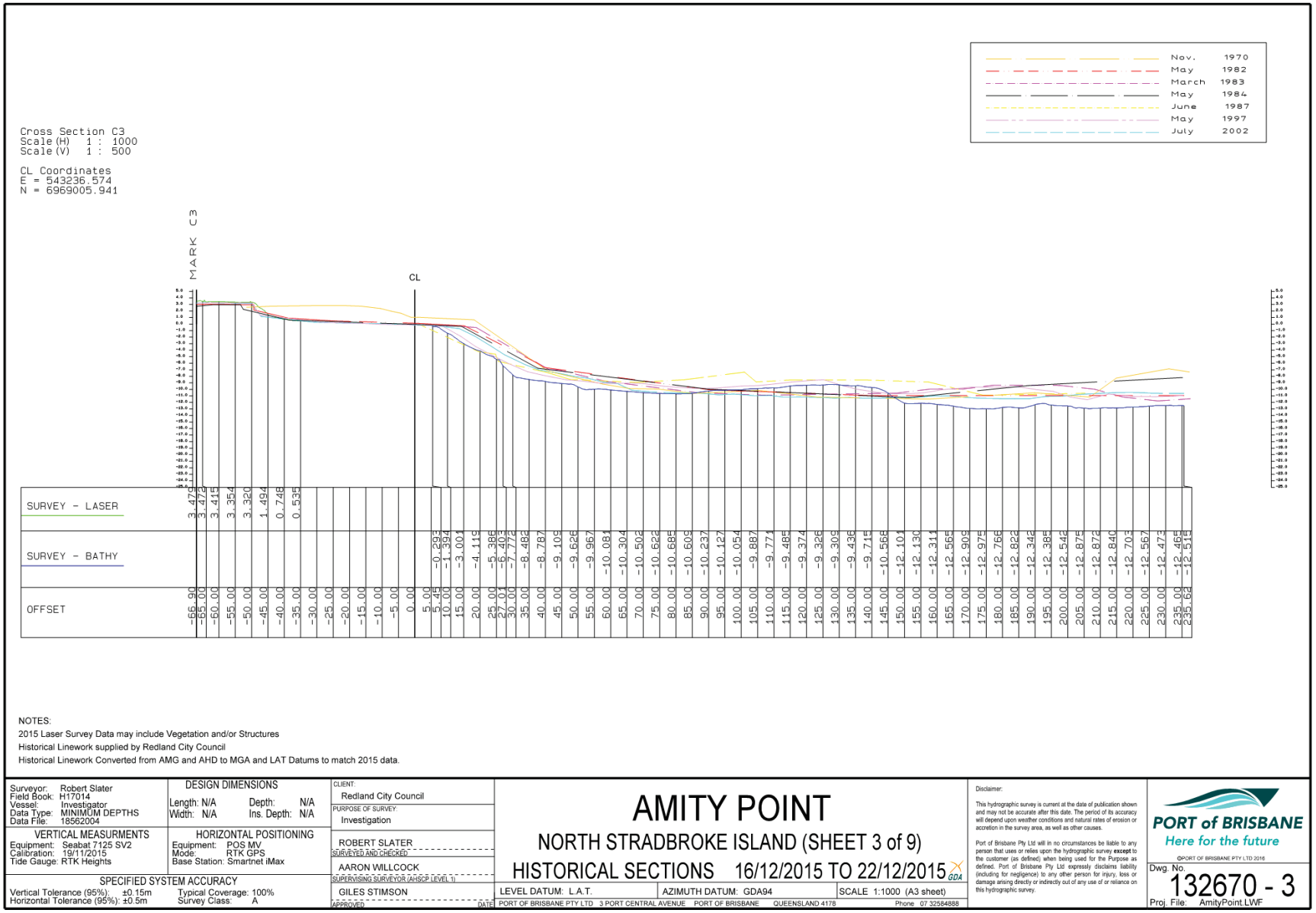

NOTES:
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Historical Linework supplied by Redland City Council
Historical Linework Converted from AMG and AHD to MGA and LAT Datums to match 2015 data.

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Field Book: H17014
Vessel: Investigator
Data Type: MINIMUM DEPTHS
Data File: 18562004

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Tide Gauge: RTK Heights

HORIZONTAL POSITIONING
Equipment: POS MV
Mode: RTK GPS
Base Station: Smartnet iMax

SPECIFIED SYSTEM ACCURACY
Vertical Tolerance (95%): ±0.15m
Horizontal Tolerance (95%): ±0.5m
Typical Coverage: 100%
Survey Class: A

CLIENT: Redland City Council
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HISTORICAL SECTIONS 16/12/2015 TO 22/12/2015 GDA

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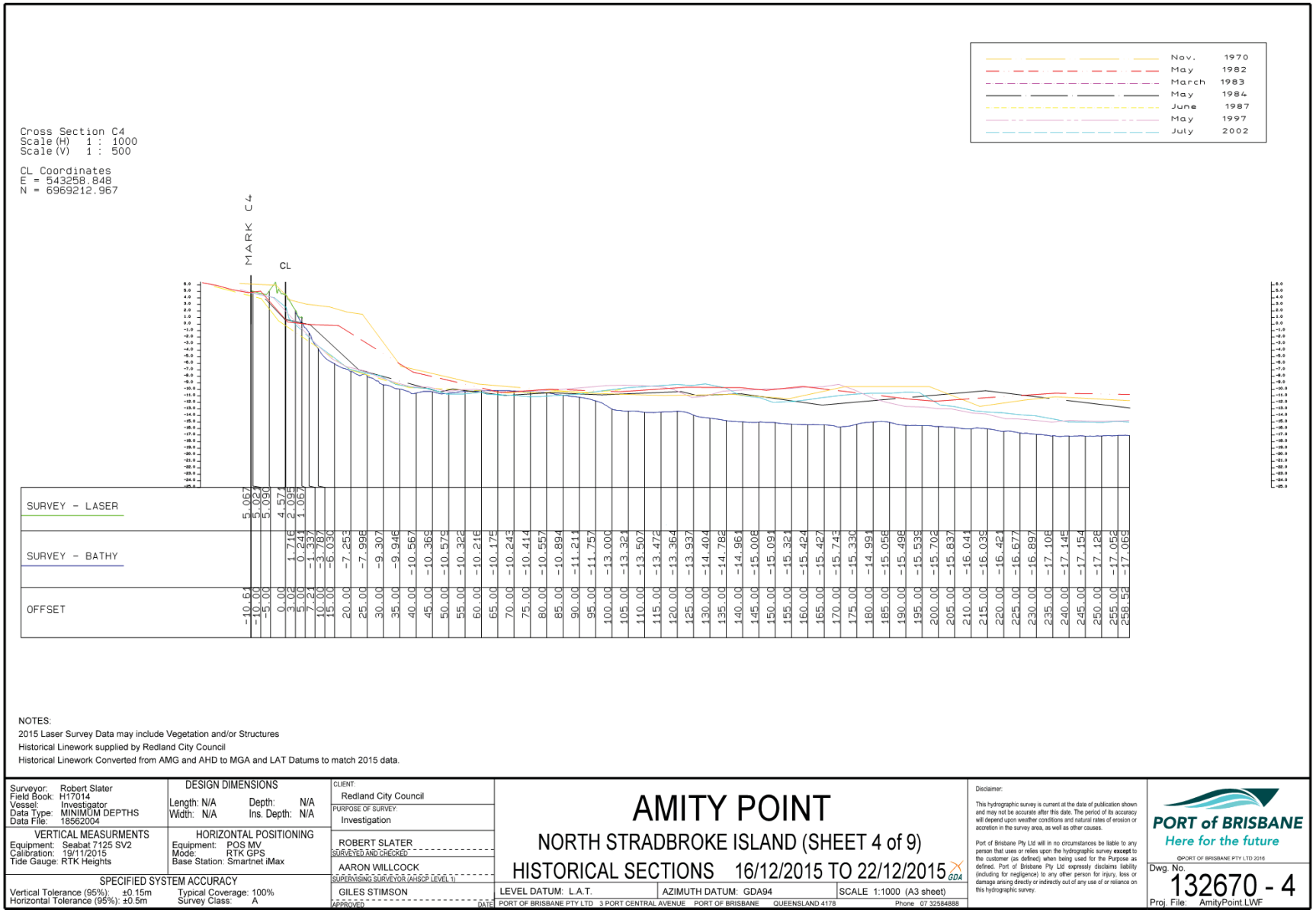

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Historical Linework supplied by Redland City Council
Historical Linework Converted from AMG and AHD to MGA and LAT Datums to match 2015 data.

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Field Book: H17014
Vessel: Investigator
Data Type: MINIMUM DEPTHS
Data File: 18562004

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Calibration: 19/11/2015
Tide Gauge: RTK Heights

HORIZONTAL POSITIONING
Equipment: POS MV
Mode: RTK GPS
Base Station: Smartnet iMax

SPECIFIED SYSTEM ACCURACY
Vertical Tolerance (95%): ±0.15m
Horizontal Tolerance (95%): ±0.5m
Typical Coverage: 100%
Survey Class: A

CLIENT: Redland City Council
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ROBERT SLATER SURVEYED AND CHECKED
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AMITY POINT
NORTH STRADBROKE ISLAND (SHEET 4 of 9)
HISTORICAL SECTIONS 16/12/2015 TO 22/12/2015 GDA

LEVEL DATUM: L.A.T. AZIMUTH DATUM: GDA94 SCALE 1:1000 (A3 sheet)
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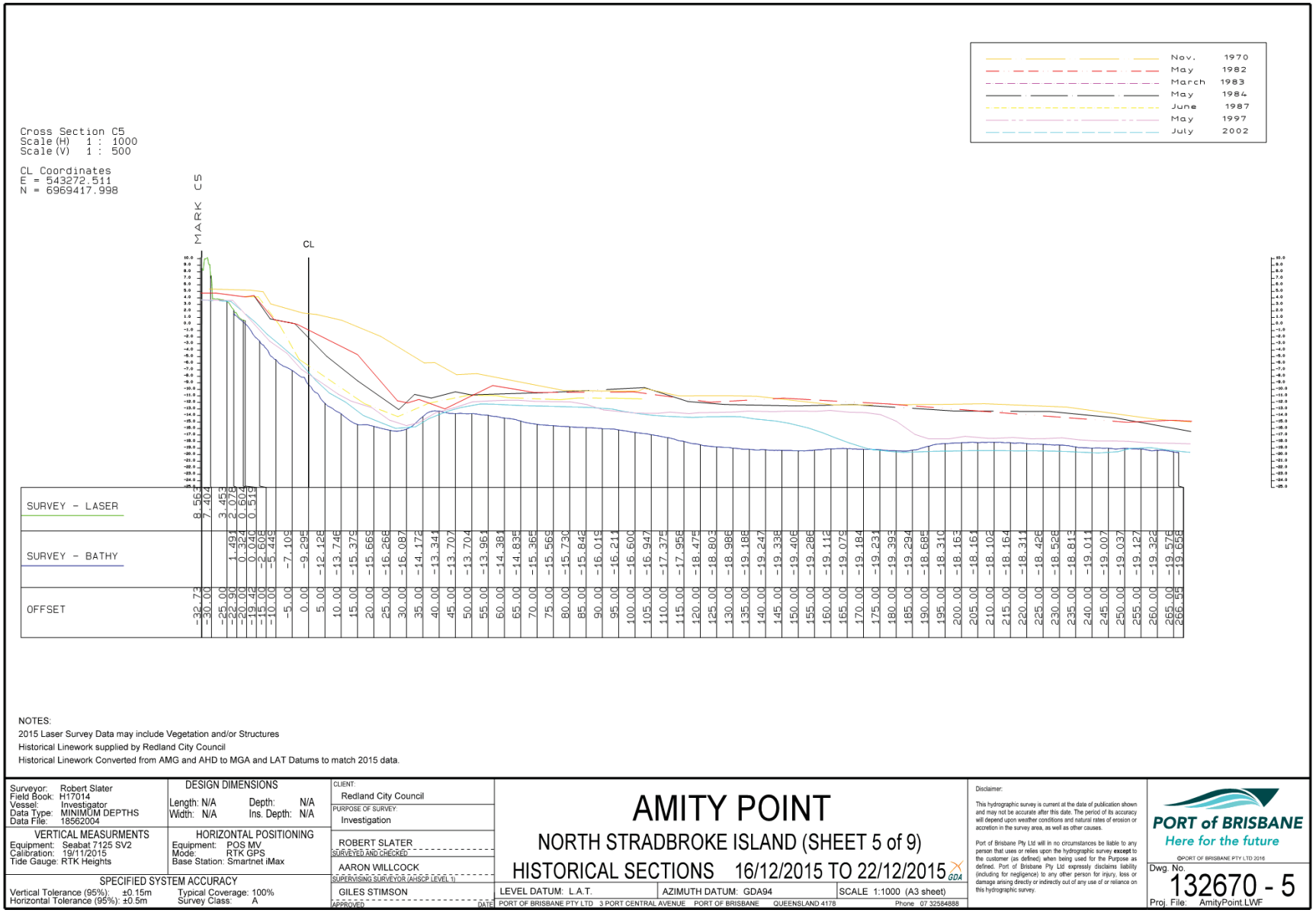

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Field Book: H17014
Vessel: Investigator
Data Type: MINIMUM DEPTHS
Data File: 18562004

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HORIZONTAL POSITIONING
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Base Station: Smartnet iMax

SPECIFIED SYSTEM ACCURACY
Vertical Tolerance (95%): ±0.15m
Horizontal Tolerance (95%): ±0.5m
Typical Coverage: 100%
Survey Class: A

CLIENT: Redland City Council
PURPOSE OF SURVEY: Investigation
ROBERT SLATER SURVEYED AND CHECKED
AARON WILLCOCK SUPERVISING SURVEYOR (AHSCP LEVEL 1)
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AMITY POINT
NORTH STRADBROKE ISLAND (SHEET 5 of 9)
HISTORICAL SECTIONS 16/12/2015 TO 22/12/2015 GDA

LEVEL DATUM: L.A.T. AZIMUTH DATUM: GDA94 SCALE 1:1000 (A3 sheet)

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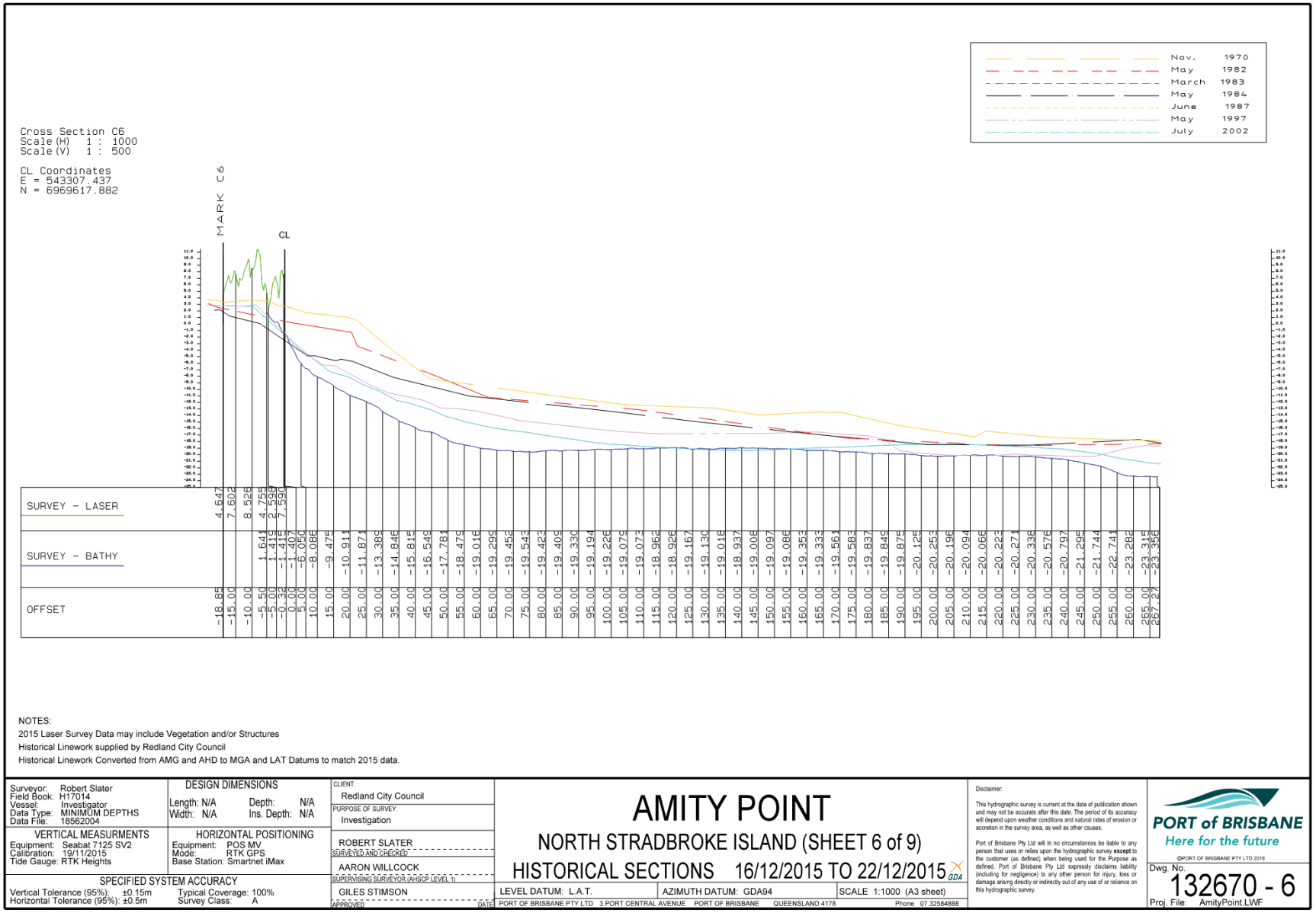

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Historical Linework Converted from AMG and AHD to MGA and LAT Datums to match 2015 data.

Surveyor: Robert Slater
Field Book: H17014
Vessel: Investigator
Data Type: MINIMUM DEPTHS
Data File: 18562004

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Calibration: 19/11/2015
Tide Gauge: RTK Heights

HORIZONTAL POSITIONING
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Mode: RTK GPS
Base Station: Smartnet iMax

SPECIFIED SYSTEM ACCURACY
Vertical Tolerance (95%): ±0.15m Typical Coverage: 100%
Horizontal Tolerance (95%): ±0.5m Survey Class: A

CLIENT: Redland City Council
PURPOSE OF SURVEY: Investigation
ROBERT SLATER SURVEYED AND CHECKED
AARON WILLCOCK SUPERVISING SURVEYOR (AHSCP LEVEL 1)
GILES STIMSON APPROVED DATE

AMITY POINT
NORTH STRADBROKE ISLAND (SHEET 6 of 9)
HISTORICAL SECTIONS 16/12/2015 TO 22/12/2015 GDA

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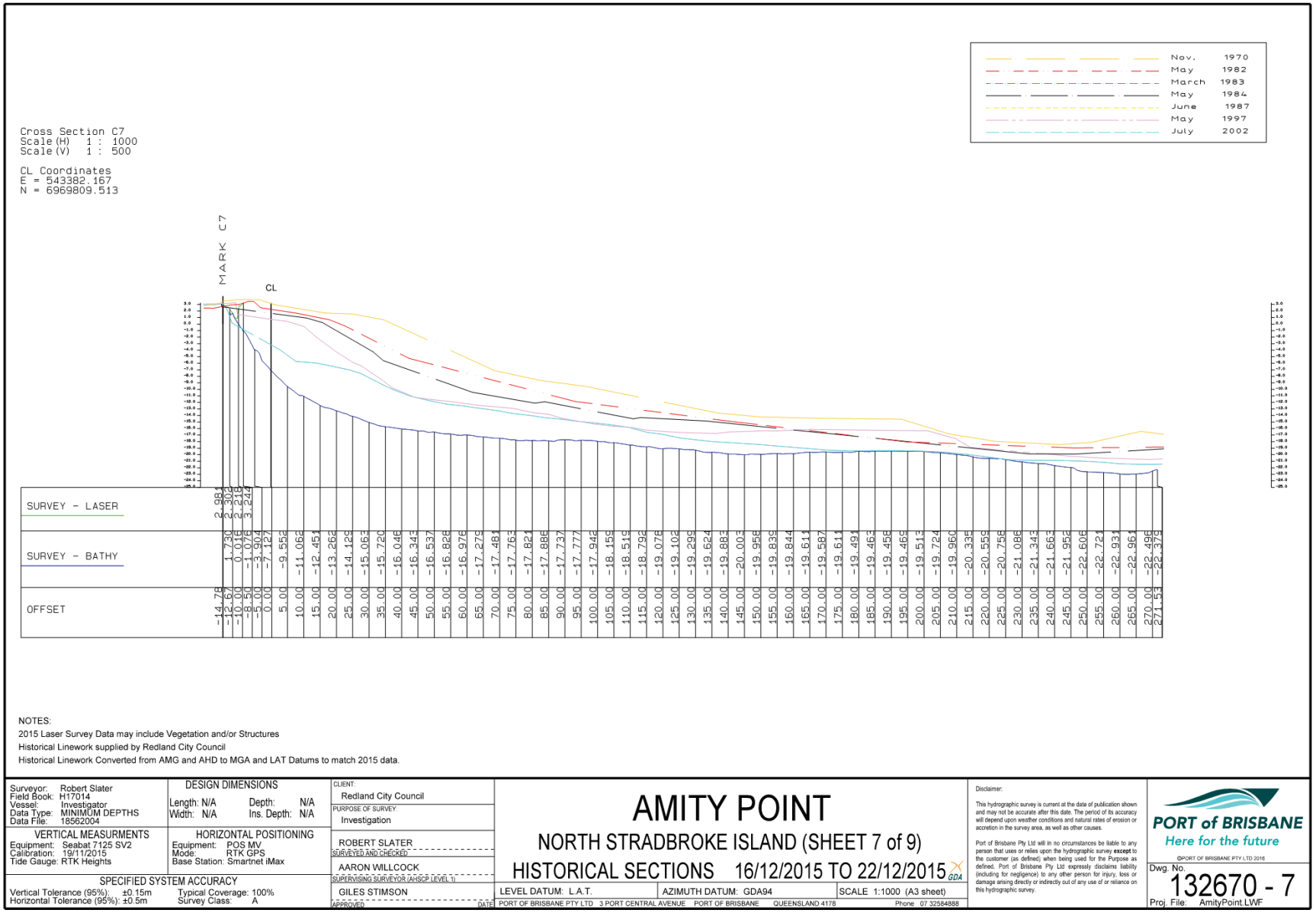

NOTES:
2015 Laser Survey Data may include Vegetation and/or Structures
Historical Linework supplied by Redland City Council
Historical Linework Converted from AMG and AHD to MGA and LAT Datums to match 2015 data.

Surveyor: Robert Slater
Field Book: H17014
Vessel: Investigator
Data Type: MINIMUM DEPTHS
Data File: 18562004

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Width: N/A Ins. Depth: N/A

VERTICAL MEASURMENTS
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Calibration: 19/11/2015
Tide Gauge: RTK Heights

HORIZONTAL POSITIONING
Equipment: POS MV
Mode: RTK GPS
Base Station: Smartnet iMax

SPECIFIED SYSTEM ACCURACY
Vertical Tolerance (95%): ±0.15m
Horizontal Tolerance (95%): ±0.5m
Typical Coverage: 100%
Survey Class: A

CLIENT: Redland City Council
PURPOSE OF SURVEY: Investigation
ROBERT SLATER SURVEYED AND CHECKED
AARON WILLCOCK SUPERVISING SURVEYOR (AHSCP LEVEL 1)
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AMITY POINT
NORTH STRADBROKE ISLAND (SHEET 7 of 9)
HISTORICAL SECTIONS 16/12/2015 TO 22/12/2015 GDA

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PORT OF BRISBANE PTY LTD 3 PORT CENTRAL AVENUE PORT OF BRISBANE QUEENSLAND 4178 Phone 07 32584888

PORT of BRISBANE
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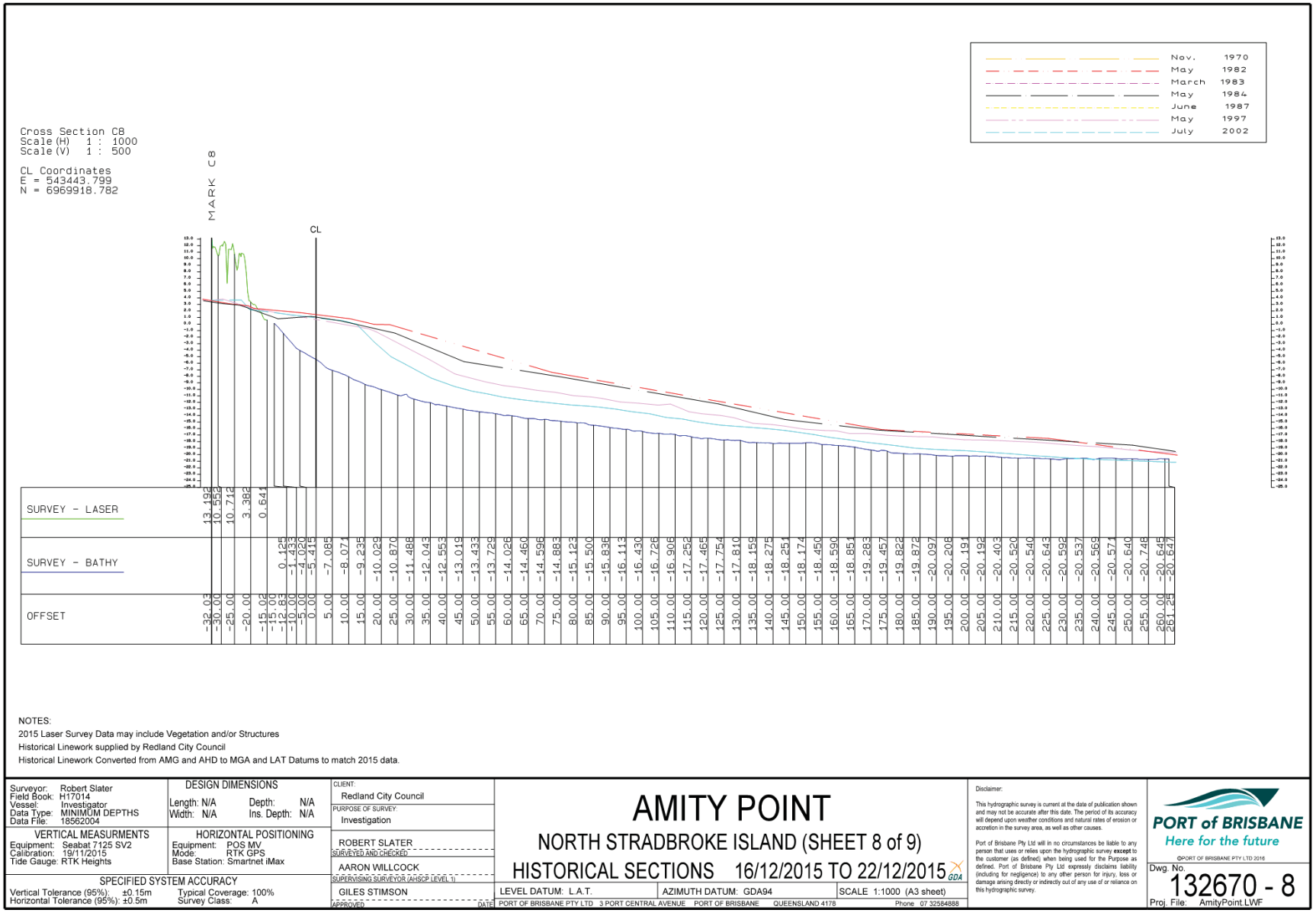

NOTES:
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Historical Linework supplied by Redland City Council
Historical Linework Converted from AMG and AHD to MGA and LAT Datums to match 2015 data.

Surveyor: Robert Slater
Field Book: H17014
Vessel: Investigator
Data Type: MINIMUM DEPTHS
Data File: 18562004

VERTICAL MEASURMENTS
Equipment: Seabat 7125 SV2
Calibration: 19/11/2015
Tide Gauge: RTK Heights

DESIGN DIMENSIONS
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Width: N/A Ins. Depth: N/A

HORIZONTAL POSITIONING
Equipment: POS MV
Mode: RTK GPS
Base Station: Smartnet iMax

SPECIFIED SYSTEM ACCURACY
Vertical Tolerance (95%): ±0.15m Typical Coverage: 100%
Horizontal Tolerance (95%): ±0.5m Survey Class: A

CLIENT: Redland City Council
PURPOSE OF SURVEY: Investigation
ROBERT SLATER SURVEYED AND CHECKED
AARON WILLCOCK SUPERVISING SURVEYOR (AHSCP LEVEL 1)
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AMITY POINT
NORTH STRADBROKE ISLAND (SHEET 8 of 9)
HISTORICAL SECTIONS 16/12/2015 TO 22/12/2015 GDA

LEVEL DATUM: L.A.T. AZIMUTH DATUM: GDA94 SCALE 1:1000 (A3 sheet)
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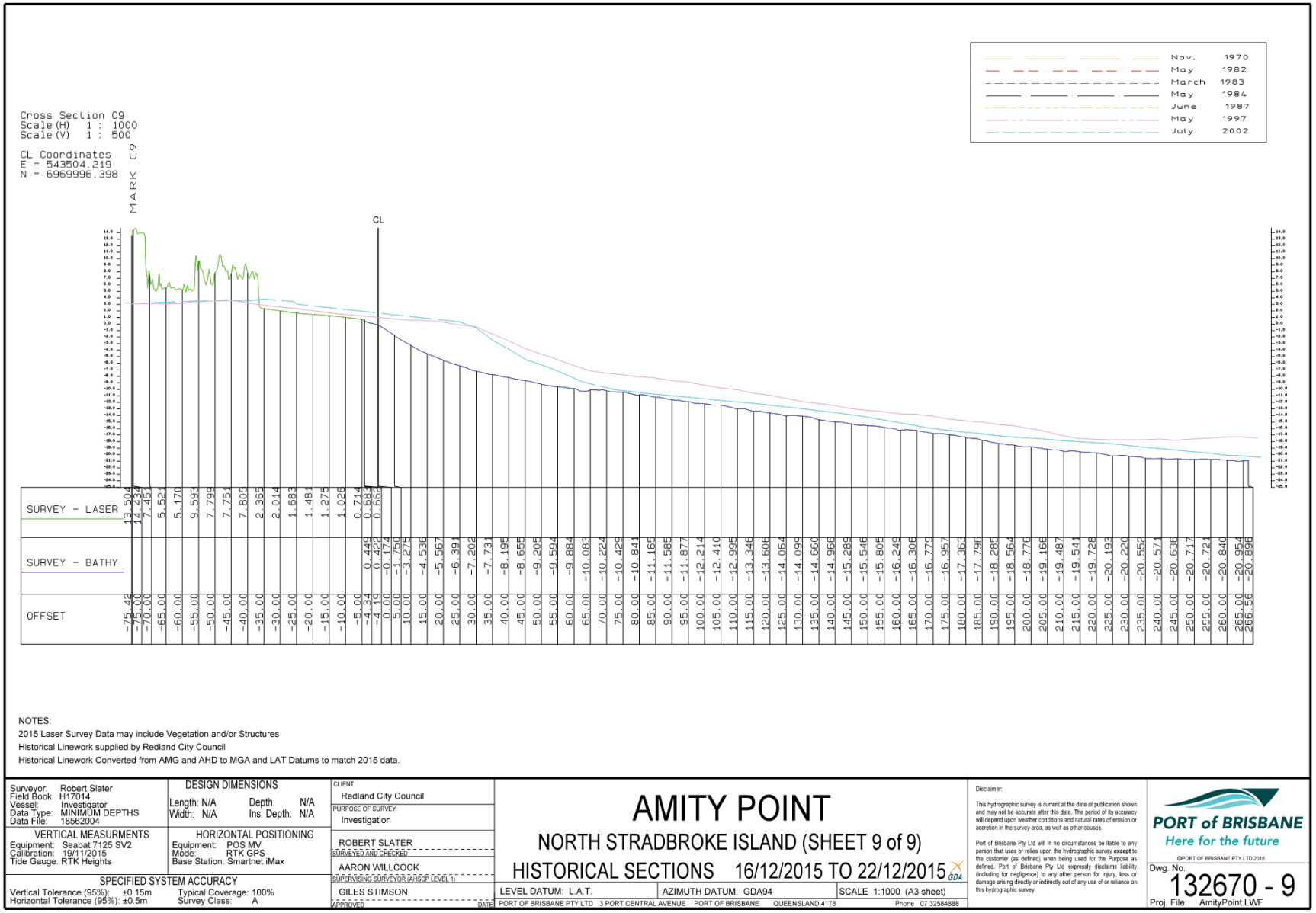

NOTES:
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Historical Linework supplied by Redland City Council
Historical Linework Converted from AMG and AHD to MGA and LAT Datums to match 2015 data.

Surveyor: Robert Slater
Field Book: H17014
Vessel: Investigator
Data Type: MINIMUM DEPTHS
Data File: 18562004

DESIGN DIMENSIONS
Length: N/A Depth: N/A
Width: N/A Ins. Depth: N/A

VERTICAL MEASURMENTS
Equipment: Seabat 7125 SV2
Calibration: 19/11/2015
Tide Gauge: RTK Heights

HORIZONTAL POSITIONING
Equipment: POS MV
Mode: RTK GPS
Base Station: Smartnet iMax

SPECIFIED SYSTEM ACCURACY
Vertical Tolerance (95%): ±0.15m
Horizontal Tolerance (95%): ±0.5m
Typical Coverage: 100%
Survey Class: A

CLIENT: Redland City Council
PURPOSE OF SURVEY: Investigation
ROBERT SLATER SURVEYED AND CHECKED
AARON WILLCOCK SUPERVISING SURVEYOR (AHSCP LEVEL 1)
GILES STIMSON APPROVED DATE

AMITY POINT
NORTH STRADBROKE ISLAND (SHEET 9 of 9)
HISTORICAL SECTIONS 16/12/2015 TO 22/12/2015 GDA

LEVEL DATUM: L.A.T. AZIMUTH DATUM: GDA94 SCALE 1:1000 (A3 sheet)

PORT OF BRISBANE PTY LTD 3 PORT CENTRAL AVENUE PORT OF BRISBANE QUEENSLAND 4178 Phone 07 32584888

Disclaimer:
This hydrographic survey is current at the date of publication shown and may not be accurate after this date. The period of its accuracy will depend upon weather conditions and natural rates of erosion or accretion in the survey area, as well as other causes.

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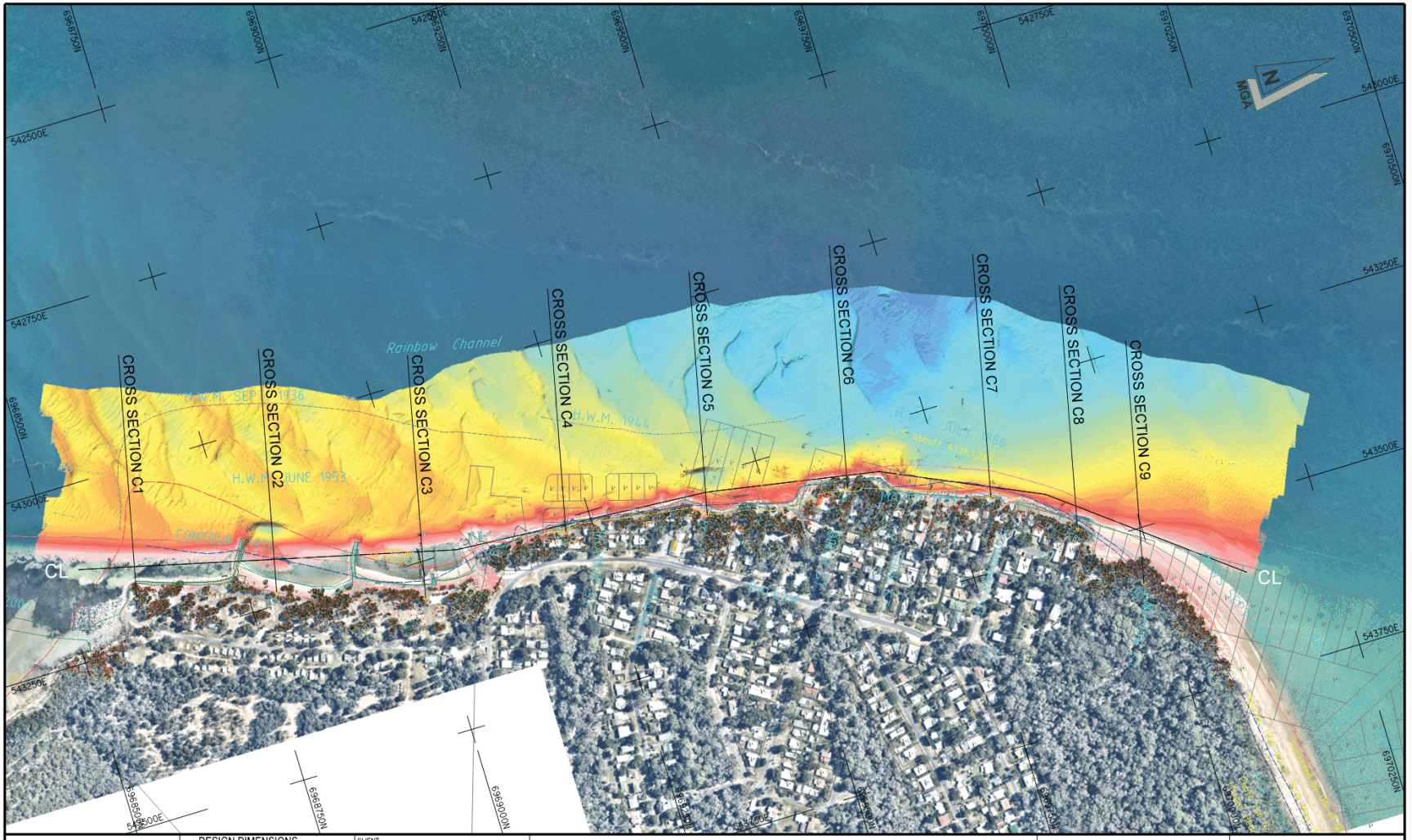
Dwg. No. 132670 - 9
Proj. File: AmityPoint.LWF



Surveyor: Robert Slater Field Book: H17014 Vessel: Investigator Data Type: MINIMUM DEPTHS Data File: 18562004	DESIGN DIMENSIONS Length: N/A Depth: N/A Width: N/A Ins. Depth: N/A	CLIENT: Redland City Council PURPOSE OF SURVEY: Investigation	# AMITY POINT ## NORTH STRADBROKE ISLAND ## HISTORICAL SECTION OVERVIEW
VERTICAL MEASURMENTS Equipment: Seabat 7125 SV2 Calibration: 19/11/2015 Tide Gauge: RTK Heights	HORIZONTAL POSITIONING Equipment: POS MV Mode: RTK GPS Base Station: Smartnet iMax	ROBERT SLATER SURVEYED AND CHECKED AARON WILLCOCK SUPERVISING SURVEYOR (AHSCP LEVEL 1) GILES STIMSON APPROVED DATE	
SPECIFIED SYSTEM ACCURACY Vertical Tolerance (95%): ±0.15m Typical Coverage: 100% Horizontal Tolerance (95%): ±0.5m Survey Class: A			LEVEL DATUM: L.A.T. AZIMUTH DATUM: GDA94 SCALE 1:5000 (A3 sheet) PORT OF BRISBANE PTY LTD 3 PORT CENTRAL AVENUE PORT OF BRISBANE QUEENSLAND 4178 Phone 07 32584888

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Proj. File: AmityPoint.LWF

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

APPENDIX B
ANALYSIS OF RAINBOW CHANNEL MIGRATION

NOTES:

- The locations of the nominated 0m, -4m and -8m depth contours on the eastern submerged side-slope of RC are plotted.
- Distances offshore are measured from the position of HAT along the shoreline that was captured by survey in December 2015.

WATER TECHNOLOGY
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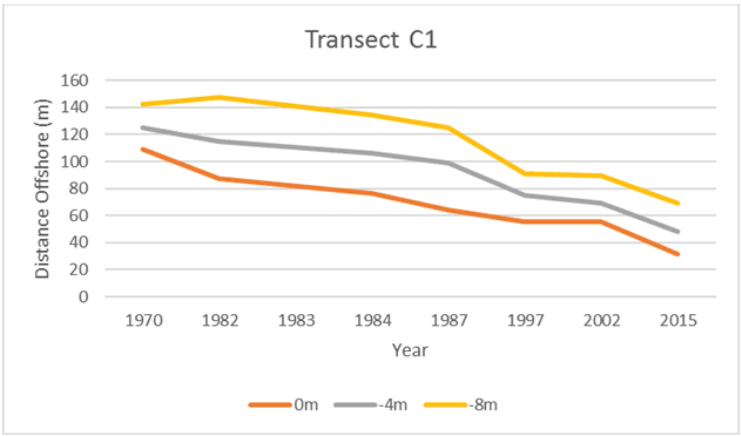
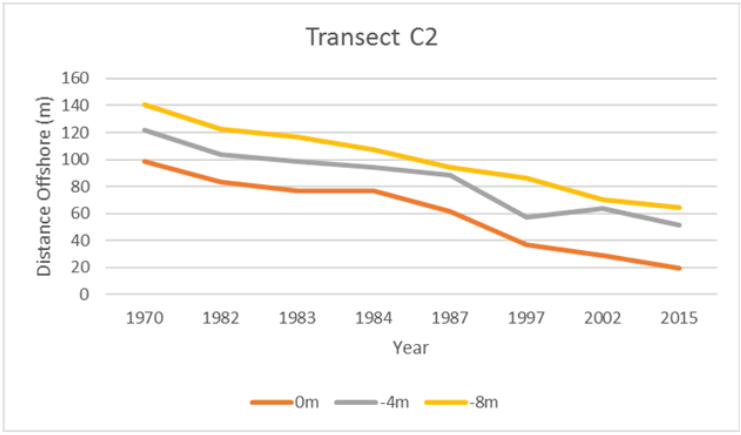
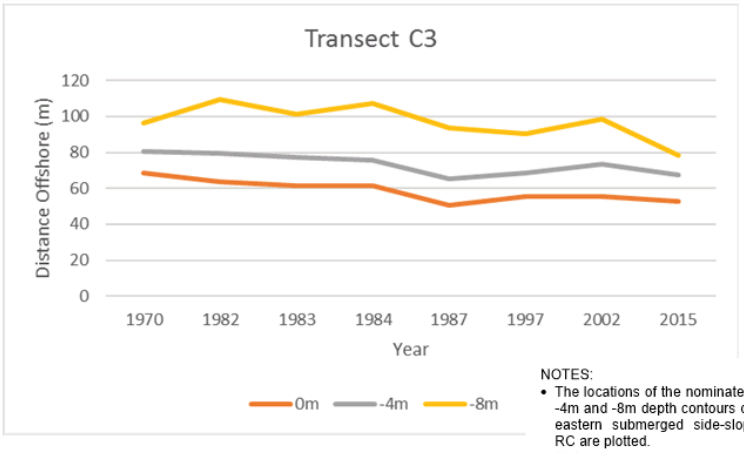
4193-01_R03v07.docx

Redland City Council | March 2019
Amity Point Shoreline Erosion Management Plan

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS







NOTES:
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- Distances offshore are measured from the position of HAT on the shoreline captured by survey in December 2015.

4193-01_R03v07.docx

Redland City Council | March 2019
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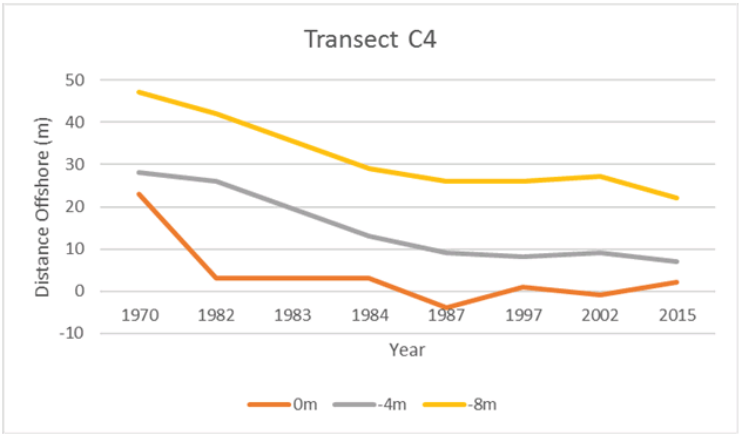

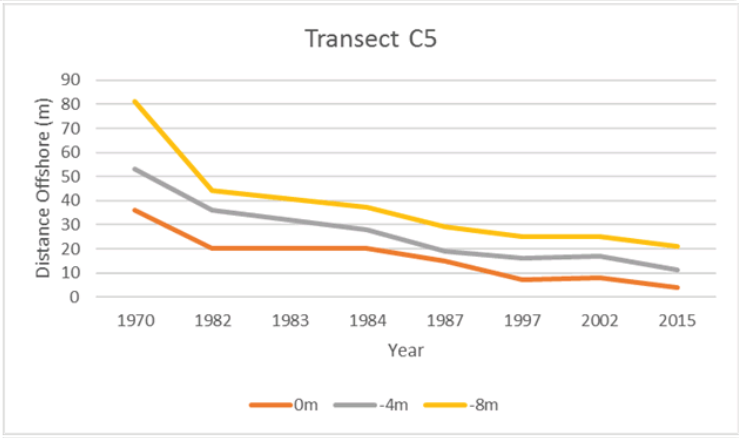

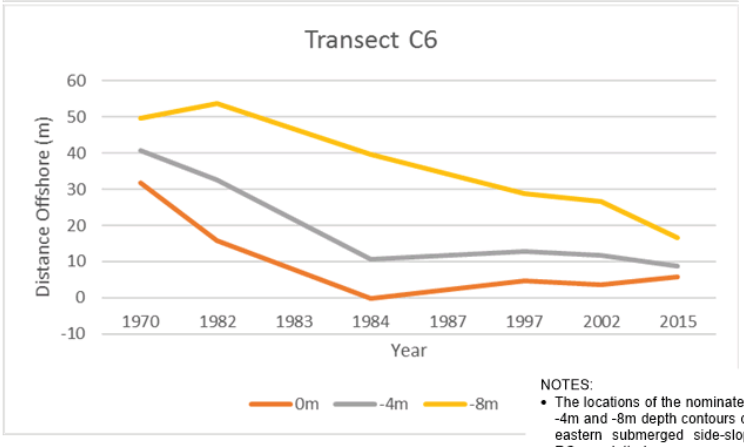

NOTES:
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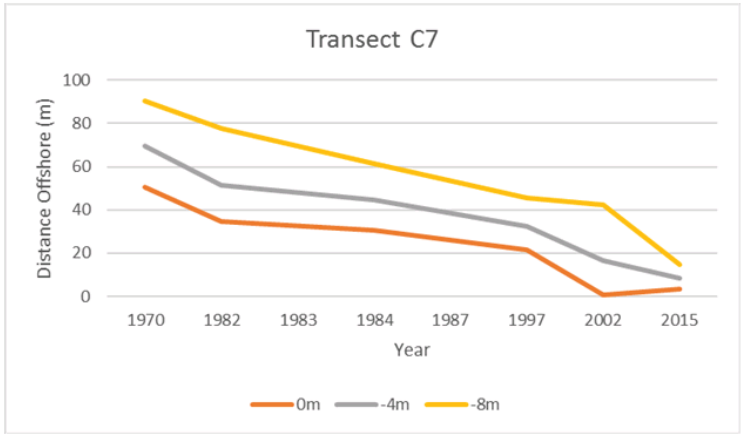

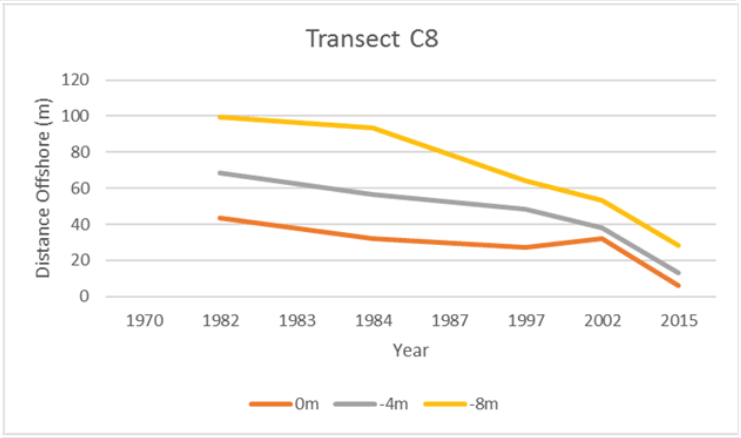

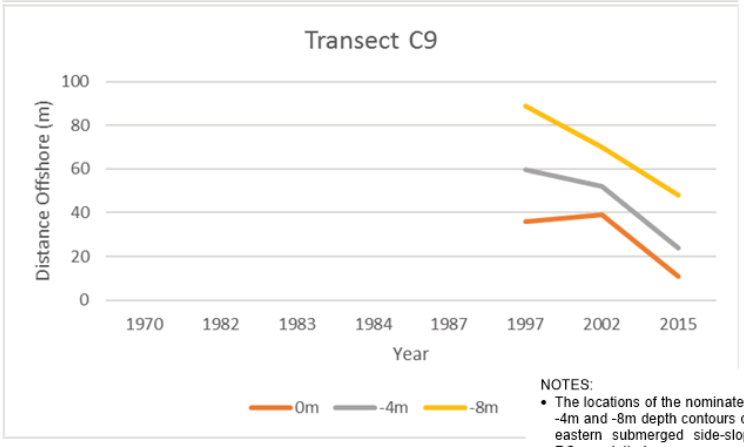

NOTES:
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4193-01_R03v07.docx

Redland City Council | March 2019
Amity Point Shoreline Erosion Management Plan

WATER TECHNOLOGY
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APPENDIX C
SUMMARY REPORT - AMITY POINT SEMP OPEN HOUSE

Summary Report – Amity Point SEMP Open House

Summary

Redland City Council's Community Engagement team in collaboration with Water Technology prepared an Open House event for the Amity Point Shoreline Erosion Management Plan. The Open House event took place on Saturday 23 April, 2016 at the Amity Point Community Hall. The aim of the Open House was to encourage the community to share their local knowledge of Amity Point and to learn/find out about the SEMP process and what it means for the township.

The Open House event was set up with a series of history and science rich display panels, and video presentations which illustrated:

- The aim of the projects and processes to produce a SEMP
- The history of Amity Point and experience with erosion
- Previous methods to manage and limit the extent of erosion
- Video footage of a 'Retrogressive Breach Failure' which is a commonly observed erosion feature at Amity Point
- A video presentation showing the changes that have occurred in the channel over a 26 year period, as captured by Google Earth
- Printed images of the recently completed hydrographic survey of a portion of the Amity Point foreshore and rock fill along Rainbow Channel.

The Open House also utilised a number of 'activities' which encouraged participants to consider the risks, values and possible management options in a holistic sense. The Open House was promoted through letterbox distribution of an invitation to all Amity point residents, posters which were put on display at key locations across North Stradbroke Island – ferry terminals, businesses, etc, and through direct contact with the Reference Group who leveraged their local networks to promote the event.

The community's response to the Open House was unanimously positive.

Key Open House Statistics

- Approximate number of attendees: ~100
- Approximate average attendee stay (duration): 45m-1hr
- Total number of engagement activity responses: Count (sign-in sheet), comments & post-its (Engagement activities)
- Event duration: 15 hours over 3 days
- Number of project team members present: 7

Background

The Open House event was initiated due to the progress of the Amity Point SEMP reaching a key milestone where it was necessary to engage the wider community on the project. Consultation with the community has been identified as a critical component of this project is complimented by the establishment of the Amity Point SEMP Community Reference Group (Reference Group). The Reference Group consists of local community members and groups who expressed an interest in the project and nominated to become a member.

The Event

Installation of the display panels for the open house event occurred on Thursday 21 April, allowing interested community members to drop-in prior to Saturday. The date for the open house was decided because of the high visitor numbers to North Stradbroke Island for holidays and long weekends, it was considered that with a high increase in population there was a likelihood that the event may experience additional interest from holiday renters or owners of holiday houses who do not live in the township permanently. The event was manned on Thursday, following installation (12pm-3pm), by a member of the Community Engagement Team and on Friday the event was left un-manned (9am – 3pm). The purpose of having an unmanned day during the consultation process was to encourage community members to visit the display and take note of the presented information in their own time without feeling 'pressured' into making comments.

Promotional material for the Open House was prepared and consisted of a letter to the Amity Point residents (Appendix 1) and posters (Appendix 2) were also created and installed at key locations across North Stradbroke Island – ferry terminals, notice boards and businesses – including Amity Point Community Club, the rangers office at the Camping ground, Seashells café, the library, Rufus King and the Little Ships Club at One Mile.

The Saturday Open House Event, from 9am – 3pm, was manned by members of the Council's Community Engagement Team and the SEMP Project team consisting of Council officers and Water Technology consultants. It was encouraging to see the number of local community members who visited the event on the day and were actively engaged and interested in the project. Furthermore, it is noted that the participants comprised many local community members who are not part of the SEMP Community Reference Group. This indicates that the role of the Reference Group to engage and disseminate information to the wider community has been successful and that the local community is interested in the Amity Point foreshore.

While it was anticipated that the local community's interest in foreshore management would be reflected in high levels of attendance, it was also noted that as a result of other community events taking place on the same day it was possible the number of attendees could have been higher. In total it is estimated that there was approximately one-hundred (100) community members who attended the Open House throughout the whole event.

An agreement has been made between Council's Community Engagement Team and the Dunwich Museum whereby panels from the open house event would be transferred to the Dunwich Museum for a static display. The panels to be displayed at the museum were to be identified by the

Museum's curators and will be held at the museum for an undisclosed period of time at which point will be returned to Council offices for storage, until needed again.

Display Panels

In total there were 11 full colour display panels installed throughout the Amity Point Community Hall outlining the SEMP process and history of Amity Point foreshore. The display panels were set out in the following order throughout the hall - refer to Appendix 3 for a copy of the display panels:

1. Welcome to the Open House
    a. What is it about?
    b. Aims of the Open House
2. What is a Shoreline Erosion Management Plan?
    a. How do you create a SEMP?
    b. Key Milestones
3. Story of Rainbow Channel
    a. Illustration of the realignment of South Passage
4. A snapshot of the European history of Amity Point
5. Why do flow side occur? *(pictorial of the observed erosion process)*
6. The story of the rock fill?
7. Why are we doing a SEMP?
8. Possible erosion mitigation strategy options
    a. Soft (or non-structural) solutions
    b. Hard (or structural) solutions
9. How does the SEMP fit in with other Council plans?
10. Hydrographic Survey – detailing the bathymetry of the rock fill and a portion of Rainbow channel
11. Hydrographic Survey– detailing the bathymetry of the rock fill and a portion of Rainbow channel

Activities

The activities at the Open House consisted of installing blank pieces of paper, essentially large post-it notes, with a leading question on the top of the page. The aim of this exercise is to encourage participants to consider the values and risks associated with the entire Amity Point foreshore. The benefit of this exercise is that requires participants to consider the holistic nature of management planning. The comments also reflect the breadth and depth of local knowledge and understanding about issues impacting on the foreshore.

What Changes have you seen?

- To date there has been too little help and so erosion continues
- The water table has lowered over last 10-15 years and does this affect hydrostatic pressure – and so impact on erosion?
- Middle sand bar has grown towards Amity Point by 300m+ - narrowing of main channel and increases to water flow rate (tide)

- There is a new channel forming to southern side of sand island parallel to top end of Rous Channel (about 5m)
- The deep water of channel is now much closer to the rock wall
- Oyster leases at Dialba Passage have increased in height, new sand levels by approximately 500mm.
- Middle Bank at 'Welsby Light' is much higher just below the low water mark.
- Draining of swamps at right angles to existing swamp. Water drains to Wallum Creek
- Need to protect $1M boat ramp that is used by tourist and commercial/professional fisherman
- The basin used to be a suitable for a large boat mooring area
- Very few changes in most areas as the rock fill seem to be holding along the Central Precinct

What mitigation area best suited to which precinct – why?

- Homes need to be protected
  - When will it start + who will pay?
- Channel diversion
  - Sink a big ship for divers, tourism, break flow current
  - NB: Beware of unintended consequences
- Look overseas → reefs, substitutes
  - Remember the load of coral put south side of the current jetty. This was to solve erosion but all the coral went out to sea on the first few high tides.
- Harness the channel energy → turbines to generate electricity to power our homes free of charge
- The owners on shoreline are responsible for paying for the rock which protects all of Amity. This does not seem fair.
- Attention to swamp outlet from Birch St to Tennis courts – erosion happening and backs up to swamp behind Gonzales St
- Fed up with "stop gap" measures
- Hard structural wall needed
- Need to stop four-wheel drive (4x4) traffic on the foreshore from Main beach to Amity Beach. Used to be signed (no longer) barrier. Traffic damages beach structure
- Central and southern precinct extend existing hard bottom in channel, maybe pylons at front of houses which could be backfilled
- The coast line in front of camping ground is vulnerable to erosion – will the rock wall be extended? Is there another solution?

Interactive mapping exercise

An interactive mapping exercise was undertaken at the event which was a printed map of Amity Point, separated into three precincts. The Northern Precinct consisted of Amity Beach and foreshore area; the Central Precinct was predominantly the rock fill section; and, the Southern Precinct being the boat ramp and beach south including the caravan park (refer to appendix 4). To engage the participants at the Open House event a separate map was printed which included a question – seeking the views of participants. In total there were seven (7) questions which sought to engage the participants at the Open House event, being:

1. What near-shore areas of Amity Point are important to local and regional marine biodiversity?
2. What changes have you seen and where?
3. What infrastructure such as roads, water, sewerage is important to the community?
4. Are there specific locations at Amity Point that are important to European heritage?
5. Are there any specific locations at Amity Point with important environmental values?
6. Are there specific locations at Amity Point that are important to Aboriginal heritage?
7. What are the implications of erosion threat to the community?

The outcome of this engagement activity was mixed with a number of comments attached to particular questions providing additional insight to the attributes and aspects of Amity Point which the community value. However, it is noted that some of the comments provided to particular maps did not match the question being asked. This indicates that the Open House project team should have placed a greater emphasis and guidance to ensure the participants was better informed and able to complete the activity.

Conclusion

The Amity Point SEMP Open House should be considered a successful engagement event based on the number of participants who attended, comments and general feedback received. The material from the open house, in particular the comments from the 'activities' will be used to help inform the development of the SEMP. These materials will also be attached as extrinsic material in the final SEMP document. The key lessons learnt from the event was the wider interest of the SEMP project from members of the Amity Point community who are not part of the SEMP Reference Group as well as members from the other townships at Point Lookout and Dunwich. The event also reaffirmed the enthusiasm of the Amity Point community in being involved in strategic planning projects within their township and importance of engaging the community during the development of a project.

APPENDIX 1 – Letter to Residents

12 April 2016

Dear Amity Point Resident

As you know, the Amity Point foreshore is constantly changing

Through talking to Amity Point and North Stradbroke Island residents and consultants, including specialised coastal engineers from Water Technology, Council has learnt a great deal about how, when and why these changes occur.

Council invites you to the Amity Point Shoreline Erosion Management Plan (SEMP) Open House, to:

- share this local knowledge, history and science (including a survey of the channel)
- find out if there is anything else relevant that you know, and
- find out what you and other members of the local community value most about Amity Point.

At the Open House you will be able to talk to the Amity Point SEMP project team, including a Council Planner, and Water Technology's consulting coastal engineer.

Amity Point SEMP Open House details
When: Saturday 23 April from 9am–3pm
Where: Amity Point Community Hall, 16 Ballow Road

Should you be unable to make the Open House on Saturday, you can view the unstaffed display at the Amity Point Community Hall on Thursday 21 April between 12pm–3pm, or Friday 22 April between 9am–3pm, or following the event at Dunwich Museum.

For further information, contact Bernard Houston at Redland City Council on 07 3829 8999, or email rcc@redland.qld.gov.au

Amity Point SEMP Project Team

APPENDIX 2 - Poster

Open House

Amity Point Shoreline Erosion Management Plan

Amity Point foreshore is constantly changing

Council invites you to the
Amity Point Shoreline Erosion Management Plan (SEMP) Open House,
at which you can talk to the Amity Point SEMP project team, including a Council Planner and a specialised coastal engineer from Water Technology.

See what locals have said

Discover the history **Learn the science**

And share what you know about Amity Point

Amity Point SEMP Open House details

When: Saturday 23 April from 9am–3pm

Where: Amity Point Community Hall
16 Ballow Road

Should you be unable to make the Open House on Saturday, you can view the unstaffed display at the Amity Point Community Hall on Thursday 21 April from midday–3pm, or Friday 22 April from 9am–3pm, or following the event at Dunwich Museum.

Visit	yoursay.redland.qld.gov.au
Email	rcc@redland.qld.gov.au email subject: Amity Point SEMP
Write to	Redland City Council, Reply Paid 21, CLEVELAND QLD 4163, or
Call	07 3829 8999

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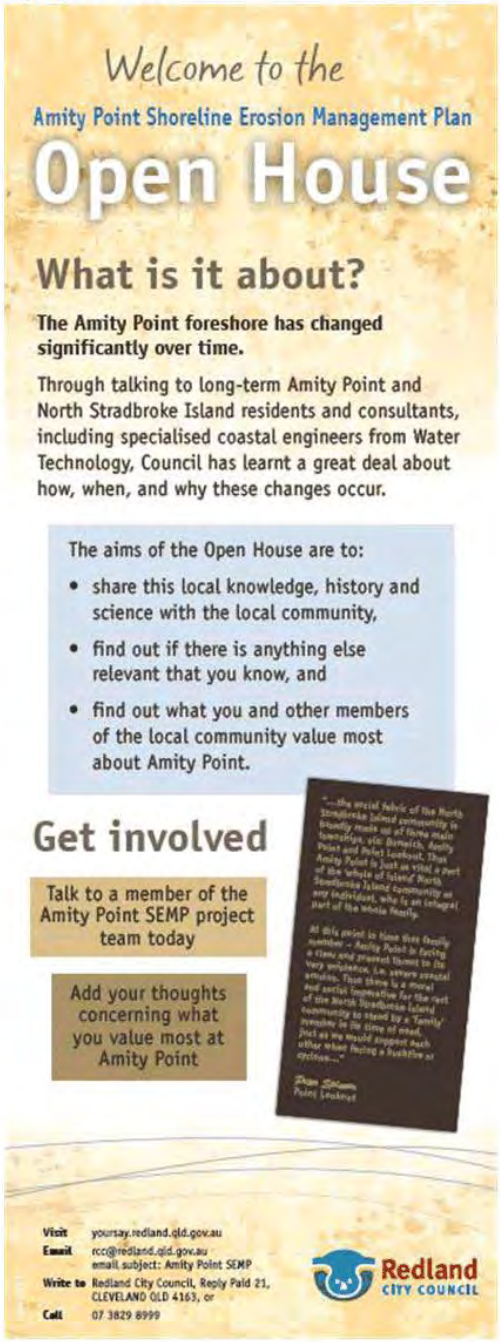
APPENDIX 3 – Display Panels



What is a
Shoreline Erosion Management Plan?

A Shoreline Erosion Management Plan (SEMP) provides a framework for the sustainable use, development and management of land vulnerable to erosion by considering the environmental, social and economic values of the land and the physical coastal processes acting on the foreshore.

A SEMP also outlines the appropriate uses of erosion prone land, and long-term management goals as agreed upon by governments and the community.

How do you create a SEMP?

Step 1:
Research – drawing on science and community knowledge, this step involves assessment, analysis and documentation of the severity of shoreline erosion and the subsequent risks posed for the community and development in the area.

Step 2:
Develop management options – this step involves preparation of technical descriptions of shoreline erosion or buffer zone management options and requirements, and ranking those options with regards to environmental, social and economic cost benefits.

Step 3:
Option selection – this stage involves outlining cost estimates associated with the preferred management strategies, and identifying possible funding sources.

Step 4:
Implementation – the final stage involves developing a program to implement the preferred method.

This stage also details all the federal, state and local government development approvals required to undertake works associated with the recommended strategies. It also outlines how the preferred management strategy complies with all relevant legislation particularly the *Coastal Protection and Management Act 1995* and relevant policies of the Draft Coastal Management Plan.

Consultation with the local community is critical when developing a SEMP. To this end an Amity Point SEMP Steering Committee, including numerous locals, was established.

Key milestones

December 2013
Draft Amity Point Shoreline Erosion Management Plan is released

February 2014
First community meeting on a shoreline erosion management plan

March 2015
Convene Reference Group

November 2015
Consultants appointed

April 2016
Where we are now

Next steps

Consider feeback

Public engagement on options

Present Draft SEMP

Adoption and implementation

Visit yoursay.redland.qld.gov.au
Email rcc@redland.qld.gov.au
email subject: Amity Point SEMP
Write to Redland City Council, Reply Paid 21, CLEVELAND QLD 4163, or
Call 07 3829 8999

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Story of the Rainbow Channel

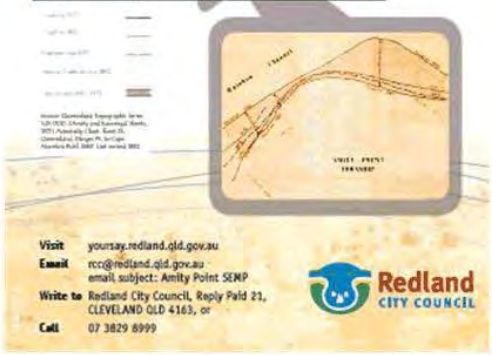
Comparison of the 1892 Admiralty Chart of the South Passage with current maps, shows re-alignment of the passage to a North-South orientation.

This change has seen the Rainbow Channel migrate East towards the shore at Amity Point.

This has introduced erosion.

Available survey records, aerial photographs, and recent research document this change.

Re-alignment of the South Passage



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email subject: Amity Point SEMP
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A snapshot of the European history of Amity Point

1823 – Pilot Station
Watercolour by Owen Stanley

1890 – Amity Fishing Village

1891 – Crouch's Fishing Amity

1910 – Amity Point Jetty

1920 – Amity Point Jetty

1926 – Amity Races

1938 – Wooley's Kiosk

1947 – Amity Tavern Washes In

1950 – Amity Boat Ramp

Thank you to the North Stradbroke Island Historical Museum for assistance in providing some of these photos.

1993 – The 93 Flow Slide

Visit yoursay.redland.qld.gov.au
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email subject: Amity Point SEMP
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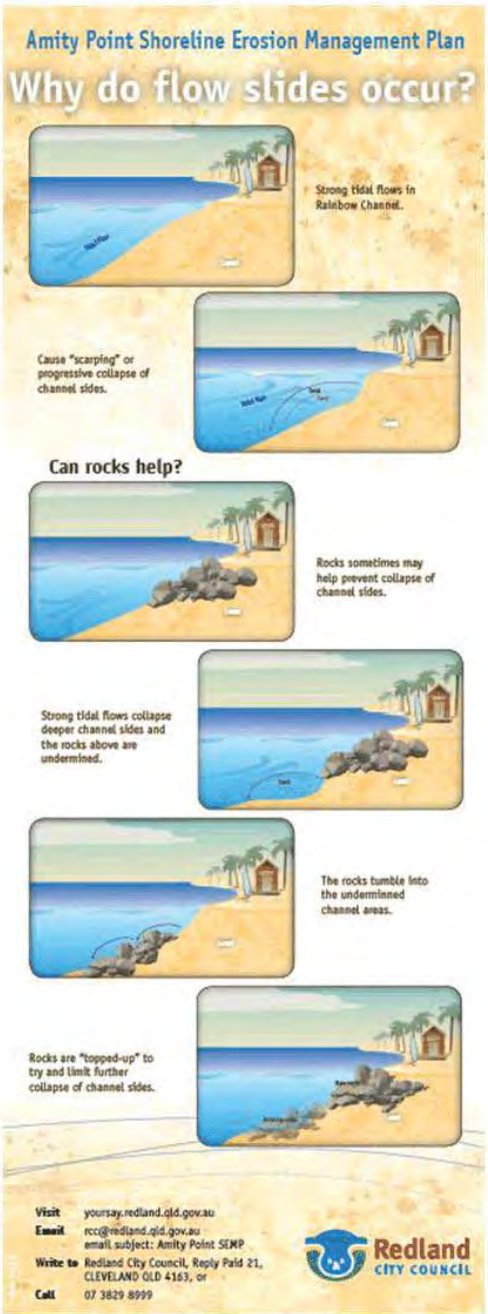
Amity Point Shoreline Erosion Management Plan
Why do flow slides occur?
Strong tidal flows in Rainbow Channel.
Cause "scarping" or progressive collapse of channel sides.
Can rocks help?
Rocks sometimes may help prevent collapse of channel sides.
Strong tidal flows collapse deeper channel sides and the rocks above are undermined.
The rocks tumble into the undermined channel areas.
Rocks are "topped-up" to try and limit further collapse of channel sides.
Visit yoursay.redland.qld.gov.au
Email rcc@redland.qld.gov.au email subject: Amity Point SEMP
Write to Redland City Council, Reply Paid 21, CLEVELAND QLD 4163, or
Call 07 3829 8999
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Amity Point Shoreline Erosion Management Plan
The story of the rock fill
1959
1960
1969
1965
1981
1989
1970s
Visit yoursay.redland.qld.gov.au
Email rcc@redland.qld.gov.au
email subject: Amity Point SEMP
Write to Redland City Council, Reply Paid 21, CLEVELAND QLD 4163, or
Call 07 3829 8999
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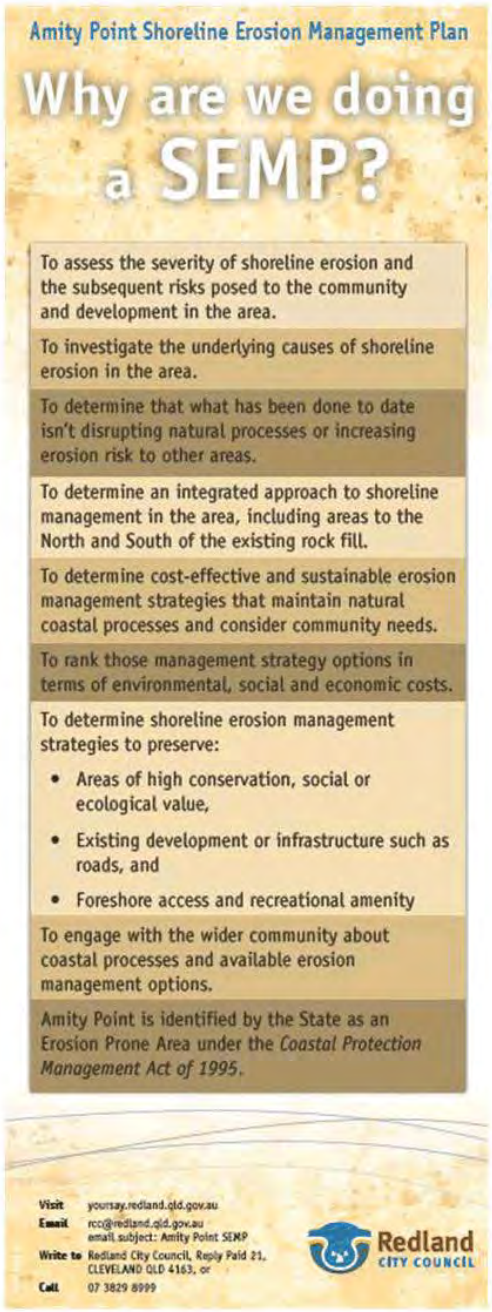
Amity Point Shoreline Erosion Management Plan
Why are we doing a SEMP?
To assess the severity of shoreline erosion and the subsequent risks posed to the community and development in the area.
To investigate the underlying causes of shoreline erosion in the area.
To determine that what has been done to date isn't disrupting natural processes or increasing erosion risk to other areas.
To determine an integrated approach to shoreline management in the area, including areas to the North and South of the existing rock fill.
To determine cost-effective and sustainable erosion management strategies that maintain natural coastal processes and consider community needs.
To rank those management strategy options in terms of environmental, social and economic costs.
To determine shoreline erosion management strategies to preserve:
• Areas of high conservation, social or ecological value,
• Existing development or infrastructure such as roads, and
• Foreshore access and recreational amenity
To engage with the wider community about coastal processes and available erosion management options.
Amity Point is identified by the State as an Erosion Prone Area under the Coastal Protection Management Act of 1995.
Visit yoursay.redland.qld.gov.au
Email rcc@redland.qld.gov.au email subject: Amity Point SEMP
Write to Redland City Council, Reply Paid 21, CLEVELAND QLD 4163, or
Call 07 3829 8999
Redland CITY COUNCIL

Amity Point Shoreline Erosion Management Plan

Possible erosion mitigation strategy options

In essence, erosion mitigation options can be considered as 'soft' non-structural solutions, or 'hard' structural solutions.

Soft (or non-structural) solutions would typically include:

- Do nothing - allowing coastal processes to take their natural course while accepting the resulting losses.
- Avoiding development - by implementing regulatory controls with regard to building in undeveloped areas.
- Planned retreat - removing the erosion threat by relocating existing development away from the vulnerable area.
- Beach nourishment - rehabilitate eroding foreshores by direct placement of sand onto the beach, thereby providing an adequate erosion buffer.
- Beach scraping - by using earthmoving plant and equipment to mechanically relocate sand from the inter-tidal zone or nearshore sandbanks into the upper beach or dune, thereby improving erosion buffers on the beach.
- Channel relocation - relocate dynamic tidal channels that may be contributing to shoreline erosion so that they have a lesser impact.

Hard (or structural) solutions to mitigate the threat of erosion could include:

- Structural walls - which act as physical barriers to prevent shoreline recession.
- Structural walls along with beach nourishment - where the seawall defines the inland extent of erosion, while sand is intermittently placed in front of the wall for improved beach amenity.
- Groynes or offshore breakwaters - used to inhibit the natural longshore movement of sand, thereby retaining sand on the eroding foreshore for longer periods.
- Groynes or offshore breakwaters along with beach nourishment - where the structure assists in maintaining sand on the beach, and beach nourishment reduces the downdrift erosion caused by the groyne's interruption to longshore sand supply.

The optimum management strategy typically could be either 'soft' or 'hard' solutions, or a combination of both.

Visit yoursay.redland.qld.gov.au
Email rcc@redland.qld.gov.au
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Redland CITY COUNCIL

Amity Point Shoreline Erosion Management Plan

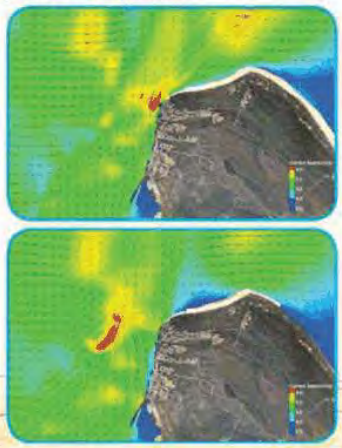
How does the SEMP fit in with other Council plans?

Management of coastal areas that are vulnerable to erosion is complex due to varying land tenure, high recreational and ecological values, competing interests in the land, and coastal processes. Long term planning for these areas must also consider the potential for coastal hazards, such as storm tide events and flooding, and the need for adaptation to climate change induced sea-level rise.

Also on display

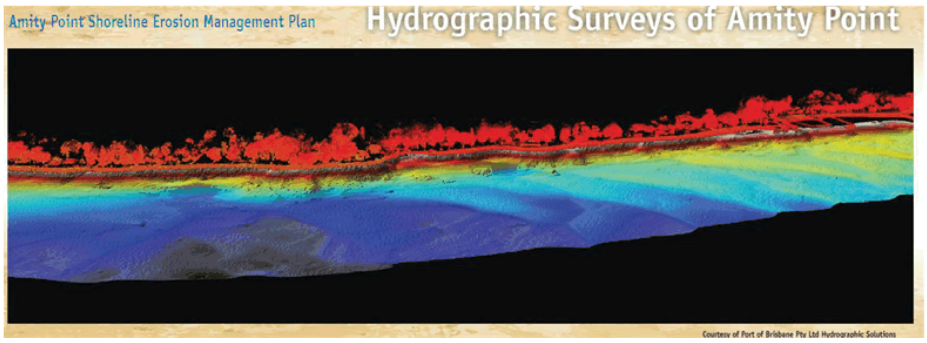
- Storm surge maps from City Plan
- Coastal erosion maps from City Plan
- City Plan zone map
- Explanations of zones and overlays panel from City Plan
- Explanation of tables of assessment from City Plan

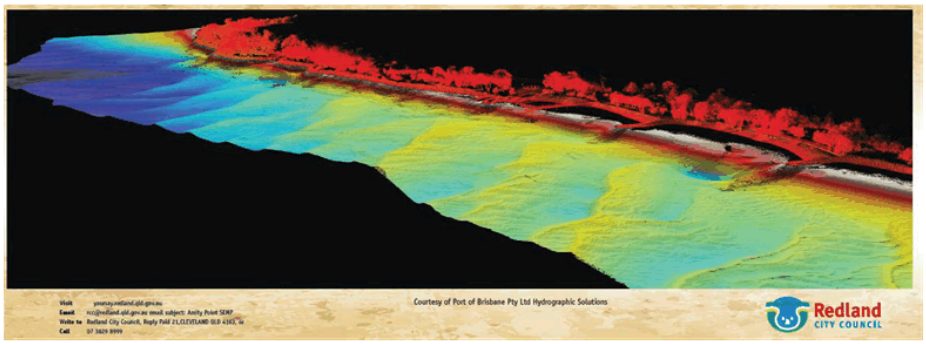
Amity Point Coastal processes



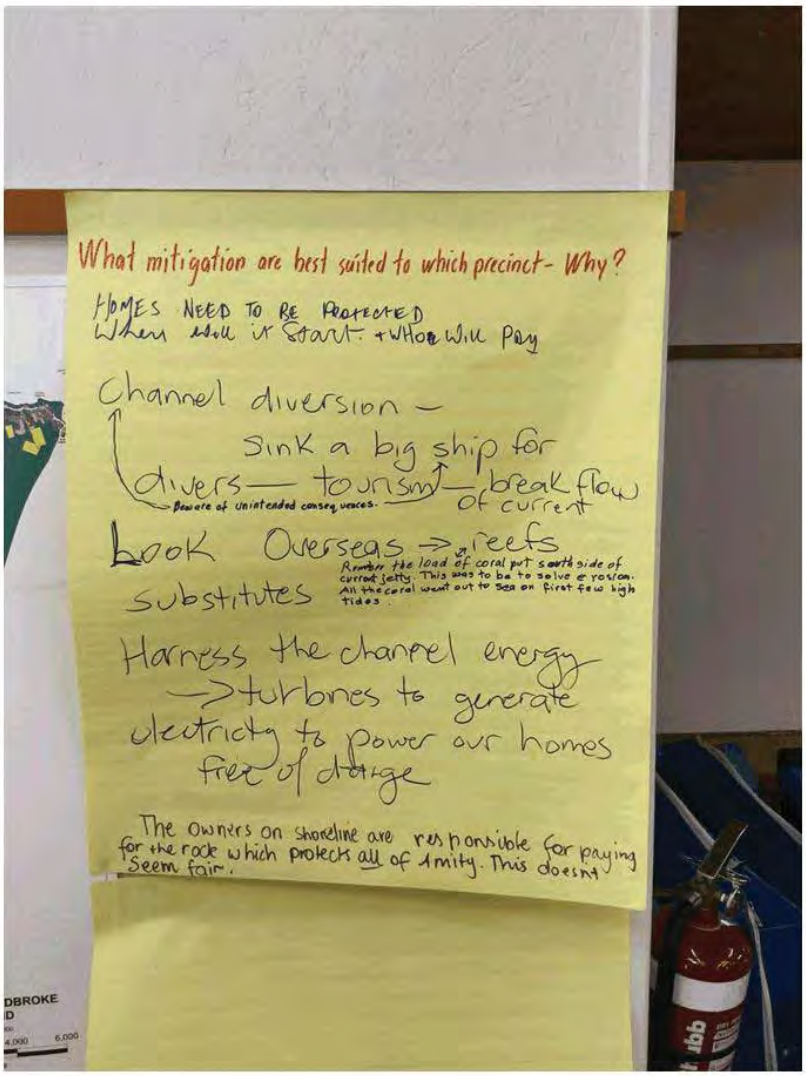
Visit yoursay.redland.qld.gov.au
Email rcc@redland.qld.gov.au
email subject: Amity Point SEMP
Write to Redland City Council, Reply Paid 21, CLEVELAND QLD 4163, or
Call 07 3829 8999

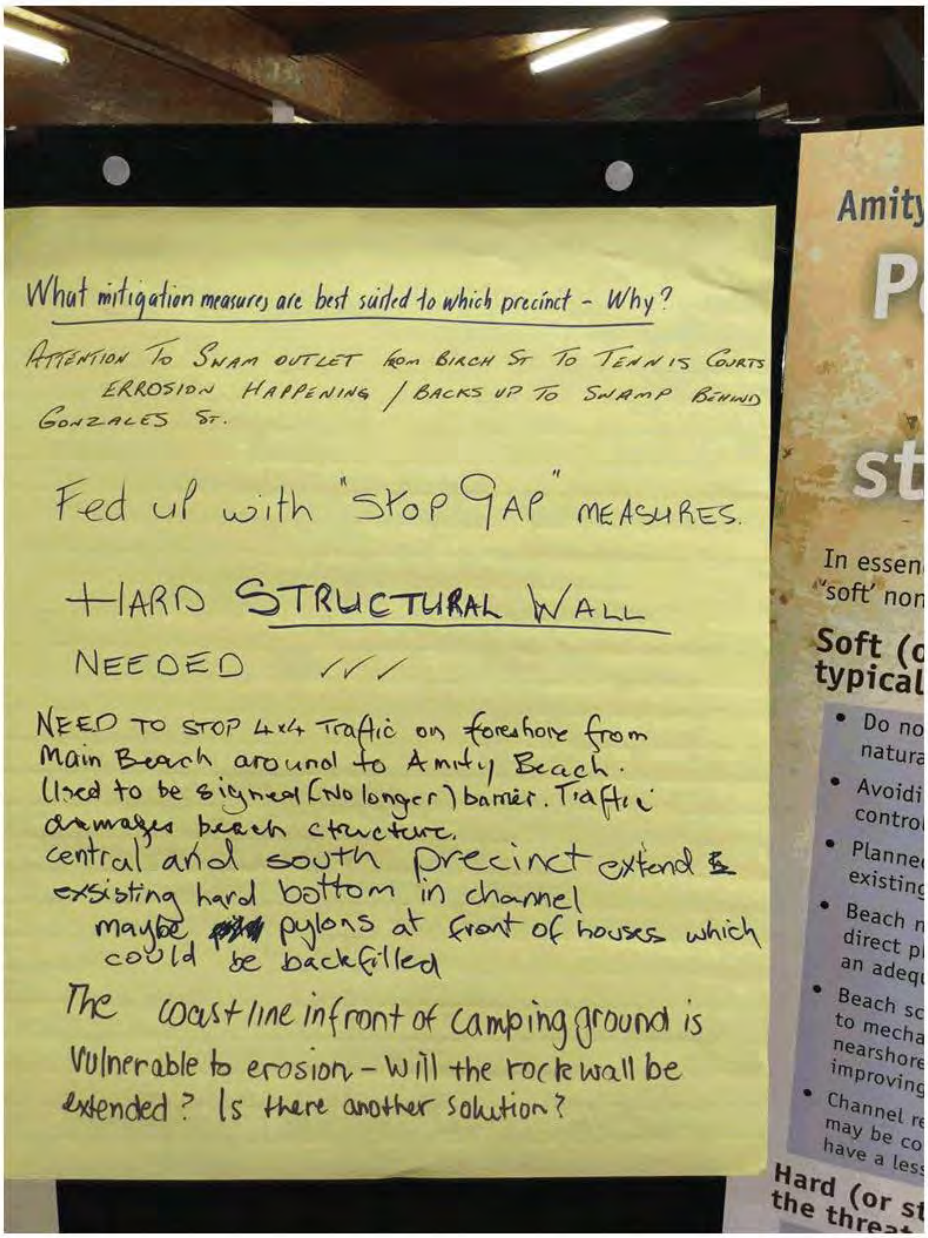
Redland CITY COUNCIL

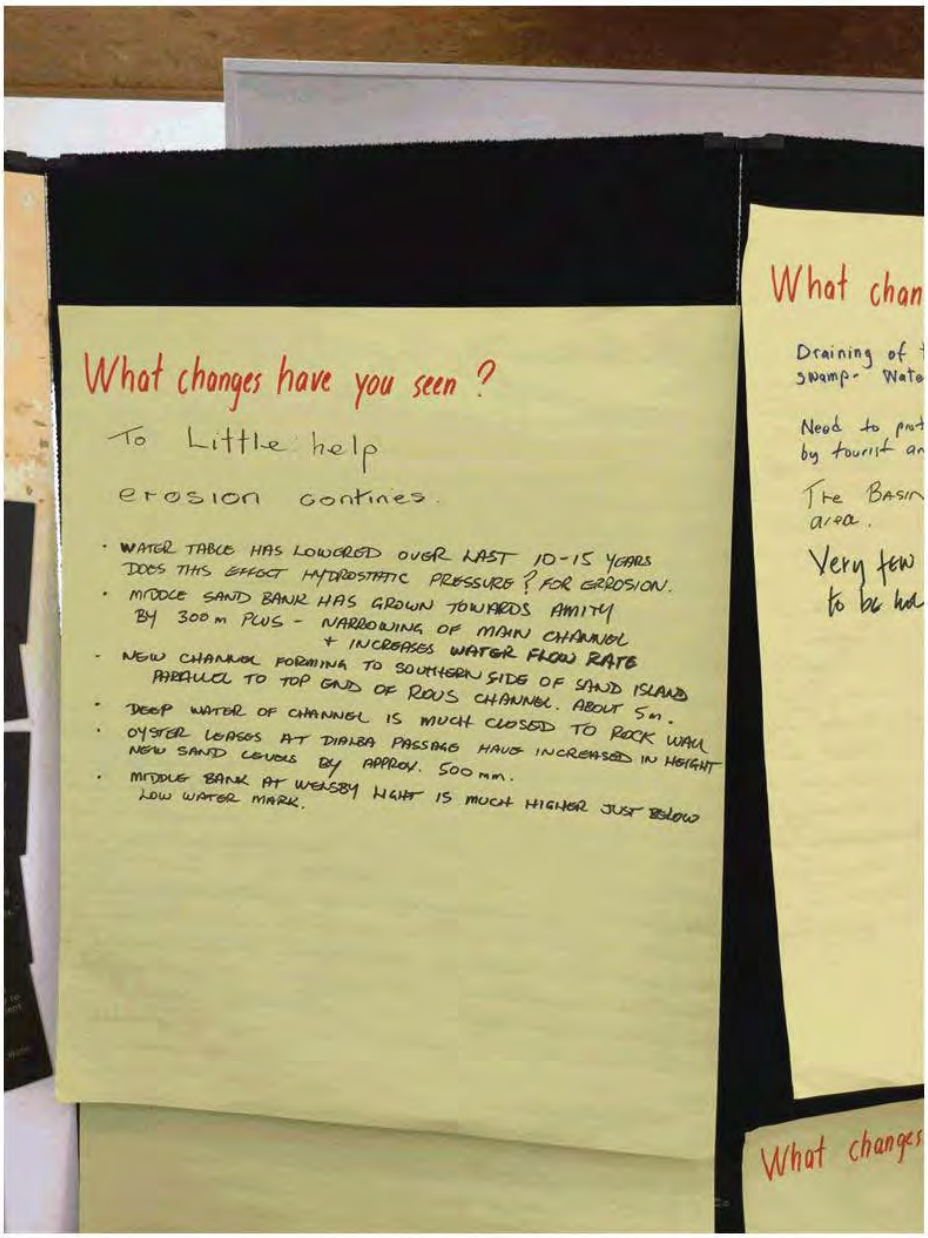

Amity Point Shoreline Erosion Management Plan
Hydrographic Surveys of Amity Point
Courtesy of Port of Brisbane Pty Ltd Hydrographic Solutions

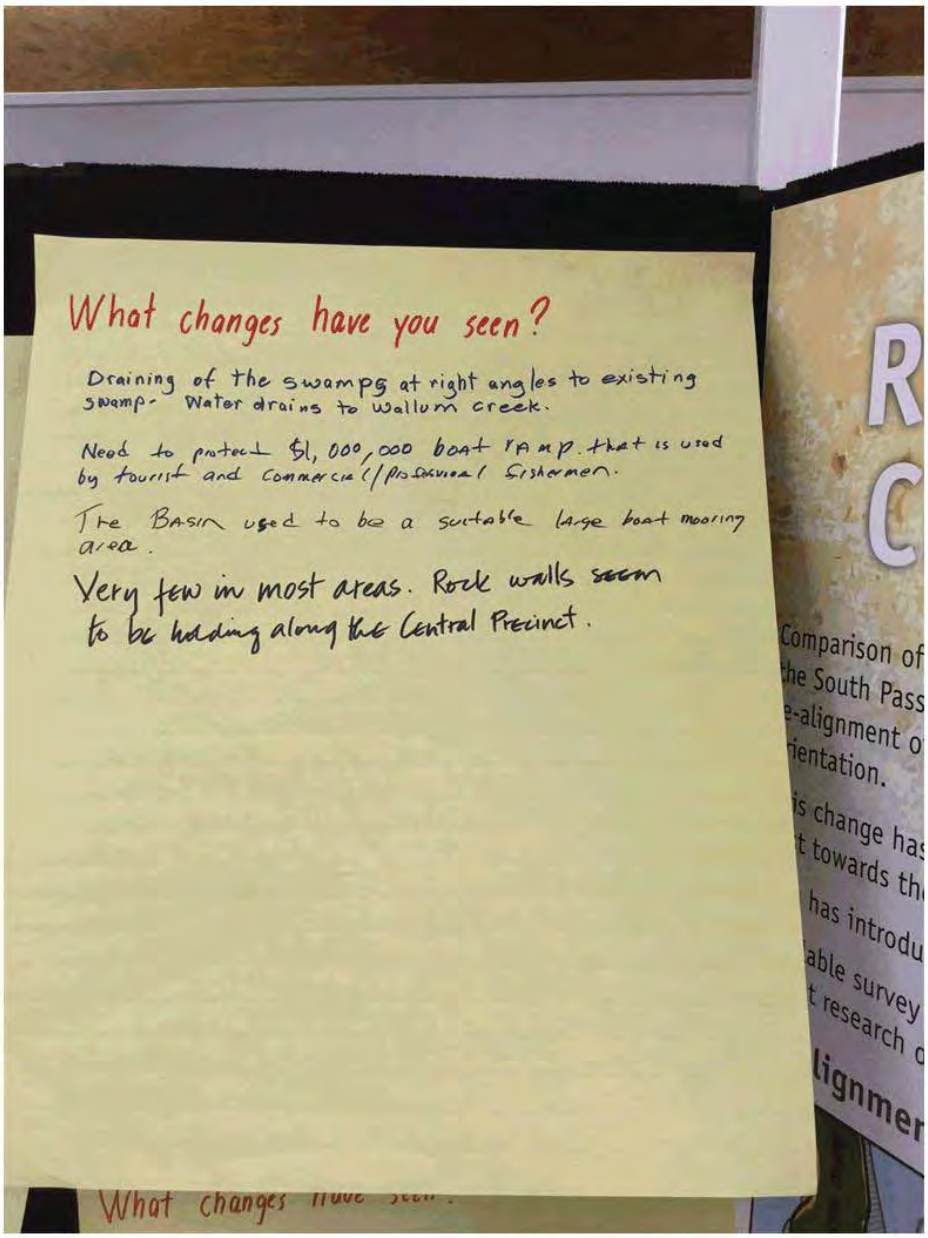

Courtesy of Port of Brisbane Pty Ltd Hydrographic Solutions
Redland
CITY COUNCIL

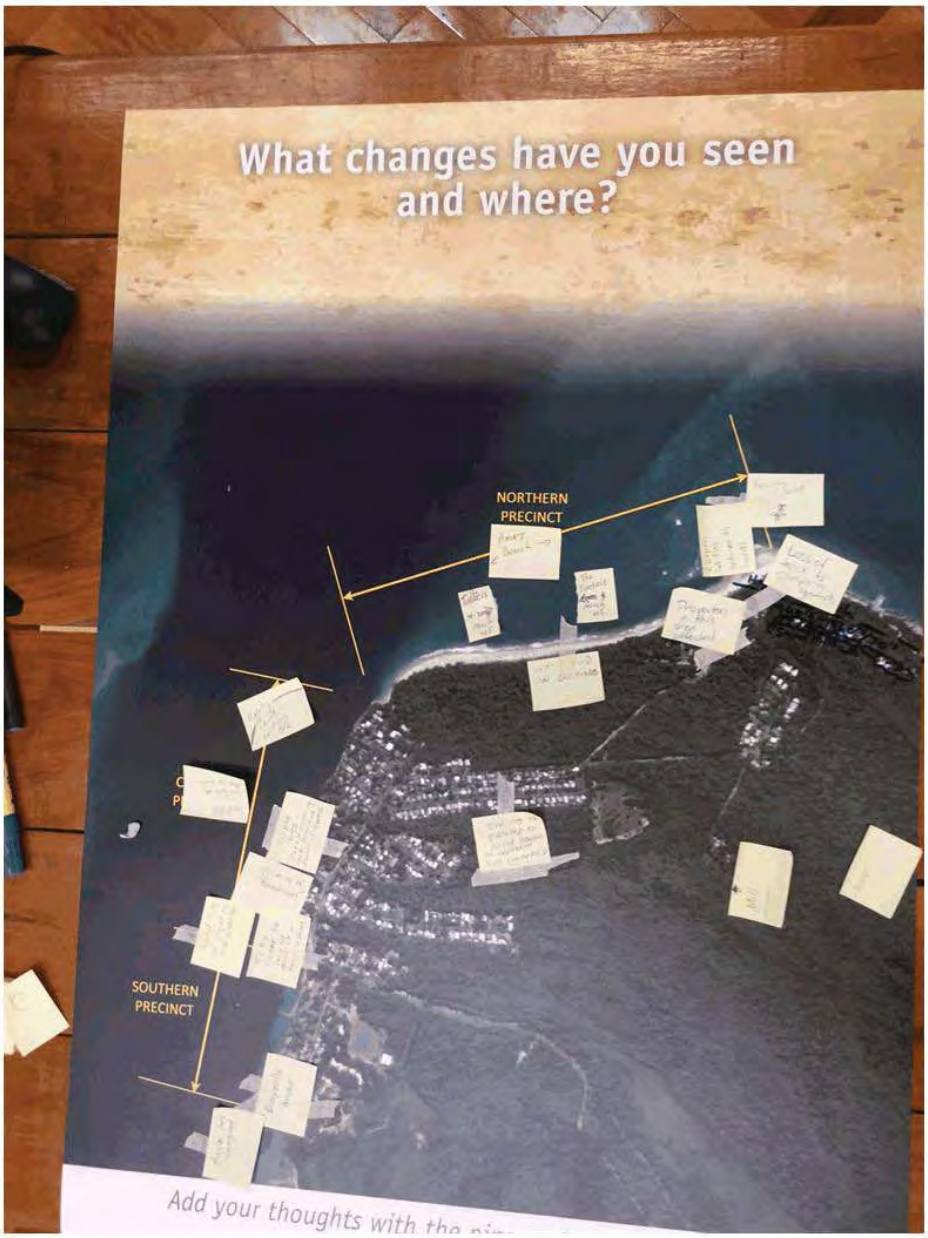
APPENDIX 4 - Open House Activities


What mitigation are best suited to which precinct- Why?
HOMES NEED TO BE PROTECTED
When will it start + Who will Pay
Channel diversion —
Sink a big ship for
divers — tourism — break flow of current
Beware of unintended consequences.
book Overseas → reefs
substitutes
Remove the load of coral put south side of current jetty. This was to be to solve erosion. All the coral went out to sea on first few high tides.
Harness the channel energy
→ turbines to generate
electricity to power our homes
free of charge
The owners on shoreline are responsible for paying for the rock which protects all of Amity. This doesn't seem fair.


What mitigation measures are best suited to which precinct - Why?
ATTENTION TO SWAN OUTLET FROM BIRCH ST TO TENNIS COURTS
EROSION HAPPENING / BACKS UP TO SWAMP BEHIND GONZALES ST.
Fed up with "STOP GAP" MEASURES.
+HARD STRUCTURAL WALL
NEEDED ✓✓✓
NEED TO STOP 4x4 Traffic on foreshore from Main Beach around to Amity Beach. Used to be signed (No longer) barrier. Traffic damages beach structure.
central and south precinct extend & existing hard bottom in channel
maybe pylons at front of houses which could be backfilled
The coastline infront of camping ground is vulnerable to erosion - will the rock wall be extended? Is there another solution?
Amity
In essen
"soft' nor
Soft (c
typical
Do no
natura
Avoidi
contro
Planne
existing
Beach n
direct p
an adeq
Beach sc
to mecha
nearshore
improving
Channel re
may be co
have a less
Hard (or st
the threat

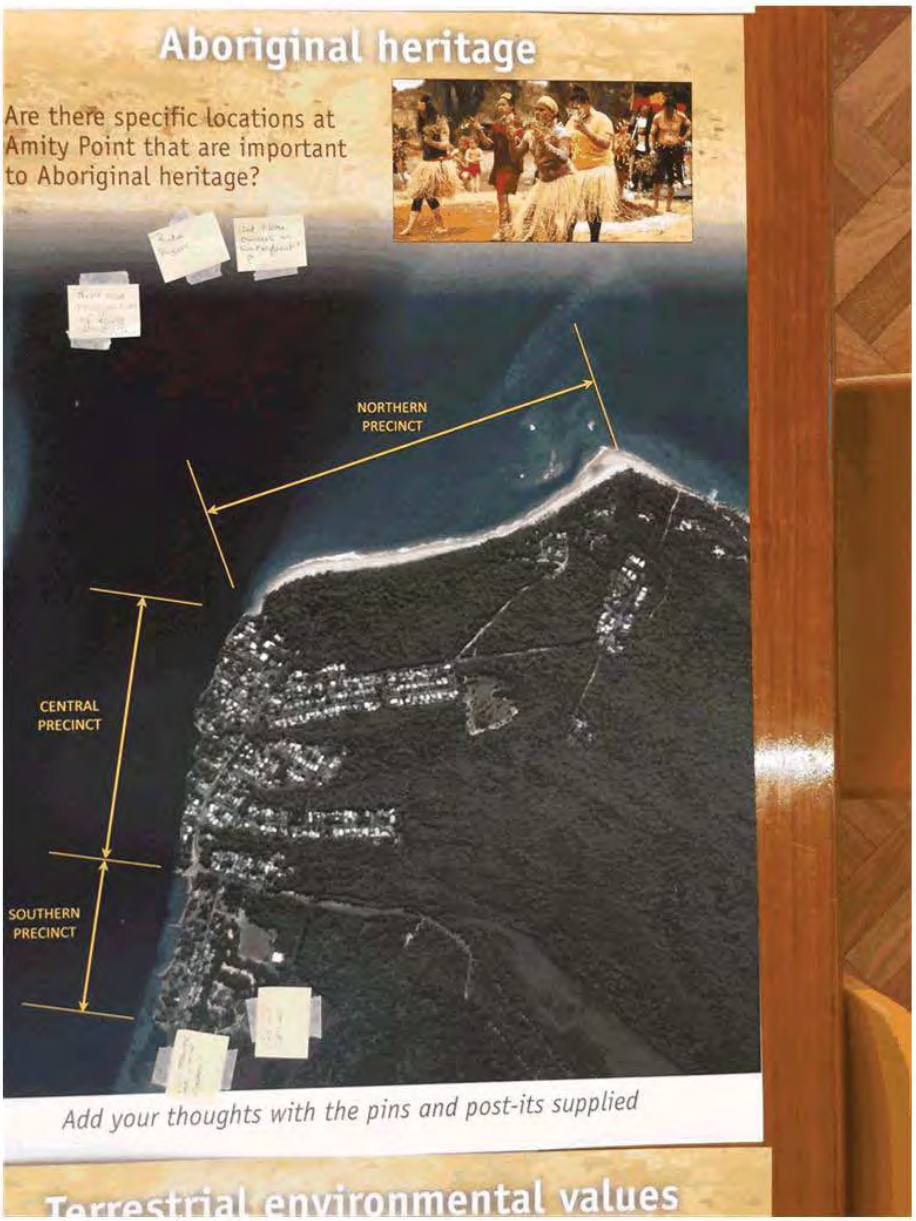

What changes have you seen ?
To Little help
erosion contines.
• WATER TABLE HAS LOWERED OVER LAST 10-15 YEARS DOES THIS EFFECT HYDROSTATIC PRESSURE? FOR EROSION.
• MIDDLE SAND BANK HAS GROWN TOWARDS AMITY BY 300 m PLUS - NARROWING OF MAIN CHANNEL + INCREASES WATER FLOW RATE
• NEW CHANNEL FORMING TO SOUTHERN SIDE OF SAND ISLAND PARALLEL TO TOP END OF ROUS CHANNEL. ABOUT 5m.
• DEEP WATER OF CHANNEL IS MUCH CLOSED TO ROCK WALL
• OYSTER LEASES AT DIRLBA PASSAGE HAVE INCREASED IN HEIGHT NEW SAND LEVELS BY APPROX. 500 mm.
• MIDDLE BANK AT WELSBY LIGHT IS MUCH HIGHER JUST BELOW LOW WATER MARK.
What chan
Draining of
swamp- Wate
Need to
by tourist
The Basin
area.
Very few
to be had
What changes

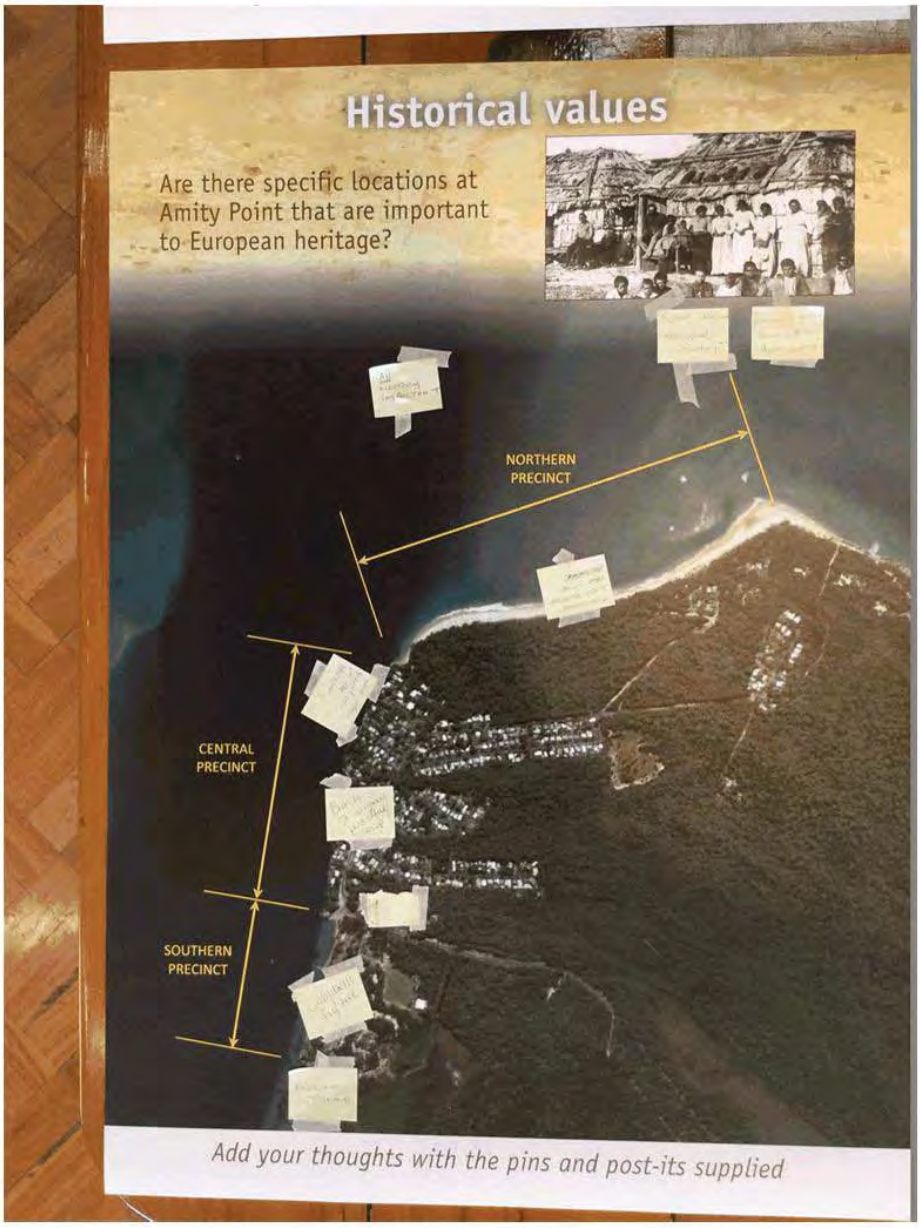

What changes have you seen?
Draining of the swamps at right angles to existing swamp- Water drains to Wallum Creek.
Need to protect $1,000,000 boat ramp that is used by tourist and commercial/Professional fishermen.
The BASIN used to be a suitable large boat mooring area.
Very few in most areas. Rock walls seem to be holding along the Central Precinct.
What changes have seen?
Comparison of
the South Pass
e-alignment o
ientation.
is change has
t towards th
has introdu
able survey
t research
lignmer

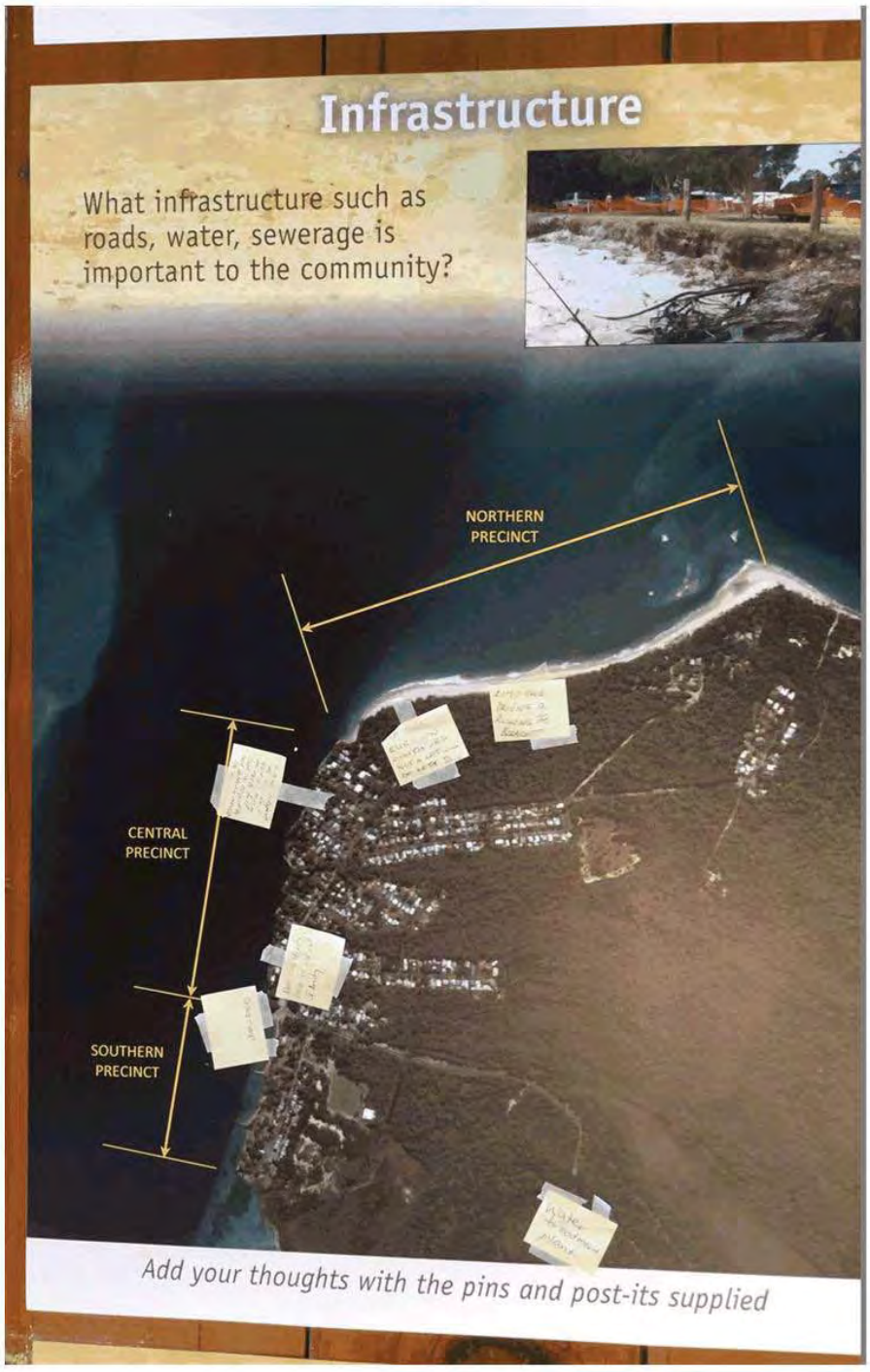

What changes have you seen and where?
NORTHERN PRECINCT
SOUTHERN PRECINCT
Add your thoughts with the


Social values
at are the implications
erosion threat to
e community?
NORTHERN
PRECINCT
CENTI
PRECI
SOUTHERN
PRECINCT
Add your thoughts with the pins and post-its supplied


Add your thoughts with the pins and post-its supplied
Terrestrial environmental values
Are there any specific locations at Amity Point with important environmental values?
NORTHERN PRECINCT
CENTRAL PRECINCT
SOUTHERN
Add your thoughts with the pins and post-its supplied


Aboriginal heritage
Are there specific locations at Amity Point that are important to Aboriginal heritage?
NORTHERN PRECINCT
CENTRAL PRECINCT
SOUTHERN PRECINCT
Add your thoughts with the pins and post-its supplied
Terrestrial environmental values

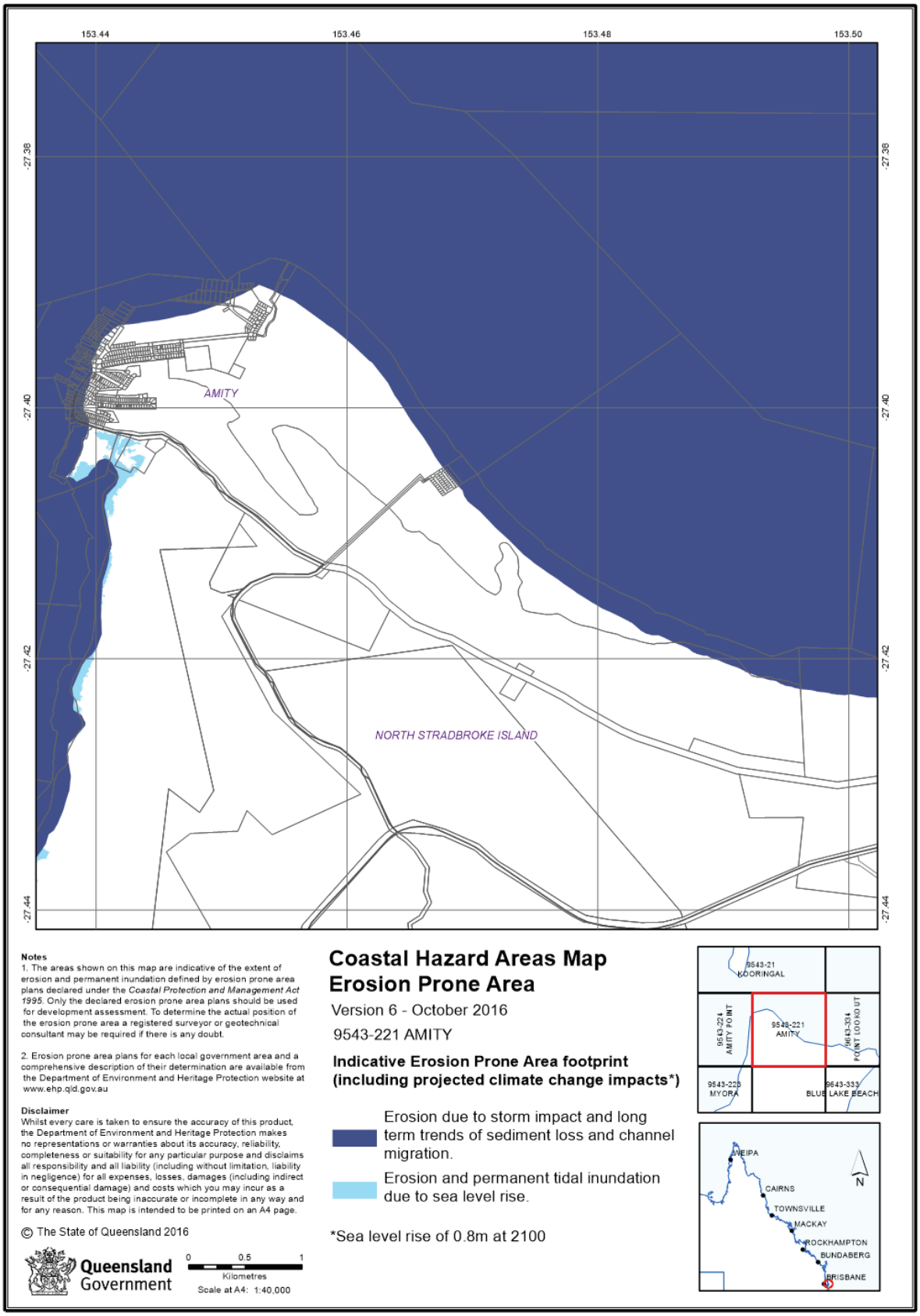

Historical values
Are there specific locations at Amity Point that are important to European heritage?
NORTHERN PRECINCT
CENTRAL PRECINCT
SOUTHERN PRECINCT
Add your thoughts with the pins and post-its supplied


Infrastructure
What infrastructure such as roads, water, sewerage is important to the community?
NORTHERN PRECINCT
CENTRAL PRECINCT
SOUTHERN PRECINCT
Add your thoughts with the pins and post-its supplied


Marine values
What near-shore areas of Amity Point are important to local and regional marine biodiversity?
NORTHERN PRECINCT
CENTRAL PRECINCT
SOUTHERN PRECINCT
Add your thoughts with the pins and post-its supplied

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

APPENDIX D
COASTAL HAZARD PLANS



Notes
1. The areas shown on this map are indicative of the extent of erosion and permanent inundation defined by erosion prone area plans declared under the *Coastal Protection and Management Act 1995*. Only the declared erosion prone area plans should be used for development assessment. To determine the actual position of the erosion prone area a registered surveyor or geotechnical consultant may be required if there is any doubt.

2. Erosion prone area plans for each local government area and a comprehensive description of their determination are available from the Department of Environment and Heritage Protection website at www.ehp.qld.gov.au

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Queensland Government

0 0.5 1
Kilometres
Scale at A4: 1:40,000

Coastal Hazard Areas Map
Erosion Prone Area

Version 6 - October 2016

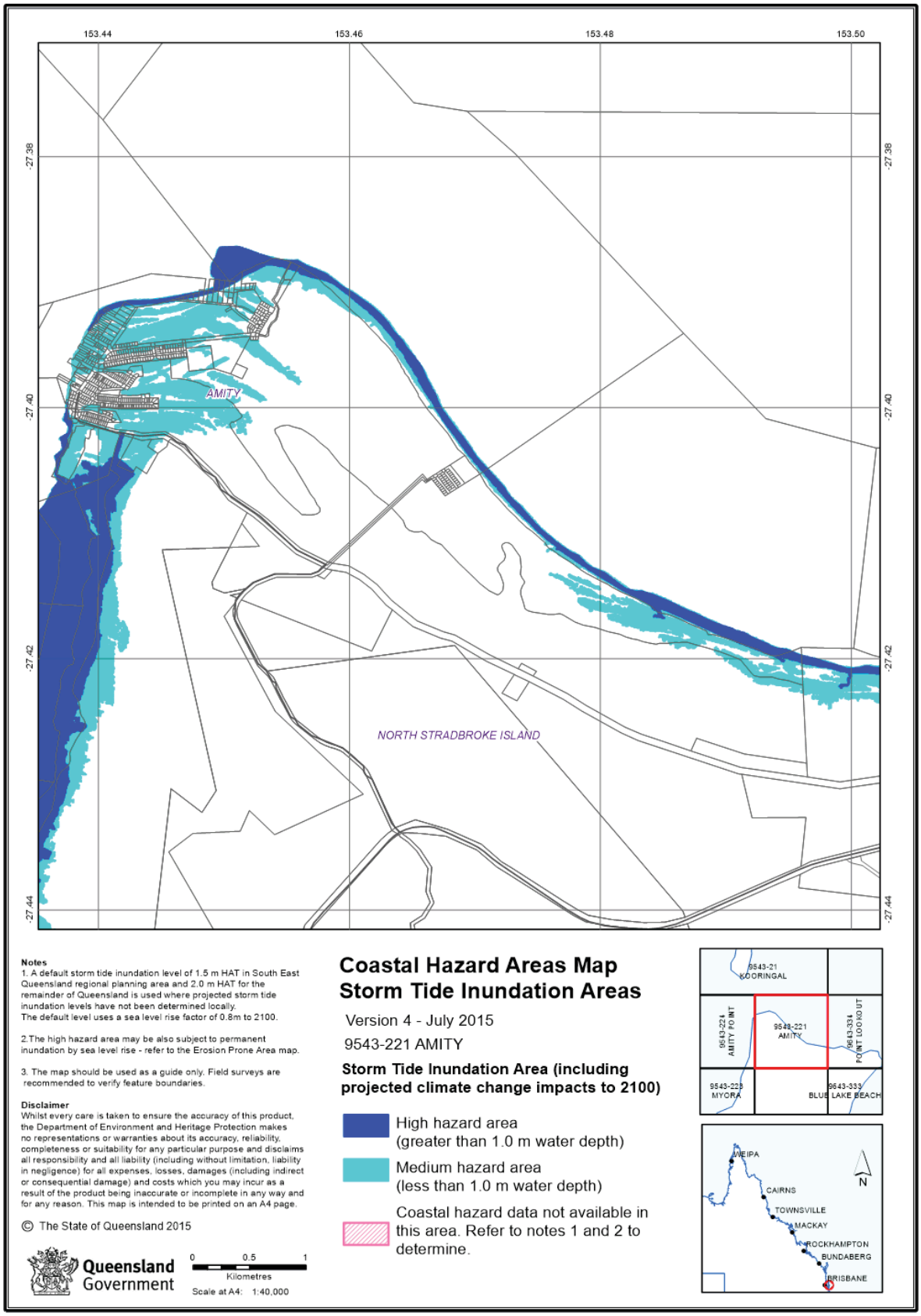
9543-221 AMITY

Indicative Erosion Prone Area footprint (including projected climate change impacts*)

Erosion due to storm impact and long term trends of sediment loss and channel migration.

Erosion and permanent tidal inundation due to sea level rise.

*Sea level rise of 0.8m at 2100



Notes
1. A default storm tide inundation level of 1.5 m HAT in South East Queensland regional planning area and 2.0 m HAT for the remainder of Queensland is used where projected storm tide inundation levels have not been determined locally.
The default level uses a sea level rise factor of 0.8m to 2100.

2.The high hazard area may be also subject to permanent inundation by sea level rise - refer to the Erosion Prone Area map.

3. The map should be used as a guide only. Field surveys are recommended to verify feature boundaries.

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Queensland Government

0 0.5 1
Kilometres
Scale at A4: 1:40,000

Coastal Hazard Areas Map
Storm Tide Inundation Areas

Version 4 - July 2015

9543-221 AMITY

Storm Tide Inundation Area (including projected climate change impacts to 2100)

- High hazard area (greater than 1.0 m water depth)
- Medium hazard area (less than 1.0 m water depth)
- Coastal hazard data not available in this area. Refer to notes 1 and 2 to determine.

Erosion Prone Area
Redland City Local Government Area

Erosion Prone Area Definition

1. Erosion prone areas are deemed to exist over all tidal water to the extent of Queensland Coastal Waters and on all land adjacent to tidal water.
2. Erosion prone areas include areas subject to inundation by the highest astronomical tides (HAT) by the year 2100 or at risk from sea erosion.
3. On land adjacent to tidal water the landward boundary of the erosion prone area shall be defined by whichever of the following methods gives the greater erosion prone area width:
   a. a line measured 40 metres landward of the plan position of the present day HAT level except where approved revetments exist in which case the line is measured 10 metres landward of the upper seaward edge of the revetment, irrespective of the presence of outcropping bedrock;
   b. a line located by the linear distance shown on Table 1 and measured, unless specified otherwise, inland from:
      i. the seaward toe of the frontal dune (the seaward toe of the frontal dune is normally approximated by the seaward limit of terrestrial vegetation or, where this cannot be determined, the level of present day HAT); or
      ii. a straight line drawn across the mouth of a waterway between the alignment of the seaward toe of the frontal dune on either side of the mouth
   c. the plan position of the level of HAT plus 0.8 m vertical elevation.

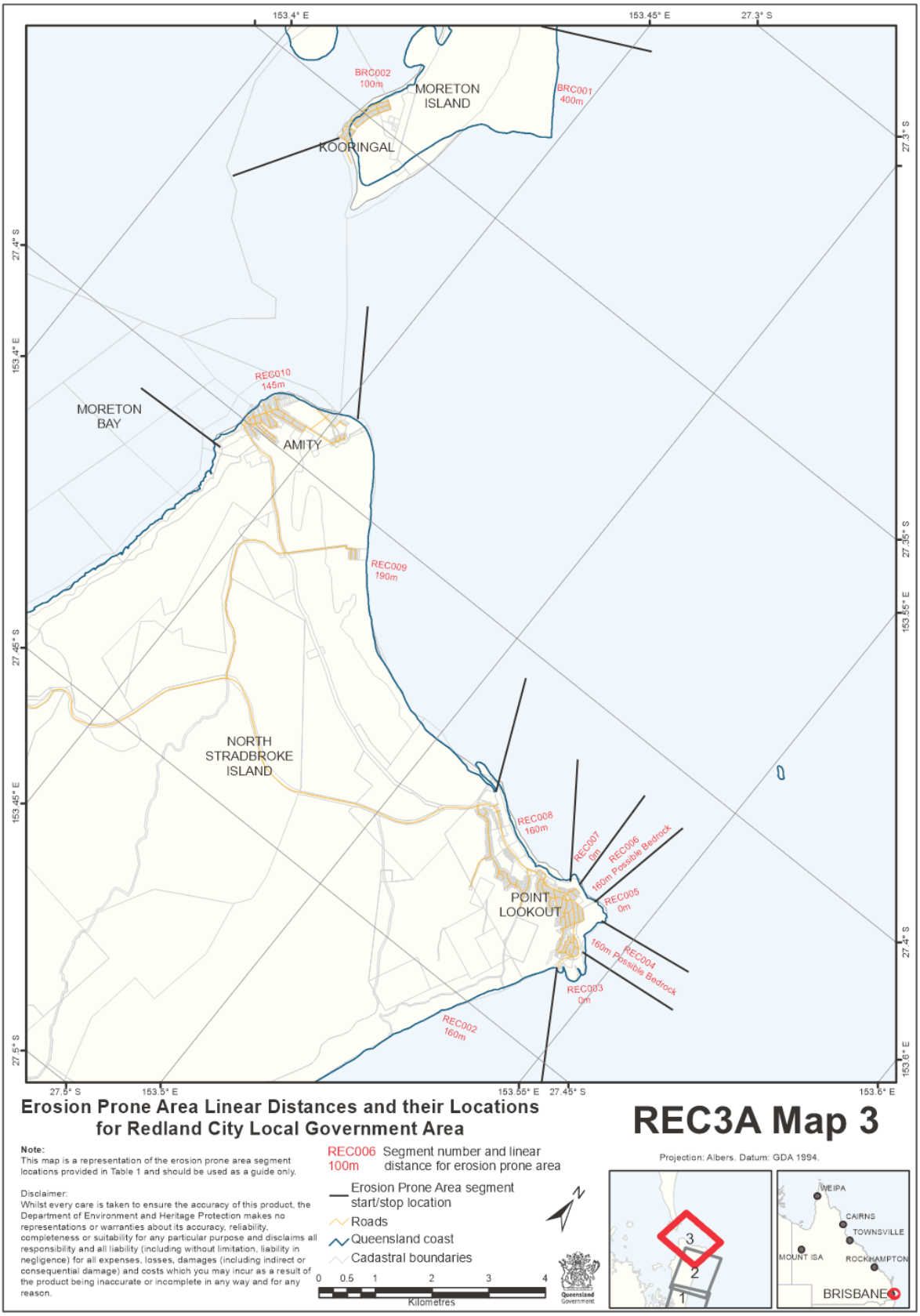
   Except:
   i. where the linear distance specified in 3b is less than 40 metres, in which case section 3a. does not apply and the erosion prone area width will be the greater of 3b and 3c; or
   ii. where outcropping bedrock is present and no approved revetments exist, in which case the line is defined as being coincident with the most seaward bedrock outcrop at the plan position of present day HAT plus 0.8m; or
   iii. in approved canals in which case the line of present day HAT applies, irrespective of the presence of approved revetments or outcropping bedrock.

4. Erosion prone areas defined in accordance with the above are deemed to exist throughout all the local government areas, irrespective of whether the entire local government area is depicted on erosion prone area plans for the area.

Notes to clarify the definition

1. The specific location along the coast to which each erosion prone area linear distance applies (a segment) is shown in Table 1.
2. A map indicating the approximate location along the coast of each linear distance segment is attached.
3. Each erosion prone area segment is located on the coastline between 2 points defined by latitude and longitude. A projection of each point to the nearest actual coastline and continuing inland perpendicular to the coast defines the erosion prone area segment.
4. "Present day HAT" in the definition is always taken to be the present day level of HAT for the coastline as defined in the Queensland Tide Tables for that year or as defined by empirical methodology at the site.
5. The extent of the erosion prone area where it is defined by "HAT plus 0.8m" is the HAT coastline at the year 2100 and includes sea level rise to that time. It is determined by the area of land inundated to the level HAT of the nearest adjacent open coast or river tide gauge plus 0.8m vertical elevation. Site based HAT is not to be used as present day attenuation of inland HAT level due to flow constraints may not persist to 2100 with coastline response to sea level rise. For further explanation see the Coastal Hazard Technical Guide.
6. Where noted on Table 1 (and the map) the specified linear distance applies except where a revetment has been constructed and maintained to the approved design in which case the landward boundary of the erosion prone area is at the upper seaward edge of the revetment (A-line).
7. The approximate erosion prone area footprint is shown on Coastal Hazard Area Maps available on the Department of Environment and Heritage Protection website at www.ehp.qld.gov.au. These footprints are indicative only and the definition in this plan prevails for any inconsistency between the two.
8. This erosion prone area plan may be updated from time to time and a new revision created. Please check with the Department of Environment and Heritage Protection or the local government that this copy is the current version prior to using the contained information in any way.

Date of Erosion Prone Area Declaration: 8 July 2015 **Date of Erosion Prone Area Amendment:**	**Plan No: REC3A**


153.4° E
153.45° E
27.3° S
BRC002
100m
MORETON
ISLAND
BRC001
400m
KOOPINGAL
27.4° S
153.4° E
REC010
145m
MORETON
BAY
AMITY
REC009
190m
27.45° S
153.45° E
NORTH
STRADBROKE
ISLAND
REC008
160m
REC007
0m
REC006
160m Possible Bedrock
REC005
0m
POINT
LOOKOUT
160m Possible Bedrock
REC004
REC003
0m
REC002
160m
27.5° S
153.5° E
153.55° E
27.35° S
153.55° E
27.4° S
153.6° E
Erosion Prone Area Linear Distances and their Locations
for Redland City Local Government Area
REC3A Map 3
Note:
This map is a representation of the erosion prone area segment locations provided in Table 1 and should be used as a guide only.
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REC006 Segment number and linear
100m distance for erosion prone area
Erosion Prone Area segment start/stop location
Roads
Queensland coast
Cadastral boundaries
0 0.5 1 2 3 4
Kilometres
Queensland Government
Projection: Albers. Datum: GDA 1994.
3
2
1
WEIPA
CAIRNS
TOWNSVILLE
MOUNT ISA
ROCKHAMPTON
BRISBANE

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

APPENDIX E
EPBC ACT PROTECTED MATTERS REPORT

Australian Government
Department of the Environment

EPBC Act Protected Matters Report

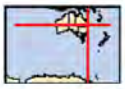
This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 29/09/16 12:32:00

Coordinates
Buffer: 1.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	50
Listed Migratory Species:	72

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	103
Whales and Other Cetaceans:	14
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	1
Regional Forest Agreements:	None
Invasive Species:	22
Nationally Important Wetlands:	2
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar)	[Resource Information]
Name	Proximity
Moreton bay	Within Ramsar site

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour may occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Species or species habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Species or species habitat may occur within area
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Species or species habitat may occur within area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Vulnerable	Species or species habitat may occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Pterodroma neglecta neglecta Kermadec Petrel (western) [64450]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Thalassarche cauta cauta Shy Albatross, Tasmanian Shy Albatross [82345]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta steadi White-capped Albatross [82344]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Species or species habitat may occur within area
Fish		
Epinephelus daemelii Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat may occur within area
Frogs		
Litoria olongburensis Wallum Sedge Frog [1821]	Vulnerable	Species or species habitat known to occur within area
Mammals		
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Megaptera novaeangliae		
Humpback Whale [38]	Vulnerable	Congregation or aggregation known to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Xeromys myoides		
Water Mouse, False Water Rat, Yirrkoo [66]	Vulnerable	Species or species habitat may occur within area
Plants		
Arthraxon hispidus		
Hairy-joint Grass [9338]	Vulnerable	Species or species habitat may occur within area
Cryptocarya foetida		
Stinking Cryptocarya, Stinking Laurel [11976]	Vulnerable	Species or species habitat likely to occur within area
Macadamia integrifolia		
Macadamia Nut, Queensland Nut, Smooth-shelled Macadamia, Bush Nut, Nut Oak [7326]	Vulnerable	Species or species habitat may occur within area
Olearia hygrophila		
Swamp Daisy, Water Daisy [5631]	Endangered	Species or species habitat likely to occur within area
Phaius australis		
Lesser Swamp-orchid [5872]	Endangered	Species or species habitat known to occur within area
Phaius bernaysii		
Yellow Swamp-orchid [4918]	Endangered	Species or species habitat likely to occur within area
Reptiles		
Caretta caretta		
Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
Chelonia mydas		
Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata		
Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Lepidochelys olivacea		
Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Species or species habitat known to occur within area
Natator depressus		
Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Sharks		
Carcharias taurus (east coast population)		
Grey Nurse Shark (east coast population) [68751]	Critically Endangered	Species or species habitat known to occur within area

Name	Status	Type of Presence
Carcharodon carcharias Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Pristis zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Breeding may occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Species or species habitat may occur within area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Vulnerable	Species or species habitat may occur within area
Diomedea gibsoni Gibson's Albatross [64466]	Vulnerable*	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Species or species habitat known to occur within area
Thalassarche cauta (sensu stricto) Shy Albatross, Tasmanian Shy Albatross [64697]	Vulnerable*	Species or species habitat may occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		

Name	Threatened	Type of Presence
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Carcharodon carcharias Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Dugong dugon Dugong [28]		Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Species or species habitat known to occur within area
Manta alfredi Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat known to occur within area
Manta birostris Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Congregation or aggregation known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Orcaella brevirostris Irrawaddy Dolphin [45]		Species or species habitat likely to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Pristis zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish	Vulnerable	Breeding may occur

Name	Threatened	Type of Presence
[68442]		within area
Rhincodon typus		
Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Sousa chinensis		
Indo-Pacific Humpback Dolphin [50]		Breeding known to occur within area
Migratory Terrestrial Species		
Cuculus optatus		
Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundapus caudacutus		
White-throated Needletail [682]		Species or species habitat likely to occur within area
Monarcha melanopsis		
Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus		
Spectacled Monarch [610]		Species or species habitat likely to occur within area
Myiagra cyanoleuca		
Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons		
Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat known to occur within area
Arenaria interpres		
Ruddy Turnstone [872]		Species or species habitat known to occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris alba		
Sanderling [875]		Species or species habitat known to occur within area
Calidris canutus		
Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris ruficollis		
Red-necked Stint [860]		Species or species habitat known to occur within area
Calidris tenuirostris		
Great Knot [862]	Critically Endangered	Species or species habitat known to occur within area
Charadrius bicinctus		
Double-banded Plover [895]		Species or species habitat known to occur

Name	Threatened	Type of Presence within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
Heteroscelus brevipes Grey-tailed Tattler [59311]		Species or species habitat known to occur within area
Heteroscelus incanus Wandering Tattler [59547]		Species or species habitat known to occur within area
Limicola falcinellus Broad-billed Sandpiper [842]		Species or species habitat known to occur within area
Limnodromus semipalmatus Asian Dowitcher [843]		Species or species habitat known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Species or species habitat known to occur within area
Numenius phaeopus Whimbrel [849]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Philomachus pugnax Ruff (Reeve) [850]		Species or species habitat known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Species or species habitat known to occur within area
Pluvialis squatarola Grey Plover [865]		Species or species habitat known to occur within area
Tringa glareola Wood Sandpiper [829]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area
Xenus cinereus Terek Sandpiper [59300]		Species or species habitat known to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Arenaria interpres Ruddy Turnstone [872]		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris alba Sanderling [875]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Calidris tenuirostris Great Knot [862]	Critically Endangered	Species or species habitat known to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat may occur within area
Catharacta skua Great Skua [59472]		Species or species habitat may occur within area
Charadrius bicinctus Double-banded Plover [895]		Species or species habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Species or species habitat known to occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat known to occur within area
Cuculus saturatus Oriental Cuckoo, Himalayan Cuckoo [710]		Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Species or species habitat may occur within area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Vulnerable	Species or species habitat may occur within area
Diomedea gibsoni Gibson's Albatross [64466]	Vulnerable*	Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Heteroscelus brevipes Grey-tailed Tattler [59311]		Species or species habitat known to occur within area
Heteroscelus incanus Wandering Tattler [59547]		Species or species habitat known to occur within area
Himantopus himantopus Black-winged Stilt [870]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area
Limicola falcinellus Broad-billed Sandpiper [842]		Species or species habitat known to occur within area
Limnodromus semipalmatus Asian Dowitcher [843]		Species or species habitat known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat likely to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Species or species habitat known to occur within area
Numenius phaeopus Whimbrel [849]		Species or species habitat known to occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Philomachus pugnax Ruff (Reeve) [850]		Species or species habitat known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Species or species habitat known to occur within area
Pluvialis squatarola Grey Plover [865]		Species or species

Name	Threatened	Type of Presence
		habitat known to occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Species or species habitat known to occur within area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Thalassarche cauta (sensu stricto) Shy Albatross, Tasmanian Shy Albatross [64697]	Vulnerable*	Species or species habitat may occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Tringa glareola Wood Sandpiper [829]		Species or species habitat known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area
Xenus cinereus Terek Sandpiper [59300]		Species or species habitat known to occur within area
Fish		
Acentronura tentaculata Shortpouch Pygmy Pipehorse [66187]		Species or species habitat may occur within area
Campichthys tryoni Tryon's Pipefish [66193]		Species or species habitat may occur within area
Corythoichthys amplexus Fijian Banded Pipefish, Brown-banded Pipefish [66199]		Species or species habitat may occur within area
Corythoichthys ocellatus Orange-spotted Pipefish, Ocellated Pipefish [66203]		Species or species habitat may occur within area
Festucalex cinctus Girdled Pipefish [66214]		Species or species

Name	Threatened	Type of Presence
		habitat may occur within area
Filicampus tigris Tiger Pipefish [66217]		Species or species habitat may occur within area
Halicampus grayi Mud Pipefish, Gray's Pipefish [66221]		Species or species habitat may occur within area
Hippichthys cyanospilos Blue-speckled Pipefish, Blue-spotted Pipefish [66228]		Species or species habitat may occur within area
Hippichthys heptagonus Madura Pipefish, Reticulated Freshwater Pipefish [66229]		Species or species habitat may occur within area
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area
Hippocampus kelloggi Kellogg's Seahorse, Great Seahorse [66723]		Species or species habitat may occur within area
Hippocampus kuda Spotted Seahorse, Yellow Seahorse [66237]		Species or species habitat may occur within area
Hippocampus planifrons Flat-face Seahorse [66238]		Species or species habitat may occur within area
Hippocampus trimaculatus Three-spot Seahorse, Low-crowned Seahorse, Flat-faced Seahorse [66720]		Species or species habitat may occur within area
Hippocampus whitei White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Micrognathus andersonii Anderson's Pipefish, Shortnose Pipefish [66253]		Species or species habitat may occur within area
Micrognathus brevirostris thorntail Pipefish, Thorn-tailed Pipefish [66254]		Species or species habitat may occur within area
Microphis manadensis Manado Pipefish, Manado River Pipefish [66258]		Species or species habitat may occur within area
Solegnathus dunckeri Duncker's Pipehorse [66271]		Species or species habitat may occur within area
Solegnathus hardwickii Pallid Pipehorse, Hardwick's Pipehorse [66272]		Species or species habitat may occur within area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within

Name	Threatened	Type of Presence
		area
Solenostomus cyanopterus Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area
Solenostomus paegnius Rough-snout Ghost Pipefish [68425]		Species or species habitat may occur within area
Solenostomus paradoxus Ornate Ghostpipefish, Harlequin Ghost Pipefish, Ornate Ghost Pipefish [66184]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
Trachyrhamphus bicoarctatus Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Mammals		
Dugong dugon Dugong [28]		Species or species habitat known to occur within area
Reptiles		
Aipysurus laevis Olive Seasnake [1120]		Species or species habitat may occur within area
Astrotia stokesii Stokes' Seasnake [1122]		Species or species habitat may occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Hydrophis elegans Elegant Seasnake [1104]		Species or species habitat may occur within area
Laticauda laticaudata a sea krait [1093]		Species or species habitat may occur within area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Species or species habitat known to occur

Name	Threatened	Type of Presence within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Pelamis platurus Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area

Whales and other Cetaceans		[Resource Information]
Name	Status	Type of Presence
Mammals		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Delphinus delphis Common Dophin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Congregation or aggregation known to occur within area
Orcaella brevirostris Irrawaddy Dolphin [45]		Species or species habitat likely to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Breeding known to occur within area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Naree Budjong Djara National Park	QLD

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat likely to occur within area
Mammals		

Name	Status	Type of Presence
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area

Nationally Important Wetlands	[Resource Information]
Name	State
Moreton Bay	QLD
North Stradbroke Island	QLD

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-27.382 153.409,-27.382 153.494,-27.418 153.494,-27.418 153.409,-27.382 153.409

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Parks and Wildlife Commission NT, Northern Territory Government
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Atherton and Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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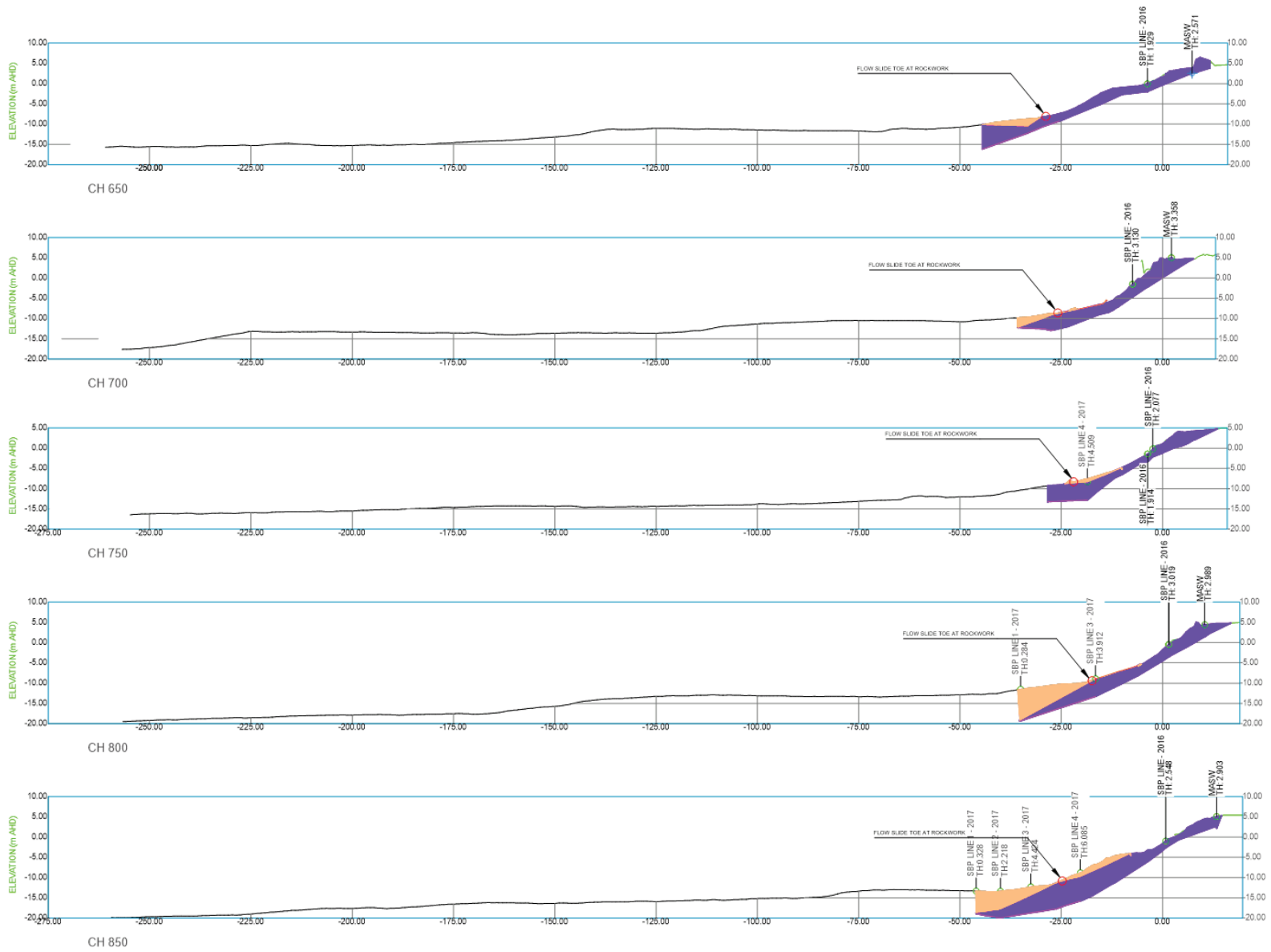
APPENDIX F
POTENTIAL INTERACTION OF FLOW SLIDES WITH THE EXISTING FLOW SLIDE BARRIER ALONG THE CENTRAL REACH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CH 650
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CH 700
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CH 750
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CH 800
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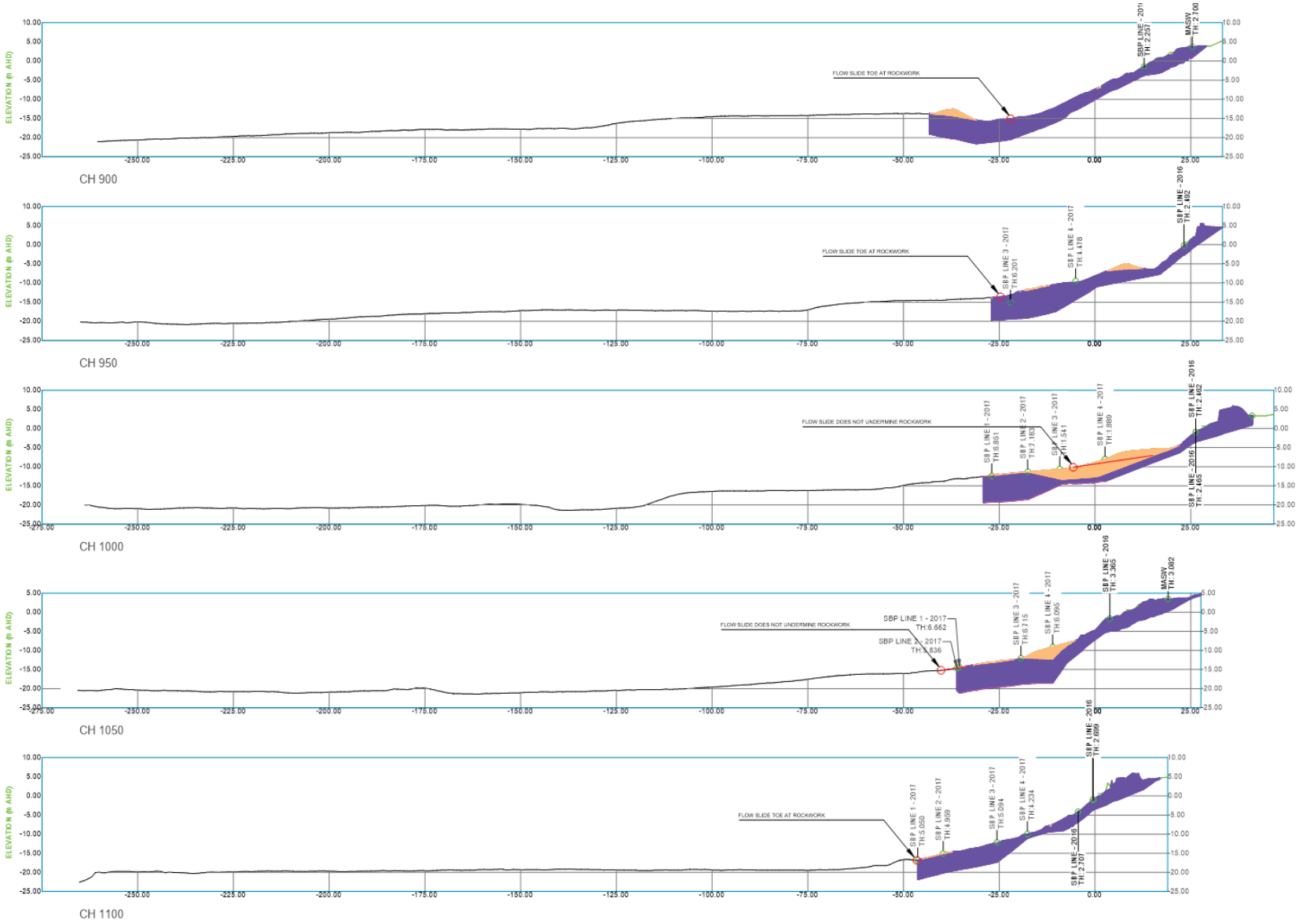
CH 850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CH 900
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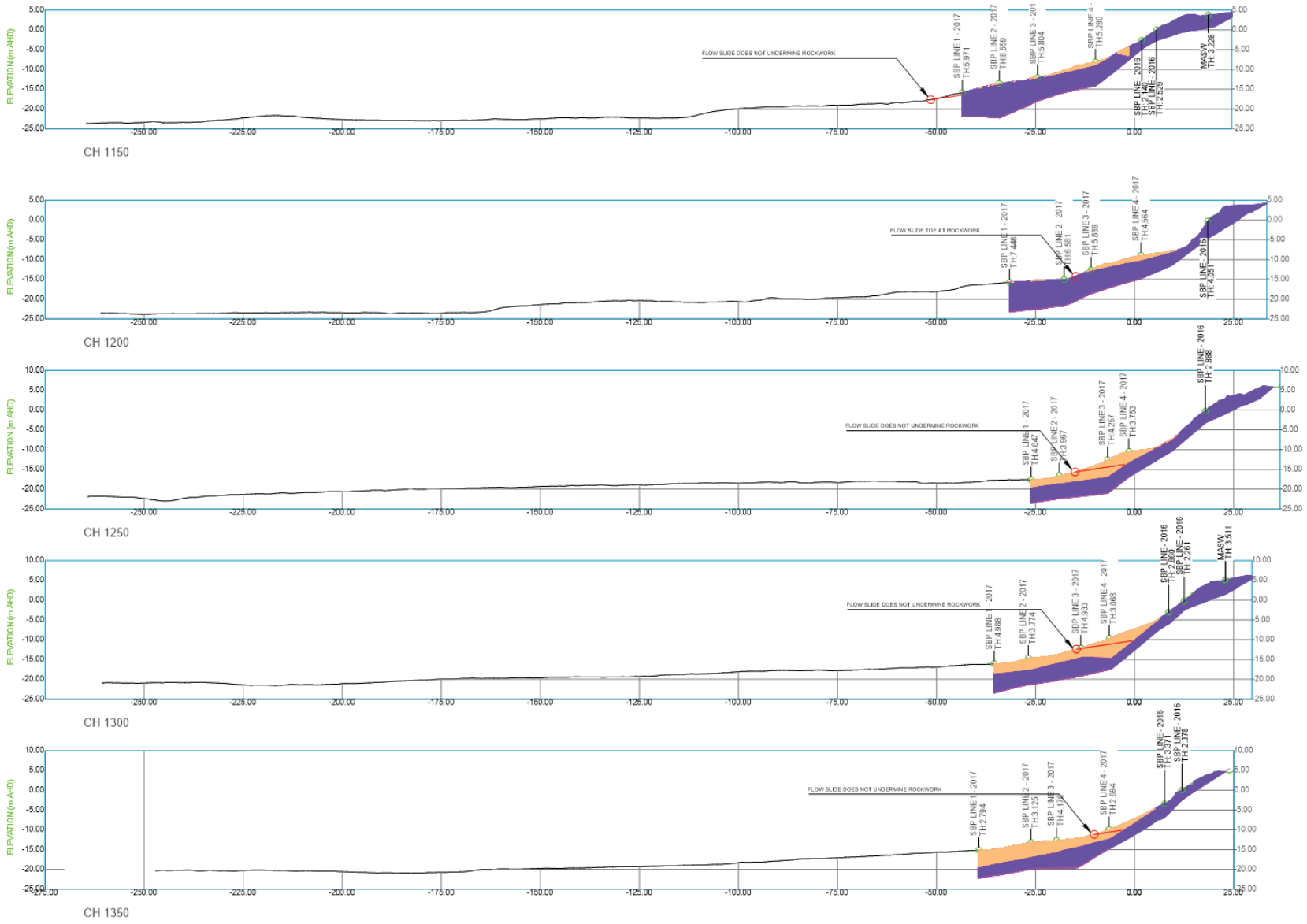
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CH 1150
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SBP LINE 4 - 2017 TH 4.564
SBP LINE - 2016 TH 4.051
CH 1200
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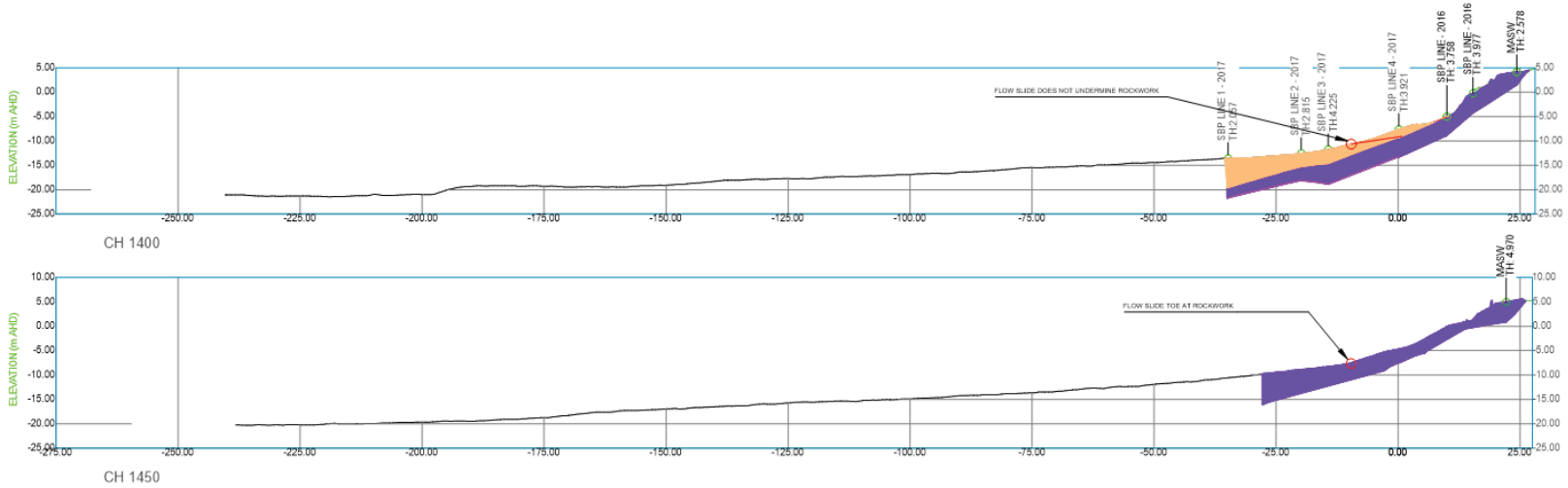
SBP LINE - 2016 TH 2.378
CH 1350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MASW TH 2.578
CH 1400
ELEVATION (m AHD)
FLOW SLIDE TOE AT ROCKWORK
MASW TH 4.970
CH 1450

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APPENDIX G
SAFETY MANAGEMENT PLAN – FLOW SLIDE BARRIER

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Safety Management Plan

Amity Point Flow Slide Barrier

Redland City Council

February 2019

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Document Status

Version	Doc type	Reviewed by	Approved by	Date issued
v01	Report	Christine Lauchlan Arrowsmith	Steve Clark	12 December 2016
v02	Report	Christine Lauchlan Arrowsmith	Paul O'Brien	21 February 2017
v03	Report	Christine Lauchlan Arrowsmith	Paul O'Brien	15 December 2017
v04	Report	Paul O'Brien	Christine Lauchlan Arrowsmith	01 May 2018
v05	Report	Astrid Stuer	Paul O'Brien	26 February 2019

Project Details

Project Name	Amity Point Flow Slide Barrier
Client	Redland City Council
Client Project Manager	Rod Powell
Water Technology Project Manager	Paul O'Brien RPEQ No. 5638
Water Technology Project Director	Steve Clark
Authors	Paul O'Brien RPEQ No. 5638
Document Number	4193-01_R04v05.docx

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Certified System Environment ISO 14001 SAI GLOBAL
Certified System Health & Safety AS 4801 SAI GLOBAL

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WATER TECHNOLOGY
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22 February 2019

Rod Powell
Marine Projects
Redland City Council
cnr. Middle and Bloomfield Streets
CLEVELAND QLD 4163

Dear Rod

Safety Management Plan – Amity Point Flow Slide Barrier

Attached please find the Safety Management Plan with regard to undertaking future emergency works to the Flow Slide Barrier along the foreshore of Amity Point on North Stradbroke Island.

This Safety Management Plan has been prepared as part of the requirements of Section 166 of Queensland's *Planning Act 2016* for undertaking Emergency Tidal Works.

Yours sincerely

Paul O'Brien RPEQ No. 5638
Senior Principal Engineer
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WATER TECHNOLOGY PTY LTD

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1 INTRODUCTION

Proactive management is an effective strategy to address coastal hazards, however given the nature of flow slide events occurring at Amity Point appropriate mechanisms to facilitate emergency works are also required. The role of this Safety Management Plan (Safety Management Plan) is to outline the emergency event, legislative requirements, triggers and the roles and responsibilities for undertaking emergency works.

The objectives of the Safety Management Plan are to:

- Outline a process to facilitate property owners to undertake emergency works along the Amity Point foreshore; and
- Provide advice on the legislative requirements

Section 166 of Queensland's *Planning Act 2016* allows tidal works to be constructed without a development approval in the event of an emergency. Nevertheless, whilst such works can be initiated quickly, there are provisions in Section 166 to ensure that proper precautions and due diligence are exercised when installing the emergency works to ensure that they are safe.

Section 166 states that development offence provisions of the *Planning Act 2016* do not apply if a person or entity who carries out the emergency work:

i. Has made and complies with a Safety Management Plan for the emergency works;

ii. Takes reasonable precautions and exercises proper diligence to ensure the works or a structure to which the works relate are in a safe condition, including by engaging a registered professional engineer to audit the works or structure;

iii. Gives a copy of the plan to the enforcement authority as soon as reasonably practicable after starting the works.

This Safety Management Plan has been prepared by Paul O'Brien (RPEQ No. 5638) in fulfillment of item (i) of the above requirements when undertaking any emergency works to the Flow Slide Barrier along the foreshore of Amity Point on North Stradbroke Island.

The location of Amity Point within the Moreton Bay regional setting is illustrated on Figure 1-1.

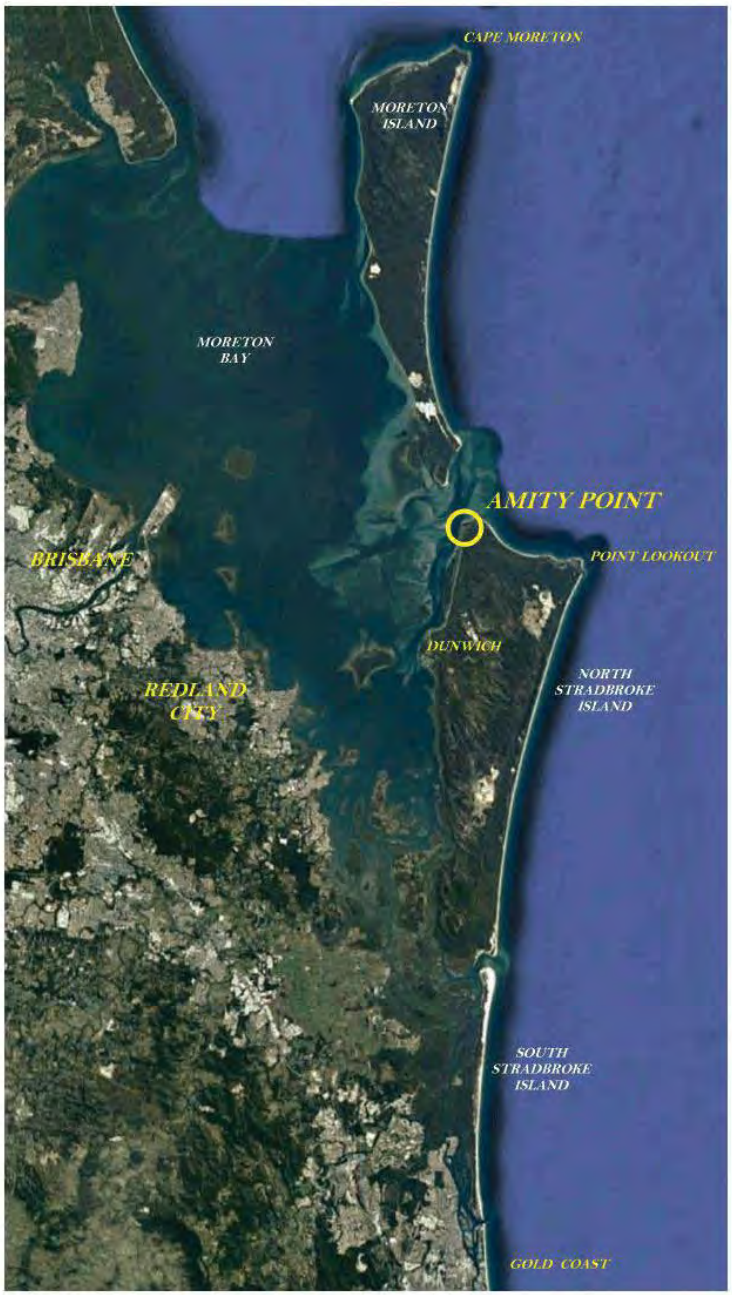

Figure 1-1 Regional Setting

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2 EMERGENCY EVENT RESPONSE

2.1 The Threat Requiring Emergency Works

The threat of shoreline erosion along the foreshore of Amity Point relates to the occurrence of *retrogressive flow slides* in the underwater side slopes of Rainbow Channel.

Retrogressive flow slides (also known as *retrogressive breach failures*) are natural events which occur in sandy deposits of many river, estuarine and coastal locations around the world. They can have a significant influence on the stability of river banks, as well as estuarine and coastal foreshores.

They have also been responsible for levee collapses along the lower reaches of the Mississippi River that have resulted in adverse flooding and damage to essential infrastructure. In the Netherlands, retrogressive flow slides have been recognised for many years as being a threat to the vital flood and sea defences along that country's coastline and riverbanks.

Due to their potentially catastrophic consequences, considerable research effort has been applied to understand retrogressive flow slides. Consequently, there is a significant body of technical literature available that describes the geomorphological mechanisms associated with retrogressive flow slide failures, as well as measures for either preventing their initiation or inhibiting their development to destructive scales.

Figure 2-1 shows images of a retrogressive flow slide underway at Amity Point[1].

The processes associated with a retrogressive flow slide can be summarised as follows:

- They occur on densely packed subaqueous sand slopes, such as those that exist along the underwater edge of tidal channels and river banks. At Amity Point they occur just offshore on the submerged side slopes of Rainbow Channel.
- A triggering mechanism develops a localised scour somewhere on the submerged slope, which can then progress to a shear failure should the disturbed area exceed the stable angle of repose for the sand.
- The sand grains remaining on the sheared face of the slope are unsupported, and will consequently move apart - increasing the void ratio (this is called *dilation*) which temporarily decreases pore pressures within the face of the slope. The lower pore pressures (compared to the surrounding hydrostatic water pressures) cause individual sand grains near the face to be "sucked" together for a short time. This enables the sand body to resist further collapse and for a near-vertical face to develop.
- The lower pore pressures at the near-vertical sand face are quickly dissipated - by the surrounding water infiltrating the voids. The unconfined grains at the face then detach and fall from the wall, generating a density current of entrained sand which carries the falling sand away into deeper water. The process continues on the newly exposed sand grains in the near-vertical face - increasing the momentum of the event.
- The density currents carry the removed sand away from the failure zone and beyond the immediate toe of the near-vertical face, allowing it to remain steep and high. This dispersion of sand away from the base of the breach can be further assisted by tidal currents flowing in the channel itself.

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[1] Images in Figure 2-1 are reproduced from Beinssen, K., Neil D.T. and Mastbergen D.R. 2014. *"Field observations of retrogressive breach failures at two tidal inlets in Queensland, Australia"*. Journal *Australian Geomechanics*. Vol. 49 No. 3, Sept 2014. pp55-63.

- In other words, the mechanism of flow slide development is driven by short-lived density currents that entrain sand off the near-vertical wall of a shoreward moving failure plane, causing sand grains to continually cascade off this advancing face. This process is classed as retrogressive breaching failure.

Figure 2-1 A Retrogressive Flow Slide Underway at Amity Point

- As the advancing sand wall grows in height, wedges of sand can also collapse off the vertical face - breaking up as they fall and mix with water, thereby enhancing the density current. Dilation in the sand face immediately behind the collapsing wedge temporarily stabilises the wall until retrogressive breaching restarts.
- Retrogression continues, creating a deep bowl-shaped scour feature in the submerged side slope of the tidal channel or river bank (as seen in Figure 2-1 above). Typically, as the event grows, this then becomes more of an amphitheatre-shaped characteristic with a narrower throat at its deeper offshore end.
- The base of the retrogressing sand wall propagates into the sand slope slightly upwards on an approximate angle of 1 vertical : 15 horizontal.

- The event ceases when the density current can no longer entrain sand from the retrogressing near-vertical face. This occurs either because there is no longer any sand available within the profile of the submerged slope to sustain the process; or the volume of sand being removed from the breaching face becomes so great as to "choke" the flow of entrained sand out of the bowl-shaped feature.
- Whilst they proceed entirely underwater, such events typically cannot be seen. It is only when they emerge above the waterline onto exposed beaches or sand banks that they can be detected by eye.

Investigations regarding the phenomenon of retrogressive flow slides at Amity Point have previously been undertaken[2]. They have included almost daily field monitoring for a period of 26 months of the at-risk beach and Rainbow Channel slope immediately to the north of the existing flow slide barrier.

Monitoring was carried out from July 2012 to August 2014. In that period, 52 retrogressive flow slides were recorded. This averages approximately one every fortnight. A summary of other findings are as follows:

- On no occasion was the approach of a subaqueous retrogressive flow slide evident on the surface of the water. Such events only became visible when they reached the beach.
- The morphology of each event was amphitheatre shaped as it progressed up the beach slope. Whilst sand grains could be seen cascading down the near-vertical face below the waterline, occasionally wedges of sand sheared off the top of the wall and sank vertically down its face.
- The speed of the retrogressing near-vertical sand face in all cases was approximately 0.8 metres / minute. However, this rate reduced as the event reached the upper beach area and began to diminish.
- The height of the subaqueous sand wall was measured on six occasions to be around 6m to 7m.
- Following each retrogressive flow slide event, the longshore littoral supply of sand from the north-west (from Amity Beach) filled the bowl-shaped erosion feature within one day to several weeks – depending upon the size of the retrogressive flow slide.
- Of the 52 events recorded, 48 were identified as having encroached onto the flow slide barrier - but none caused significant structural damage.

2.2 The Historical Response to the Threat of Flow Slides

It is apparent from the historical record that retrogressive flow slides have been occurring at Amity Point along the eastern edge of Rainbow Channel for over one hundred years, and probably longer.

Renowned local historian Thomas Welsby wrote in 1913 of his recollections[3] prior to that time of many "large slips" occurring at Amity Point which swept away "tons of sand". His observations dating back to the late 1800's indicate the occurrence of retrogressive flow slides and their adverse impacts on local foreshores and sand shoals at that time.

4193-01_R04v05.docx

[2] Beinssen, K., and Neil D.T. 2015. "*Retrogressive Breach Failure Events at Amity Point, Australia and their Interaction with Built Defences*". Proceedings of the 25th International Ocean and Polar Engineering Conference. Hawaii, USA; June 21-26, 2015. Copyright the International Society of Offshore and Polar Engineers (ISOPE). pp 1325-1339. ISBN 978-1-880653-89-0; ISSN 1098-6189.

[3] Thomson, A.K. (Ed.) 1967. "*The Collected Works of Thomas Welsby* ". Jacaranda Press Pty Ltd., Brisbane.

Since then there have been numerous such events, many of which can be recalled by long-term residents[4] and are recorded in photographs dating back to the 1940's. Residents of Amity Point have historically (and still today) refer to retrogressive flow slides as "sink holes". There is wide-spread understanding in the local community that such events occur regularly at Amity Point and that they represent a threat - not only to foreshore properties, but potentially to the township itself.

The response of the local community to the threat of retrogressive flow slides have been varied over the years. These have included sea defences constructed of timber piles salvaged from an abandoned WW2 anti-submarine netting project, large ti-tree mats, and cement stabilisation (G. Litherland 2015 pers. comm.). Prior to the opening of a quarry on North Stradbroke Island in the 1970's, fill comprising large tree trunks, old car bodies and other such materials (including the *Bandicoot*, a decommissioned steam launch previously used as a dredge tender) were placed as emergency works by the community at locations of retrogressive flow slides.

Large rocks became available from the island's quarry around the mid-1970's. As a consequence, foreshore property owners have more recently used this material to armour their properties. Typically, this entails the placement of large volumes of rock into any areas of foreshore adversely affected by retrogressive flow slides. This occurs as soon as possible after each event. When a retrogressive flow slide undermines previously placed armour, those rocks slump or collapse into the eroded shoreline. Residents then place additional rocks to "top-up" the slumped armour. In effect this is progressively building a rock barrier to retrogressive flow slides, since each local undermining occurrence results in deeper foundations and a re-charging of the reserves of rock higher in the structure by residents.

Whilst there has been intermittent damage to the structure by deep retrogressive flow slides requiring placement of additional armour rocks to reinstate its alignment and effectiveness, this flow slide barrier has prevented any long-term recession of the shoreline alignment for more than 40 years. This is apparent from the historical foreshore surveys that have been undertaken since 1970.

As noted above, the mechanism of flow slide development is driven by short-lived density currents that entrain sand off the near-vertical wall of the shoreward moving failure plane, causing sand grains to cascade off the advancing failure face. Measures to prevent flow slides from being triggered on submarine sand slopes can be difficult and costly to implement, often with only limited effectiveness. Therefore, a significant focus of overseas research has been directed to identifying submarine sand slopes that are susceptible to flow slides; and to then devise the means to prevent them from developing into large scale failures.

For strategies that seek to prevent further development of an initiated flow slide, the primary objective is to disrupt or completely dissipate the density currents which entrain sand on the near-vertical failure plane. Blocking of flow slide development occurs when:

- The advancing near-vertical sand wall encounters non-erodible material within the sand body. In which case, there is no longer sand available to sustain the momentum of the density currents driving the growth of the flow slide event;
- Non-erodible layers present in the sand slope above the point of flow slide initiation become undermined and collapse in sufficient quantity down into the bowl-shaped failure area - thereby diffusing the density currents and armouring the near-vertical advancing sand wall.

There is a very large volume of rock (and other non-erodible material) placed by foreshore property owners over recent decades into the Amity Point foreshore. Even though Rainbow Channel has been migrating eastward towards Amity Point, resulting in deeper and steeper seabed slopes in front of the foreshore (with

[4] G. Litherland, 2015 pers. comm.; D. & E. Cilento 2015 pers. comm.; C. & M. McIllwain, 2015 pers. comm.; B. Hoare 2016 pers. comm.; J. & L. Walker 2016 pers. comm.; K. Norris 2016 pers. comm.; I. Panebianco 2016 pers. comm.

resulting greater vulnerability of the foreshore to flow slides), there have been fewer large failure events in recent years. This is very likely due to the blocking effect of the rock barrier that has been progressively reinforced by foreshore property owners.

In the past, whenever a flow slide event occurring on the submerged sand slopes of Rainbow Channel undermines any rocks placed previously, the buried rock mass slumps or collapses into the active flow slide region bringing the processes to an end. This typically manifests itself as a settling or dislodgement of rocks at the top of the slope. The response of local property owners is to then (and as soon as possible after the event) place additional rocks in the upper part of the collapsed rock slope.

Consequently, a flow slide barrier made of rock has been progressively built along the foreshore of the Central Reach over many years. Each undermining event caused by deep flow slides locates the foundations of the barrier deeper; whilst the reserve of rocks higher in the structure (to accommodate any future slumping) is recharged by local property owners.

The fundamental purpose of the flow slide barrier is to mitigate the development of flow slides to damaging proportions. This function will only be maintained if the current practice of recharging the upper reserves of rock in the structure occurs whenever there is local undermining of the barrier.

3 THE EMERGENCY TIDAL WORKS

The Emergency Tidal Works covered by this Safety Management Plan relate to the emergency placement of rocks to repair and reinstate the function of the existing flow slide barrier along the foreshores of Amity Point.

3.1 Trigger Event

Section 166 of the *Planning Act (2016)* defines emergency tidal works as being "…. *works, development or a use (an activity) carried out because an emergency endangers :*

i. a person's life or health; or

ii. a building's structural safety; or

iii. the operation or safety of infrastructure, other than a building; or

iv. *for tidal works – the structural safety of a structure for which there is a development permit for operational works that is tidal works.*"

Given the physical characteristics of the existing flow slide barrier, in conjunction with the above definition of emergency tidal works, the trigger for implementation of this Safety Management Plan is when the flow slide barrier becomes damaged to the extent that people and houses adjacent to the structure are placed at significant risk.

Small movements and settlement of exposed rocks in the upper slope of the flow slide barrier can occur due to small retrogressive flow slides occurring near the buried toe of the barrier. This is acceptable from a structural integrity perspective. It is only when a deep retrogressive flow slide occurs which significantly undermines the barrier (causing significant slumping of the upper part of the barrier) is there a need to implement Emergency Tidal Works.

Such works should be triggered when:

- Excessive rock slumping : All visible rocks in the flow slide barrier above the prevailing tide level have slumped down below the waterline; or
- Excessive rock erosion : The extent of rock settlement during a single retrogressive flow slide event is such that the upper seaward-most corner of the barrier's front slope is eroded inland by 5 metres.

These two fundamental trigger actions are illustrated respectively in Figure 3-1 and Figure 3-2.

Figure 3-1 Emergency Tidal Works Trigger Event – Excessive Rock Slumping

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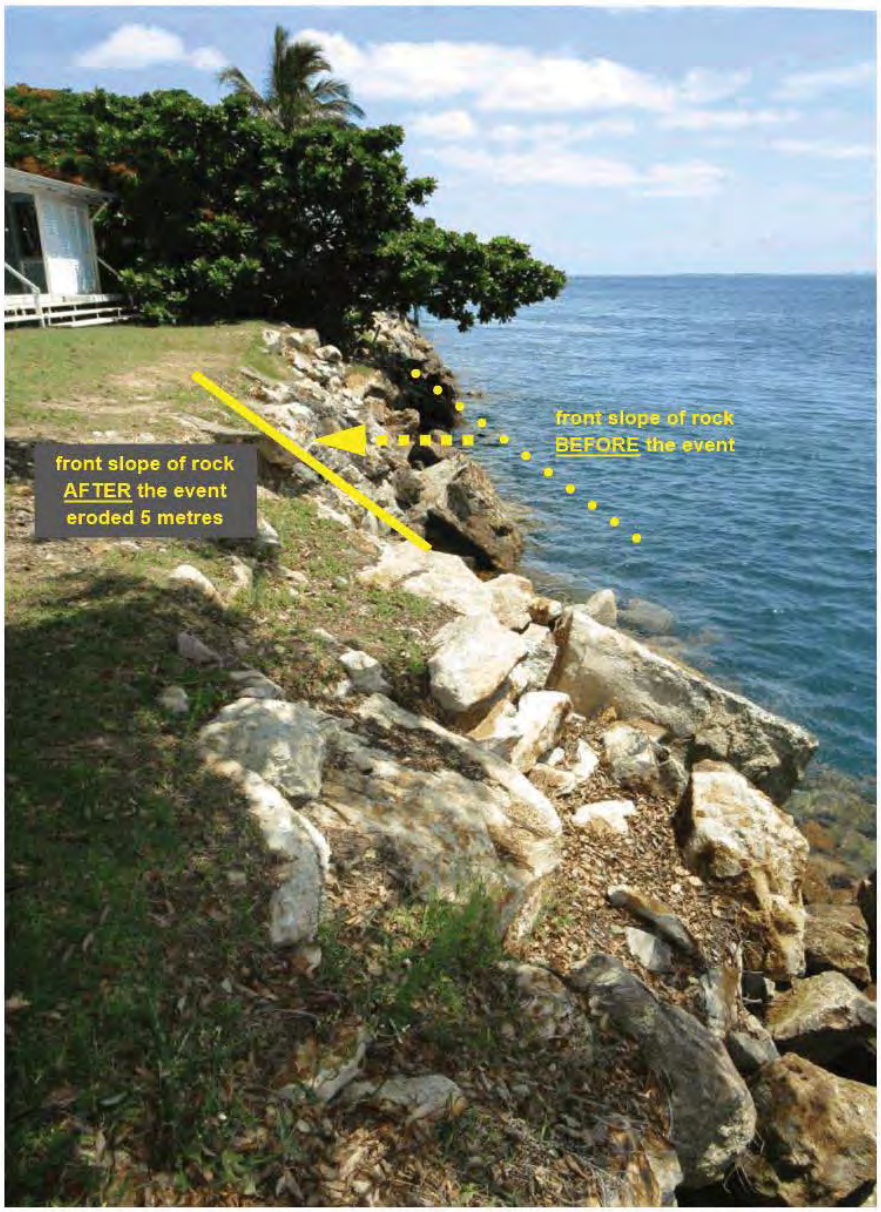

Figure 3-2 Emergency Tidal Works Trigger Event – Excessive Rock Erosion

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3.2 Rock Placement Requirements

As part of obtaining development approval for the flow slide barrier, a Detailed Engineering Design will need to be undertaken. Repair works to that structure can then be done as approved works to reinstate the function of the flow slide barrier provided that they are in accordance with that Detailed Design.

However, if repair works to the existing flow slide barrier following a flow slide event are required prior to receiving development approval, then the works are to comply with the structural characteristics and requirements of the Concept Design prepared during the development of the Amity Point Shoreline Erosion Management Plan (SEMP). The Concept Design is shown overleaf on page 16.

In the event of damage to the flow slide barrier by a retrogressive flow slide, the effectiveness of structural repairs and the reinstatement of the barrier's primary function is significantly affected by the time between the occurrence of the damaging event and the commencement of the emergency tidal works.

It is important that repairs to the damaged flow slide barrier be initiated within only a few hours of the damaging event. Longer delays compromise the effectiveness of those repairs and the future effectiveness of the flow slide barrier in preventing the development of retrogressive flow slides to damaging proportions.

Repairs to the flow slide barrier can be effected by simply dumping rock armour (complying with the material specifications in Section 3.2) from conventional tip-trucks directly into the zone of the slumped/damaged barrier.

To ensure the safety of staff and equipment involved in the emergency work, it is essential that no dumping of rock occurs whilst a retrogressive flow slide is occurring. Rock placement should only be undertaken once the damaging flow slide event has ceased.

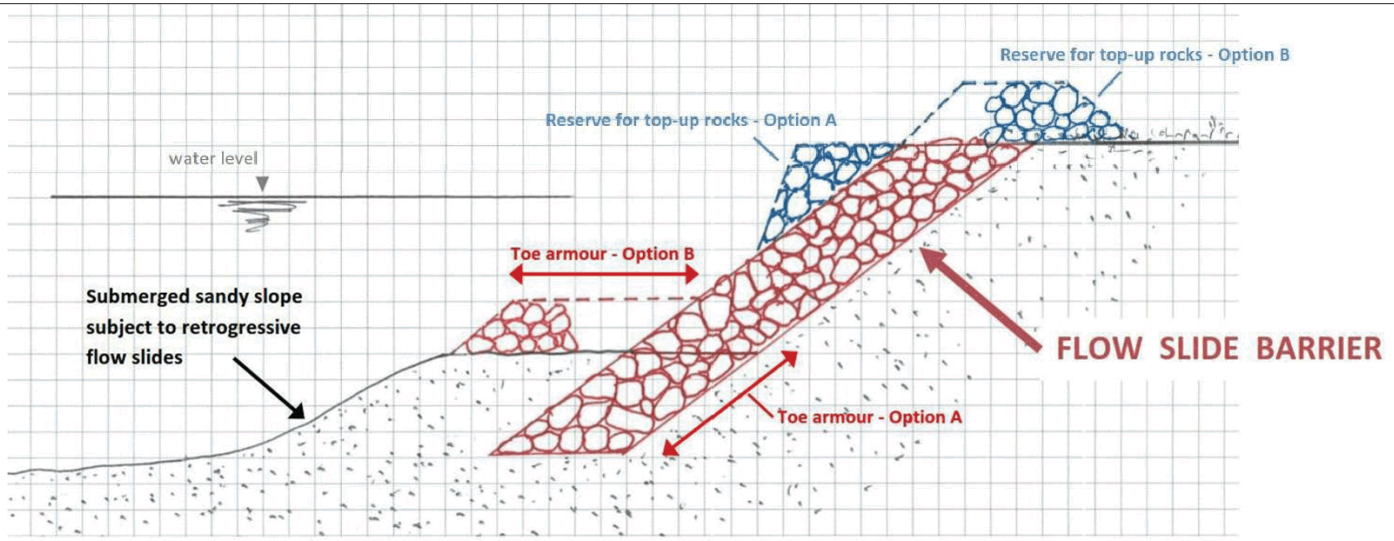
3.3 Material Specification

Rock material used to facilitate the emergency repairs to the damaged flow slide barrier shall be obtained from a stockpiled source maintained solely for that purpose. The material shall comply with the following specifications:

- All of the rocks used in the repair of the flow slide barrier are considered and referred to herein as "rock armour".
- All rock armour shall have a Specific Gravity of at least 2.60.
- Only rocks between the sizes of 50kg and 4tonnes shall be used for repair works on the flow slide barrier.
- All rock armour shall be well graded, clean, free from overburden, spoil, shale and organic matter.
- Individual rocks shall be slightly weathered to fresh; durable; sound; and suitable for use as armour in a marine environment.
- All rock armour must be free of any defects which would result in breakdown of individual stones in the foreshore environment of the works.
- Rocks displaying cleavage planes and weak seams shall not be used.

3.4 Notification

A requirement of Section 166 of the *Planning Act (2016)* is that a development approval is applied for as soon as "*reasonably practical*" after the Emergency Tidal Works are completed. It is also a requirement that the assessment manager for the application be given written notice of the emergency works and a copy of this Safety Management Plan.



NOTES :

1. All armour rocks used in the Flow Slide Barrier are to have a nominal weight designed to withstand tide/flood currents, storm tides and storm wave action– comparable to the design standards for rock-armoured seawalls in Queensland. This will include the determination of minimum and maximum weights of armour rocks to ensure tight interlocking of all rocks within the armour matrix.
2. The thickness of the Flow Slide Barrier is to be such as to prevent the unrestricted growth of any flow slide that develops on the adjacent seabed slope. The minimum thickness is to be at least ten times (x10) the dimension of the smallest allowable rock armour size.
3. The gradient of all exposed rock slopes are to be no steeper than 1 horizontal : 1.33 vertical.
4. Two options are shown as acceptable arrangements for the placement of rocks in the lower toe area of the Flow Slide Barrier. The intent is to ensure that there are adequate rocks in this toe area to provide protection for the maximum expected scour level of adjacent seabed/channel features. In the case of Option A, this is achieved by armouring down to at least the expected level of seabed scour/lowering. In the case of Option B, this is achieved by having an adequate volume of rock to self-armour the slope below in the event of undercutting of this reserve of rocks as the seabed level drops.
5. Two options are shown as acceptable arrangements for the placement of rocks in the upper area of the Flow Slide Barrier that provide a reserve of top-up rocks. Such reserves are to mitigate any slumping or structural damage to lower regions of the Barrier that may be initiated by a flow slide. The intent is to ensure that there is a sufficient volume of top-up rocks to reinstate the form and function of the Flow Slide Barrier following any such slumping/damage.

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CHECKED	ASX	
DESIGN	PLO	
CHECKED	AXS	
APPROVED	PLO	

AMITY POINT SEMP
CONCEPT DESIGN - FLOW SLIDE BARRIER

SHEET 1 of 1

Drawing No. 4193-01-D01 SCALE: NTS
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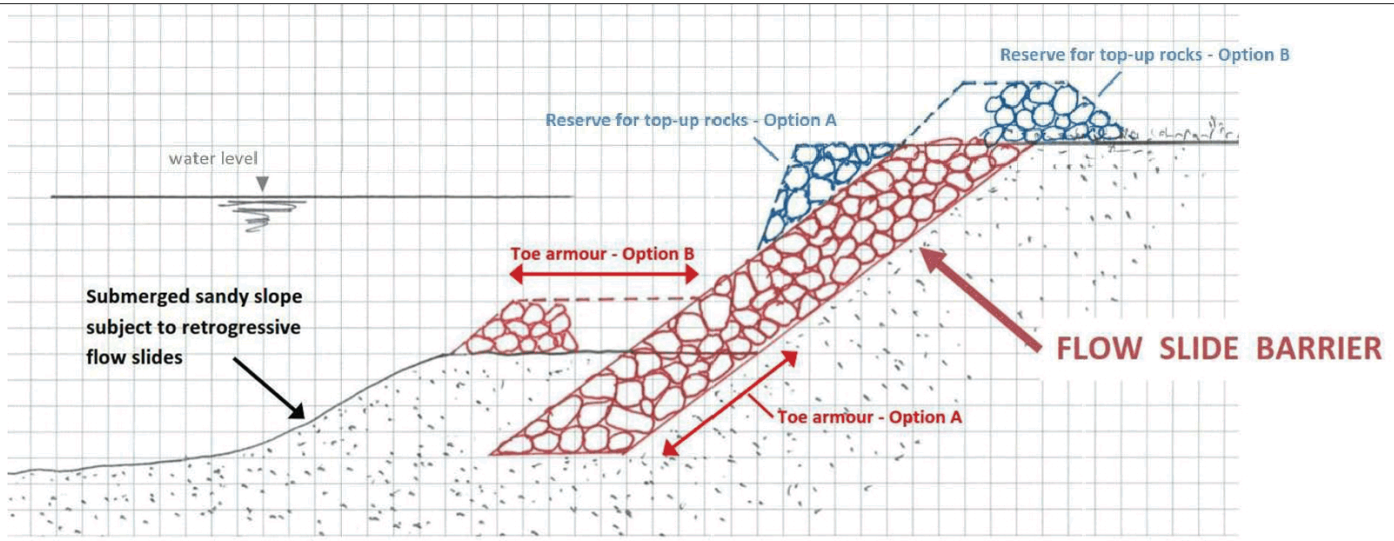
APPENDIX H
CONCEPT DESIGN FOR A FLOW SLIDE BARRIER



NOTES :

1. All armour rocks used in the Flow Slide Barrier are to have a nominal weight designed to withstand tide/flood currents, storm tides and storm wave action– comparable to the design standards for rock-armoured seawalls in Queensland. This will include the determination of minimum and maximum weights of armour rocks to ensure tight interlocking of all rocks within the armour matrix.
2. The thickness of the Flow Slide Barrier is to be such as to prevent the unrestricted growth of any flow slide that develops on the adjacent seabed slope. The minimum thickness is to be at least ten times (x10) the dimension of the smallest allowable rock armour size.
3. The gradient of all exposed rock slopes are to be no steeper than 1 horizontal : 1.33 vertical.
4. Two options are shown as acceptable arrangements for the placement of rocks in the lower toe area of the Flow Slide Barrier. The intent is to ensure that there are adequate rocks in this toe area to provide protection for the maximum expected scour level of adjacent seabed/channel features. In the case of Option A, this is achieved by armouring down to at least the expected level of seabed scour/lowering. In the case of Option B, this is achieved by having an adequate volume of rock to self-armour the slope below in the event of undercutting of this reserve of rocks as the seabed level drops.
5. Two options are shown as acceptable arrangements for the placement of rocks in the upper area of the Flow Slide Barrier that provide a reserve of top-up rocks. Such reserves are to mitigate any slumping or structural damage to lower regions of the Barrier that may be initiated by a flow slide. The intent is to ensure that there is a sufficient volume of top-up rocks to reinstate the form and function of the Flow Slide Barrier following any such slumping/damage.

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DESIGN	PLO	
CHECKED	AXS	
APPROVED	PLO	

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CONCEPT DESIGN - FLOW SLIDE BARRIER

SHEET 1 of 1

Drawing No. 4193-01-D01
Rev No. 01
JOB NO. 4193-01

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15 MAYORAL MINUTE

In accordance with s.22 of POL-3127 Council Meeting Standing Orders, the Mayor may put to the meeting a written motion called a 'Mayoral Minute', on any matter. Such motion may be put to the meeting without being seconded, may be put at that stage in the meeting considered appropriate by the Mayor and once passed becomes a resolution of Council.

16 NOTICES OF MOTION TO REPEAL OR AMEND A RESOLUTION

In accordance with *s.262 Local Government Regulation 2012.*

17 NOTICES OF MOTION

In accordance with s.3(4) POL-3127 Council Meeting Standing Orders.

18 URGENT BUSINESS WITHOUT NOTICE

In accordance with s.26 of POL-3127 Council Meeting Standing Orders, a Councillor may bring forward an item of urgent business if the meeting resolves that the matter is urgent.

Urgent Business Checklist	**YES**	**NO**
To achieve an outcome, does this matter have to be dealt with at a general meeting of Council?		
Does this matter require a decision that only Council make?		
Can the matter wait to be placed on the agenda for the next Council Meeting?		
Is it in the public interest to raise this matter at this meeting?		
Can the matter be dealt with administravely?		
If the matter relates to a request for information, has the request been made to the CEO or a General Manager Previously?		

19 CONFIDENTIAL ITEMS

COUNCIL MOTION

That Council considers the confidential report(s) listed below in a meeting closed to the public in accordance with Section 275(1) of the *Local Government Regulation 2012*:

19.1 Purchase of Land - Conservation Purposes, Ormiston

This matter is considered to be confidential under Section 275(1)(h) of the *Local Government Regulation 2012,* and the Council is satisfied that discussion of this matter in an open meeting would, on balance, be contrary to the public interest as it deals with other business for which a public discussion would be likely to prejudice the interests of the local government or someone else, or enable a person to gain a financial advantage.

19.2 New Community Lease Request - Respite Service

This matter is considered to be confidential under Section 275(1)(e) of the *Local Government Regulation 2012,* and the Council is satisfied that discussion of this matter in an open meeting would, on balance, be contrary to the public interest as it deals with contracts proposed to be made by it.

19.3 Southern Moreton Bay Island (SMBI) Passenger Ferry Terminal Upgrade

This matter is considered to be confidential under Section 275(1)(e) of the *Local Government Regulation 2012,* and the Council is satisfied that discussion of this matter in an open meeting would, on balance, be contrary to the public interest as it deals with contracts proposed to be made by it.

20 MEETING CLOSURE