



Our Ref: 01523

Date: 5th April 2015

The General Manager
Tweed Shire Council
PO Box 816
MURWILLUMBAH NSW 2484

Attention: Mr. Joshua Townsend

PLANNING PROPOSAL
P: 12959 + 12961

TWEED SHIRE COUNCIL	
FILE No: P10/0007 Pt 3	
DOC. No:	
REC'D: 14 APR 2015	
ASSIGNED TO: TOWNSEND J	
HARD COPY <input checked="" type="checkbox"/>	IMAGE <input type="checkbox"/>

RE: Mooball Planning Proposal 10/007

Dear Sir,

We refer to the above matter, recent discussions with Council officers and to the information gleaned from the completed exhibition period.

The proponents of the proposed rezoning are extremely keen to progress the rezoning to its conclusion and to this end, and with reference to the resolutions of Council (replicated below) (**Attachment A**), some additional information has been prepared to advance this matter further.

With respect to the information contained within, the extent of information provided is commensurate with issues of note raised in the exhibition process and Council's most recent resolution being June 2014 (replicated below).

In this regard, we hereby attach a completed Flooding Assessment for Council's review. This report is provided at **Attachment B**. We have not provided any additional bushfire impact assessment as this matter has, as we understand it, been cleared between Council officers and the NSW Rural Fire Service. It is understood that the NSW Rural Fire Service will require some layout changes at the DA stage. This is understood and agreed to by the proponents given that layouts prepared to date are conceptual only and designed to guide the zoning process based on the sites constraints.

We have also not provided any additional Geotechnical information as the process to date has resulted in the very clear limiting of future development (reflected in the zone boundaries) on those areas that are unsuitable for urban development via the identification of and exclusion from development of those areas with excessive slope. Furthermore, Geotechnical information has already been provided (and is attached again for reference at **Attachment C**) with a sufficient level of detail to guide the rezoning of the land. Importantly, no additional geotechnical issues of any relevance were identified in the exhibition period that would add further justification to carrying out additional Geotechnical assessments. This would, with reference to the wording of the June 2014 resolution, appear to indicate that such information is best deferred (where relevant) to the DA stage.

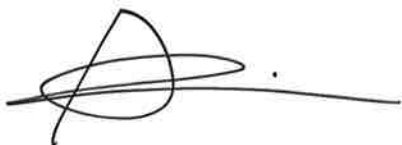
We have previously submitted detailed Contamination testing and reporting and we understand that this information satisfactorily addresses concerns raised to date.

Given the stage to which the proposal is currently at, we have also engaged a solicitor to assist in the preparation of a Voluntary Planning Agreement (VPA). A copy of this is attached for review at **Attachment D**.

We would be pleased if Council could confirm receipt of this documentation and confirm in return, the timing of the process from here. You will note in this regard that all monies are paid up to date (by the proponent) and that the proposal has now been in Council for some 4 and half years. There remains significant opportunity to release affordable housing stock to the market only in the event that Council works with the proponents to facilitate the remainder of this rezoning process urgently and without any further delay.

Please do not hesitate to contact the undersigned at any time should you have any queries in this regard.

Kind regards

A handwritten signature in black ink, consisting of a stylized, overlapping loop followed by a long horizontal line extending to the right.

Adam Smith
Director
Planit Consulting P/L

Attachment A

AMENDMENT

Cr K Milne

Cr G Bagnall

RESOLVED that:

1. The Planning Proposal PP10/0007 relating Lot 2 in DP 534493 and Lot 7 in DP 593200 be updated to align with the preliminary subdivision layout illustrated in the Concept Master plan detailed within Figure 1 of this report;
2. The Planning Proposal, as amended in accordance with Resolution 1 above, be referred to the NSW Department of Planning and Infrastructure requesting a Gateway Determination under Section 56(1) of the *Environmental Planning and Assessment Act 1979*;
3. On receiving an affirmative Determination Notice all outstanding studies, to include Flood Impact Study (including cumulative impacts), Geotechnical and Slope Stability Assessment and Bushfire Hazard Assessment, and works be prepared and the Planning Proposal finalised, following which it is to be exhibited in accordance with the Determination or where there is no condition or a condition requiring a public notification less than 28 days, for a period not less than 28 days; and,
4. Following public exhibition of the Planning Proposal a report is to be submitted to Council at the earliest time detailing the content of submissions received and how those, if any, issues have been addressed.
5. Prior to any public exhibition of the Planning Proposal a Site Contamination Report demonstrating compliance with the provisions and requirements of State Environmental Planning Policy 55 - Remediation of Land, Clause 6, is to be prepared to Council's satisfaction.
6. Prior to any public exhibition of the Planning Proposals provisions are put in place to protect the existing agricultural land-use pursuits of Lot B and against noise complaints, protection of the existing Right of Way servicing Lot B and for the exclusive use of Lot B, provision of an adequate clear buffer to retain rural amenity for the life of Lot B as a rural Lot and Plan of how the buffer is to be maintained/managed and including during earthworks/construction phase.

The Amendment was **Carried**

FOR VOTE - Cr M Armstrong, Cr K Milne, Cr G Bagnall, Cr B Longland

AGAINST VOTE - Cr P Youngblutt, Cr W Polglase, Cr C Byrne

The Amendment on becoming the Motion was **Carried** - (Minute No 736 refers)

FOR VOTE - Cr M Armstrong, Cr K Milne, Cr G Bagnall, Cr B Longland

AGAINST VOTE - Cr P Youngblutt, Cr W Polglase, Cr C Byrne

Cr B Longland

Cr M Armstrong

RESOLVED that in respect of Planning Proposal PP10/0007 relating to the site Lot 2 in DP 534493 and Lot 7 in DP 593200, Mooball:

1. Council rejects the request of the planning consultant acting on behalf of the Proponent for this Planning Proposal to remove Points 3 and 6 of the resolution on this matter at Council's Meeting of 21 November 2013, which requires additional studies and other matters to be prepared by the proponent as part of the proposed exhibited Planning Proposal documents, and
2. The additional planning studies referred to in paragraph 1 of this recommendation are to be prepared or submitted by the Applicant following the public exhibition of the planning proposal, which will provide Council with a better appreciation of the local community's view of the rezoning and whether those planning studies will be required as part of the strategic investigations or otherwise deferred to a development application process, and

3. Council officers are to proceed with preparing the Planning Proposal in accordance with the standing resolutions of 21 November 2013, except as amended by paragraph 2 of this recommendation.

Attachment B



Flood Impact Assessment

**5867 Tweed Valley Way, Mooball
Lots 2 on DP534493 & 7 on DP593200**

Prepared by:

**Mr Rodrigo Manenti
Senior Civil Engineer
Cozens Regan Williams Prove Pty Ltd**

Approved by:

**Mr John Williams
Director
Cozens Regan Williams Prove Pty Ltd**

Date:

March 2015

DOCUMENT CONTROL RECORD

Report Details

Client: Planit Consulting Pty Ltd
Document Name: Flood Impact Assessment
Site Address: 5867 Tweed Valley Way, Mooball
Job Number: 14476
File Name: 14476_FLOOD IMPACT ASSESSMENT_A

Issue	Rev	Checked	Date	Approved	Date	Distributed to:	Qty.
Preliminary	A		16/03/2015		16/03/2015	Planit Consulting Pty Ltd	1

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**5867 Tweed Valley Way, Mooball
Lots 2 on DP534493 & 7 on DP593200**

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1.0 EXECUTIVE SUMMARY

This report aims to define the characteristics of flooding that affects the subject site and to address the flood risk and impact of the proposed development.

Part of the site has been identified as being influenced by flood inundation. The designated flood event is the 1% AEP or (100 year ARI) for flood planning events. The proposed development is required to identify the level of risk to life and property as a result of a flood event and to ensure that, where necessary, mitigation measures are implemented.

A flood search was carried out with Tweed Shire Council to obtain the designated flood level for the development. This search has determined the designated flood level to be RL 12.0m AHD and is known to be the 1% AEP or (100 year ARI).

This report intends to show that the proposed development has responsibly addressed all flood impact issues, including prevention from the impact of major flooding and impacts caused by the development.

The prevention of flood impact is to be provided by compensatory flood storage and provision of improved conveyance capability to the legal point of discharge.

2.0 INTRODUCTION

2.1 GENERAL INTRODUCTION

Cozens Regan Williams Prove Pty Ltd has been commissioned by Planit Consulting Pty Ltd to prepare a Flood Impact Assessment for the proposed residential subdivision at 5867 Tweed Valley Way, Mooball.

This Flood Impact Assessment is required to support a Rezoning Application.

2.2 SCOPE OF PLAN

This plan focuses on the temporary impacts of flooding likely to be encountered during a major storm event and the measures required to reduce the impact on the proposed residential development.

2.3 SITE DESCRIPTION

The subject site is two properties which are located off Tweed Valley Way in Mooball, New south Wales. The properties are bound by rural properties to the east, south and west and existing residential properties to the north that front Tweed Valley Way.

The site is described as Lots 2 on DP534493 and 7 on DP593200 and has a total area of 79.02ha. A site locality plan is provided in Figure 2.1 below.



Figure 2.1 - Site locality plan

2.4 EXISTING SITE CONDITION AND LAND USE

The two (2) properties are presently designated as Zone 1(a) - Rural within the Tweed Shire Planning Scheme. The existing properties fronting Tweed Valley Way are designated as Zone 2(d) – Residential and the surrounding properties to the west, south and east are designated as Zone 1(a) - Rural.

The existing properties have a diverse topography ranging from very steep to undulating to relative flat areas at the northern boundary. The levels range from approximately RL 145m at the south-westerly corner of the sites to approximately RL 10m at the township of Mooball. The most elevated areas of the properties are generally located on the western, southern and part eastern boundaries. Lot 7 on DP593200 is traversed by a major ridge outcrop which slopes towards Tweed Valley Way. A few minor ridges reach out into the sites from the steeper areas in a northerly direction.

The properties have in the past been used for agriculture purposes (banana plantation). The majority of both properties has been cleared of trees and is presently well covered with grass.

The properties are located within two (2) major distinct precipitation catchments A (70ha) and B (8.0ha). A minor internal sub-catchment C (1.2ha) is located at the northern boundary of lot 2 on DP534493. The upper reaches of catchments A and B generally follow the southern and the eastern boundaries of the properties.

A narrow section of land external and adjacent to the western boundary of lot 2 on DP534493 with an area of approximately 4.2ha is forming part of catchment A. The two (2) major catchments are dissected internally by a major south-north orientated ridge within lot 7 on DP593200.

Catchment A is defined by the external ridge which is located approximately parallel to the western boundary, the southern boundary which is located on the upper reach of the catchment and the internal south-north orientated ridge. The catchment is drained by a series of watercourses generally orientated and draining in a northerly direction. The watercourses discharge into an open drain which is located along the northern boundary adjacent to the existing properties fronting Tweed Valley Way. The open drain carries the collected run-off to an existing culvert which crosses the Tweed Valley Way immediately to the east of the existing properties and eventually discharges into an excavated open drain on the northern side of Tweed Valley Way.

Catchment B is defined by the internal south-north orientated ridge and the southern and the eastern boundaries of lot 7 on DP593200 located on the upper reaches of the catchment. Minor watercourses drain the catchment to a major watercourse discharging into the adjoining property at the north-eastern corner of the site. The major watercourse carries the run off to a culvert which crosses the Tweed Valley Way and eventually discharges into a recipient on the northern side of the road.

Catchment C is defined by ridge lines extended from the major south-north orientated ridge and the runoff is carried to an existing culvert which crosses the Tweed Valley Way and eventually discharges to the northern side of the road.

The properties are presently subjected to flooding during a 100 ARI flood event at and immediately upstream from the culvert crossing Tweed Valley Way which receives the Catchment A run-off.

In accordance with the 'Tweed Development Control Plan: Section A3 – Development of Flood Liable Land' the highest recorded flood level at Mooball is approximately RL12.0 AHD. Council's flood plans are contained in Appendix B.

3.0 PROPOSED DEVELOPMENT

It is proposed to combine the two (2) lots and construct a residential subdivision. Earthworks will be required on the lower portion of the site in the flood affected area, to facilitate the construction of flood free lots.

Details of the proposed lot layout is contained in Appendix A – Concept Master Plan.

4.0 FLOOD IMPACT ASSESSMENT

4.1 PURPOSE

The purpose of this Flood Impact Assessment is to identify flood factors within the proposed development site, to describe the flood characteristics of the site and to propose flood mitigation measures to maximise protection and safety of residents/visitors and property of the proposed development site.

4.2 FLOOD ASSESSMENT

In accordance with the 'Tweed Development Control Plan: Section A3 – Development of Flood Liable Land' the highest recorded flood level at Mooball is approximately RL12.0 AHD. Council's flood plans are contained in Appendix B.

Tweed Shire Council's flood maps indicates that only a portion of the site is affected by flooding. This plan is attached in Appendix B.

The regional flooding experienced on the site is due to a combined effect of riverine flooding and storm surge. This results in relatively slow moving flood waters at the site and therefore the conveyance of flood waters through the development is not an issue. Local flooding is to be considered and conveyance of site discharge and impact assessed.

4.3 FLOOD STORAGE

The subdivision will result in the construction of residential allotments which will require flood immunity. This immunity can only be achieved by associated earthworks and site filing to above the flood level of RL12.00AHD.

The site fillings a, shown on the plans in Appendix C, is to be located below the designated flood level and therefore would affect the existing flood plain storage.

In order to maintain flood storage capacities compensatory cutting is required to be provided below the designated flood level. The compensatory cutting is to be achieved by re-grading the site between the building edge and existing boundaries to lower existing levels whilst also ensuring positive drainage is achieved.

The existing site and proposed development (with compensatory cutting) has been modelled in 3d modelling software to confirm the volume of flood storage pre/post development. The pre and post development flood storage quantities are shown below.

	Flood Storage
Existing Site	31,700 m ³
Developed Site (with compensatory cutting)	31,990 m ³
Difference in pre/post flood storage	+290 m ³

As can be seen above, after compensatory cutting the development achieves the required flood storage balance.

The impact on flooding, as a result of the proposed development, will be negligible.

4.4 CONVEYANCE

The flooding experienced on the site is due to the backup effect associated with the regional flood events. This results in relatively slow moving flood waters at the site and therefore the conveyance of flood waters through the development.

Mitigation and conveyance of the Catchment A local flood event to reduce the impact on surrounding sites requires the formalisation of the overland flow to the culverts under Tweed Valley Way.

The installation of a "formal" open channel of the area between the proposed lots and the existing lots will provide a better containment of the site discharge and also provide compensatory storage for the regional flood situation.

The site discharge is expected to be in the order of 25cum/s for the ARI 100 year event. This site discharge is proposed to be conveyed within the proposed open channel.

Details of the proposed channel are contained in Appendix C.

4.5 DEVELOPMENT SITE FLOOD ADAPTATION MEASURES

To reduce the potential for property damage and risk to human life the development has been designed in accordance with relevant requirements and the Queensland Urban Drainage Manual.

The following adaptation measures have been incorporated into the design to ensure compliance with Council requirements and the Queensland Urban Drainage Manual.

- Lots are to be filled above the designated flood level at R.L. 12.00m.
- An open channel is proposed to carry the discharge for catchment A, to the legal point of discharge being the culverts under Tweed Valley way.
- Compensatory cutting in the order of 9,000m³ has been proposed around the development site and within the proposed open channel to ensure flood storage capacity is maintained.
- Development of the roads and allotments will have discharge form the site kept to pre-development levels in accordance with the recommendations of section 5.3 of the Engineering Report issued by ADG, dated November 2010.

In order to complement the integration of the sites flood mitigation measures the owner of the property is to be aware of the flood characteristics and evacuation procedures and avail all tenants, visitors and future occupants/owners of these characteristics.

5.0 CONCLUSION

This report has been prepared to provide information relating to the flooding hazard, mitigation strategies and compliance with Tweed Shire Councils requirements in relation to the proposed development.

It has been indicated within this report that a portion of the subject site is prone to flooding during the designated Q100 event. The flood levels and extents have been determined by a flood search provided by Tweed Shire Council.

Site filling of the proposed flood affected allotments will meet minimum freeboard requirements for the designated flood event. As such all future habitable dwellings will remain above the inundation level up to the designated flood event and will provide refuge for residents and visitors alike.

As the proposed Site filling will resume some of the flood waters, in order to maintain flood storage capacity, flood storage improvements are required. These improvements will include a combination of compensatory cutting and improved conveyance.

Compensatory cutting is to be provided by re-grading the site between the edge of the proposed allotments requiring filling and existing boundaries whilst also ensuring positive drainage is achieved.

This report is to be used to demonstrate that the proposed development has considered all necessary flood issues in the preliminary design and ensures a responsible approach to development within a flood affected area.

Appendix A
Site Development Plan



Concept Masterplan 01



Legend

- Subject Site Precinct A
Total Area: 72,900m²
 - Internal Road Network**
Internal road network layout on site. Consideration is given to address drainage, earthworks, and to preserve the potential to retain existing vegetation.
 - Public Open Space Recreation Park**
Conceptual Park approx. 7,500m². Location of Park to increase retention of ecologically significant vegetation, predominantly flat lands with 75% road frontage. Refer to PDS Detail sheet for indicative amenity and layout.
 - Environmental Conservation 1**
Conservation area associated with existing drainage line and riparian vegetation communities. Minimum of 10m buffer from drainage low flow point (6) (meals lot).
 - Stormwater Treatment**
Potential location of stormwater treatment device (shade full outside of the 50m buffer to the drainage line).
 - Environmental Conservation 2**
Conservation area consisting of ecologically significant vegetation. 100m buffer from southern site boundary to be retained and revegetated.
 - STP Lot**
Location of Sewerage Treatment Plant and associated 50m exclusion buffer (*****).
 - Existing Dwelling**
Existing Dwelling (Lot 10 in DP41984) 50m Offset line illustrated (-----) 100m Offset line illustrated (-----)
 - Pedestrian Circulation**
Proposed circulation based on site topography analysis and internal Road Network.
 - Primary Site Access - Vehicular
 - Secondary Site Access - Vehicular
 - Potential link to future development
- | | | |
|--|-------------------------------------------------------------|-----|
| | 450m min lots (Min width: 13.85m) | 141 |
| | 700m min lots | 108 |
| | Childcare / Retail | 1 |
| | 1ha min lots | 21 |
| | 1A Rural
including Existing Dwelling on Lot B in DP41984 | 1 |



Appendix B
Flood Maps



TWEED DEVELOPMENT CONTROL PLAN
Section A3
Development of Flood Liable Land

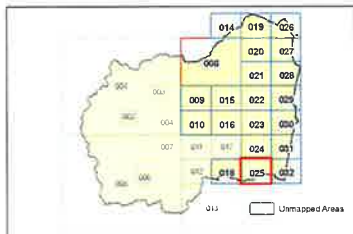
High Flow Maps
- Sheet 025

ARI 100 year flood
 Flood velocity depth product

- <= 0.3 'Low Flow Area'
- > 0.3 'High Flow Area'

DISCLAIMER
 This map is based on the predictions of the "Tweed Valley Flood Study (update 2005)" and the "Coastal Creeks Flood Study 2009".
 The predicted inundated areas only apply to areas within the Model Boundary of the study. Uncoloured parts of the map may also be subject to flooding. The map applies to river flooding only and does not apply to local stormwater catchment flooding. The approximate extent of land liable to flooding has been based on survey data available at the time of preparation. Conditions may have changed since that time. The extent of flooding for individual properties can only be determined by a licensed surveyor. This map has been prepared using the best available data, computer modelling and mapping techniques. However, the accuracy of the study and maps is not absolute and reflects only the accuracy of the data and the techniques used. Tweed Shire Council do not warrant that this map is definitive nor free from error and do not accept liability for any loss caused or arising from reliance upon information provided herein.

Cadastral
 Cadastre 10/05/2010
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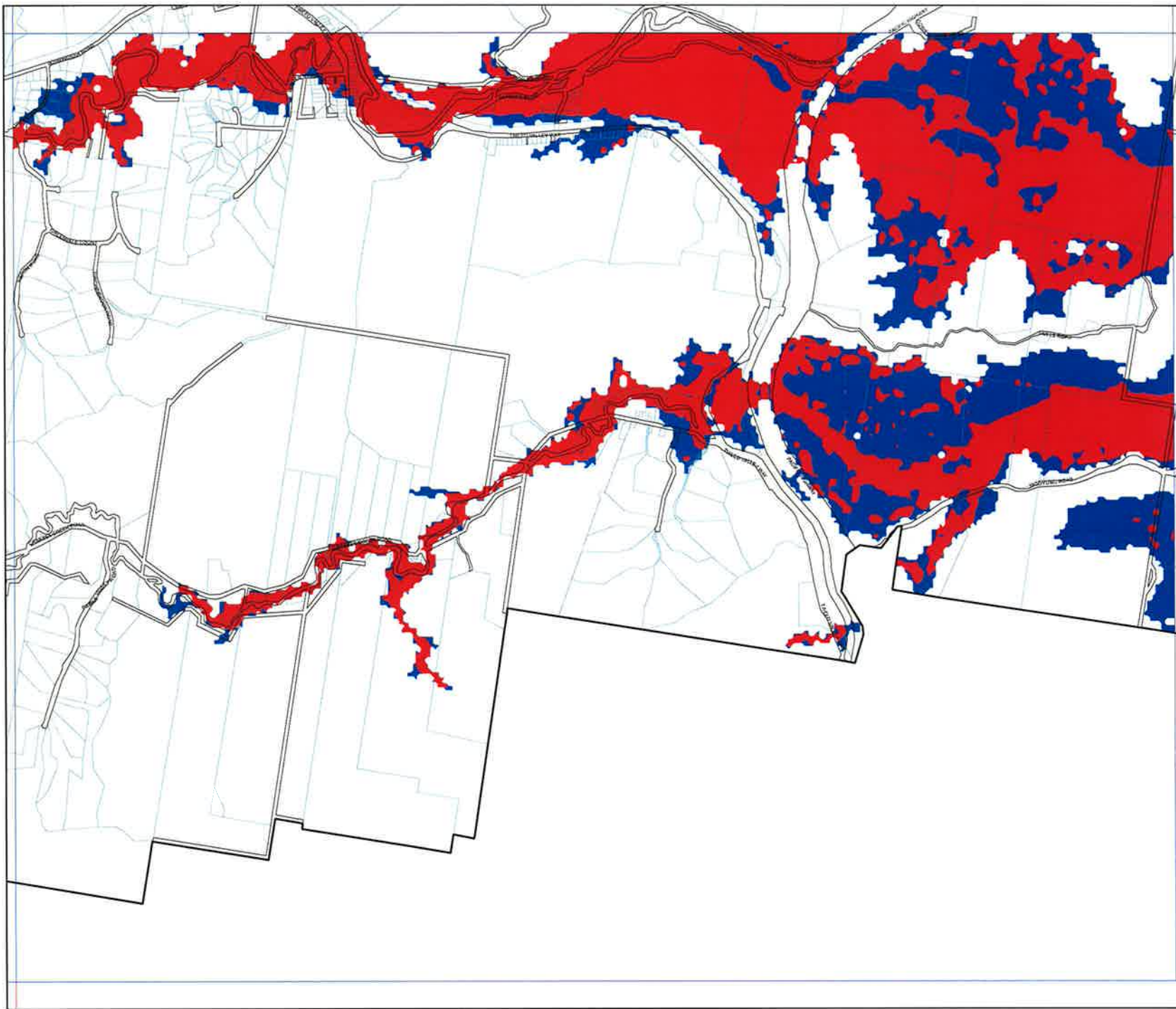


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Projection: GDA 1994
 MGA Zone 56

Map identification number: DCP_A3_HFL_025_020_20100510



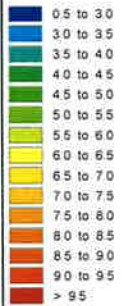


TWEED DEVELOPMENT CONTROL PLAN
Section A3
Development of Flood Liable Land

Design Flood Level Maps
- Sheet 025

Areas predicted to be inundated in
 ARI 100 year flood
 Inundated area regions (flood levels, metres AHD)

Flood level contour
 (Metres AHD)

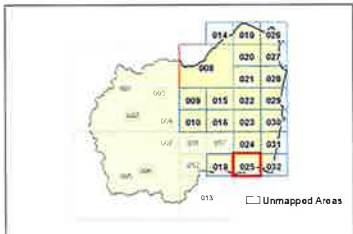


Probable maximum flood (PMF)
 Additional areas inundated by PMF

Area Behind Levee
 Refer DCPA3 Table 2.1
 for Design Flood Level

DISCLAIMER
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 The predicted inundated areas only apply to areas within the Model Boundary of the study. Unoutlined parts of the map may also be subject to flooding. The map applies to river flooding only and does not apply to local stormwater catchment flooding. The approximate extent of land liable to flooding has been based on survey data available at the time of preparation. Conditions may have changed since that time. The extent of flooding for individual properties can only be determined by a licensed surveyor. This map has been prepared using the best available data, computer modeling and mapping techniques. However, the accuracy of the study and maps is not absolute and reflects only the accuracy of the data and the techniques used. Tweed Shire Council do not warrant that this map is definitive nor free from error and do not accept liability for any loss caused or arising from reliance upon information provided herein.

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 Cadastre 07/09/2010
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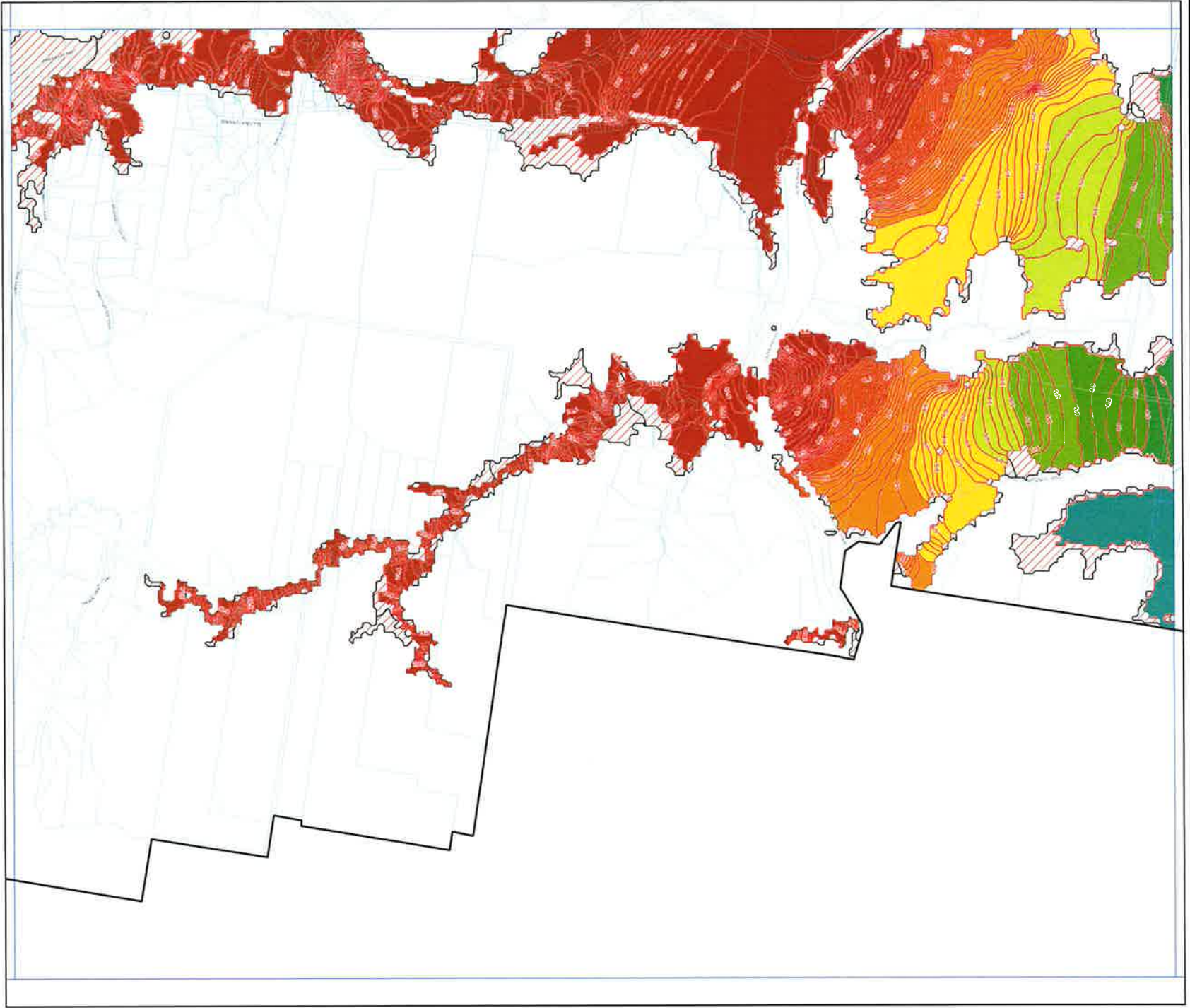


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Scale 1:20,000 @ A3

Projection: GDA 1994
 MGA Zone 56

Map identification number: DCP_A3_DF_L_025_020_201001

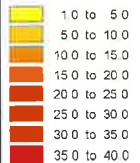




TWEED DEVELOPMENT CONTROL PLAN
Section A3
Development of Flood Liable Land

Probable Maximum Flood Level Maps
- Sheet 025

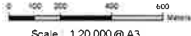
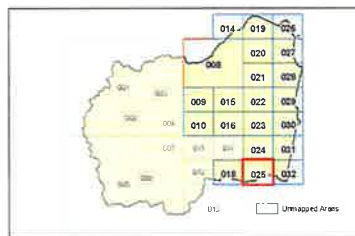
Areas predicted to be inundated by Probable Maximum Flood (PMF)



PMF flood level contours
 (metres AHD)

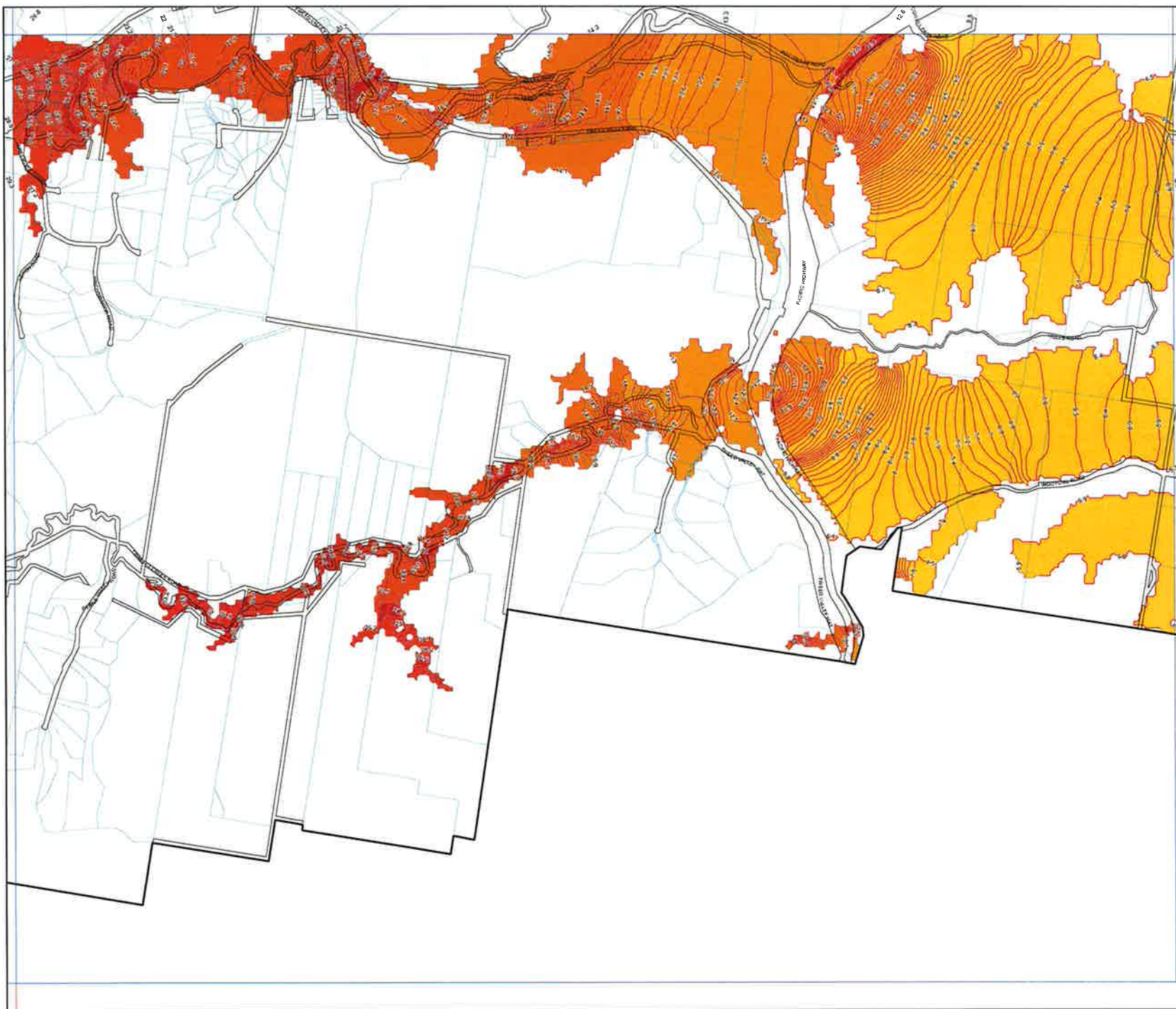
DISCLAIMER
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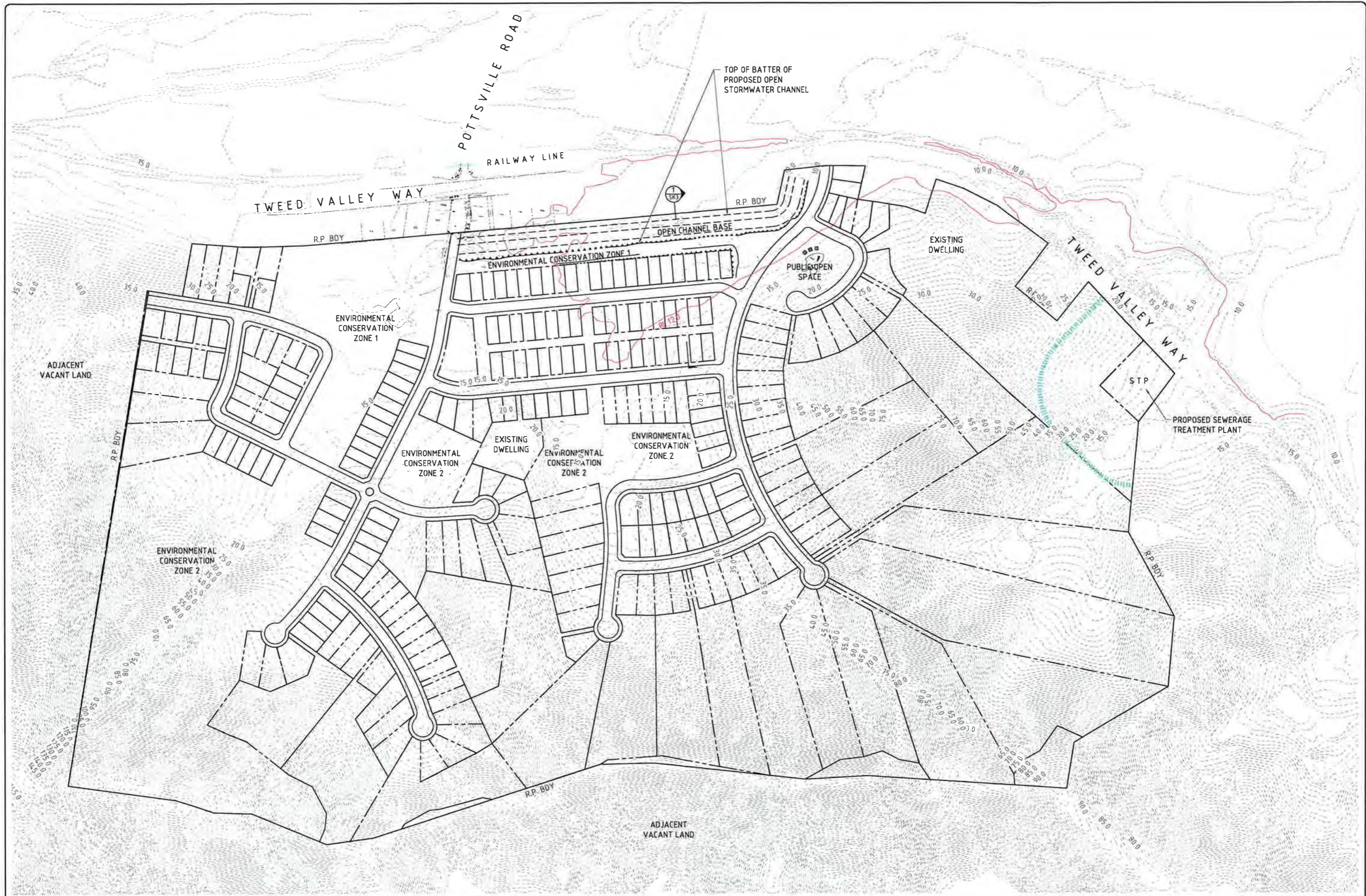


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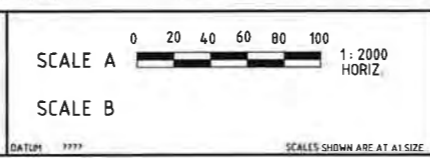
Appendix C
Civil Flood Plans



No.	DATE	ISSUE	REVISED	CHECKED
A	7/77	ORIGINAL ISSUE	7/77	7/77

IN ASSOCIATION WITH

PRELIMINARY
NOT FOR CONSTRUCTION



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CHECKED: JAW

APPROVED FOR AND ON BEHALF OF:
COZENS-REGAN WILLIAMS-PROVE PTY LTD
(RPEQ No 41)

CLIENT: PLANIT CONSULTING PTY. LTD

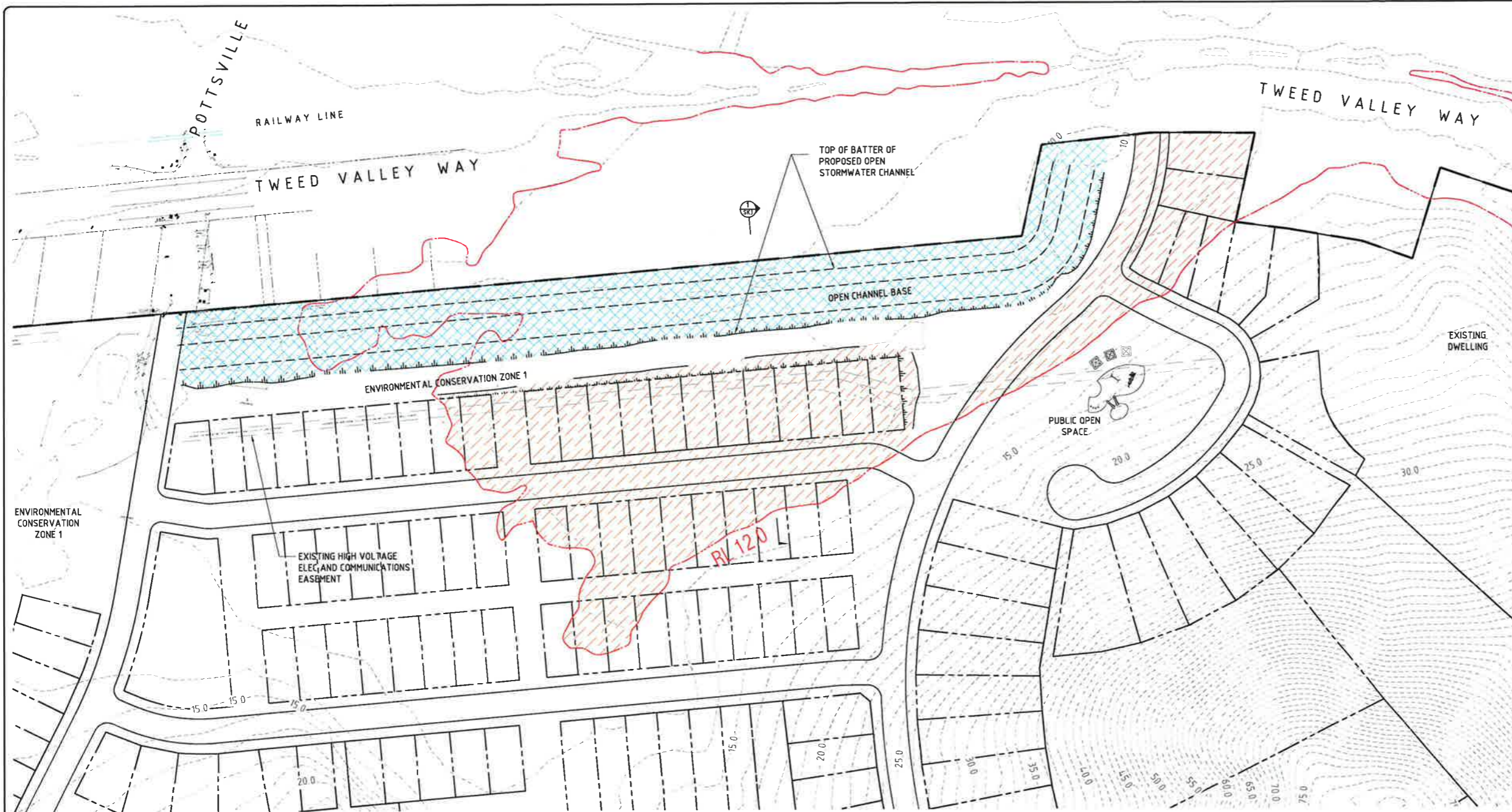
PROJECT: RESIDENTIAL DEVELOPMENT
5867 TWEED VALLEY WAY, MOOBALL
CONCEPTUAL LAYOUT PLAN

ISSUED: 7/77

JOB NO: 14476

DRAWING NO: SK01

ISSUE: A



PART CONCEPT STORMWATER PLAN

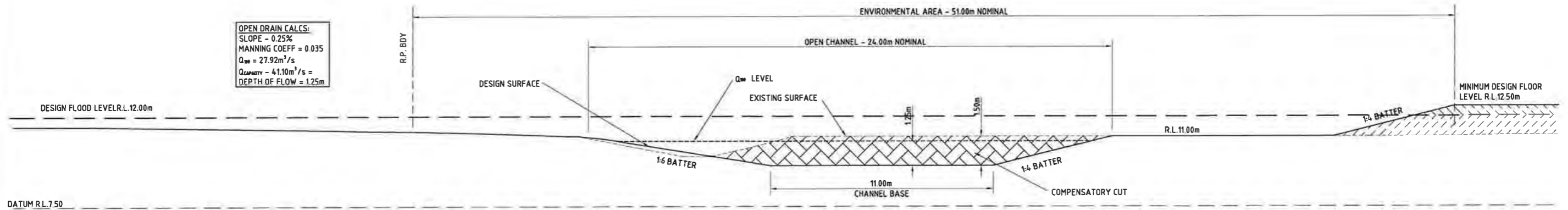
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LEGEND

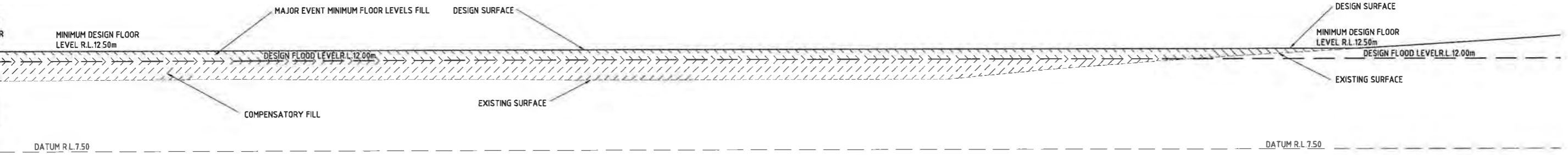
-  COMPENSATORY FILL AREA
-  COMPENSATORY CUT AREA STORMWATER CONVEYANCE CHANNEL

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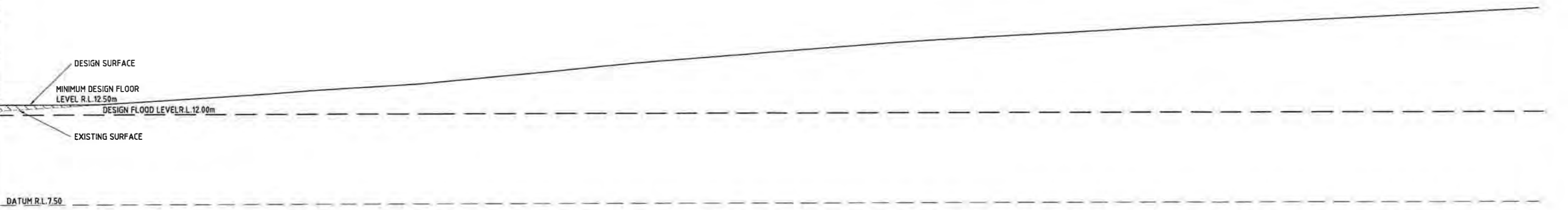
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SECTION 1 SK2
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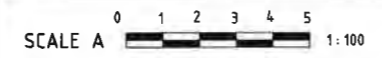


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SCALE B

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APPROVED FOR AND ON BEHALF OF COZENS REGAN WILLIAMS PROVE PTY LTD (RPEQ No 4)	
RPEQ No 4536	

CLIENT
PLANIT CONSULTING PTY. LTD

PROJECT
RESIDENTIAL DEVELOPMENT
 5867 TWEED VALLEY WAY, MOOBALL
 EARTHWORKS SECTION


JOB NO.	14476
DRAWING NO.	SK03
ISSUE	A


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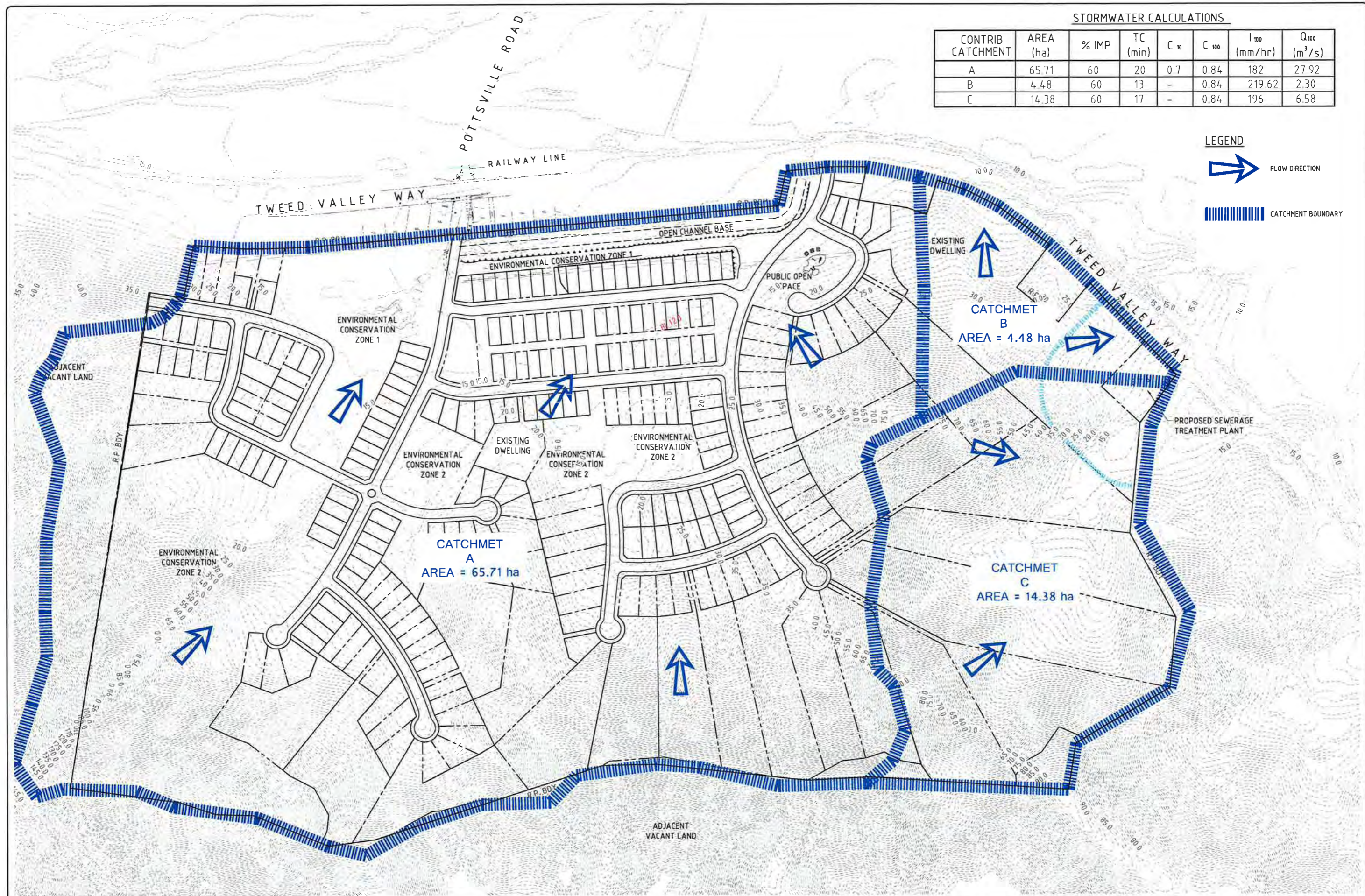
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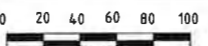

CONTRIB CATCHMENT	AREA (ha)	% IMP	TC (min)	C ₁₀	C ₁₀₀	I ₁₀₀ (mm/hr)	Q ₁₀₀ (m ³ /s)
A	65.71	60	20	0.7	0.84	182	27.92
B	4.48	60	13	-	0.84	219.62	2.30
C	14.38	60	17	-	0.84	196	6.58

LEGEND

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Attachment C



**Cardno
BOWLER**

Shaping the Future



**Broadscale Stage 1 Geotechnical and
Slope Stability Assessment
Proposed Residential Assessment
Tweed Valley Road, Mooball**

Job Number	9543gs.10
Prepared for	Cardno (Qld) Pty Ltd
Date of Report	15 July 2010



Shaping the Future

ABN 74 128 806 735

5/10 Jay Gee Court
Nerang QLD 4211
Australia


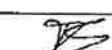
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Document Control

Version	Date	Author	Reviewer
1	15 July 2010	Gary Samuels 	David Stirling 

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General Guidelines for Hillside Construction

Important Information About Your Geotechnical Engineering Report

Annexes

Annex A Fieldwork Results

Annex B Laboratory Results

1 INTRODUCTION

A Stage 1 broadscale geotechnical and slope stability investigation was carried out for a proposed residential development on the southern side of Tweed Valley Way, Mooball as requested Cardno (Qld) Pty Ltd.

We understand the project involves the development of a residential subdivision.

Exact cut/fill levels for building platforms and building envelopes were not known at the time of preparation of this report.

The objectives of this investigation were provided in our estimate no. E6686.10 dated 6 April 2010 and were as follows:

- Assess the feasibility of the proposed development in terms of geotechnical issues.
- To identify potential for stability or soft soil concerns.

Authorisation to proceed with the investigation was received on 1 July 2010 from Steve McMillan representing Heritage Pacific.

This report must be read in conjunction with our attached 'General Notes', the ASFE publication 'Important Information About Your Geotechnical Engineering Report' and 'Guidelines for Hillside Construction', Australian Geomechanics Society Journal, Volume 37, No. 2, May 2002.

2 SITE DESCRIPTION

The site was located behind the existing pub at Mooball. Access to the site was via the pub carpark.

The site was bound by rural residential properties to the south, west and east and residential and commercial properties to the north. These properties were adjacent Tweed Valley Way.

The site was irregular in shape and was undulating pastoral land.

Several small dams, a residential structure, etc were scattered throughout the site. Numerous drainage gullies were noted throughout the site.

Refer to plates 1 to 5 for typical site conditions encountered during our investigation.



PLATE 1: TYPICAL SITE VIEW OF LOW LYING AREAS OF THE SITE



PLATE 2: TYPICAL SITE VIEW OF THE LOW LYING AREAS OF THE SITE WITH HILLS IN THE BACKGROUND



PLATE 3: TYPICAL SITE VIEW OF HILL AREAS OF THE SITE



PLATE 4: TYPICAL SITE VIEW OF HILL AREAS OF THE SITE



PLATE 5: TYPICAL SITE VIEW OF HILL AREAS OF THE SITE

3 INVESTIGATION WORK

3.1 Fieldwork

Fieldwork for the Stage 1 investigation was carried out on the 6 July 2010 and included the drilling of 5 boreholes at the locations shown on the attached site sketch, Figure 1. The material encountered at each location is described on borehole log sheets included in Annex A. Generally, the site can be segregated into 2 distinct regions, those being high relief hills and low lying areas at the foot of said hills. As part of this preliminary investigation, 2 boreholes were drilled in the low lying areas and 3 boreholes in the hilly areas of the site.

A structural mapping exercise, 'site walkover' was also carried out by a Senior Engineering Geologist/Geotechnical Engineer on 9 July 2010.

Fieldwork was carried out in accordance with Australian Standard, AS1726-1993 'Site Investigation Code', and the Queensland State Planning Policy 1/03 'Mitigating the Adverse Impacts of Flood, Bushfire and Landslide'.

3.2 Laboratory Testing

Samples of representative strata were recovered and returned to our NATA accredited soils laboratory. The following tests were carried out on selected samples;

- Moisture Content
- Particle Size Distribution
- Atterberg Limits

The laboratory test results are included in Annex B. Laboratory testing was carried out in accordance with Australian Standard AS1289 'Laboratory Testing For Engineering Purposes'.

4 SUBSURFACE CONDITIONS

4.1 Subsurface Strata

The logs in Annex A should be referred to for the detailed description of material encountered at each investigation location. A summary of conditions encountered at each investigation location is detailed in Table 1 below.

Table 1: Summary of Subsurface Strata

Soil Descriptions/Depth (m)				
BH No	Topsoil	Clay	Weathered Rock	TD
Low Lying				
1	0.0-0.3	0.3-TD	-	3.0
2	0.0-0.3	0.3-TD	-	3.0
Hills				
3	0.0-0.2	0.2-TD	-	3.0
4	0.0-0.2	-	0.2-TD	0.6 ⁽³⁾
5	0.0-0.2	0.2-0.9	0.9-TD	3.0

NOTES:

1. All depths measured in metres below ground level at the time of the investigation on 6 July 2010.
2. TD = Termination Depth.
3. Represent 'TC' (tungsten carbide) bit refusal for the drilling rig.

No groundwater was encountered in any of the boreholes during the investigation. However, ponding water was noted in the low lying areas of the site and the site was quite boggy in parts. Also, some seepage was noted in some of the hillside areas.

4.2 Laboratory Test Results

Laboratory testing was undertaken on the predominant soil type to assess the potential reactivity ranges which could be expected and as such what indicative site classifications could result based on anticipated earthworks.

A summary of the laboratory test results are shown in Table 2 below.

Table 2: Summary of Laboratory Test Results

BH No.	Depth (m)	% Sand & Gravel	% Clay & Silt	Moisture Content	Liquid Limit %	Plasticity Index %
1	0.7-0.8	27	73	20.9	48	23
3	0.6-0.7	14	86	27.8	69	39
	2.5-2.6	17	83	22.6	51	28

5 GEOTECHNICAL AND SLOPE STABILITY ASSESSMENT

5.1 Earthworks

Details on proposed earthwork levels were not known at the time of the preparation of this report.

Site Preparation and Traffickability

All site preparation work should be carried out in accordance with AS3798-2007 '*Guidelines on Earthworks for Commercial and Residential Developments*'.

Proposed cut/fill levels were not known at the time of preparation of this report for building platforms or lot access.

All soil containing grass and root material should be stripped from the building sites and access areas prior to construction. This material is not considered suitable for use as structural fill but may be stockpiled for possible future landscaping purposes, if required. Stripping depths will generally be in the order of up to 0.3m. However, isolated areas may require a deeper stripping depth.

In the low lying, areas of the site, during our investigation, some areas were quite 'boggy' and as such the development of haul roads to improve traffickability may be required in order to maintain some reasonable manoeuvrability around the site during the bulk earthworks operations.

Prior to the placement of any structural fill the site should be proof rolled using a minimum 10 tonne vibrating padfoot roller. Should isolated soft/loose areas be encountered during this process, this material should be removed and replaced with select fill.

Depressions formed by the removal of vegetation should have all disturbed soil cleaned out and be backfilled with compacted select fill material.

Cardno Bowler should be engaged to confirm the suitability of the stripping depth and confirm the adequacy of the newly exposed soil for fill placement.

Structural Fill Placement

With the exception of the topsoil stratum, all materials encountered during the investigation are considered acceptable for use as structural fill provided that any pre-treatment (moisture conditioning, removal of oversize), is carried out prior to fill placement. It must be stressed that the clays on site are high plasticity and could be expected to result in stiff raft foundation types if encountered in significant thicknesses or where used as fill.

To minimise the potential for post compaction volume change due to moisture content variations, any structural clay bearing fill should be placed in loose layers not greater than 200mm thick at a moisture content in the range -2% to +3% of the standard optimum moisture content, and be compacted to a minimum dry density ratio of 95% standard compaction as per AS1289 5.1.1.

Measures should be adopted to ensure that this clay fill material is not allowed to dry out prior to the placement of succeeding layers of fill and final covering with building slabs and road pavements.

It is recommended that the placement of all structural fill be inspected, tested and certified by Cardno Bowler to Level 1 requirements, during the earthworks operations to ensure that all fill is placed in a '*controlled manner*', in accordance with AS3798-2007.

Where filling is to be carried out over sloping land (slope > 8H:1V), the surface of the natural material should be benched so that the fill can be 'keyed' into the slope, allowing for a good bonding interface between structural fill and the natural. The maximum height of the step must not exceed 0.5m, and the benching must be sloped to ensure free drainage.

Excavatability

No problems should be encountered in excavating the materials on site above 'TC' bit limit. Most soils encountered on site should be within the excavation limits of a small dozer (e.g. Cat D6 or similar) in bulk excavations or medium size backhoe (e.g. Case 580 or similar) in trench excavations.

'TC' bit limit was noted at a depth of 0.6m in BH4. While there is no direct reliable relationship between drilling resistance and excavatability, as a rule of thumb the limit of the 'TC' bit may be taken as indicative of the limit of excavation of a medium sized dozer in bulk excavation (Cat D7E, D8) or a large excavator in trench excavation (Kato or Hymac).

Generally below the 'TC' bit limit, larger excavation equipment, explosives, compressor driven pneumatic tools, or hydraulic rock breakers would be required for excavation.

5.2 Batter Slopes

For initial design purposes, previous experience in the area has indicated that the following maximum unprotected batter slopes may be adopted for the cut and fill batters on the site.

Table 3: Maximum Unprotected Batter Slopes

Material Type	Short Term (Maximum)	Long Term (Maximum)
Residual Clays (cut)	1V:1H	1V:2H
Fill Batters ⁽¹⁾	1V:2H	1V:2H
Weathered Rock	1V:1H	*

Notes:

- (1) All fill batters should be overfilled, compacted and cut back at the maximum angles recommended above and with some form of erosion protection to minimise any potential unnecessary scour effects due to weathering.
- * Denotes requirement for detailed stability assessment.

5.3 Building Footings

Based on the predominant soil types encountered for individual lots, and envisaged cut/fill operations, (which are yet to be confirmed), it is expected that the site classifications, in accordance with AS2870-1996 'Residential Slabs and Footings' over the site area, are likely to vary between the following:

- Class A – Weathered rock at surface
- Class S – Slightly reactive
- Class M – Moderately reactive
- Class P – Filled site

However, the above should be considered 'indicative' only and may vary depending upon the materials encountered over a proposed building footprint, the properties of these materials and final building platform geometry.

Provided all earthwork filling operations are carried out in a 'controlled' manner, as recommended in section 5.1 of this report, the Class 'P' classification for filled lots is likely to be able to be re-classified. Final site classifications will be a function of earthworks geometry, type of structure and the underlying strata.

As a general approach, we recommend that all load bearing footings for a residence be supported on similar competent natural strata around the entire perimeter of the building. In areas of controlled fill, this may involve the deepening of perimeter footings or the use of backhoe piers/short bored piles to support the perimeter footings and carry the footing loads to similar competent natural strata. Allowable bearing capacities of 100kPa and at least 600kPa should be available in the stiff residual clays and weathered rock respectively.

Based on the expectation of adequate fill compaction, testing and supervision being carried out, if required, the founding of footings such as stiffened rafts on compacted fill can be considered, with an estimated allowable bearing capacity of 100kPa being available within the fill. However, it should be understood that all fill settles to some extent, no matter how well compacted. The nature of the fill material at a particular location and the variation in fill thickness over a particular building would also be considered in the assessment of the most appropriate footing and slab system for a particular building.

The most appropriate dwelling type will be a function of earthworks and final building platform geometry, which were not known at the time of the preparation of this report. For preliminary design purposes, the following guidelines may be used.

Where the lot varies significantly in slope percentage, the final proposed building location will have a significant bearing on the most likely dwelling type. Should the building be constructed over an area which is less than 15% slope and residual soils or weathered rock are encountered, then a slab-on-ground may be considered. Where the slope exceeds 15%, pole type or split level homes should be considered. A combination slab-on-ground, split level, pole type dwelling may be considered where slope percentages vary across a proposed building platform and appropriate soils allow for this type of construction. Where slopes exceed 25%, pole type homes should be considered only. A final decision on the most appropriate building type will need to be made at the design stage of the proposed building.

The above should be considered 'indicative' only and subject to variation depending on the results of the site specific geotechnical investigation required to be carried out to finalise site classifications for footing design.

The above assumes that appropriate subsurface and surface drainage control measures will be designed, installed and certified in order to control groundwater and surface runoff.

Where pole type dwellings are proposed, these dwellings should be of a lightweight, flexible construction using timber/steel, suspended timber floors and cladding. Also pole supports should be designed to resist any lateral loading due to creep within the soils.

5.4 Slope Stability Assessment

Fieldwork for this component of the investigation was carried out by a Senior Engineering Geologist on 9 July 2010.

The fieldwork exercise included a broadscale inspection, where possible, of the entire site to assess the following;

- Determine slope angle
- Observe vegetation

- Note any evidence of tension cracking
- Note any evidence of seepage
- Note any evidence of soil creep
- Note any evidence of previous slips
- Geological features
- Subsurface conditions
- Drainage issues

For the majority of the site, no physical evidence of previous movement, seepage, soil creep, etc was observed during the mapping exercise across the site in its current state. However, Figure 1 shows areas where a minor surficial slip and seepage were noted. The seepage noted as S1, maybe an underground spring as water was 'bubbling' through the ground. The area noted as S2, was seepage noted from the fill platform associated with the building pad for the existing residential dwelling on site.

Refer to Plate 6 and 7 below for observations made at the area of the spring and slip.



PLATE 6: THE AREA NOTED AS BEING A POSSIBLE UNDERGROUND SPRING

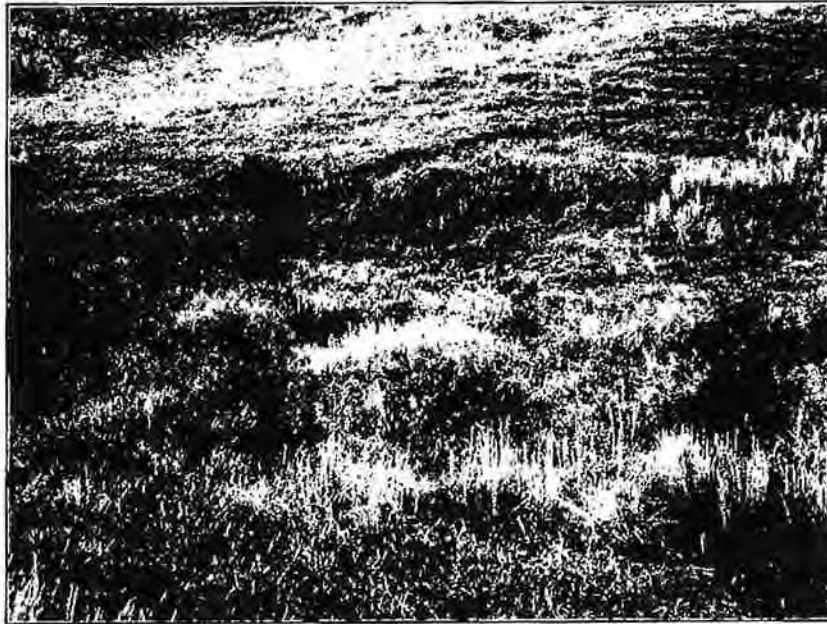


PLATE 7: THE SLIP NOTED ON THE STEEP SIDE OF A HILL

These areas will require more detailed works and recommendations for stabilisation depending on final earthwork levels. Although encountered, the slip and seepage areas were minor in their occurrence and extent and are not expected to effect the overall development of the project as engineering solutions can be provided into stabilise these areas, as required.

During the above interpretation, no physical evidence was noted across the site to indicate that the site had undergone any significant previous instability that would preclude the site from being developed for its proposed usage.

Slope angles varied from less than 10° (17%) to greater than 17° (30%) across the site and over possible individual building areas.

Proposed earthworks levels and building house pad locations were not known at this time. However, it is recommended that cut/filling construction be restricted to the area on the blocks where **natural** slope angles are less than 14° (say 25%) and where residual soils/weathered rock existed. This cut and fill should be limited to heights not exceeding 1m without more detailed geotechnical investigation work. Where slopes exceed 14° (say 25%), it is recommended that no cut/fill be undertaken without detailed geotechnical assessment.

As final cut/fill levels are not known at the time of the preparation of this report, it is recommended that a detailed slope stability assessment, using cross sectional drawings, be carried out by Cardno Bowler once final lot levels are known in order to provide recommendations for slope stability.

Based on the mapping exercise, no significance physical evidence was observed to indicate previous instability or potential future instability across the site that would preclude the development for being used for the proposed purpose. This is a general statement and is subject to additional works being carried out in areas of minor slip and seepage zones.

The development of this site is not expected to adversely affect the current stability of adjoining properties provided the recommendations above are adhered to and adequate civil/hydraulic and structural issues are addressed.

Given the results of our assessment, the site is considered acceptable for its proposed usage with regards to stability.

Effective subsurface and surface drainage will be critical in the maintenance of stability on the site.

As this investigation is 'broadscale' all findings should be considered preliminary only. It is recommended that proposed cut/fill levels for building pad construction be reviewed and analysed by Cardno Bowler prior to the commencement of any earthworks to confirm the theoretical stability factor of safety (FOS) against failure is ≥ 1.5 . Further, during the construction phase of the project, Cardno Bowler should be engaged to inspect the cut/fill batters and certify that the required FOS can be achieved or whether remediation works are required.

5.5 Settlement

In the low lying areas of the site, our preliminary investigation indicated that no compressible soils were encountered. As such, under reasonable fill loads plus building loads ($\leq 60\text{kPa}$) the underlying strata is not expected to undergo any significant settlement.

5.6 Drainage

There are numerous drainage gullies scattered throughout the site which will need to be looked at in detail as they may have a significant impact on the development with regards to surface flow depending on final earthwork levels. Further, improved drainage will be required in the low lying areas of the site to prevent ponding water.

5.7 General Comment

No significant geotechnical issues were noted that would preclude the site from being developed for its proposed usage. However, it must be noted that this assessment is based on very limited work over a large area and as such should be considered preliminary only and should be confirmed by a more detailed geotechnical investigation and assessment.

6 CONSTRUCTION INSPECTIONS

It is recommended that placement of all structural fill and cut/fill batters be inspected, tested and certified where necessary, by Cardno Bowler Pty Ltd to ensure recommendations made in this report have been adhered to.

Should subsurface conditions other than those described in this report be encountered, Cardno Bowler Pty Ltd should be consulted immediately and appropriate modifications developed and implemented if necessary.

7 CONCLUSIONS AND RECOMMENDATIONS

The following is a summary of the conclusions and recommendations in regard to the broadscale geotechnical and slope stability investigation for the proposed residential development at the site behind the pub in Mooball along Tweed Valley Way, Mooball. However, the preceding sections of this report should be read for a full description of the conclusions and recommendations.

1. The subsurface conditions, at the investigation locations generally consisted of stiff or better residual soils in the low lying areas of the site and stiff or better clays overlying weathered rocks in the hills.
2. Earthworks should be carried out in accordance with AS3798.2007 '*Guidelines on Earthworks for Commercial and Residential Developments*'. Refer to Section 5.1 for details on recommendations for earthwork operations.
3. Refer to section 5.2 for recommendations on maximum unprotected cut/fill batter angles for the site.
4. Based on the possible cut/fill operations, it is expected that the predominant site classifications for residential allotments could be Class A, S, M, H or P, subject to fill placement supervision. As a general recommendation, it is suggested that all load bearing footings should extend through any fill and be supported in competent natural strata. This would require footings in fill to be supported on backhoe piles or short bored piers, or some other deep level footing type if appropriate.
5. Refer to section 5.4 for indicative dwelling types for the site based on existing site conditions.
6. Based on the background search, aerial photographic interpretation, fieldwork results and the site '*walkover*', no evidence of previous instability was noted. This site may be considered stable in its current state. It is recommended that Cardno Bowler review all proposed cut/fill levels, once finalised, to ensure a theoretical FOS of >1.5 can be achieved. During construction Cardno Bowler should be engaged to carry out site inspections to certify that all cut/fill batters will achieve the theoretical FOS as required.
7. Effective subsurface and surface drainage will be critical in the maintenance of stability on the site.
8. No significant settlement issues are expected in the low lying areas of the site under fill plus building loads, based on the limited information to date.
9. Although some areas in the hills showed some evidence of minor seepage and slumping, with appropriate analysis and stabilisation works, these areas could be stabilised. Given this, the hill areas are considered suitable for residential development from a slope stability viewpoint.

Proposed Residential Assessment, Tweed Valley Road, Mooball

Prepared for Cardno (Qld) Pty Ltd

10. No significant geotechnical issues were noted that would preclude the site from being developed for its proposed usage. However, it must be noted that this assessment is based on very limited work over a large area and as such should be considered preliminary only and should be confirmed by a more detailed geotechnical investigation and assessment.

Yours faithfully






GARY SAMUELS
PRINCIPAL



DAVID STIRLING
SENIOR GEOTECHNICAL ENGINEER



KEY

-  Approximate Borehole Location
-  Approximate Seepage Location
-  Approximate Slip Location

NOT TO SCALE



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SITE INVESTIGATION LOCATION PLAN

PROPOSED RESIDENTIAL DEVELOPMENT

TWEED VALLEY ROAD, MOOBALL

JOB NO.:

9543

FIGURE 1

GENERAL NOTES

April 2005

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GENERAL

This report comprises the results of an investigation carried out for a specific purpose and client as defined in the introduction section(s) of the document. The report should not be used by other parties or for other purposes as it may not contain adequate or appropriate information.

TEST HOLE LOGGING

The information on the Test Hole Logs (Boreholes, Backhoe Pits, Exposures etc.) has been based on a visual and tactile assessment except at the discrete locations where test information is available (field and/or laboratory results).

Reference should be made to our standard sheets for the definition of our logging procedures (Soil and Rock Descriptions).

GROUNDWATER

Unless otherwise indicated the water levels given on the test hole logs are the levels of free water or seepage in the test hole recorded at the given time of measuring. The actual groundwater level may differ from this recorded level depending on material permeabilities. Further variations of this level could occur with time due to such effects as seasonal and tidal fluctuations or construction activities. Final confirmation of levels can only be made by appropriate instrumentation techniques and programmes.

INTERPRETATION OF RESULTS

The discussion and recommendations contained within this report are normally based on a site evaluation from discrete test hole data. Generalised or idealised subsurface conditions (including any cross-sections contained in the report) have been assumed or prepared by interpolation/extrapolation of these data. As such these conditions are an interpretation and must be considered as a guide only.

CHANGE IN CONDITIONS

Local variations or anomalies in the generalised ground conditions used for this report can occur, particularly between discrete test hole locations. Furthermore, certain design or construction procedures may have been assumed in assessing the soil structure interaction behaviour of the site.

Any change in design, in construction methods, or in ground conditions as noted during construction, from those assumed in this report should be referred to this firm for appropriate assessment and comment.

FOUNDATION DEPTH

Where referred to in the report, the recommended depth of any foundation (piles, caissons, footings, etc.) is an engineering estimate of the depth to which they should be constructed. The estimate is influenced and perhaps limited by the fieldwork method and testing carried out in connection with the site investigation, and other pertinent information as has been made available. The depth remains, however, an estimate and therefore liable to variation. Footing drawings, designs and specifications based upon this report should provide for variations in the final depth depending upon the ground conditions at each point of support.

REPRODUCTION OF REPORTS

Where it is desired to reproduce the information contained in this report for the inclusion in the contract documents or engineering specification of the subject development, such reproduction should include at least all the relevant test hole and test data, together with the appropriate standard description sheets and remarks made in the written report of a factual or descriptive nature.

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IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL ENGINEERING REPORT

More construction problems are caused by site subsurface conditions than any other factor. As troublesome as subsurface problems can be, their frequency and extent have been lessened considerably in recent years, due in large measure to programs and publications of ASFE / The Association of Engineering Firms Practicing in the Geosciences.

The following suggestions and observations are offered to help you reduce the geotechnical-related delays, cost-overruns and other costly headaches that can occur during a construction project.

A GEOTECHNICAL ENGINEERING REPORT IS BASED ON A UNIQUE SET OF PROJECT-SPECIFIC FACTORS

A geotechnical engineering report is based on subsurface exploration plan designed to incorporate a unique set of project-specific factors. These typically include the general nature of the structure involved, its size and configuration; the location of the structure on the site and its orientation; physical concomitants such as access roads, parking lots and underground utilities, and the level of additional risk which the client assumed by virtue of limitations imposed upon the exploratory program. To help avoid costly problems, consult the geotechnical engineer to determine how any factors which change subsequent to the date of the report may affect its recommendations.

Unless your consulting geotechnical engineer indicates otherwise, *your geotechnical engineering report should not be used:*

- When the nature of the proposed structure is changed, for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one;
- when the size or configuration of the proposed structure is altered;
- when the location or orientation of the proposed structure is modified;
- when there is a change of ownership, or
- for application to an adjacent site.

Geotechnical engineers cannot accept responsibility for problems which may develop if they are not consulted after factors considered in their report's development have changed.

MOST GEOTECHNICAL "FINDINGS" ARE PROFESSIONAL ESTIMATES

Site exploration identifies actual subsurface conditions only at those points where samples are taken, when they are taken. Data derived through sampling and subsequent testing are extrapolated by geotechnical engineers who then render an opinion about overall subsurface conditions, their likely reaction to proposed construction activity and appropriate foundation design.

Even under optimal circumstances actual conditions may differ from those inferred to exist, because no geotechnical engineer, no matter how qualified, and no subsurface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than a report indicates. Actual conditions in areas not sampled may differ from predictions. *Nothing can be done to prevent the unanticipated, but steps can be taken to help minimize their impact.* For this reason, *most experienced owners retain their geotechnical consultants through the construction stage, to identify variances, conduct additional tests which may be needed, and to recommend solutions to problems encountered on site.*

SUBSURFACE CONDITIONS CAN CHANGE

Subsurface conditions may be modified by constantly changing natural forces. Because a geotechnical engineering report is based on conditions which existed at the time of subsurface exploration, *construction decisions should not be based on a geotechnical engineering report whose adequacy may have been affected by time.* Speak with the geotechnical consultant to learn if additional tests are advisable before construction starts.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes or groundwater fluctuations may also affect subsurface conditions and thus, the continuing adequacy of a geotechnical report. The geotechnical engineer should be kept apprised of any such events, and should be consulted to determine if additional test are necessary.

GEOTECHNICAL SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND PERSONS

Geotechnical engineers' reports are prepared to meet the specific needs of specific individuals. A report prepared for a consulting civil engineer may not be adequate for a construction contractor, or even some other consulting civil engineer. Unless indicated otherwise, this report was prepared expressly for the client involved and expressly for purposes indicated by the client. Use by any other persons for any purpose, or by the client for a different purpose, may result in problems. *No individual other than the client should apply this report for its intended purpose without first conferring with the geotechnical engineer. No person should apply this report for any purpose other than that originally contemplated without first conferring with the geotechnical engineer.*

A GEOTECHNICAL ENGINEERING REPORT IS SUBJECT TO MISINTERPRETATION

Costly problems can occur when other design professionals develop their plans based on misinterpretations of a geotechnical engineering report. To help avoid these problems, the geotechnical engineer should be retained to work with other appropriate design professionals to explain relevant geotechnical findings and to review the adequacy of their plans and specifications relative to geotechnical issues.

BORING LOGS SHOULD NOT BE SEPARATED FROM THE ENGINEERING REPORT

Final boring logs are developed by geotechnical engineers based upon their interpretation of field logs (assembled by site personnel) and laboratory evaluation of field samples. Only final boring logs customarily are included in geotechnical engineering reports. *These logs should not under any circumstances be redrawn* for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process. Although photographic reproduction eliminates this problem, it does nothing to minimize the possibility of contractors misinterpreting the logs during bid preparation. When this occurs, delays, disputes and unanticipated costs are the all-too-frequent result.

To minimize the likelihood of boring log misinterpretation, *give contractors ready access to the complete geotechnical engineering report prepared or authorized for their use**. Those who do not provide such access may proceed under the *mistaken* impression that simply disclaiming

* For further information on this aspect reference should be made to "Guidelines for the Provision of Geotechnical Information in Construction Contracts" published by The Institution of Engineers Australia, National Headquarters, Canberra, 1987.

responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes which aggravate them to disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY

Because geotechnical engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against geotechnical consultants. To help prevent this problem, geotechnical engineers have developed model clauses for use in written transmittals. These are *not* exculpatory clauses designed to foist geotechnical engineers' liabilities onto someone else. Rather, they are definitive clauses which identify where geotechnical engineers' responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your geotechnical engineering report, and you are encouraged to read them closely. Your geotechnical engineer will be pleased to give full and frank answers to your questions.

OTHER STEPS YOU CAN TAKE TO REDUCE RISK

Your consulting geotechnical engineer will be pleased to discuss other techniques which can be employed to mitigate risk. In addition, ASFE has developed a variety of materials which may be beneficial. Contact ASFE for a complimentary copy of its publications directory.

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Annex A

Fieldwork Results

SOIL DESCRIPTION

This procedure involves the description of a soil in terms of its visual and tactile properties, and relates to both laboratory samples and field exposures as applicable. A detailed soil profile description, in association with local geology and experience, will facilitate the initial (and often complete) site assessment for engineering purposes.

The method involves an evaluation of each of the items listed below and is in general agreement with the Site Investigation Code AS1726-1993.

SOIL TYPE

The soil is described on the basis of the grain size composition of the constituent particles, and the plasticity of the fraction of material passing the 425µm sieve.

Furthermore, as most natural soils are part combinations of various constituents, the primary soil is described and modified by minor components. In brief, the system is as follows;

SILT OR CLAY AS MINOR COMPONENT		GRAVEL OR SAND AS MINOR COMPONENT	
% Fines	Modifier	% Coarse	Modifier
≤5	omit, or use "trace"	≤15	omit, or use "trace"
>5 ≤12	describe as "with clay/silt" as applicable	>15 ≤30	describe as "with sand/gravel" as applicable
>12	prefix soil as "silty/clayey" as applicable	>30	prefix soil as "sandy/gravelly" as applicable

Note: For soils containing both sand and gravel the minor coarse fraction is omitted if less than 15%, or described as "with sand/gravel" as applicable when greater than 15%.

The appropriate classification group symbol for soil classification is also given before the soil type description in accordance with AS1726-1993, Table A1.

For granular soils, an assessment of grading (well, uniform, gap or poor), particle size (fine, medium etc), angularity, shape and particle composition may also be given.

COLOUR

Colour is important for correlation of data between test holes and for subsequent excavation operations. The prominent colour is noted, followed by (spotted, mottled, streaked etc.) secondary colours as applicable. Colour should be described in the "moist" condition, though both wet and dry colours may also be appropriate.

MOISTURE

The moisture condition of the soil is described by the appearance and feel of the soil using one of the following terms:

Dry cohesive soils - hard, friable or powdery; granular soils - cohesionless, free funning.
 Moist soil cool, darkened colour: cohesive soils - can be moulded; granular soils - tend to cohere.
 Wet soil cool, darkened colour: cohesive soils - usually weakened, free water on hands when handling; granular soils - tend to cohere.

In addition, the presence of any seepage or free water is noted on all test hole logs.

CONSISTENCY/RELATIVE DENSITY

Granular soils are generally described in terms of relative density (density index) as listed in Table A5 AS1726. These soils are inherently difficult to assess and normally a penetration test procedure (SPT, DCP or CPT) is used in conjunction with published correlation tables. Alternatively, insitu density tests can be conducted in association with minimum and maximum densities performed in the laboratory.

Cohesive soils can be assessed by direct measurement (shear vane), or estimated approximately by tactile means and/or the aid of a geological pick as given on the following table. It is emphasised that a "design shear strength" must take cognisance of the insitu moisture content and the possible variations of moisture with time.

Term	Tactile Properties	Undrained Shear Strength (kPa)
Very Soft	Exudes between the fingers when squeezed in the hand.	≤12
Soft	Easily penetrated by thumb about 30-40mm. Pick head can be pushed in up to shaft. Moulded by light finger pressure.	>12 ≤25
Firm	Penetrated by thumb 20-30mm with moderate effort. Sharp end of pick pushed in some 30-40m. Moulded by strong finger pressure.	>25 ≤50
Stiff	Indented by thumb about 4mm with moderate effort. Pick pushed in up to 10mm. Cannot be moulded in fingers.	>50 ≤100
Very Stiff	Readily indented by thumb nail. Slight indentation produced by pushing pick into soil.	>100 ≤200
Hard	Difficult to indent with thumb nail. Requires power tools for excavation.	>200

STRUCTURE/OTHER FEATURES

The structure of the soil may be described with reference to: zoning, where soils consist of separate zones differing in colour, grain size or other properties; defects, including fissures, cracks, root-holes and the like; cementing, with the strength (weakly to strongly), and nature of the cementing agent; additional observations including geological origin, odour and the like. In addition, the presence of other features (ferricrete nodules, organic inclusions) should also be noted as applicable.

BOREHOLE LOG SHEET

Client: CARDNO (QLD) PTY LTD	Hole No: BH1
Project: PROPOSED RESIDENTIAL DEVELOPMENT, MOOBALL	Sheet: 1 of 1
Location: POTTSVILLE RD AND TWEED VALLEY WAY	Job No: 9543
Position: 56J 0547605 6853030	Angle from Horizontal: 90°
Rig Type: Q Drill 3000	Bit: TC BIT
Casing Diameter:	Contractor: CARDNO BOWLER
Date Started: 6/7/10	Date Completed: 6/7/10
Logged By: DL	Date Logged: 6/7/10

Depth (m)	Drilling		Groundwater (m)	Sample or Field Test	Recovered	DCP	RL (m AHD)	Graphic Log	USCS Symbol	Description (SYMBOL, SOIL NAME, plasticity/particle characteristics, colour, minor components, moisture, consistency, structure, ORIGIN)
	Auger 'V' Bit	Auger 'TC' Bit								
0.00 - 0.10 m						2			CI	SILTY CLAY/SANDY CLAY, medium to high plasticity, fine to coarse grained sand, red orange, with fine to medium gravel and some fine roots, trace of cobbles, dry to moist, soft to firm, TOPSOIL
0.30 - 0.40 m						4			CI	SILTY CLAY, medium to high plasticity, trace fine to coarse grained sand, red orange, dry to moist, silt to very stiff, NATURAL
0.70 - 0.80 m						10			CI	
1.40 - 1.50 m						6			CI	
2.60 - 2.70 m						10				
						+20				
BOREHOLE TERMINATED AT 3.00 m										

EG LIB 01-IGLE Log EG SOL LOC 9543-LOGS-GPJ <<DrawingPlot>> 19/07/2010 13:39

See Standard Sheets for details of abbreviations & basis of descriptions



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BOREHOLE LOG SHEET

Client: CARDNO (QLD) PTY LTD	Hole No: BH2	
Project: PROPOSED RESIDENTIAL DEVELOPMENT, MOOBALL	Job No: 9543	Sheet: 1 of 1
Location: POTTSVILLE RD AND TWEED VALLEY WAY	Angle from Horizontal: 90°	Surface Elevation:
Position: 56J 05475021 6853364	Bit: TC BIT	Driller: DL
Rig Type: Q Drill 3000	Contractor: CARDNO BOWLER	
Casing Diameter:	Date Started: 6/7/10	Date Completed: 6/7/10
	Logged By: DL	Date Logged: 6/7/10

Depth (m)	Drilling				Groundwater (m)	Sample or Field Test	Recovered	DCP	RL (m AHD)	Graphic Log	USCS Symbol	Description (SYMBOL, SOIL NAME, plasticity/particle characteristics, colour, minor components, moisture, consistency, structure, ORIGIN)
	Auger 'V' Bit	Auger 'TC' Bit	Washbore	Casing								
0.00 - 0.30 m							2				Cl	SILTY CLAY/SANDY CLAY, medium to low plasticity, fine to coarse grained sand, pale brown, dry to moist, soft, TOPSOIL
0.30 - 0.40 m							2				Cl	
0.40 - 0.50 m							2				Cl	
0.50 - 0.60 m							4				Cl	SILTY CLAY/SANDY CLAY, medium to high plasticity, fine to coarse grained sand, red orange, dry to moist, stiff to very stiff, NATURAL
0.60 - 0.70 m							5				Cl	
0.70 - 0.80 m							5				Cl	
0.80 - 0.90 m							6				Cl	
0.90 - 1.00 m							6				Cl	
1.00 - 1.10 m							7				Cl	
1.10 - 1.20 m							8				Cl	
1.20 - 1.30 m							8				CH	SANDY SILTY CLAY, high plasticity, fine to coarse grained sand, red orange cream mottle, dry, very stiff, NATURAL
1.30 - 1.40 m							10				CH	
1.40 - 1.50 m							10				CH	
1.50 - 1.60 m							10				CH	SILTY CLAY, high plasticity, fine to medium grained sand, orange cream, with some coarse grained sand, dry, hard, NATURAL
1.60 - 1.70 m							13				CH	
1.70 - 1.80 m							+20				CH	
1.80 - 1.90 m											CH	
1.90 - 2.00 m											CH	
2.00 - 2.10 m											CH	
2.10 - 2.20 m											CH	
2.20 - 2.30 m											CH	Trace fine gravel
2.30 - 2.40 m											CH	
2.40 - 2.50 m											CH	
2.50 - 2.60 m											CH	
2.60 - 2.70 m											CH	
2.70 - 2.80 m											CH	
2.80 - 2.90 m											CH	
2.90 - 3.00 m											CH	
3.00 - 3.00 m												BOREHOLE TERMINATED AT 3.00 m

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See Standard Sheets for details of abbreviations & basis of descriptions



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BOREHOLE LOG SHEET

Client: CARDNO (QLD) PTY LTD Project: PROPOSED RESIDENTIAL DEVELOPMENT, MOOBALL Location: POTTSVILLE RD AND TWEED VALLEY WAY	Hole No: BH3 Sheet: 1 of 1 Job No: 9543 Surface Elevation: Angle from Horizontal: 90° Driller: DL Bit: TC BIT Contractor: CARDNO BOWLER Logged By: DL Date Logged: 6/7/10
Position: 56J 0547996 6853194	Surface Elevation:
Rig Type: Q Drill 3000	Bit: TC BIT
Casing Diameter:	Contractor: CARDNO BOWLER
Date Started: 6/7/10	Date Completed: 6/7/10

Depth (m)	Drilling				Groundwater (m)	Sample or Field Test	Recovered	DCP	RL (m AHD)	Graphic Log	USCS Symbol	Description <small>(SYMBOL, SOIL NAME, plasticity/particle characteristics, colour, minor components, moisture, consistency, structure, ORIGIN)</small>
	Auger "V" Bit	Auger "C" Bit	Washbore	Casing								
0.00 - 0.30 m						PP=370kPa	1	1			CI-CH	SILTY CLAY/SANDY CLAY, medium to high plasticity, fine to coarse grained sand, grey, grass roots, moist to wet, soft, ALLUVIAL/TOPSOIL
0.30 - 0.60 m							2	2				SILTY CLAY, high plasticity, trace fine to coarse grained sand, pale brown yellow, moist to wet, stiff to very stiff, NATURAL
0.60 - 0.70 m							3	3			CH	
0.70 - 0.80 m							4	4				
0.80 - 0.90 m							4	4				
0.90 - 1.00 m							4	4				
1.00 - 1.10 m							5	5				
1.10 - 1.20 m							6	6				
1.20 - 1.30 m							6	6				
1.30 - 1.40 m							6	6				
1.40 - 1.50 m							6	6				
1.50 - 1.60 m							6	6				
1.60 - 1.70 m							6	6				
1.70 - 1.80 m							6	6				
1.80 - 1.90 m							6	6				
1.90 - 2.00 m							6	6				
2.00 - 2.10 m							6	6				
2.10 - 2.20 m							6	6				
2.20 - 2.30 m							6	6				
2.30 - 2.40 m							6	6				
2.40 - 2.50 m							6	6				
2.50 - 2.60 m							6	6				
2.60 - 2.70 m							6	6				
2.70 - 2.80 m							6	6				
2.80 - 2.90 m							6	6				
2.90 - 3.00 m							6	6				
3.00 - 3.10 m							6	6				
3.10 - 3.20 m							6	6				
3.20 - 3.30 m							6	6				
3.30 - 3.40 m							6	6				
3.40 - 3.50 m							6	6				
3.50 - 3.60 m							6	6				
3.60 - 3.70 m							6	6				
3.70 - 3.80 m							6	6				
3.80 - 3.90 m							6	6				
3.90 - 4.00 m							6	6				
4.00 - 4.10 m							6	6				
4.10 - 4.20 m							6	6				
4.20 - 4.30 m							6	6				
4.30 - 4.40 m							6	6				
4.40 - 4.50 m							6	6				
4.50 - 4.60 m							6	6				
4.60 - 4.70 m							6	6				
4.70 - 4.80 m							6	6				
4.80 - 4.90 m							6	6				
4.90 - 5.00 m							6	6				
5.00 - 5.10 m							6	6				
5.10 - 5.20 m							6	6				
5.20 - 5.30 m							6	6				
5.30 - 5.40 m							6	6				
5.40 - 5.50 m							6	6				
5.50 - 5.60 m							6	6				
5.60 - 5.70 m							6	6				
5.70 - 5.80 m							6	6				
5.80 - 5.90 m							6	6				
5.90 - 6.00 m							6	6				

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See Standard Sheets for details of abbreviations & basis of descriptions	Cardno BOWLER	Cardno Bowler 7/98 Anzac Ave HILLCREST QLD 4118 PH: (07) 3800 6446 FAX: (07) 3800 0816
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BOREHOLE LOG SHEET

Client: CARDNO (QLD) PTY LTD Project: PROPOSED RESIDENTIAL DEVELOPMENT, MOOBALL Location: POTTSVILLE RD AND TWEED VALLEY WAY	Hole No: BH4 Sheet: 1 of 1
Position: 56J 0548395 6853385 Rig Type: Q Drill 3000	Angle from Horizontal: 90° Bit: TC BIT
Casing Diameter:	Contractor: CARDNO BOWLER
Date Started : 6/7/10	Date Completed: 6/7/10
Logged By: DL	Date Logged: 6/7/10

Depth (m)	Drilling					Groundwater (m)	Sample or Field Test	Recovered	DCP	RL (m AHD)	Graphic Log	USCS Symbol	Description (SYMBOL, SOIL NAME, plasticity/particle characteristics, colour, minor components, moisture, consistency, structure, ORIGIN)
	Auger 'V' Bit	Auger 'TC' Bit	Washbore	Casing	Coring								
0.5								1 2 7			CL-CL XW	SILTY CLAY/SANDY CLAY, medium to low plasticity, fine to coarse grained sand, brown dark grey, with grass roots, moist, soft, TOPSOIL SILTSTONE	
-0.5						D 0.30 - 0.40 m		+20					
-1.0													
-1.5													
-2.0													
-2.5													
-3.0													
-3.5													

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See Standard Sheets for details of abbreviations & basis of descriptions



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BOREHOLE LOG SHEET

Client: CARDNO (QLD) PTY LTD Project: PROPOSED RESIDENTIAL DEVELOPMENT, MOOBALL Location: POTTSVILLE RD AND TWEED VALLEY WAY	Hole No: BH5 Sheet: 1 of 1
Position: 56J 0548270 6853069 Rig Type: Q Drill 3000	Angle from Horizontal: 90° Bit: TC BIT Driller: DL
Casing Diameter:	Contractor: CARDNO BOWLER
Date Started : 6/7/10 Date Completed: 6/7/10	Logged By: DL Date Logged: 6/7/10

Depth (m)	Drilling				Groundwater (m)	Sample or Field Test	Recovered	DCP	RL (m AHD)	Graphic Log	USCS Symbol	Description (SYMBOL, SOIL NAME, plasticity/particle characteristics, colour, minor components, moisture, consistency, structure, ORIGIN)
	Auger 'V' Bit	Auger 'C' Bit	Washbore	Casing								
0.00 - 0.10 m							1				CI-CL	SILTY CLAY/SANDY CLAY, medium to low plasticity, fine to coarse grained sand, brown dark grey, with grass roots, moist, soft, TOPSOIL
0.10 - 0.50 m							1 4 5 5				CI-CH	SILTY CLAY/SANDY CLAY, medium to high plasticity, fine to coarse grained sand, cream yellow, with trace of fine gravel, dry, stiff to very stiff, NATURAL
0.50 - 0.60 m							4					Fine to medium gravel
0.60 - 1.00 m							15 12 17					SILTSTONE
1.00 - 2.00 m							-20				XW	
2.00 - 2.80 m												
2.80 - 3.00 m												
3.00 - 3.50 m												BOREHOLE TERMINATED AT 3.00 m

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See Standard Sheets for details of abbreviations & basis of descriptions	Cardno BOWLER	Cardno Bowler 7/98 Anzac Ave HILLCREST QLD 4118 PH: (07) 3800 6446 FAX: (07) 3800 0816
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Annex B

Laboratory Results

September, 2001

LABORATORY TESTING

GENERAL

Samples extracted during the fieldwork stage of a site investigation may be "disturbed" or "undisturbed" (as generally indicated on the test hole logs) depending upon the nature and purpose of the sample as well as the method of extraction. Nominally "undisturbed" samples may suffer a varying degree of disturbance during extraction, transportation, extrusion and testing. This aspect should be taken into account when assessing test results which must of necessity reflect the effects of such disturbance.

All soil properties (as measured by laboratory testing) exhibit inherent variability and thus a certain statistical number of tests is required in order to predict an average property with any degree of confidence. The site variability of soil strata, future changes in moisture and other conditions, and the discrete sampling positions must also be considered when assessing the representative nature of the laboratory programme.

Certain laboratory test results provide interpreted soil properties as derived by conventional mathematical procedures. The applicability of such properties to engineering design must be assessed with due regard to the site, sample condition, procedure and project in hand.

TESTING

Laboratory testing is normally carried out in accordance with Australian Standard 1289 as amended, or Queensland Transport Standards when specified. The routine Australian Standard tests are as follows:

Sample Preparation	Test 1
Moisture Content	Test 2.1.1
Liquid Limit	Test 3.1.1)
Plastic Limit	Test 3.2.1) collectively known as Atterberg Limits
Plasticity Index	Test 3.3.1)
Linear Shrinkage	Test 3.4.1
Particle Density	Test 3.5.1
Particle Size Distribution	Tests 3.6.1, 3.6.2, 3.6.3
Emerson Class Number	Test 3.8.1)
Percent Dispersion	Test 3.8.2) collectively, Dispersion Classification
Pinhole Dispersion Classification	Test 3.8.3)
Organic Matter	Test 4.1.1
Sulphate content	Test 4.2.1
pH Value	Test 4.3.1
Resistivity	Test 4.4.1
Standard Compaction	Test 5.1.1
Modified Compaction	Test 5.2.1
Dry Density Ratio	Test 5.4.1
Minimum/Maximum Density	Test 5.5.1
Density Index	Test 5.6.1
California Bearing Ratio	Tests 6.1.1, 6.1.2
Undrained Triaxial Shear	Test 6.4.1
One Dimensional Consolidation	Test 6.6.1
Constant Head Permeability	Test F7.1
Shrink Swell Index	Test 7.1.1

Where tests are used which are not covered by appropriate standard procedures, details are given in the report.

LABORATORY

Our laboratory is a Registered Laboratory with the National Association of Testing Authorities (NATA).



**Cardno
Bowler**
Shaping the Future
Geotechnical Engineering Consultants
Construction Testing Services
Environmental Consultants
A.B.N. 74 128 806 735

Gold Coast Laboratory
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NERANG QLD 4211
Delivery Address: 5/10 Jay Geo Court
NERANG QLD 4211
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Email: cardnobowlergc@cardno.com.au



SOIL CLASSIFICATION TEST REPORT

SAMPLING PROCEDURES: A.S.1289.1.2.1-6.5.3

TEST PROCEDURES: AS1289.2.1.1, 3.1.2, 3.2.1, 3.3.1, 3.4.1

CLIENT:	CARDNO (QLD) PTY LTD	JOB No.: GC 2460 / 9543
PROJECT:	PROPOSED RESIDENTIAL DEVELOPMENT - TWEED VALLEY WAY, MOOBALL	REPORT No.: 1
TEST ITEM:	DISTURBED SAMPLE	DATE ISSUED: 15/07/10
SITE TEST No.:	Q 1	LOCATION: BOREHOLE No. 1
SAMPLE No.:	85390	
DATE SAMPLED:	12/07/10	SOIL DESCRIPTION: CI CLAY with sand, red brown
MATERIAL SOURCE:	INSITU	
PROPOSED MATERIAL TYPE:	-	ELEVATION m: 0.7 - 0.8m

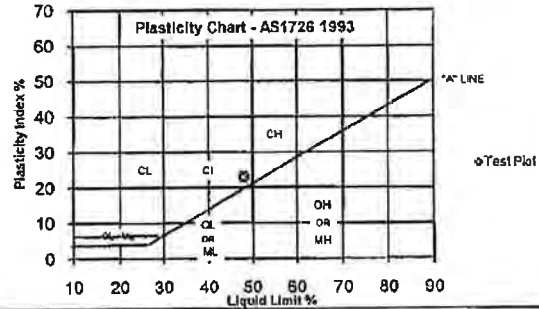
ATTERBERG LIMITS & LINEAR SHRINKAGE

SAMPLE HISTORY: Air Dried

METHOD OF PREPARATION: Dry Sieved

RESULTS

LIQUID LIMIT	48	%
PLASTIC LIMIT:	25	%
PLASTICITY INDEX	23	%
 FIELD MOISTURE CONTENT:	20.9	%



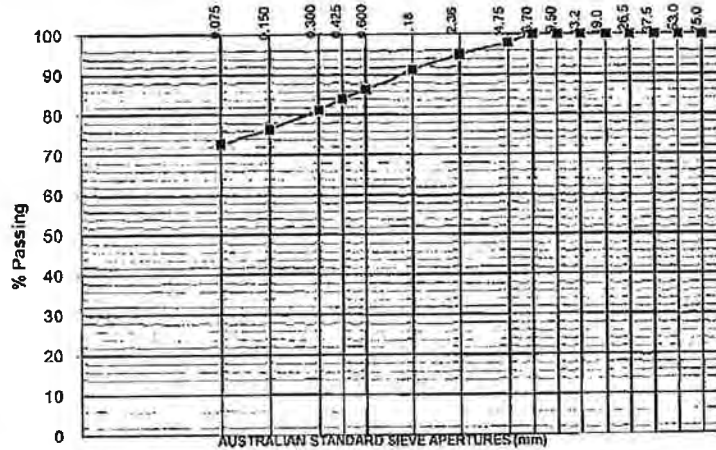
PLASTICITY

Descriptive Term	Range of L.L.
Of low plasticity	≤ 35
Of medium plasticity	> 35 ≤ 50
Of high plasticity	> 50

PARTICLE SIZE DISTRIBUTION

TEST PROCEDURES: AS1289 1.6.1 - WET SIEVED

SIEVE SIZE (mm)	% PASSING (by mass)
75.0	100
53.0	100
37.5	100
26.5	100
19.0	100
13.2	100
9.5	100
6.7	100
4.75	98
2.36	95
1.18	91
0.600	86
0.425	84
0.300	81
0.150	76
0.075	73



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ACCREDITATION

Mr S. Thomas
(Approved Signatory)

NATA Accredited Laboratory Number: 13392

This document is issued in accordance with NATA's accreditation requirements.

Accredited for compliance with ISO/IEC 17025



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SOIL CLASSIFICATION TEST REPORT

SAMPLING PROCEDURES: A.S.1289.1.2.1-6.5.3

TEST PROCEDURES: AS1289.2.1.1, 3.1.2, 3.2.1, 3.3.1, 3.4.1

CLIENT: CARDNO (QLD) PTY LTD **JOB No.:** GC 2480 / 9543
PROJECT: PROPOSED RESIDENTIAL DEVELOPMENT - **REPORT No.:** 2
 TWEED VALLEY WAY, MOOBALL **DATE ISSUED:** 15/07/10
TEST ITEM: DISTURBED SAMPLE

SITE TEST No.: Q 2 **LOCATION:** BOREHOLE No. 3
SAMPLE No.: 85391
DATE SAMPLED: 12/07/10 **SOIL DESCRIPTION:** CI CLAY with traces of sand,
brown mottled red brown
MATERIAL SOURCE: INSITU **ELEVATION m:** 0.6 - 0.7m
PROPOSED MATERIAL TYPE: -

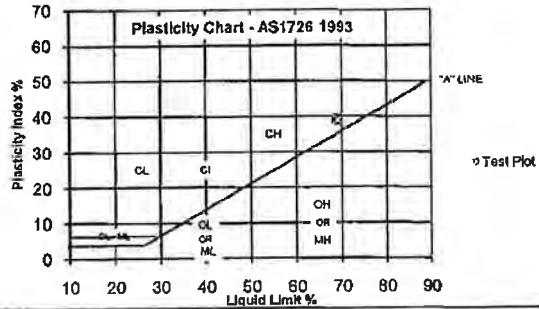
ATTERBERG LIMITS & LINEAR SHRINKAGE

SAMPLE HISTORY: Air Dried

METHOD OF PREPARATION: Dry Sieved

RESULTS

LIQUID LIMIT: 69 %
 PLASTIC LIMIT: 30 %
 PLASTICITY INDEX: 39 %
 FIELD MOISTURE CONTENT: 27.8 %

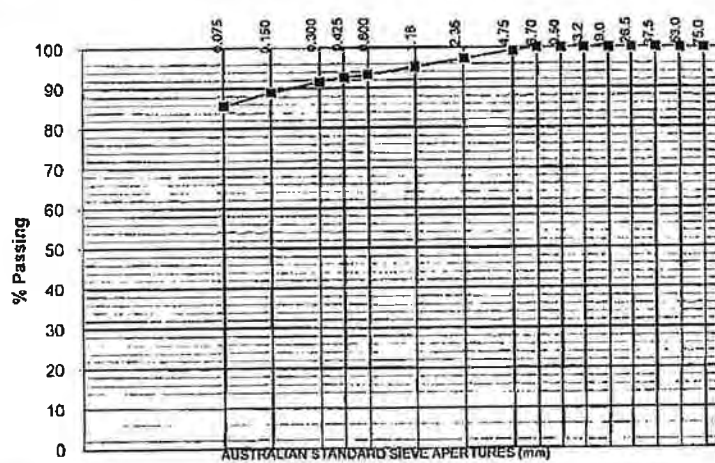


PLASTICITY	
Descriptive Term	Range of L.L.
Of low plasticity	≤ 35
Of medium plasticity	> 35 ≤ 50
Of high plasticity	> 50

PARTICLE SIZE DISTRIBUTION

TEST PROCEDURES AS1289 3.6.1 - WET SIEVED

SIEVE SIZE (mm)	% PASSING (by mass)
75.0	100
53.0	100
37.5	100
26.5	100
19.0	100
13.2	100
9.5	100
6.7	100
4.75	99
2.36	97
1.18	95
0.600	93
0.425	93
0.300	92
0.150	89
0.075	86



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(Approved Signatory)



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SOIL CLASSIFICATION TEST REPORT

SAMPLING PROCEDURES: A.S.1289.1.2.1-6.5.3		TEST PROCEDURES: ASI289.2.1.1, .3.1.2, .3.2.1, .3.3.1, .3.4.1	
CLIENT:	CARDNO (QLD) PTY LTD	JOB No.: GC 2460 / 9543	
PROJECT:	PROPOSED RESIDENTIAL DEVELOPMENT - TWEED VALLEY WAY, MOOBALL	REPORT No: 3	
TEST ITEM:	DISTURBED SAMPLE	DATE ISSUED: 15/07/10	
SITE TEST No.:	Q 3	LOCATION: BOREHOLE No. 3	
SAMPLE No.:	85392	SOIL DESCRIPTION: CH CLAY with sand, pale brown	
DATE SAMPLED:	12/07/10	ELEVATION m: 2.5 - 2.6m	
MATERIAL SOURCE:	INSITU		
PROPOSED MATERIAL TYPE:	*		

ATTERBERG LIMITS & LINEAR SHRINKAGE

SAMPLE HISTORY: Air Dried

RESULTS

LIQUID LIMIT **51** %

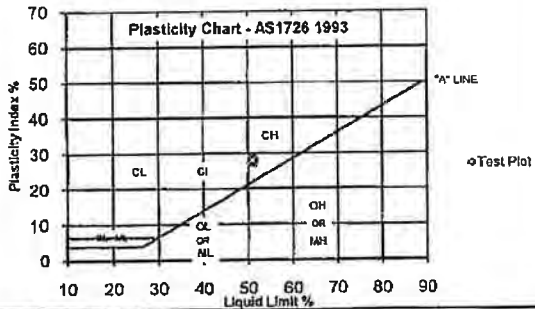
PLASTIC LIMIT: **23** %

PLASTICITY INDEX **28** %

FIELD MOISTURE CONTENT: **22.6** %

METHOD OF PREPARATION: Dry Sieved

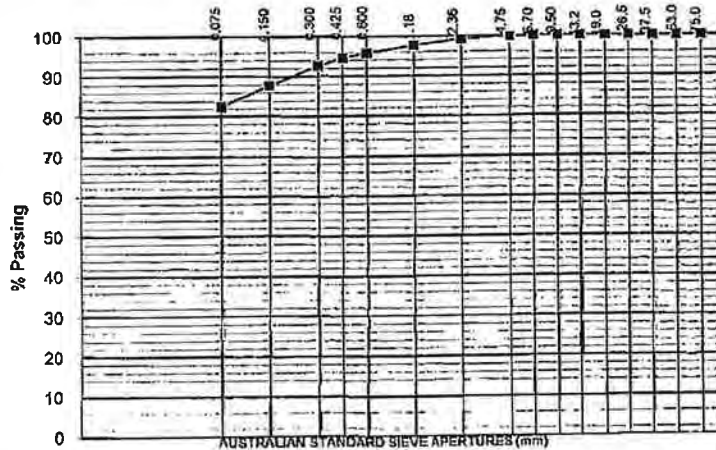
Descriptive Term	Range of I.L.L.
Of low plasticity	≤ 35
Of medium plasticity	> 35 ≤ 50
Of high plasticity	> 50



PARTICLE SIZE DISTRIBUTION

TEST PROCEDURES: ASI289 3.6.1 - WET SIEVED

SIEVE SIZE (mm)	% PASSING (by mass)
75.0	100
53.0	100
37.5	100
26.5	100
19.0	100
13.2	100
9.5	100
6.7	100
4.75	100
2.36	99
1.18	98
0.600	96
0.425	95
0.300	93
0.150	88
0.075	83



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Mr S. Thomas
(Approved Signatory)

Attachment D

Mooball Residential Development
Planning Agreement – Lot 2 in DP 534493 and Lot 7 in
DP 593200
5861 and 5867 Tweed Valley Way, Mooball

Under s93F of the *Environmental Planning and Assessment Act 1979*

Tweed Shire Council
Jefferson Lane Pty Limited ACN

Dated:

Mooball Residential Land Planning Agreement

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Tweed Shire Council
Jefferson Lane Pty Limited

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Mooball Residential Land Planning Agreement

Council:

Name: Tweed Shire Council
Address: PO Box 816 Murwillumbah NSW 2484
Telephone: (02) 6670 2400
Facsimile: (02) 6670 2429
Email: tsc@tweed.nsw.gov.au
Representative: Iain Lonsdale

Landowner:

Name: INSERT DETAILS

Developer:

Name: Jefferson Lane Pty Limited
Address: C/-PLANIT Consulting PO Box 1623 Kingscliff NSW 2487
Telephone: (02) 6674 5001
Facsimile: (02) 6674 5003
Email: info@planitconsulting.com.au
Representative: Adam Smith

Land

See definition of *Land* in clause 1.1.

Instrument Change

See definition of *Draft LEP* in clause 1.1

Development

See definition of *Development* in clause 1.1.

Development Contributions

Obtaining approval for the construction and operation of a privately constructed wastewater system to service the development.

Application of s94 and s94A of the Act

Not excluded (see clause 7).

Security

Bank Guarantee or bond to secure the performance of the Developer's obligations in relation to the Water Infrastructure and HRP Works (see clause 14).

Registration

The Agreement is to be registered (see clause 26).

Restriction on dealings

Assignment and sale of land clause (see clause 27).

Dispute Resolution

Expert determination and mediation (see clauses 28 and 29).

Mooball Residential Land Planning Agreement

Pursuant to s93F of the Environmental Planning and Assessment Act 1979

Parties

Tweed Shire Council ABN 90 178 732 496 PO Box 816 Murwillumbah NSW 2484
(Council)

and

Jefferson Lane Pty Limited (Developer)

and

XX (Landowner)

Background

- A The Landowner is the owner of the Land.
- B The Developer requested that the Council prepare a planning proposal to rezone the Land under the *Tweed Local Environmental Plan 2000*, to facilitate residential development.
- C The Council has agreed to include provisions in the Draft LEP which will enable the residential development of part of the Land, being the zoning of the land for residential purposes, and consequential amendments to lot size, height of buildings and floor space ratio applying to the Land.
- D The Developer intends to lodge a Development Application for the Development.
- E The Land is not connected to Council's reticulated sewerage infrastructure.
- F The Developer and Landowner are prepared to make Development Contributions in accordance with this Agreement in connection with the carrying out of the Development as permitted by the Draft LEP.
- G The Developer has agreed to obtain all necessary approvals for the construction and operation of a privately constructed wastewater system to service the development, and will construct the wastewater system in accordance with those approvals.

Operative provisions Part 1 -

Preliminary

1 Definitions & Interpretation

1.1 In this Agreement the following definitions apply:

Act means the *Environmental Planning and Assessment Act 1979* (NSW).

Agreement includes any schedules, annexures and appendices to this Agreement.

Bank Guarantee means an irrevocable and unconditional undertaking without any expiry or end date in favour of the Council to pay an amount or amounts of money to the Council on demand issued by:

- (a) one of the following trading banks:
 - (i) Australia and New Zealand Banking Group Limited,
 - (ii) Commonwealth Bank of Australia,
 - (iii) Macquarie Bank,
 - (iv) National Australia Bank Limited,
 - (iv) St George Bank Limited,
 - (v) Westpac Banking Corporation, or
- (b) any other financial institution approved by the Council in its absolute discretion.

Building has the same meaning as in the Act.

Compliance Certificate has the same meaning as in the Act.

Construction Certificate has the same meaning as in the Act.

Consumer Price Index means the Consumer Price Index (All Groups Index) for Sydney as issued by the Australian Bureau of Statistics.

Contributions Plan has the same meaning as in the Act.

Defects Liability Period means the period commencing on the date on which a Work is completed and ending 12 months after that date.

Development means the development of the Land for residential purposes that can only be carried out by reason of the Draft LEP.

Development Application has the same meaning as in the Act.

Development Consent has the same meaning as in the Act.

Development Contribution means a monetary contribution, the dedication of land free of cost, the carrying out of work, or the provision of any other material public benefit, or any combination of them, to be used for, or applied towards, a public purpose.

Mooball Residential Land Planning Agreement
Tweed Shire Council
Jefferson Lane Pty Limited

Draft LEP means the draft *Tweed Local Environmental Plan 2015* that will rezone the part of the Land RU5 Village and R5 Large Lot Residential which will permit higher density residential uses, and consequential changes to the controls for the Land relating to lot sizes, heights of buildings and floor space ratio.

GST has the same meaning as in the GST Law.

GST Law has the same meaning as in *A New Tax System (Goods and Services Tax) Act 1999* (Cth) and any other Act or regulation relating to the imposition or administration of the GST.

Land means Lot 2 in DP 534493 and Lot 7 in DP 593200 as shown on the Plan.

Locality means the Council's local government area and its immediate surrounds.

LPI means Land & Property Information or any other body exercising the functions of Land & Property Information.

Network Operator Licence has the same meaning as in the WIC Act.

Occupation Certificate has the same meaning as in the Act.

Party means a Party to this agreement, including their successors and assigns.

Plan means the series of plans contained in Schedule 1.

Public Purpose means any purpose that benefits the public or a section of the public, including but not limited to a purpose specified in s93F(2) of the Act.

Real Property Act means the *Real Property Act 1900*.

Rectification Notice means a notice in writing issued in the Defects Liability Period that identifies a defect in a Work and requires rectification of the defect during the Defects Liability Period or during such later period specified in the notice as is reasonable in the circumstances.

Register means the Torrens title register maintained under the Real Property Act.

Regulation means the *Environmental Planning and Assessment Regulation 2000*.

Retail Supply Licence has the same meaning as in the WIC Act.

Security means a Bank Guarantee or cash bond unless the Council, in its absolute discretion, agrees to another kind of security as a suitable means of enforcing the Developer's obligations under this Agreement.

Stage means a stage in the Development.

Subdivision Certificate has the same meaning as in the Act.

Water Infrastructure means infrastructure to be constructed by the Developer to manage the water supply and wastewater services for the Development including an advanced private on-site waste water treatment plant and effluent irrigation disposal scheme, and to facilitate servicing the Development's potable and non-potable water demands as further described in clause 10.

Water Infrastructure Security means the Security to be provided under clause 14.

Mooball Residential Land Planning Agreement
Tweed Shire Council
Jefferson Lane Pty Limited

WIC Act means the *Water Industry Competition Act 2006 (NSW)*.

WIC Licences means a Retail Supply Licence and a Network Operator Licence in respect of the Water Infrastructure.

Work means the physical result of any building, engineering or construction work in, on, over or under land required to be carried out by the Developer under this Agreement and includes the Water Infrastructure.

- 1.2 In the interpretation of this Agreement, the following provisions apply unless the context otherwise requires:
- 1.2.1 Headings are inserted for convenience only and do not affect the interpretation of this Agreement.
 - 1.2.2 A reference in this Agreement to a business day means a day other than a Saturday or Sunday on which banks are open for business generally in Sydney.
 - 1.2.3 If the day on which any act, matter or thing is to be done under this Agreement is not a business day, the act, matter or thing must be done on the next business day.
 - 1.2.4 A reference in this Agreement to dollars or \$ means Australian dollars and all amounts payable under this Agreement are payable in Australian dollars.
 - 1.2.5 A reference in this Agreement to any law, legislation or legislative provision includes any statutory modification, amendment or re-enactment, and any subordinate legislation or regulations issued under that legislation or legislative provision.
 - 1.2.6 A reference in this Agreement to any agreement, deed or document is to that agreement, deed or document as amended, novated, supplemented or replaced.
 - 1.2.7 A reference to a clause, part, schedule or attachment is a reference to a clause, part, schedule or attachment of or to this Agreement.
 - 1.2.8 An expression importing a natural person includes any company, trust, partnership, joint venture, association, body corporate or governmental agency.
 - 1.2.9 Where a word or phrase is given a defined meaning, another part of speech or other grammatical form in respect of that word or phrase has a corresponding meaning.
 - 1.2.10 A word which denotes the singular denotes the plural, a word which denotes the plural denotes the singular, and a reference to any gender denotes the other genders.
 - 1.2.11 References to the word 'include' or 'including' are to be construed without limitation.
 - 1.2.12 A reference to this Agreement includes the agreement recorded in this Agreement.
 - 1.2.13 A reference to a Party to this Agreement includes a reference to the servants, agents and contractors of the Party, and the Party's successors and assigns.
 - 1.2.14 Any schedules, appendices and attachments form part of this Agreement.
 - 1.2.15 Notes appearing in this Agreement are operative provisions of this

Mooball Residential Land Planning Agreement
Tweed Shire Council
Jefferson Lane Pty Limited

Agreement.

- 1.2.16 A reference to any matter that may be agreed between the Parties is a reference to such an agreement in writing.

2 Status, application & effect of this Agreement

- 2.1 This Agreement is a planning agreement for the purposes of s93F of the Act.
2.2 This Agreement applies to the Land and to the Development.

3 Commencement of this Agreement

- 3.1 This Agreement commences when it has been executed by all of the Parties.
3.2 The Party who executes this Agreement last is to notify the other Parties once it has done so and promptly provide them with a copy of the fully executed version of this Agreement.

4 Commencement of Development Contributions obligations

- 4.1 With the exception of the Developer's obligations arising under Part 3 of this Agreement, the Developer is under no obligation to make the Development Contributions to the Council in accordance with this Agreement unless both of the following events have occurred:
4.1.1 the Draft LEP takes effect, and
4.1.2 Development Consent is granted to the Development or any part of it.

5 Further Agreements Relating to this Agreement

- 5.1 The Parties may, at any time and from time to time, enter into an agreement that provides more detail relating to the subject-matter of this Agreement for the purpose of implementing this Agreement.
5.2 Any such agreement is not to be inconsistent with this Agreement.

6 Surrender of right of appeal, etc.

- 6.1 The Landowner and Developer are not to commence or maintain, or cause to be commenced or maintained, any proceedings in the Land and Environment Court concerning:
6.1.1 the validity of this Agreement,
6.1.2 the making of the Draft LEP, or the granting or modification of any Development Consent for the Development, to the extent that the Draft

**Mooball Residential Land Planning Agreement
Tweed Shire Council
Jefferson Lane Pty Limited**

LEP was made or the Development Consent was granted or modified having regard to the existence of this Agreement, or

- 6.1.3 the imposition on any Development Consent granted to the Development of conditions of the type contemplated in clause 9 of this Agreement.

7 Application of s94, s94A and 94EF of the Act to the Development

- 7.1 This Agreement does not exclude the application of s94 of the Act to the Development.
- 7.2 This Agreement does not exclude the application of s94A of the Act to the Development.
- 7.3 This Agreement does not exclude the application of s94EF of the Act to the Development.

8 Application of Development Contributions by the Council

- 8.1 Subject to this Agreement, the Council is to apply a Development Contribution made by the Developer under this Agreement towards the Public Purpose for which it is made, and otherwise in accordance with this Agreement.

Part 2 – Provisions relating to the Water Infrastructure

9 Need for the Water Infrastructure

- 9.1 The Developer and Landowner acknowledge that:
- 9.1.1 Council does not intend to connect the Land to its sewer infrastructure; and
- 9.1.2 Council agreed to prepare the Draft LEP on the basis that the Developer would construct the Water Infrastructure if Development Consent is granted to the Development.
- 9.2 The Developer agrees to construct the Water Infrastructure in accordance with any conditions of Development Consent granted to the Development, if the Draft LEP is made, and Development Consent is granted to the Development.
- 9.3 The Developer and Landowner acknowledge that any Development Consent granted to the Development may:
- 9.3.1 be a deferred commencement consent within the meaning of s80(3) of the Act which will not operate until the Developer has satisfied the Council that:
- (a) WIC Licences necessary to operate the Water Infrastructure have been obtained;
- (b) it has the legal right to construct the Water Infrastructure on

Mooball Residential Land Planning Agreement
Tweed Shire Council
Jefferson Lane Pty Limited

- any land on which it is proposed to be located; and
- (c) it has the legal right to dispose of waste water, in perpetuity, from the Land and the Water Infrastructure onto other land on which such waste water is to be disposed;
- 9.3.2 require any deferred commencement conditions to be satisfied within a specified period from the date of the grant of the Development Consent;
- 9.3.3 be subject to conditions requiring the construction of the Water Infrastructure and that the Water Infrastructure be complete, and fully operational, to the satisfaction of Council, prior to the issue of a Subdivision Certificate for the Development; and
- 9.3.4 be subject to conditions requiring covenants to be registered on the title to the Land to provide for the ongoing management and operation of the Water Infrastructure .

10 Water Infrastructure

- 10.1 The Water Infrastructure is to include at a minimum, and subject to Council's further requirements:
- 10.1.1 a waste water treatment plant on the Land producing non-potable residential reuse standard effluent.
- 10.1.2 effluent storage facilities sufficient to cater for the extended wet weather periods experienced in the Locality; and
- 10.2 The Parties acknowledge that potable water for the Development will be sourced from Council's water supply system.

11 Rezoning of Land

- 11.1 If Development Consent is granted to the Development, and that Development Consent becomes operational, but the Developer determines that it will not act on the Development Consent as it will not or can not construct the Water Infrastructure, then the Developer must immediately notify Council of its intention not to act on the Development Consent, and must surrender the Development Consent.
- 11.2 If the Developer:
- 11.2.1 surrenders the Development Consent in accordance with clause 11.1; or
- 11.2.2 the Development Consent does not become operative because the Developer fails to satisfy any deferred commencement condition by the time required by the Development Consent,
- then the Developer and Landowner agree that they will not make any objection in respect of any proposal by the Council to rezone the Land to a zoning which permits the intensity of residential use proposed in this Agreement purposes, and will not take any action against the Council if the Council determines that it will rezone the Land in such a manner.

12 Surrender of right to make application to declare Council as retailer of last resort

- 12.1 The Landowner and Developer must not, and must not cause any other person to make any application or representation to the Minister administering the WIC Act seeking to have the Council declared a retailer of last resort, within the meaning of the WIC Act, or an operator of last resort, if such a concept is incorporated into the WIC Act, in relation to the provision of sewerage services to the Land.

13 Alternative infrastructure

- 13.1 Notwithstanding any other provision of this Agreement, if the Council, or any other person constructs infrastructure which would serve the same purpose as the Water Infrastructure, and agrees to the Development connecting to, and relying on that infrastructure, then:
- 13.1.1 the Developer will have no obligations under this Agreement in respect of the Water Infrastructure other than to the extent to which the Water Infrastructure is infrastructure of the type usually required to be constructed by a developer in connection with a development similar to the Development, such as internal site sewer and water supply, and
- 13.1.2 the Developer may, if Development Consent has been granted to the Development subject to conditions of the kind contemplated by clause 9, make applications to modify the Development Consent to delete any conditions requiring WIC Licences to be obtained, or the construction of the Water Infrastructure, or anything else to be done in relation to the Water Infrastructure, other than to the extent to which the Water Infrastructure is infrastructure of the type usually required to be constructed by a developer in connection with a development similar to the Development such as internal site sewer and water supply.

14 Water Infrastructure Security

- 14.1 The Developer is to provide the Water Infrastructure Security to the Council prior to the issue of a Construction Certificate in respect of the Development in an amount determined in accordance with clause 14.2.
- 14.2 The amount of the Water Infrastructure Security shall be an amount agreed between Council and the Developer which is based on an estimate of the costs to design, construct, commission and prove operational the Water Infrastructure.
- 14.3 The Council is not to call upon the Water Infrastructure Security unless:
- 14.3.1 the Council considers that the Developer has failed to comply with a notice referred to in clause 24 relating to a breach by the Developer of the obligation to construct the Water Infrastructure; or
- 14.3.2 Council seeks to rezone the Land in the circumstances set out in clause 11.2.
- 14.4 The Council may apply the Water Infrastructure Security in satisfaction of:
- 14.4.1 the Developer's obligations under this Agreement or any Development

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- Consent granted to the Developer to construct the Water Infrastructure, and
- 14.4.2 any liability, loss, cost, charge or expense directly or indirectly incurred by the Council:
- (a) because of the failure by the Developer to construct the Water Infrastructure; or
 - (b) in relation to the rezoning of the Land to a zoning which does not permit development for residential purposes.
- 14.5 The Council:
- 14.5.1 will, on each anniversary of the date of provision of the Water Infrastructure Security, and
- 14.5.2 may otherwise, in its absolute discretion,
progressively release and return the Water Infrastructure Security to the Developer as and when the Developer complies with its obligations under this Agreement relating to the construction of the Water Infrastructure to the reasonable satisfaction of the Council but only if the remaining amount of the Water Infrastructure Security held by the Council is not less than the Council's estimate of the cost to the Developer of completing the Water Infrastructure.
- 14.6 The Council is to release and return the Water Infrastructure Security or any remaining part of it to the Developer within 28 days of:
- 14.6.1 the date on which the Water Infrastructure is commissioned and the whole system is fully operational and has demonstrated satisfactory performance, reliability and repeatability for a period of 12 months, but only if the Developer is not in breach of this Agreement at that time; or
- 14.6.2 if clause 11.2 applies, the date on which any rezoning of the Land contemplated by that clause takes effect.
- 14.7 If the Council calls on the Water Infrastructure Security in accordance with this Agreement, the Council may, by notice in writing to the Developer, require the Developer to provide a further Water Infrastructure Security in an amount which, together with any unused portion of any existing Water Infrastructure Security, does not exceed the amount specified in clause 14.2, unless the Water Infrastructure Security is called on pursuant to clause 14.3.2, in which case, no further Water Infrastructure Security is to be provided.
- 14.8 Any difference between the amount of the Water Infrastructure Security called upon by the Council and the costs incurred by the Council in:
- 14.8.1 completing the Water Infrastructure; or
 - 14.8.2 rezoning the Land pursuant to clause 11.2,
- may be recovered by the Council from the Developer as a debt due in a court of competent jurisdiction.

Part 3 – Carrying out of Work

15 Application of this Part

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15.1 This Part applies to the Water Infrastructure.

16 Carrying out of Work

16.1 Except as otherwise specifically provided by this Agreement, any Work that is required to be carried out by the Developer under this Agreement is to be carried out in accordance with:

16.1.1 any relevant Development Consent,

16.1.2 any relevant policies and specifications of the Council existing at the time such a consent is granted,

16.1.3 any WIC Licence,

16.1.4 any other applicable law, and

16.1.5 otherwise to the reasonable satisfaction of the Council.

16.2 The Developer is to comply with any direction given to it by the Council, acting reasonably, to prepare or modify a design or specification relating to a Work that the Developer is required to carry out under this Agreement.

17 Access to the Land

17.1 The Landowner and Developer are to permit the Council, its officers, employees, agents and contractors to enter the Land or any other land at any time, upon giving reasonable prior notice, in order to inspect, examine or test any Work or to remedy any breach of the Landowner relating to the carrying out of a Work.

17.2 The Council is to permit the Developer to enter and occupy any land owned or controlled by the Council for the purpose of enabling the Developer to carry out any Work under this Agreement that is required to be carried out on such land or to perform any other obligation imposed on the Developer by or under this Agreement, provided that such access is reasonably necessary for that purpose..

18 Protection of people and property

18.1 The Developer is to ensure to the fullest extent reasonably practicable in relation to the carrying out of any Work that:

18.1.1 all necessary measures are taken to protect people and property, and

18.1.2 unnecessary interference with the passage of people and vehicles is avoided, and

18.1.3 nuisances and unreasonable noise and disturbances are prevented.

19 Damage and repairs to Work

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- 19.1 The Developer, at its own cost, is to repair and make good to the reasonable satisfaction of the Council any loss or damage to a Work from any cause whatsoever which occurs before the date on which the Work is completed.

20 Variation of Work

- 20.1 A Work is not to be varied by the Developer, unless:
- 20.1.1 the Parties agree in writing to the variation, and
 - 20.1.2 any consent or approval required under the Act or any other law to the variation is first obtained.
- 20.2 For the purposes of clause 22.1 a variation may relate to any matter in relation to the Works that is dealt with by this Agreement.

21 Completion of Work

- 21.1 Work is completed for the purposes of this Agreement when the Council at the request of the Developer, acting reasonably, gives a certificate to the Developer to that effect or the Developer gives the Council a Compliance Certificate to that effect.
- 21.2 Notwithstanding clause 21.1, the Water Infrastructure is not completed for the purposes of this Agreement until the Council certifies in writing to the Developer, acting reasonably, that it is satisfied that the Water Infrastructure has been commissioned and the whole system is fully operational and has demonstrated satisfactory performance, reliability and repeatability for a period of 12 months.

22 Rectification of defects

- 22.1 During the Defects Liability Period, the Council may give the Developer a Rectification Notice.
- 22.2 Subject to the resolution of a dispute in accordance with this Agreement, the Developer is to comply with a Rectification Notice at its own cost and to the reasonable satisfaction of the Council.
- 22.3 To the extent that this clause is inconsistent with the WIC Act or the terms of any WIC Licence, the terms of the WIC Act and WIC Licences prevail.

Part 4 – Other Provisions

23 Indemnity and Insurance

- 23.1 The Landowner and Developer indemnify the Council, its employees, officers, agents, contractors and workmen from and against all losses, damages, costs

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(including legal costs on a full indemnity basis), charges, expenses, actions, claims and demands whatsoever which may be sustained, suffered, recovered or made arising in connection with an act or omission of the Developer in carrying out any Work and the performance of any other obligation under this Agreement.

- 23.2 The Developer is to take out and keep current, or is to ensure that their contractors take out and keep current, to the reasonable satisfaction of the Council the following insurances in relation to Work required to be carried out by the Developer under this Agreement up until the Work is completed:
- 23.2.1 contract works insurance, noting the Council as an interested party, for the full replacement value of the Works (including the cost of demolition and removal of debris, consultants' fees and authorities' fees), to cover the Developer's liability in respect of damage to or destruction of the Works,
- 23.2.2 public liability insurance for at least \$20,000,000.00 for a single occurrence, which covers the Council, the Landowner and the Developer and any subcontractor of the Developer, for liability to any third party,
- 23.2.3 workers compensation insurance as required by law, and
- 23.2.4 any other insurance required by law.
- 23.3 If the Developer fails to comply with clause 23.2, the Council may effect and keep in force such insurances and pay such premiums as may be necessary for that purpose and the amount so paid shall be a debt due from the Developer to the Council and may be recovered by the Council as it deems appropriate including:
- 23.3.1 by calling upon any Security provided by the Developer to the Council under this Agreement, or
- 23.3.2 recovery as a debt due in a court of competent jurisdiction.
- 23.4 The Developer is not to commence to carry out any Work unless it has first provided to the Council satisfactory written evidence of all of the insurances specified in clause 23.2 relevant to that Work.

24 Failure to carry out Work

- 24.1 If the Council reasonably considers that the Developer is in breach of any obligation under this Agreement relating to a Work, including compliance with a Rectification Notice, the Council may give the Developer a notice requiring the breach to be rectified to the Council's reasonable satisfaction.
- 24.2 The dispute resolution provisions of this Agreement do not apply to the giving of a notice under clause 24.1.
- 24.3 A notice given under clause 24.1 is to allow the Developer a period of not less than 28 days to rectify the breach or such further period as the Council considers reasonable in the circumstances.
- 24.4 The Council may carry out and complete the Work the subject of a notice under clause 24.1 if the Developer fails to comply with the notice to the Council's reasonable satisfaction.
- 24.5 The Developer is to do all things reasonably necessary to enable the Council to exercise its rights under clause 24.4.

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- 24.6 If the Council incurs a cost in carrying out, completing or rectifying a defect in a Work resulting from non-compliance by the Developer with this Agreement that is not met by calling-up any Security, the Council may recover the cost from the Developer in a court of competent jurisdiction.
- 24.7 For the purpose of clause 24.6, the Council's costs of carrying out, completing or rectifying a defect in a Work includes, but is not limited to:
- 24.7.1 the reasonable costs of the Council's servants, agents and contractors reasonably incurred for that purpose,
- 24.7.2 all fees and charges necessarily or reasonably incurred by the Council in order to have the Work carried out, completed or rectified, and
- 24.7.3 all legal costs and expenses reasonably incurred by the Council, by reason of the Landowner's or Developer's failure to comply with this Agreement.

25 Enforcement

- 25.1 Without limiting any other remedies available to the Parties, this Agreement may be enforced by the Parties in any court of competent jurisdiction.
- 25.2 For the avoidance of doubt, nothing in this Agreement prevents:
- 25.2.1 a Party from bringing proceedings in the Land and Environment Court to enforce any aspect of this Agreement or any matter to which this Agreement relates, and
- 25.2.2 the Council from exercising any function under the Act or any other Act or law relating to the enforcement of any aspect of this Agreement or any matter to which this Agreement relates.

26 Registration of this Agreement

- 26.1 The Landowner warrants that it is legally and beneficially entitled to obtain all consents and approvals and to compel any person to assist, cooperate and to otherwise do all things necessary for the Developer to comply with its obligations under clause 26.2 in relation to the Land.
- 26.2 As contemplated by section 93H of the Act, the Developer agrees to deliver to the LPI all documents in registrable form necessary for registration of this Agreement under the Real Property Act in all relevant folios of the Register of the Land within 30 business days after execution of this Agreement.
- 26.3 The Developer, at its own expense, will take all practical steps and otherwise do anything to procure:
- 26.3.1 the consent of each person to the registration of this Agreement pursuant to this clause who:
- (a) has an estate or interest in the Land; or
- (b) is seized or possessed of an estate or interest in the Land;

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and

26.3.2 the execution of any documents; and

26.3.3 the production of the relevant certificates of title; and

26.3.4 the lodgment and registration of this Agreement, by the Registrar-General in the relevant folio of the Register.

26.4 The Developer must not sell any part of the Land or carry out any Development until registration of this Agreement has been effected under this clause.

26.5 The Developer will provide the Council with a copy of the relevant folios of the Register and a copy of the registered dealing referable to this Agreement within 10 business days of registration of this Agreement on the title of the Land.

26.6 Subject to clause 26.7, the Council agrees to sign any document and provide any consents necessary to effect the release and discharge of this Agreement with respect to all of the Land upon full satisfaction of the Developer's and Landowner's obligations under this Agreement.

26.7 Each party agrees to act in good faith and to promptly do all things necessary (and in any event within 15 business days) to meet any request or requirement of the other party or the LPI arising from the operation of this clause 26.

27 Assignment, sale of the Land, etc

27.1 Unless the matters specified in clause 27.2 are satisfied, the Landowner and Developer are not to do any of the following:

27.1.1 to transfer the Land to any person, or

27.1.2 assign the Landowner's or Developer's rights or obligations under this Agreement, or novate this Agreement, to any person.

27.2 The matters required to be satisfied for the purposes of clause 27.1 are as follows:

27.2.1 the Landowner or Developer has, at no cost to the Council, first procured the execution by the person to whom the Landowner's or Developer's rights or obligations under this Agreement are to be assigned or novated, of an agreement in favour of the Council on terms satisfactory to the Council, and

27.2.2 the Council, by notice in writing to the Landowner or Developer, as the case may be, has stated that evidence satisfactory to the Council has been produced to show that the assignee or novatee, is reasonably capable of performing its obligations under the Agreement, and

27.2.3 the Landowner and Developer are not in breach of this Agreement, and

27.2.4 the Council otherwise consents to the transfer, assignment or novation.

27.3 Clauses 27.1 and 27.2 do not apply in relation to any sale or transfer of the Land if this Agreement is registered on the title to the Land at the time of the

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sale.

28 Dispute Resolution – expert determination

- 28.1 This clause applies to a dispute under this Agreement which relates to a matter that can be determined by an appropriately qualified expert.
- 28.2 Any dispute between the Parties as to whether a dispute to which this clause applies can be determined by an appropriately qualified expert is to be referred to the Chief Executive Officer of the professional body that represents persons with the relevant expertise for determination, which is to be final and binding on the Parties.
- 28.3 Such a dispute is taken to arise if one Party gives another Party a notice in writing specifying particulars of the dispute.
- 28.4 If a notice is given under clause 28.3, the Parties are to meet within 14 days of the notice in an attempt to resolve the dispute.
- 28.5 If the dispute is not resolved within a further 28 days, the dispute must be referred to the President of the NSW Law Society to appoint an expert for expert determination.
- 28.6 The expert determination is binding on the Parties except in the case of fraud or misfeasance by the expert.
- 28.7 Each Party must bear its own costs arising from or in connection with the appointment of the expert and the expert determination.

29 Dispute Resolution - mediation

- 29.1 This clause applies to any dispute under this Agreement other than a dispute to which clause 28 applies.
- 29.2 Such a dispute is taken to arise if one Party gives another Party a notice in writing specifying particulars of the dispute.
- 29.3 If a notice is given under clause 29.2, the Parties are to meet within 14 days of the notice in an attempt to resolve the dispute.
- 29.4 If the dispute is not resolved within a further 28 days, the Parties must mediate the dispute in accordance with the Mediation Rules of the Law Society of New South Wales published from time to time and must request the President of the Law Society, or the President's nominee, to select a mediator.
- 29.5 If the dispute is not resolved by mediation within a further 28 days, or such longer period as may be necessary to allow any mediation process which has been commenced to be completed, then the Parties may exercise their legal rights in relation to the dispute, including by the commencement of legal proceedings in a court of competent jurisdiction in New South Wales.

30 Review of this Agreement

- 30.1 The Parties agree to review this Agreement if any party is of the opinion that any change of circumstance has occurred, or is imminent, that materially

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affects the operation of this Agreement and requests a review.

- 30.2 For the purposes of clause 30.1, the relevant changes include (but are not limited to) any change to a law that restricts or prohibits or enables the Council or any other planning authority to restrict or prohibit any aspect of the Development.
- 30.3 For the purposes of addressing any matter arising from a review of this Agreement, the Parties are to use all reasonable endeavours to agree on and implement appropriate amendments to this Agreement.
- 30.4 If this Agreement becomes illegal, unenforceable or invalid as a result of any change to a law, the Parties agree to do all things necessary to ensure that an enforceable agreement of the same or similar effect to this Agreement is entered into.
- 30.5 A failure by a Party to agree to take action requested by the other Party as a consequence of a review of this Agreement is not a dispute for the purposes of the dispute resolution provisions of this Agreement.

31 Notices

- 31.1 Any notice, consent, information, application or request that must or maybe given or made to a Party under this Agreement is only given or made if it is in writing and sent in one of the following ways:
 - 31.1.1 delivered or posted to that Party at its address set out in the Summary Sheet,
 - 31.1.2 faxed to that Party at its fax number set out in the Summary Sheet, or
 - 31.1.3 emailed to that Party at its email address set out in the Summary Sheet.
- 31.2 If a Party gives the other Party 3 business days notice of a change of its address or fax number, any notice, consent, information, application or request is only given or made by that other Party if it is delivered, posted or faxed to the latest address or fax number.
- 31.3 Any notice, consent, information, application or request is to be treated as given or made if it is:
 - 31.3.1 delivered, when it is left at the relevant address,
 - 31.3.2 sent by post, 2 business days after it is posted,
 - 31.3.3 sent by fax, as soon as the sender receives from the sender's fax machine a report of an error free transmission to the correct fax number.
- 31.4 If any notice, consent, information, application or request is delivered, or an error free transmission report in relation to it is received, on a day that is not a business day, or if on a business day, after 5pm on that day in the place of the Party to whom it is sent, it is to be treated as having been given or made at the beginning of the next business day.

32 Entire Agreement

- 32.1 This Agreement contains everything to which the Parties have agreed in relation to the matters it deals with.

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- 32.2 No Party can rely on an earlier document, or anything said or done by another Party, or by a director, officer, agent or employee of that Party, before this Agreement was executed, except as permitted by law.

33 Further Acts

- 33.1 Each Party must promptly execute all documents and do all things that another Party from time to time reasonably requests to effect, perfect or complete this Agreement and all transactions incidental to it.

34 Governing Law and Jurisdiction

- 34.1 This Agreement is governed by the law of New South Wales.
- 34.2 The Parties submit to the non-exclusive jurisdiction of its courts and courts of appeal from them.
- 34.3 The Parties are not to object to the exercise of jurisdiction by those courts on any basis.

35 No Fetter

- 35.1 Nothing in this Agreement shall be construed as requiring Council to do anything that would cause it to be in breach of any of its obligations at law, and without limitation, nothing shall be construed as limiting or fettering in anyway the exercise of any statutory discretion or duty.

36 Representations and Warranties

- 36.1 The Parties represent and warrant that they have power to enter into this Agreement and comply with their obligations under the Agreement and that entry into this Agreement will not result in the breach of any law.

37 Severability

- 37.1 If a clause or part of a clause of this Agreement can be read in a way that makes it illegal, unenforceable or invalid, but can also be read in a way that makes it legal, enforceable and valid, it must be read in the latter way.
- 37.2 If any clause or part of a clause is illegal, unenforceable or invalid, that clause or part is to be treated as removed from this Agreement, but the rest of this Agreement is not affected.

38 Modification

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- 38.1 No modification of this Agreement will be of any force or effect unless it is in writing and signed by the Parties to this Agreement.

39 Waiver

- 39.1 The fact that a Party fails to do, or delays in doing, something the Party is entitled to do under this Agreement, does not amount to a waiver of any obligation of, or breach of obligation by, another Party.
- 39.2 A waiver by a Party is only effective if it is in writing and only in relation to the particular obligation or breach in respect of which it is given.

40 GST

- 40.1 In this clause:

Adjustment Note, Consideration, GST, GST Group, Margin Scheme, Money, Supply and Tax Invoice have the meaning given by the GST Law.

GST Amount means in relation to a Taxable Supply the amount of GST payable in respect of the Taxable Supply.

GST Law has the meaning given by the *A New Tax System (Goods and Services Tax) Act 1999* (Cth).

Input Tax Credit has the meaning given by the GST Law and a reference to an Input Tax Credit entitlement of a Party includes an Input Tax Credit for an acquisition made by that Party but to which another member of the same GST Group is entitled under the GST Law.

Taxable Supply has the meaning given by the GST Law excluding (except where expressly agreed otherwise) a supply in respect of which the supplier chooses to apply the Margin Scheme in working out the amount of GST on that supply.

- 40.2 Subject to clause 40.4, if GST is payable on a Taxable Supply made under, by reference to or in connection with this Agreement, the Party providing the Consideration for that Taxable Supply must also pay the GST Amount as additional Consideration.
- 40.3 Clause 40.2 does not apply to the extent that the Consideration for the Taxable Supply is expressly stated in this Agreement to be GST inclusive.
- 40.4 No additional amount shall be payable by the Council under clause 40.2 unless, and only to the extent that, the Council (acting reasonably and in accordance with the GST Law) determines that it is entitled to an Input Tax Credit for its acquisition of the Taxable Supply giving rise to the liability to pay GST.
- 40.5 If there are Supplies for Consideration which is not Consideration expressed as an amount of Money under this Agreement by one Party to the other Party that are not subject to Division 82 of the *A New Tax System (Goods and Services Tax) Act 1999*, the Parties agree:
- 40.5.1 to negotiate in good faith to agree the GST inclusive market value of those Supplies before issuing Tax Invoices in respect of those Supplies, and

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- 40.5.2 that any amounts payable by the Parties in accordance with clause 40.2 (as limited by clause 40.4) to each other in respect of those Supplies will be set off against each other to the extent that they are equivalent in amount.
- 40.6 No payment of any amount pursuant to this clause 40, and no payment of the GST Amount where the Consideration for the Taxable Supply is expressly agreed to be GST inclusive, is required until the supplier has provided a Tax Invoice or Adjustment Note as the case may be to the recipient.
- 40.7 Any reference in the calculation of Consideration or of any indemnity, reimbursement or similar amount to a cost, expense or other liability incurred by a Party, must exclude the amount of any Input Tax Credit entitlement of that Party in relation to the relevant cost, expense or other liability.
- 40.8 This clause continues to apply after expiration or termination of this Agreement.

41 Explanatory Note Relating to this Agreement

- 41.1 The Appendix contains the Explanatory Note relating to this Agreement required by clause 25E of the Regulation.
- 41.2 Pursuant to clause 25E(7) of the Regulation, the Parties agree that the Explanatory Note in Appendix 2 is not to be used to assist in construing this Planning Agreement.

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Execution

Executed as an Agreement

Dated:

Executed on behalf of the Council:

General Manager

Witness/Name/Position:

Executed on behalf of the Landowner

Name:

Name:

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Executed on behalf of the Developer in accordance with s127(1) of the
Corporations Act 2001 (Cth):

Director/Name:

Company Secretary/Name:

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Schedule 1

(Clause 1.1)

Plan

[The Plan comprising 2 sheets is on the following pages]

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Appendix

(Clause 41)

Environmental Planning and Assessment Regulation 2000

(Clause 25E)

Explanatory Note

Draft Planning Agreement

Under s93F of the Environmental Planning and Assessment Act 1979

Parties

Tweed Shire Council ABN 90 178 732 496 PO Box 816 Murwillumbah NSW 2484 (**Council**)

and

Jefferson Lane Pty Limited Brisbane QLD 4001 (**Developer**)

And

XX (Landowner)

Description of the Land to which the Draft Planning Agreement Applies

Lot 2 in DP 534493 and Lot 7 in DP 593200.

Description of Proposed Development

Future development of the Land for residential purposes that can only be carried out by reason of the Draft LEP.

Summary of Objectives, Nature and Effect of the Draft Planning Agreement

Objectives of Draft Planning Agreement

The objective of the Draft Planning Agreement is to ensure that adequate water and waste water infrastructure is provided to the Development on the Land.

Nature of Draft Planning Agreement

The Draft Planning Agreement is a planning agreement under s93F of the *Environmental Planning and Assessment Act 1979 (Act)*. It is an agreement between the Council, the Developer and the Landowner of the land to which the Agreement applies. The Draft Planning Agreement is a voluntary agreement under which Development Contributions (as defined in clause 1.1 of the Draft Planning Agreement) are made by the Developer for various public purposes (as defined in s93F(3) of the Act).

Effect of the Draft Planning Agreement

The Draft Planning Agreement:

- relates to the carrying out by the Developer of the Development on the Land,
- does not exclude the application of ss94, 94A and 94EF of the Act to the Development,
- requires the carrying out of specified Work by the Developer for the water and waste water infrastructure to service the Land.
- imposes obligations on the Developer in relation to the carrying out of specified Work, and the rectification of defects in the Work.
- requires the Developer to provide the Council with Security relating to the satisfactory completion of specified Work required to be carried out by the Developer under the Agreement,
- is to be registered on the title to the Land,
- imposes restrictions on the Parties transferring the Land or part of the Land or assigning an interest under the Agreement,
- provides two dispute resolution methods for a dispute under the Agreement, being expert determination and mediation,
- provides that the Agreement is governed by the law of New South Wales, and
- provides that the *A New Tax System (Goods and Services Tax) Act 1999 (Cth)* applies to the Agreement.

Assessment of the Merits of the Draft Planning Agreement

The Planning Purposes Served by the Draft Planning Agreement

The Draft Planning Agreement:

- promotes and co-ordinates of the orderly and economic use and development of the Land to which the Agreement applies,
- provides land for public purposes in connection with the Development,
- provides and co-ordinates community services and facilities in connection with the Development, and
- provides increased opportunity for public involvement and participation in environmental planning and assessment of the Development.

How the Draft Planning Agreement Promotes the Public Interest

The Draft Planning Agreement promotes the public interest by promoting the objects of

the Act as set out in s5(a)(ii)-(v) and 5(c) of the Act.

For Planning Authorities:

Development Corporations - How the Draft Planning Agreement Promotes its Statutory Responsibilities

N/A

Other Public Authorities – How the Draft Planning Agreement Promotes the Objects (if any) of the Act under Which it is Constituted

N/A

Councils – How the Draft Planning Agreement Promotes the Elements of the Council's Charter

The Draft Planning Agreement promotes the elements of the Council's charter by:

- providing services and facilities for the community,
- ensuring that public facilities provided by the Landowner under the Agreement are transferred to and managed by the Council or are otherwise subject to the Council's control,
- by providing a means for the private funding of public facilities for the benefit of the Development and the wider community, and
- providing a means that allows the wider community to make submissions to the Council in relation to the Agreement.

All Planning Authorities – Whether the Draft Planning Agreement Conforms with the Authority's Capital Works Program

The Draft Planning Agreement requires specified Work to be carried out by the Developer for the establishment of provision of water and wastewater infrastructure to service the Development.

The Work is not included in the Council's relevant current capital works program. However, the Council's Delivery Program identifies these types of Work in the relevant capital works program. Accordingly, the provision of the Work under the Agreement is consistent and conforms with the capital works envisioned by the Council's Delivery Program.

All Planning Authorities - Whether the Draft Planning Agreement specifies that certain requirements must be complied with before issuing a construction certificate, subdivision certificate or occupation certificate

The Draft Planning Agreement specifies that certain obligations under the Agreement must be complied with before the issuing of Subdivision Certificates or Construction Certificates.