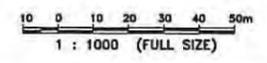


KEY PLAN
NOT TO SCALE

LEGEND

- 12 — FINISHED SURFACE CONTOURS
- - - - - NOMINAL KERB LINE
- S - SEWER MAIN
- W - - - - - EXISTING WATER
- - - - - LIMIT OF WORKS



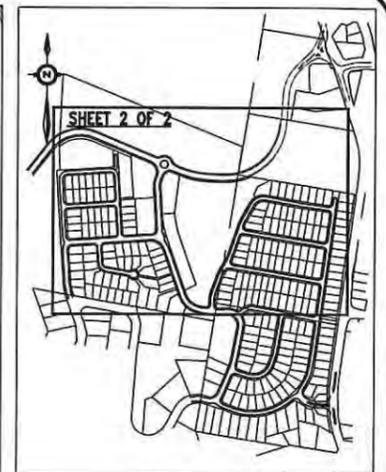
NEWLAND DEVELOPERS PTY LTD
TERRANORA PRECINCT 1
 SEWER LAYOUT
 SHEET 1 OF 2

09-374
07-01-2013
 SK 3629
 REVISION B

Bradford Lees Pty Ltd
 ABN 29 064 159 191
 Ph 07 5528 6411
 Fax 07 5528 6422
 Web www.bradlees.com.au
 Email mail@bradlees.com.au
 Postal PO Box 2293, Southport QLD 4215
 Gold Coast Office Level 1, 34 Thomas Drive, Chevron Island QLD 4217
 Sunshine Coast Ph 07 5451 1994 Tweed Coast Ph 02 6674 8133

Bradlees
Civil Consulting

ISO 9001
 QUALITY ASSURED COMPANY
 REG. NO. 333



KEY PLAN
NOT TO SCALE



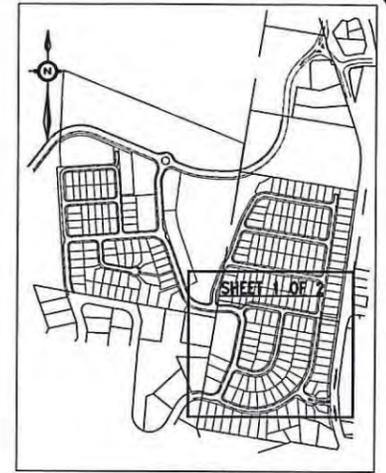
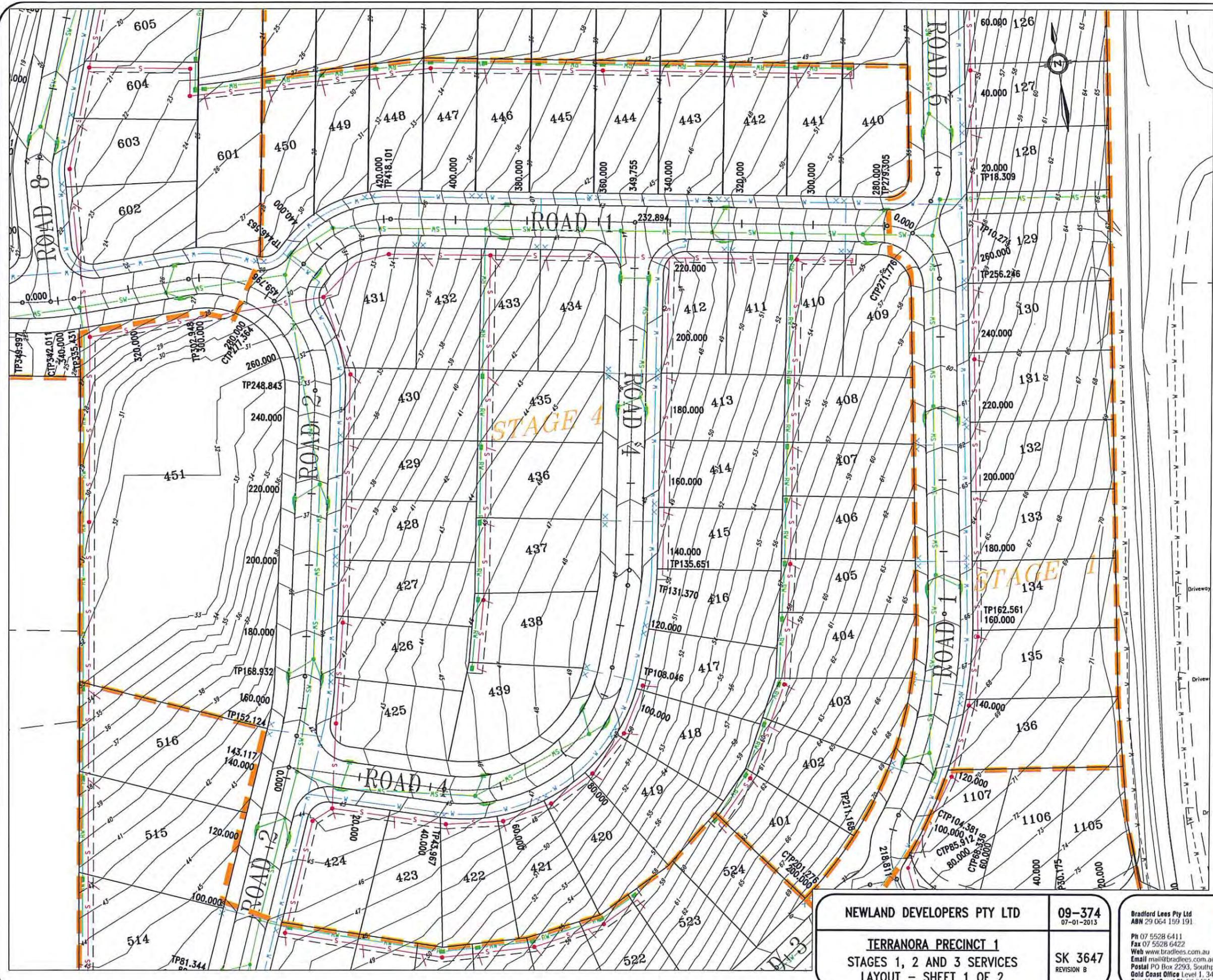
LEGEND

- 12 — FINISHED SURFACE CONTOURS
- - - - - NOMINAL KERB LINE
- S - SEWER MAIN
- RM - SEWER RISING MAIN
- W - W - - EXISTING WATER
- - - - - LIMIT OF WORKS

10 0 10 20 30 40 50m
1 : 1000 (FULL SIZE)

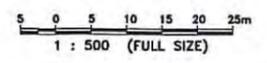
NEWLAND DEVELOPERS PTY LTD	09-374 09-04-2013
ALTITUDE ASPIRE SEWER LAYOUT SHEET 2 OF 2	SK 3630 REVISION C

Bradford Lees Pty Ltd ABN 29 064 159 191 Ph 07 5528 6411 Fax 07 5528 6422 Web www.bradlees.com.au Email mail@bradlees.com.au Postal PO Box 2293, Southport QLD 4215 Gold Coast Office Level 1, 34 Thomas Drive, Chevron Island QLD 4217	<p>Bradlees Civil Consulting</p>	<p>ISO 9001 ISO 14001</p>
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------	-------------------------------



KEY PLAN
NOT TO SCALE

- LEGEND**
- 12 — FINISHED SURFACE CONTOURS
 - NOMINAL KERB LINE
 - S — SEWER MAIN
 - W — PROPOSED WATER MAIN
 - SW — STORMWATER DRAINAGE LINE
 - W -W - EXISTING WATER
 - STAGE BOUNDARY



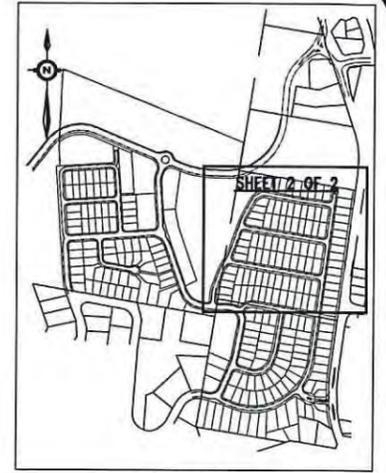
NEWLAND DEVELOPERS PTY LTD
TERRANORA PRECINCT 1
STAGES 1, 2 AND 3 SERVICES
LAYOUT - SHEET 1 OF 2

09-374
07-01-2013
SK 3647
REVISION B

Bradford Lees Pty Ltd
ABN 29 064 159 191
 Ph 07 5528 6411
 Fax 07 5528 6422
 Web www.bradlees.com.au
 Email mail@bradlees.com.au
 Postal PO Box 2293, Southport QLD 4215
 Gold Coast Office Level 1, 34 Thomas Drive, Cheyenne Island QLD 4217
 Sunshine Coast Ph 07 5451 1994 Tweed Coast Ph 02 6674 8133

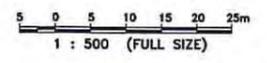
Bradlees
Civil Consulting

ISO 9002
 SCI QUAL
 INTERNATIONAL
 QUALITY ASSURED COMPANY
 AS/NZS ISO 9001:2008
 REG. NO. 233



KEY PLAN
NOT TO SCALE

- LEGEND**
- 12 — FINISHED SURFACE CONTOURS
 - - - NOMINAL KERB LINE
 - S SEWER MAIN
 - RH SEWER RISING MAIN
 - W PROPOSED WATER MAIN
 - SW STORMWATER DRAINAGE LINE
 - W -W -W EXISTING WATER
 - STAGE BOUNDARY



NEWLAND DEVELOPERS PTY LTD	09-374 09-04-2013
TERRANORA PRECINCT 1 STAGES 1, 2 AND 3 SERVICES LAYOUT - SHEET 2 OF 2	SK 3648 REVISION C

Bradford Lees Pty Ltd
ABN 29 064 159 191

Ph 07 5528 6411
Fax 07 5528 6422
Web www.bradlees.com.au
Email mail@bradlees.com.au
Postal PO Box 2293, Southport QLD 4215
Gold Coast Office Level 1, 34 Thomas Drive, Chevron Island QLD 4217

Bradlees
Civil Consulting

QUALITY ASSURED COMPANY
AS/NZS ISO 9001:2008
REG. NO. 233

Adopted but not yet in effect, see Council resolution of 13 December 2011

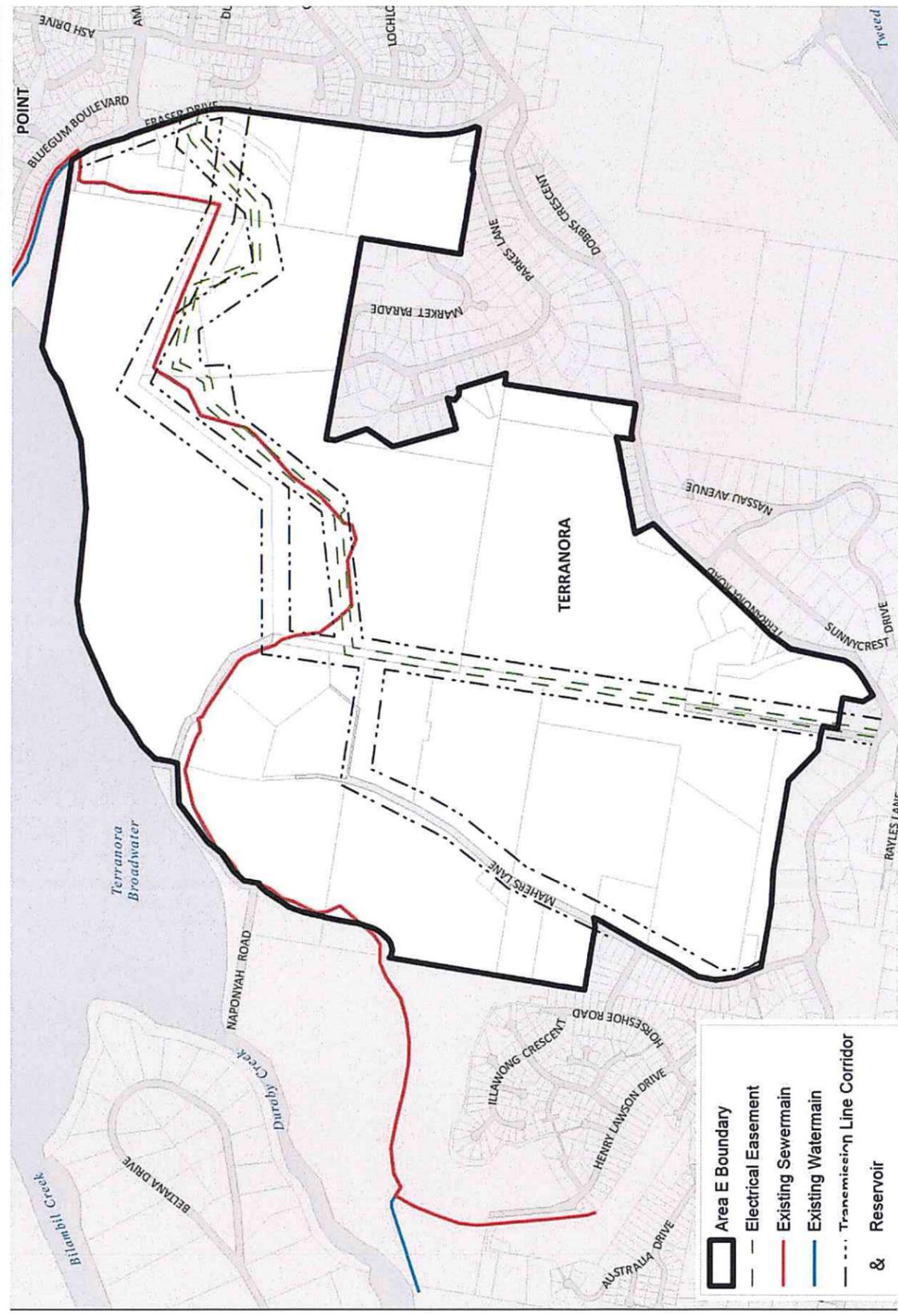


Figure 2.17 - Existing Infrastructure

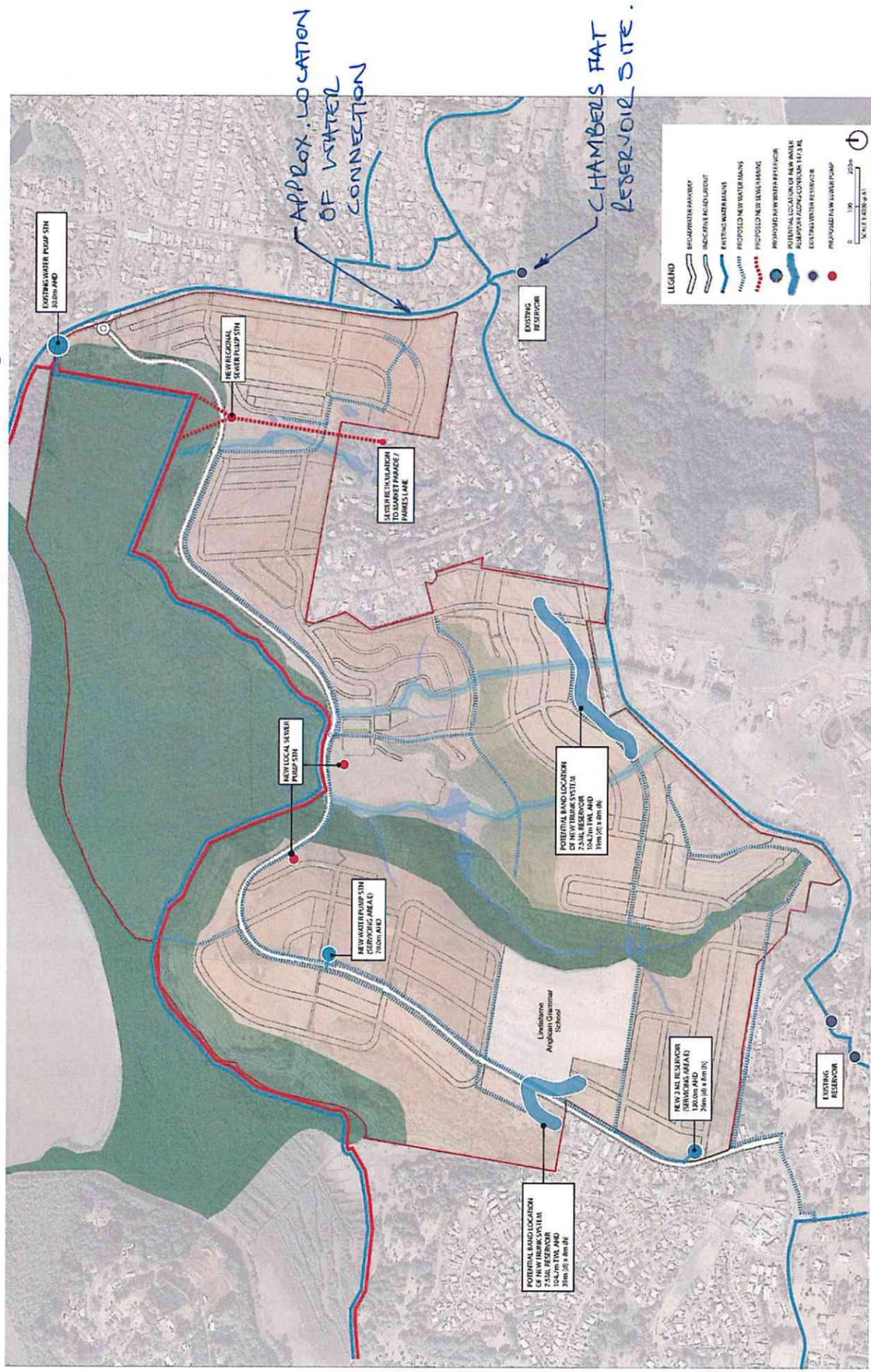


Figure 2.18 - Area E Conceptual Water and Sewer Reticulation Strategy

APPENDIX 9

- 7214/01/4-MP5 Preliminary Master Plan Concept Plan

DEVELOPMENT STATISTICS

1. SEPP 14 WETLAND BUFFER

- 1.1 TOTAL AREA IN BUFFER = 210,000m²
- 1.2 TOTAL LENGTH BUFFER 'A' TO 'B' = 2200m
- 1.3 IE MEAN WIDTH OF BUFFER = 95.4m

2. AVERAGE LOT SIZE

- 2.1 GROSS DEVELOPMENT ENVELOPE WITHIN PROPOSED 2(C) ZONE AREA = 1,110,000m²
- 2.2 TOTAL AREA OF PROPOSED ROADS = 210,400m²
- 2.3 TOTAL AREA OF UNUSABLE PUBLIC OPEN SPACE IN 2(C) (IE EXCLUDING USABLE NEIGHBOURHOOD PARKS) = 137,000m²
- 2.4 IE NET DEVELOPABLE AREA = 2.1 - (2.2+2.3) = 762,700m²
- 2.5 TOTAL NUMBER OF SEPARATE LOTS BY THIS PLAN FROM WITHIN THE PROPOSED 2(C) LINES = 890
- 2.6 IE MEAN AREA PER LOT = 762,700 ÷ 889 = 858m² EACH



- LEGEND**
- DUPLEX LOTS MIN 900m² (1000m² CORNER LOTS)
 - ZERO LOT LINE LOTS (450m²)
 - PATHWAY
 - PARKS

LEGEND

- PROPOSED PUBLIC OPEN SPACE - TSC STRUCTURE PLAN
- LAND USE BOUNDARIES - TSC STRUCTURE PLAN
- UNSTABLE SLOPES - TSC STRUCTURE PLAN
- RES. TRANSITION ZONE - TSC STRUCTURE PLAN
- ACOUSTIC BUFFER- 30m TERRANORA ROAD
- SEPP 14 BOUNDARY
- KEY HABITAT, INCL. 20m BUFFERS (J. WARREN) NPWS
- BUSHFIRE BUFFERS - NOM 30-50m WIDE
- THREATENED SPECIES (J. WARREN)
- 20m VEGETATION BUFFER - TSC STRUCTURE PLAN
- ELECTRICITY CORRIDOR
- PROPOSED PUBLIC OPEN SPACE & NEIGHBORHOOD PARKS
- LANDS RETAINED BY VENDOR
- TREE LINE (APPROX.)
- PROPOSED RESIDENTIAL
- POSSIBLE DUPLEX LOTS
- MEDIUM DENSITY PRECINCT
- ZERO LOT LINE LOTS (450m²)
- PATHWAYS
- ZERO LOT LINE LOTS (450m²)
- ZERO LOT LINE LOTS (450m²)

IMPORTANT NOTE:

THIS PRELIMINARY MASTERPLAN HAS BEEN PREPARED FOR USE BY METRICON QLD PTY LTD AND LANLEX No 49 PTY LTD ONLY, FOR THE ASSESSMENT OF DEVELOPMENT POTENTIAL AND VIABILITY, AND IS SUBJECT TO:-

- (a) CONFIRMATION BY RECONCILIATION WITH ABUTTING DEVELOPMENT PROPOSALS
- (b) CONFIRMATION BY DETAILED ROAD GRADIENT AND LANDFORMING ACCEPTABILITY.
- (c) CONFIRMATION OF LOCATION OF COLLECTOR ROAD TO FRASER DRIVE, BY T.S.C.
- (d) CONFIRMATION BY DETAILED DESIGN AND ENVIRONMENTAL ASSESSMENT.

DATE PLOTTED: 06 MAY, 2010 - 11:24 AM XREF.k

REV.	DATE	REVISIONS	REC.	APPR.
E	MAY 07	REVISED LOT LAYOUT		
D	JULY 05	REVISED LAYOUT	J.M.	M.R.
C	JULY 05	AMENDED TO COUNCIL REQUIREMENTS	J.M.	M.R.
B	MAY 05	AMENDED TO INCLUDE VENDOR RETAINED LAND (MP2)	J.M.	M.R.
A	MARCH 05	REFINEMENT OF MP1 (FEB 05)		

© Cardno (Qld) Pty Ltd All Rights Reserved 2002.
 Copyright in the whole and every part of this drawing belongs to Cardno (Qld) Pty Ltd and may not be used, sold, transferred, copied or reproduced in whole or in part in any manner or form or on any media, to any person other than by agreement with Cardno (Qld) Pty Ltd.
 This document is produced by Cardno (Qld) Pty Ltd solely for the benefit of and use by the client in accordance with the terms of the retainer. Cardno (Qld) Pty Ltd does not and shall not assume any responsibility or liability whatsoever to any third party arising out of any use or reliance by third party on the content of this document.

DESIGNED: JM	A1 DATUM: A.H.D.	RPED 6509
DRAWN: SJR	APPROVED: PROJ. DIR.	
CHECKED: JM		
RECOMMENDED: PROJ. MAN.		
JM	HR	

Cardno
 Cardno (Qld) Pty Ltd ACN: 051 074 992
 Commercial Centre, Isle of Capri
 Gold Coast City, Queensland 4217

OFFICES: Gold Coast (07) 5539 3333, Brisbane (07) 3369 9822, Sydney (02) 9416 8233, Sunshine Coast (07) 5443 2555, Townsville (07) 4772 1166, Hervey Bay Central Coast (02) 4323 2558, Port Moresby (0011675) 325 2322, Philippines (0011632) 910 5146

TELEPHONE: (07) 5538 4647, (07) 3369 9722, (02) 9416 6529, (07) 5443 5642, (07) 4721 2506, (07) 4124 5455, (02) 4324 3251, (0011675) 325 0951, (0011632) 910 5146

FAX: (07) 5538 4647, (07) 3369 9722, (02) 9416 6529, (07) 5443 5642, (07) 4721 2506, (07) 4124 5155, (02) 4324 3251, (0011675) 325 0951, (0011632) 910 5146

VARIOUS LAND OWNERS
 AREA 'E', AT TERRANORA
PRELIMINARY MASTER PLAN CONCEPT

DATE: JUNE 2007	
DRAWING No:	
7214/01/4-MP5	

APPENDIX 10

- Tweed Shire Council email dated 10 November 2011 – Agreed road alignment north east precinct Altitude Aspire
- History of Consultation with Tweed Shire Council

David Holstein

Subject: FW: Altitude Aspire, Terranora - Preferred Project Report
Attachments: SK-02 STRUCTURE PLAN.pdf

From: Shaun Nicholson [<mailto:ShaunNicholson@newland.com.au>]

Sent: Thursday, 10 November 2011 11:47 AM

To: Jenny (on behalf of Darryl); Brian Lees; B & P Surveys - Brian Raaen; James Warren; Neil Sutherland; Andrew; Matt Franzmann; Nick McGowan; Suzelie Connelly

Cc: Stuart Campbell

Subject: Altitude Aspire, Terranora - Preferred Project Report

To All,

We received advice from Council today in relation to our proposal to run roads in an east/west direction instead of north/south and they agree that east west roads are appropriate in this instance. This issue was fundamental to Newland being able to develop Altitude Aspire. We have been unable to commence our PPR until we had positive advice on this issue which is a huge milestone for the project.

The majority of your fee proposals were prepared in June/July this year and there have been significant changes to the proposed development lot layout through our extensive workshop process with Council. We have attached a copy of the latest lot layout for your information and request that you review your fee proposals and provide updated copies. Should you require a CAD file please let me know and we will forward a copy.

We propose to have a Consultant Workshop next Wednesday 16 November at 10:00am in our office to commence the PPR for Altitude Aspire, can you please confirm you are available to attend.

To all Consultants that helped during the last five months of negotiations with Council we thank you for your efforts.

Should you have any further queries please give me a call otherwise we look forward to seeing you next Wednesday.

Regards,

Shaun Nicholson
Regional Manager - North Qld



Newland Developers Pty Ltd
Po Box 3407 Robina TC Qld 4230
Suite 205 Level 2 Eastside
232 Robina Town Centre Drive Robina Qld 4226
Tel: 07 5501 7222 Mob: 0422 814 936
Fax: 07 5562 5634 Email: shaunnicholson@newland.com.au

David Holstein

Subject: FW: Area E Sewer Strategy
Attachments: Area E Sewer Strategy Map.pdf; Area E Sewerage Strategy Doc.pdf

From: Peter Pennycuick [<mailto:PeterP@TWEED.nsw.gov.au>]
Sent: Wednesday, 19 October 2011 10:24 AM
To: Brian Lees
Cc: Anthony Burnham
Subject: Area E Sewer Strategy

Brian,
At long last I have managed to get free of a million competing priorities to do some development of the Area E Sewer Strategy.

Attached are preliminary text and map for your review.
I would value your comments.

As the Manager Water is currently on leave, I have not included the funding options at this stage, but I believe that Council would provide some contribution to the ultimate works that are provided at Stage 1. Also, I haven't received his comments on the proposed strategy so the information I am providing is to be considered as draft for your information and comment only and not official at this stage.

Peter Pennycuick | Strategic and Assets Engineer
Community and Natural Resources - Water Unit



p (02) 6670 2638 | f (02) 6670 2751 | e peterp@tweed.nsw.gov.au | w www.tweed.nsw.gov.au
Civic and Cultural Centre Tumbulgum Road Murwillumbah NSW 2484 | PO Box 816 Murwillumbah NSW 2484 | ABN: 90 178 732 496

Customer Service: (02) 6670 2400 | 1300 292 872

Our values: transparency | customer focus | fairness | reliability | progressiveness | value for money | collaboration

Please consider the environment before printing this email. One tonne of paper is equivalent to 13 trees and 30 KL of water

This email (including any attachments) is confidential and must only be used by the intended recipient(s) for the purpose(s) for which it has been sent. It may also be legally privileged and/or subject to copyright.

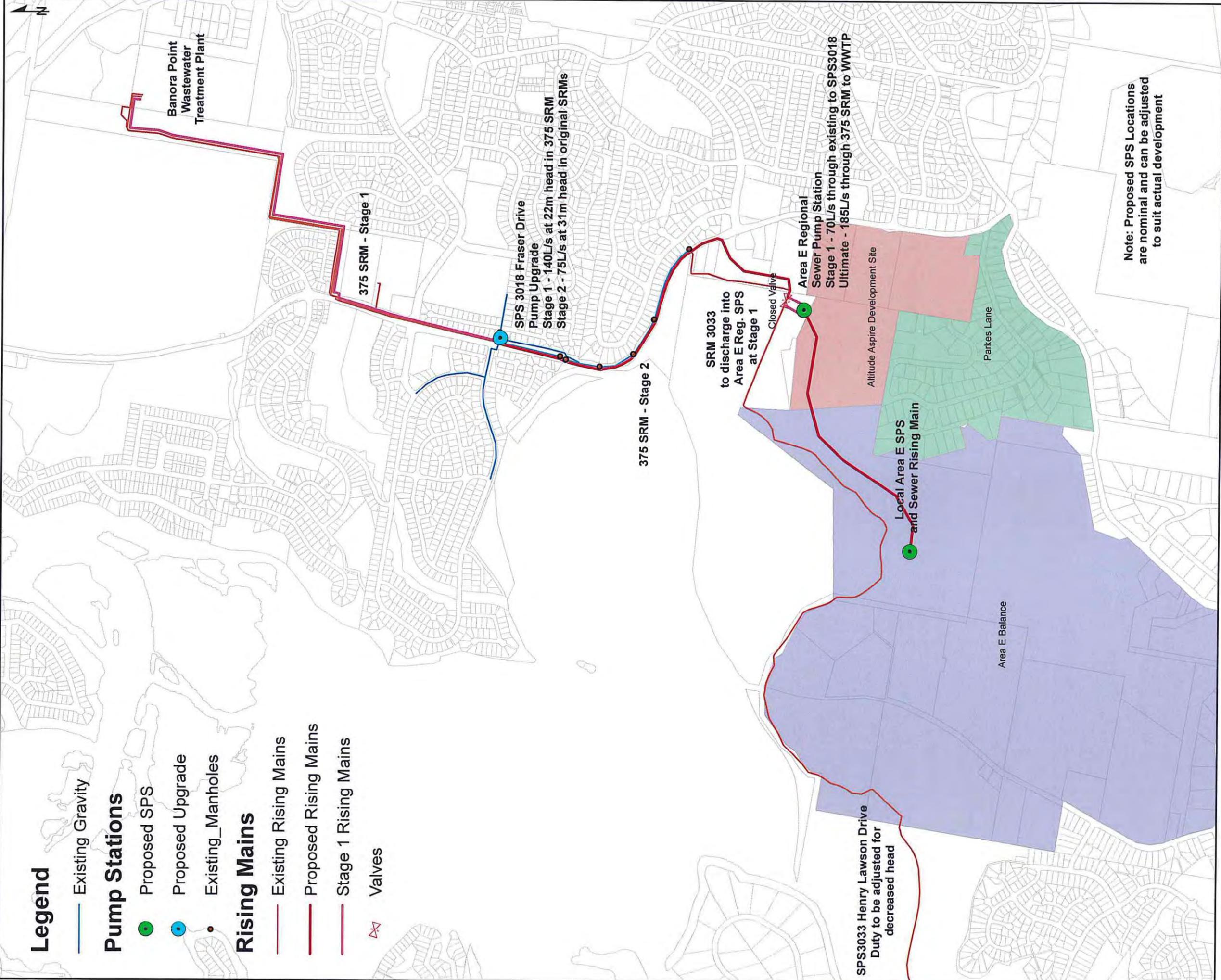
If you are not an intended recipient, any disclosure, distribution, copying or use of or reliance on this email (or any attachment) is strictly prohibited. If you have received this email in error, please promptly notify the sender by return email and then delete all copies of this email (and any attachments).

If you forward or otherwise distribute this email (or any attachment) you may be personally liable for a breach of confidentiality, an infringement of copyright, defamation or other legal liability.
Any opinions, views or conclusions expressed in this email (or any attachment) are those of the individual sender and may not necessarily reflect the official position of the Council.
www.tweed.nsw.gov.au

This email has been scanned by the MessageLabs Email Security System

Legend

- Existing Gravity
- Pump Stations**
- Proposed SPS
- Proposed Upgrade
- Existing Manholes
- Rising Mains**
- Existing Rising Mains
- Proposed Rising Mains
- Stage 1 Rising Mains
- ✕ Valves



Area E Sewerage Strategy Interim and Ultimate Development

Disclaimer: While every care is taken to ensure the accuracy of this data, Tweed Shire Council makes no representations or warranties expressed or implied, statutory or otherwise, about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which may be incurred by any person in reliance on the information contained in this diagrammatic only. It should not be used for survey or construction purposes and prior to any excavations a "dig before you dig" enquiry must be made by calling 1100. The information contained on this document remains valid for 30 days only from the date of supply.

Coordinate System
MGA Zone 56
GDA Datum - GDA 94
Date Plotted: 19 October, 2011
Author: salim
Filepath: W:\Tweed1\GIS\water\Strategic\Network_Strategies\Area E Sewer Strategy_Ult.mxd

Cadastral: 19 October, 2011
© Land and Property Management Authority (LPMA) & Tweed Shire Council.
Boundaries shown should be considered approximate only.

DO NOT SCALE
COPY ONLY - NOT CERTIFIED
1:12,500
0 115 230 460 M

Sewerage Strategy – Area E.

A sewerage strategy for Area E was documented in the Banora Point Sewerage Strategy Study 1999. The ultimate strategy for this area generally remains the same however a number of conditions have changed since then to change the interim strategy.

The interim strategy involved development of the first stage of the Area E Regional Sewer Pump Station with the first development of the estate. Flow from SPS 3033 Henry Lawson Drive would be intercepted at the pump station and re-pumped with the new catchment through the original rising main to the existing gravity system to SPS3018 Fraser Drive Sewer Pump Station. This would then pump through the 250 rising main and the old 150 rising main in parallel to the Banora Point WWTP.

Alternatively, the first development could construct a pump station that may or may not be the regional pump station and a rising main to connect to the at that time disused 150 rising main. The new interim pump station would pump to Banora Point WWTP through that main and SPS3018 would pump independently through the 250 rising main.

In the intervening period, there has been no development at Area E but Terranora Village, Flame Tree Park and other contributing areas have fully developed, changing the current loading on SPS3018. In fact some years ago SPS3018 began pumping through both 150 and 250 mains in parallel to improve capacity available for the current peak wet weather load. If the pumps were to be replaced at present, it would be considered necessary to provide an upgrade which would almost certainly require an electrical upgrade or a rising main upgrade to reduce the power required for the pumps.

If any flow from Area E is added, a pump upgrade will be necessary and if there is not an accompanying rising main upgrade, the size pumps required will exceed the ability to provide electrical cubicles of a suitable size on the existing constrained site. As it is, under Council's current standards, a control building and standby generator would be necessary if the station was to be developed new now.

A number of interim scenarios have been investigated as shown in the Table below.

	SPS3018 Fraser Drive	SPS3033 Henry Lawson Dr	SPS Area E		
			Local	Parkes Ln	Total
Existing	111.6	45.9	0	0	0
Interim 1	120.9	45.9	9.1	0	54
Interim 2	158.7	45.9	23.4	21.1	87.5
Ultimate	74.6	45.9	123.6	21.1	184.5

Interim 1 is the existing situation with the first 10 ha of the Altitude development added via the gravity system in Fraser Drive.

Interim 2 provides for the full Altitude development plus the sewerage of the Parkes Lane area.

There is a possible stage between these two interims which does not include Parkes Lane sewerage.

Analysis of the gravity system suggests that the Interim 2 scenario would surcharge the gravity system but without an overflow situation, whereas the intermediate interim would not surcharge the gravity main.

It therefore appears that the first stages of the development of Area E could be pumped to the gravity in Fraser Drive with an upgrade of the rising main from SPS3018 to Banora Point WWTP.

As the corridor in which this new main is to be constructed already has two mains, it is considered that any new main should be the size of the ultimate main rather than having to fit a fourth main in the space at a later date.

Analysis has shown that it would be possible to provide suitable pumps in SPS3018 that would not exceed the capacity of the existing switchboard but would be able to deliver the required flow rate through a 375 diameter rising main due to the reduced friction loss in the larger main. During this period, the existing 250 and 150 diameter mains would be disused except for the section that receives flow from SPS3038

For example, the Interim 1 flow rate of 120.9L/s would require an head of 42.8m in the existing main resulting in pumps of 85kW rated power, well in excess of the current pump's 55kW rating, however in the proposed 375 main, the head would be 19.1m and power required at 60% efficiency would be 38kW.

A flow of 140L/s would have a head of 21.6m and a power requirement at 60% efficiency of 50kW.

Judicious pump selection could provide a pump in SPS3018 that would provide a duty that could service most of the proposed Altitude development, but when that load is pumped directly from the Area E regional pump station through the 375 SRM to Banora Point WWTP and SPS3018 is returned to pumping through either the 250 diameter main, or the 250 and 150 diameter mains in parallel, the pumps could achieve the desired flow at the increased head, possibly with an impellor change if necessary.

The point at which the final 375 diameter main from the Area E Regional pump station to the first stage main will be required will depend upon the exact pumps selected and when development reaches a stage that would generate that peak wet weather flow.

The other matter for consideration is the storage available in the well of SPS3018 above the normal alarm level. The normal design criteria is for there to be adequate storage in the system to enable the station to be off line for eight hours at average dry weather conditions. This can be aided by replacing the telemetry in the existing switch board with the new Clear Scada system which has the ability to be

programmed to automatically isolate up stream pump stations in the event of a failure or power outage, thereby distributing the storage in use. A preliminary assessment of the storage available shows that this latter measure will be necessary to minimise the likelihood of an overflow in the event of a pump station failure.

With this measure in place and the provision of the regional pump station sized wet well, the risk of overflow can be dramatically reduced to an acceptable level.

In summary, the proposed strategy is as follows:

Interim Stage:

Initial Area E Pump Station to be Regional Pump Station with well sized accordingly but pumps suitable for early development and possibly to include flow from SPS3033.

If the latter, the existing SRM could be used to deliver flow to the existing trunk gravity system in Fraser Drive.

An alternative to this is construction of a smaller pump station and a separate small rising main to the Fraser Drive trunk gravity sewer. This would have the disadvantage of constructing the smaller rising main that would be abandoned later as well as not providing as much storage benefit as the regional station well would.

375 Ultimate sized SRM from SPS3018 to Banora Point WWTP

SPS3018 to be upgraded with pumps of a similar power to existing but able to deliver higher flows at lower head in the new SRM but with an eye to their suitability for the ultimate stage as well.

SPS3018 Telemetry to be upgraded to provide upstream pump station controls to isolate SPS3033, 3034, 3035 3036, 3042 and Area E Regional Pump Station to maximise emergency storage.

Provision of a standby generator at SPS3018 if a location on site can be found.

Pumps at SPS3033 will need to be changed to allow for a greatly reduced head as they will now be "pumping downhill". It may also be necessary to develop an artificial head to give enough resistance in the system to be able to select a suitable pump.

Ultimate Stage:

375 Ultimate SRM extended to the Area E Regional Pump Station.

Regional Pump Station Mechanical and Electrical upgrade to ultimate size pumps.

SPS3018 pumps return to pumping through 250 and 150 parallel mains to service reduced flows. If a good selection made at the interim stage, these pumps may only need an impeller change to ensure that they are suitable for the different duty.

It may be that there could be two stages within this ultimate stage with the selection of a mid-range duty pump to deliver flow in the full length ultimate main until the area grows to its final development.

A standby generator should also be provided by this stage.

David Holstein

Subject: FW: Area E Water Supply Strategy

From: Peter Pennycuick [<mailto:PeterP@TWEED.nsw.gov.au>]

Sent: Tuesday, 8 November 2011 1:59 PM

To: Brian Lees

Subject: RE: Area E Water Supply Strategy

Hi Brian.

I thought the water strategy was pretty well sorted. Two options – Either the full strategy in accordance with the LEP document or the alternate where Altitude construct a 3ML reservoir for which Council would contribute marginal difference from 1.5ML on Council's existing land at Chambers.

This reservoir could supply 2150ep in Altitude Aspire and adjoining areas of Area E to the West to a level of about 65m AHD. Some area in Altitude might need pressure boosting.

The balance would provide additional capacity for infill in the area east of Fraser Drive serviced by Chambers Reservoir. Additional capacity will be needed before the development could get a subdivision certificate.

I think the details of this were generally as presented in the advertised DCP.

I will have a closer look a bit further down the track.

Regards

Peter Pennycuick | Strategic and Assets Engineer
Community and Natural Resources - Water Unit



p (02) 6670 2638 | f (02) 6670 2751 | e peterp@tweed.nsw.gov.au | w www.tweed.nsw.gov.au
Civic and Cultural Centre Tumbulgum Road Murwillumbah NSW 2484 | PO Box 816 Murwillumbah NSW 2484 | ABN: 90 178 732 496

Customer Service: (02) 6670 2400 | 1300 292 872

Our values: transparency | customer focus | fairness | reliability | progressiveness | value for money | collaboration

Please consider the environment before printing this email. One tonne of paper is equivalent to 13 trees and 30 kL of water

From: Brian Lees [<mailto:brian@bradleys.com.au>]

Sent: Monday, 7 November 2011 4:49

To: Peter Pennycuick

Cc: David Holstein

Subject: RE: Area E Water Supply Strategy

Peter,

Just a short email to follow on from your email below regarding the sewer strategy and to ask how you are progressing with the water strategy? I expect that you are constantly juggling competing priorities, but if you could please elevate this one to the top of your priority list it would be greatly appreciated. The issue is now becoming quite critical for our client.

If you could let me know how you go with the priority as soon as possible.

I did phone today and left a message with the main reception for you to call me back, but you could reply via email if that is more convenient.

Regards,

Brian Lees
Director
Email: brian@bradlees.com.au



Ph 07 5528 6411 Fax 07 5528 6422
Web www.bradlees.com.au Email info@bradlees.com.au
Postal PO Box 2292, Southport QLD 4215 Gold Coast Office Level 1, 34 Thomas Drive, Chevron Island QLD 4217
Sunshine Coast Ph 07 5461 1994 Tweed Coast Ph 02 6674 8133

From: Peter Pennycuik [<mailto:PeterP@TWEED.nsw.gov.au>]
Sent: Wednesday, 19 October 2011 10:24 AM
To: Brian Lees
Cc: Anthony Burnham
Subject: Area E Sewer Strategy

Brian,
At long last I have managed to get free of a million competing priorities to do some development of the Area E Sewer Strategy.

Attached are preliminary text and map for your review.
I would value your comments.

As the Manager Water is currently on leave, I have not included the funding options at this stage, but I believe that Council would provide some contribution to the ultimate works that are provided at Stage 1. Also, I haven't received his comments on the proposed strategy so the information I am providing is to be considered as draft for your information and comment only and not official at this stage.

Peter Pennycuik | Strategic and Assets Engineer
Community and Natural Resources - Water Unit



p (02) 6670 2638 | f (02) 6670 2751 | e peterp@tweed.nsw.gov.au | w www.tweed.nsw.gov.au
Civic and Cultural Centre Tumbulgum Road Murwillumbah NSW 2484 | PO Box 816 Murwillumbah NSW 2484 | ABN: 90 178 732 496

Customer Service: (02) 6670 2400 | 1300 292 872

Our values: transparency | customer focus | fairness | reliability | progressiveness | value for money | collaboration

Please consider the environment before printing this email. One tonne of paper is equivalent to 13 trees and 90 kL of water

This email (including any attachments) is confidential and must only be used by the intended recipient(s) for the purpose(s) for which it has been sent. It may also be legally privileged and/or subject to copyright.

If you are not an intended recipient, any disclosure, distribution, copying or use of or reliance on this email (or any attachment) is strictly prohibited. If you have received this email in error, please promptly notify the sender by return email and then delete all copies of this email (and any attachments).

If you forward or otherwise distribute this email (or any attachment) you may be personally liable for a breach of confidentiality, an infringement of copyright, defamation or other legal liability.
Any opinions, views or conclusions expressed in this email (or any attachment) are those of the individual sender and may not necessarily reflect the official position of the Council.
www.tweed.nsw.gov.au

This email has been scanned by the MessageLabs Email Security System

Bradlees Consulting Disclaimer

This message is intended for the named recipients' use only. No confidentiality or privilege is waived or lost by any mistransmission or interception. This email has been virus scanned as it was sent from our network. We cannot guarantee that the email has not been infected, changed, deleted (partially or fully), etc. prior to being delivered.

This email and attachments are not warranted and need to be compared against hard copies. We only warrant drawings and correspondence signed in hard copy by a company director. It is the recipient's responsibility to ensure that the information contained in this email is consistent with hard copies. No liability will be accepted where the contractor or others have not verified the data against a hard copy.

Bradlees Civil Consulting records and monitors all electronic communication on its computer systems. Staff members have been advised that no privacy exists in this communication format.

This email (including any attachments) is confidential and must only be used by the intended recipient(s) for the purpose(s) for which it has been sent. It may also be legally privileged and/or subject to copyright.

If you are not an intended recipient, any disclosure, distribution, copying or use of or reliance on this email (or any attachment) is strictly prohibited. If you have received this email in error, please promptly notify the sender by return email and then delete all copies of this email (and any attachments).

If you forward or otherwise distribute this email (or any attachment) you may be personally liable for a breach of confidentiality, an infringement of copyright, defamation or other legal liability.
Any opinions, views or conclusions expressed in this email (or any attachment) are those of the individual sender and may not necessarily reflect the official position of the Council.
www.tweed.nsw.gov.au

This email has been scanned by the MessageLabs Email Security System

File Note

Wednesday 17 March 2010

Subject: Area E - 300 Lot Development by Metricon
Meeting with BradLees Consulting
File Reference: MP09_0166
Time: 10:30am
Date of occurrence: 11 March 2010
Present: Brian Lees, Fredy Rey (BradLees Consulting),
Peter Pennycuick (TSC Water Unit)

BradLees Consulting requested the meeting to discuss water supply and sewerage issues in relation to the above project. This project is the first to application within the Area E urban release area and is located at the eastern end of the area bounded by Fraser Drive and the Parkes Lane area.

Water Supply:

PP advised that the strategy for water supply for the whole of Area E relied upon a reservoir to be constructed by the developers in the south-western corner of the development area with all the area below about contour 110 m AHD to be serviced by that reservoir. The balance above that level can be serviced from the existing Rayles Lane Reservoir. There is no spare capacity in the Chambers Reservoir to serve any of the proposed development area. This presents a difficulty for development beginning on the eastern end of the area.

BL advised that it was not practical to proceed with the reservoir at the initial stage and that it had been understood from the Parsons Brinkerhoff study that initial supply could be obtained from Fraser Drive.

PP advised he was not aware of that particular advice.

PP suggested that it may be possible to obtain a temporary supply from the 600mm trunk main on the northern edge of the site, but that the hydraulic grade line could vary significantly, particularly once Cobaki Lakes begins to draw significant amounts of water from the system. A pressure reducing valve would be necessary as the static pressure in the main will exceed the maximum pressure for the attached reticulation system during periods of low demand in the network. Approval for this possible interim connection could only be given for a limited period as the uptake in Cobaki Lakes and other development in the northern area would increase the likelihood of inadequate pressure as time goes on, and would depend upon detailed modelling of the system.

BL requested advice on the hydraulic grade line under various conditions.

Sewerage:

PP advised that the strategy for sewerage this area had been included in the Banora Point Sewerage Strategy Study 1999. A pdf version was supplied to FR.

This provided for a regional sewer pump station (SPS) generally in the lowest part of this particular development proposal. Sewerage from areas west that could not gravitate to this pump station would require a local SPS to transfer it to this pump station. Flow from Terranora Village would be diverted into this regional SPS and initially re-pumped through the existing main. The strategy provided for a couple of alternative interim arrangements

File Note



with the final development requiring a new trunk main from the regional SPS to the Banora Point Wastewater Treatment Plant.

The option of providing a local sewer pump station in the low point of this development and the regional SPS in the larger valley of Area E was discussed and considered feasible.

BL suggested that the small SPS could perhaps be connected to the same discharge manhole in Fraser Drive as the Terranora Village SPS.

PP advised that this would depend upon the capacity of

- a) the gravity sewer
- b) SPS3018
- c) SRM3018 (150 and 250 combined).

PP advised that the gravity sewer has good capacity in the steeper sections but that it may be marginal once it reaches the flatter sections of Fraser Drive. The capacity of SPS3018 will need to be verified.

Peter Pennycuik
Strategic and Assets Engineer
Water Unit

Brian Lees

From: Fredy Reys
Sent: Monday, 22 March 2010 10:10 AM
To: Brian Lees
Subject: FW: Area E - 600mm trunk main hydraulic grade line
Attachments: image001.png; image002.png

FYI

Should you require any further information please do not hesitate to contact our office.

Regards

Fredy

Fredy Reyes
Civil Designer
for and on behalf of
BradLees Consulting

Level 1, 34 Thomas Drive, Chevron Island QLD 4217 - PO Box 2293, Southport QLD 4215 Ph. 07 5528 6411 Fax 07 55286422

8 Pikki Street, Maroochydore QLD 4558 - PO Box 1722, Sunshine Plaza QLD 4558 Ph. 07 5451 1994 Fax 07 5451 1963

Unit 29, 11 - 13 Pearl Street, Kingscliff NSW 2487 - PO Box 1623, Kingscliff NSW 2487 - Ph 02 6674 8133 Fax 02 6674 5003

From: Peter Pennycuick [mailto:PeterP@TWEED.nsw.gov.au]
Sent: Friday, 19 March 2010 10:36 AM
To: Fredy Reys
Cc: Cheryl Jackson
Subject: Area E - 600mm trunk main hydraulic grade line

Fredy, Brian,

Further to your request for hydraulic grade line data in relation to the 300 Lot subdivision you are looking at in Area E, please note the following information extracted from our conveyancing network model.

This relates to Junction 3575 which is approximately 90m west Lot 1 DP798632 where the main turns northward. Existing ground level approximately 1.0m

2011 Average Day Scenario - Max Head 113.9m AHD	Min Head 96.7m AHD
2011 Maximum Day Scenario - Max Head 113.9m AHD	Min Head 87.4m AHD
2021 Average Day Scenario - Max Head 113.9m AHD	Min Head 95.1m AHD
2021 Maximum Day Scenario - Max Head 113.8m AHD	Min Head 83.8m AHD

113.94m AHD represents the operational TWL of the North Tumbulgum Reservoir that supplies the trunk main.

Hence, supply from the trunk main would require a PRV to limit maximum pressure in the lower areas, but it could not be used to give reliable supply to the higher areas of the development, say above 60m AHD.

To make the temporary connection work for higher areas, a temporary booster pump system might be necessary, but this could not guarantee fire flows at hydrants if the fire coincided with a blackout (which I have seen happen).

If the high area were to obtain supply from Chambers reservoir (which is currently over committed already), it is likely that a temporary booster would be needed for the highest areas (above 70m AHD) anyway. We might be able to add just the very top section to Chambers on a temporary basis with a temporary booster system, but like the connection to the 600mm trunk main, it would have to be for a strictly limited period.

Another point in relation to the design of the water reticulation system, the connection to the future supply from the 3ML reservoir should be included in the design of the subdivision and provided during construction.

(Cheryl, please register this email.)

Peter Pennycuick Strategic and Assets Engineer
Community and Natural Resources - Water Unit



p (02) 6670 2638 f (02) 6670 2751 e peterp@tweed.nsw.gov.au w www.tweed.nsw.gov.au
Civic and Cultural Centre Tumbulgum Road Murwillumbah NSW 2484 PO Box 816 Murwillumbah NSW 2484 ABN: 90 178 732 496

Customer Service: (02) 6670 2400 1300 292 872

Our values: transparency customer focus fairness reliability progressiveness value for money collaboration

consider the environment

From: Fredy Reys [mailto:Fredy@bradlees.com.au]
Sent: Wednesday, 17 March 2010 4:01
To: Peter Pennycuick
Subject: RE: File Note BradLees Consulting Mtg 11-3-2010.doc

Hi Peter,

Thanks for the information/meeting.

Should you require any further information please do not hesitate to contact our office.

Regards

Fredy

Fredy Reyes
Civil Designer
for and on behalf of
BradLees Consulting

Level 1, 34 Thomas Drive, Chevron Island QLD 4217 - PO Box 2293, Southport QLD 4215 Ph. 07 5528 6411 Fax 07 55286422

8 Pikki Street, Maroochydore QLD 4558 - PO Box 1722, Sunshine Plaza QLD 4558 Ph. 07 5451 1994 Fax 07 5451 1963

Unit 29, 11 - 13 Pearl Street, Kingscliff NSW 2487 - PO Box 1623, Kingscliff NSW 2487 - Ph 02 6674 8133 Fax 02 6674 5003

From: Peter Pennycuick [mailto:PeterP@TWEED.nsw.gov.au]
Sent: Wednesday, 17 March 2010 2:05 PM
To: Fredy Reys
Subject: FW: File Note BradLees Consulting Mtg 11-3-2010.doc

Fredy, Brian,

Attached is my file note from our meeting last Thursday.

Peter Pennycuick Strategic ad Assets Engineer
Community and Natural Resources - Water Unit



p (02) 6670 2638 f (02) 6670 2751 e peterp@tweed.nsw.gov.au w www.tweed.nsw.gov.au

ALTITUDE 1
Minutes of D&I Meeting
Tweed Shire Council
26 March 2010

File: 09-374

2. APPOINTMENT:

Addressed By: Darryl Anderson - Darryl Anderson Consulting, Neil Sutherland – Gilbert Sutherland, Brian Lees – Bradlees Consulting, Stuart Campbell, Shaun Nicholson – Metricon QLD Pty Ltd

Postal Address: Suite 7, Corporate House, 8 Corporation Circuit, Tweed Heads South, NSW, 2486

Present: Messrs Rowena Michel, Acting Manager Development Assessment; Danny Rose, Planning & Infrastructure Engineer; Barry Stegeman, Acting Manager Building & Environmental Health, John Zawadzki, Traffic/Infrastructure Engineer, Mick Denny, Senior Development Engineer and Kristin-Lee McIntyre (recorder)

Property Description: Lot 1 DP 304649, Lot 1 DP 175235, Lot 1 DP 781687, Lot 2 DP 778727, Lot 1 DP 781697, Lot 1 DP 169490 and Lots 40 & 43 DP 254416, Fraser Drive Terranora.

Land No:

Proposal: Proposed 300 Lot Subdivision (Major Project 09_0166 Altitude 1 Development at Terranora). This proposal known as Altitude 1 forms part of the broader Urban Release Area known as AREA E.

Comments:

1. Planning Comments

Issues:

Permissibility

- The land is zoned 2(c) Urban Expansion and 7(a) Environmental Protection (Wetlands and Littoral Rainforests) under Tweed LEP 2000 and the proposed development is permissible with consent. The Tweed LEP 2000 is available on Council's website at www.tweed.nsw.gov.au/planningservice/TweedLEP2000.pdf.

Part 3A Assessment

The DOP has identified the proposal as subject to a Part 3A assessment and issued Director General's Requirements for the proposal (refer attached) The DOP is the consent authority however council officers raise matters of concern below. Details in relation to these matters are attached.

Relevant SEPP's and referrals

- The site is located within the Coastal zone and State Environmental Planning Policy No. 71 applies.
- SEPP 14
- Any works within 40m of a waterbody should be referred to the Department of Environment Climate Change and Water.
- The site is bushfire prone and should be referred to the Rural Fire Service.
- SEPP (North Coast Regional Environmental Plan) 1988, particular attention is drawn to Clause 32(b)(4) in relation to overshadowing of coastal foreshore open space

- Provision of water. Note that further discussions are required on the comments in relation to water. Council officers agreed to organize a further meeting with Anthony Bumham, Manager of Water in conjunction with discussions in relation to traffic and roads as above.
- Requirements in relation to Sewer
- Landforming
- Stormwater concerns and lawful point of discharge.
- Internal road geometry

Additional plans and details required in the Environmental Assessment should include (but is not limited to the following):

- Historical land uses and contamination risks (A DECCW Accredited Site Auditor would be required to oversee the contamination investigation and remediation)
- Site Audit Statement certifying the land is suitable for the proposed use.
- Geotechnical stability of the land.
- Flora and Fauna assessment addressing: fauna-wildlife corridor values of the site, wetland conservation value – wetland corridor values of the site, threatened flora recorded in the vicinity should be targeted in surveys, threatened fauna should be addressed, key fish habitat values should be addressed, SEPP 14 wetland and buffer should be addressed, proposed clearing of native vegetation and fauna habitat, effects to groundwater, proposed avoidance, mitigation and or compensatory measures proposed.
- Proposed works including cut and fill and location/depth of retaining walls/batters.
- A statement of landscaping intent should be provided.
- The application should include a site analysis identifying surrounding land use, site constraints and opportunities (etc).
- Visual analysis

Heritage: Aboriginal

- The Tweed Shire area has a rich history of former Aboriginal settlement and activity. Under strict cultural protocols, the surveyed evidence of known and potential sites of Aboriginal significance is kept confidential among the local Aboriginal community as well as the NSW State Government's National Parks and Wildlife Service. These sites often contained highly significant items or relics which require careful and specialised investigation and conservation management.

The Tweed LEP 2000 contains specific provisions which sets out the planning processes required for development proposals affecting those known or potential sites of Aboriginal heritage significance. Such development will require a cultural heritage investigation as part of any DA or rezoning, consultation with the local Aboriginal community, and may also require Integrated Development approval from the Department of Environment, Climate Change and Water (DECCW).

If you wish to check if any property you are interested in is affected by the above issues, you should contact either the Tweed Byron Local Aboriginal

Attachment – DAP Appointment – 26 March 2010

Traffic Issues

Traffic network planning for Area E is reliant on Broadwater Parkway, and its eastern connection to Fraser Drive, at a location yet to be confirmed. The proposal attempts to remain independent of Broadwater Parkway, and provide a "temporary connection" to Fraser Drive approximately 120m north of the existing Parkes Lane intersection.

This proposal is not supported by Council. There is no certainty that the future Broadwater Parkway will ever be constructed "by others". The alignment of the Broadwater Parkway has yet to be confirmed, let alone approved, given the environmental, slope, and probable geotechnical constraints. While construction of the Parkway presents difficulties for the proponents due to the multiple land ownership in Area E, it is considered to be a reasonable requirement given the proposal's location at the eastern extent of the urban release area, adjacent to Fraser Drive.

Previous concept plans have shown a road connection to Fraser Drive north of Terranora Road however this was only anticipated to be a minor connection which would be subject to left in – left out traffic control without impacting on the existing Parkes Lane and Glen Ayr Drive intersections with Fraser Drive. It has always been considered by Council to be an additional connection to Fraser Drive, not an alternative to Broadwater Parkway.

The subdivision will generate about 258 vehicles per hour at peak hour. This is a significant 'temporary' traffic volume.

Council shall oppose the subject subdivision unless approval for and construction of Broadwater Parkway from (and including) the Fraser Drive intersection to the north to at least the proposed roundabout adjacent to Stage 7 is included in the proposal. This necessitates involvement of landholders of Lot 1 DP 814255, Lot 2 DP 713031, Lot 3 DP 713031, Lot 1 DP 798632, and possibly Lot 2 DP 814255 depending on final alignment.

The proposed Broadwater Parkway connection with Fraser Drive will need to:

- Accommodate all traffic from the proposed subdivision
- Be readily upgradable to a signalised intersection for future stages of development in the Area E urban release area
- Accommodate the future four-laning of Fraser Drive. The proponents are not required to carry out four-laning of Fraser Drive, but would still be required to provide any necessary widening for turning lanes etc. on Fraser Drive to service the subdivision.

The applicant must dedicate the road reserve and provide a detailed design for the remainder of Broadwater Parkway to the western extent of Stage 10 of the subdivision. The detailed design must demonstrate compliant vertical and horizontal alignments, and this may result in amendments to the proposed subdivision layout. For example, the relatively sharp corner shown for the Broadwater Parkway at the north western corner of the proposal is unacceptable as a 150m radius minimum corner is required for a 70 km/h design speed, or 90m radius for a 60km/h design speed. This requires changes to the Stage 9 and 10 design. The western termination

Stormwater Issues

The subdivision discharges its stormwater via a central drainage reserve onto private land (Lot 227 DP755740). The applicant must demonstrate that this is a lawful point of discharge for stormwater, by obtaining owners consent or creating easements. This issue is essential for compliance with DCP A5 - Subdivision Manual, and therefore Council's support for the subdivision.

If this first issue can be resolved, the applicant must demonstrate that the stormwater discharge onto Lot 227, which contains SEPP 14 wetlands, is suitable in terms of water quality and quantity. This will require compliance with:

- Development Design Specification D7 - Stormwater Quality (currently under review to adopt "Water By Design" best practice WSUD from SEQ)
- Any additional ecological constraints regarding the SEPP 14 environment.

Further consideration of the provisions of the Cobaki-Terranora Broadwater CEMP regarding impacts of the development on Trutes Bay should be provided.

All stormwater infrastructure upstream of Lot 227 must assume zero future maintenance of any discharge flow paths or channels through Lot 227, due to environmental constraints. This must be considered in tailwater assumptions for hydraulic design of the subdivision.

Erosion and sediment control is also essential to protect the downstream environment from adverse impacts. An erosion and sediment management plan is required and must consider the construction stages of the subdivision, as well as measures to ensure adequate control during the house building phase throughout the subdivision, such as temporary sediment basins.

A stormwater management plan is required to address all of these issues.

The subdivision design does not properly consider stormwater measures required to protect residential land from overland flooding. House lots are located at the bottom of steep roadways, without any allowance being made for continuing overland flow paths through to the drainage reserve (e.g. lots 605, 606, 715, 716, 720, 721, 1021, 1022). Stage 4 also appears to require a drainage reserve in the vicinity of lot 431 through to the north west to cater for major storm flows. To properly address this overland flow issue, significant amendments to the lot and road layout are needed.

Section 94 Issues

The Department of Planning's \$20,000 cap per allotment on developer contributions will significantly affect the delivery of key community infrastructure in Area E. Prior to introduction of the cap, Area E was subject to contributions in excess of \$20,000, due largely to a Local Area Contribution (LAC) for Broadwater Parkway in the Tweed Road Contribution Plan (CP No.4). Council applied unsuccessfully for a variation to the cap for Area E, citing the land constraints and the need to provide the Parkway in an equitable and orderly manner, however this request was denied by the Planning Minister. As such, the LAC cannot be applied, and the applicant will therefore be responsible for delivery of the eastern portion of the Parkway without any ready means of recouping this investment from other benefitting landholders in the urban release area.

Sewer:

The sewerage strategy for this area is for a regional pump station to be located in the low area from which sewage would be pumped in a new sewer rising main to the Banora Point Wastewater Treatment Plant. Several interim solutions were proposed which would enhance the capacity of the existing sewer rising main (SRM) from Terranora Village to the BPWWTP.

Bradlees Consulting has proposed a different interim solution based on the proposed development. It would have a local sewer pump station (SPS) that would pump through a new SRM to the same gravity sewer manhole into which the existing Terranora SRM discharges.

The viability of this would depend upon the capacity available in the flatter sections of the gravity system, SPS3018 and SRM3018 which currently pumps through two parallel SRM to BPWWTP.

Detailed analysis including testing of the SPS is required before this option can be approved. It is unlikely that here will be adequate long term capacity, but this may be a short term interim solution, with the permanent discharge being to the proposed regional SPS.

Provision within the sewer reticulation is required for the connection of the Parkes Lane area to sewer at a later date.

Relocation of Existing Services

It has been suggested that pending detailed design, the existing trunk water main and sewer rising main through Area E may need to be relocated to be in a more suitable location and not excessively deep. No information as to the final levels of the development in relation to the existing services is currently available to Water Unit, so the proponent should be alerted to the potential issue.

Common Works

The proposed 3 ML Reservoir, Water Pump Station and pumping mains are common to all of Area E and within the LES (PB 2004) are proposed to be funded and constructed by the developer.

Accordingly, it would be advantageous for all involved developers to come to a cost sharing agreement for these works.

The Regional SPS and SRM however are likely to be funded by S64 contributions or in the case of a developer constructing the wet well S64 contributions may fund the marginal difference in the construction of the larger wet well.

Contaminated Land

The site has been previously used for cropping for a number of years. Given this history and the intended high yield residential use proposed for the site, a DECCW Accredited Site Auditor would need to be engaged to oversee the contamination

existing overland drainage opportunities which is in accordance with WSUD objectives.

- The EA should address impacts of increased traffic on the existing local street network.
- The internal road layout must maximise connectivity internal to the development and external to future and existing urban development.

Environmental Impacts

- Flora and Fauna assessment is required, addressing: fauna-wildlife corridor values of the site, wetland conservation value – wetland corridor values of the site, threatened flora recorded in the vicinity should be targeted in surveys, threatened fauna should be addressed, key fish habitat values should be addressed, SEPP 14 wetland and buffer should be addressed, proposed clearing of native vegetation and fauna habitat, effects to groundwater, proposed avoidance, mitigation and or compensatory measures proposed. Various relevant ecological mapping included below.
- The EA should address how the adjoining wetlands or any areas proposed to be dedicated to Council will be managed, given Council does not have the resources for on-going maintenance costs.
- Erosion and sediment controls for the subdivision and subsequent building works must be addressed, with particular regard to the sensitivity of the receiving water body (SEPP14).

Brian Lees

From: Jenny [jenny@daconsulting.com.au]
Sent: Friday, 9 April 2010 9:46 AM
To: Stuart Campbell; Shaun Nicholson; sutherland.nm@groupgs.com; Brian Lees
Subject: FW: Altitude 1
Attachments: image002.jpg; image001.jpg; Option 2.pdf; Option 1.pdf

Brian

Thanks for that correction, updated version below.

Regards

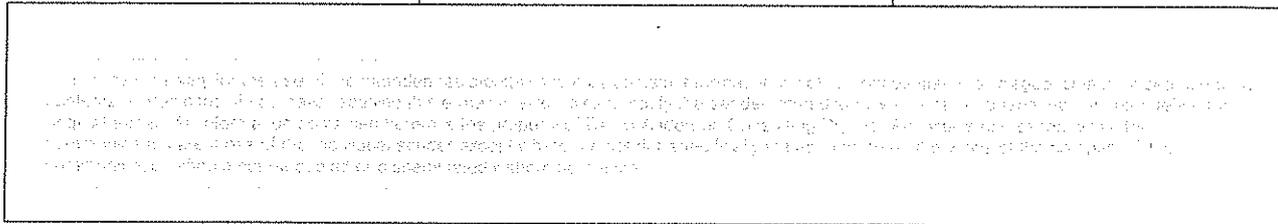
Darryl Anderson
Director



DARRYL ANDERSON CONSULTING PTY LTD
TELEPHONE: 07 5523 3611

Darryl Anderson Consulting Pty Ltd
Suite 7, Corporate House
8 Corporation Circuit
Tweed Heads South NSW 2486

P: 07 5523 3611
F: 07 5523 3612
E: admin@daconsulting.com.au
W: www.daconsulting.com.au



From: Jenny
Sent: Thursday, 8 April 2010 12:29 PM
To: Stuart Campbell; Shaun Nicholson; Neil Sutherland (sutherland.nm@groupgs.com); 'Brian Lees'
Subject: Altitude 1

Gents

My notes and outcomes of the meeting with Council today are as follows:

In attendance:

Tweed Shire Council	Metricon
Vince Connell	Stuart Campbell
Patrick Knight	Brian Lees
Lindsay McGavin	Neil Sutherland
Petria Jukes	Darryl Anderson
John Zawadzki	
Mick Denny	
Peter Pennycuik	
Danny Rose	

Item 1 – Broadwater Parkway

Patrick Knight tabled two concept design options for the alignment of Broadwater Parkway copies of which are attached. Option 1 only involves acquisition from two properties and is preferred in that respect. However, **Brian** as discussed could you refine the design and address the intersection spacing including, if possible, moving the

alignment to the east to avoid the EEC and locating the alignment in the outer 50m of the 100m wetland buffer. You can obtain CAD copies of the drawings from Paul Morgan (paulm@tweed.nsw.gov.au).

Option 2 in my view does not warrant further consideration in view of its obvious implications for Altitude 1.

Item 2 – Temporary Intersection Fraser Drive

Patrick Knight accepted in principle that a temporary intersection is feasible and based on the additional plans tabled by Brian, John Zawadzki generally acknowledged that a satisfactory intersection design could be achieved however Patrick does not support the temporary intersection beyond about 50 lots and his strongly preferred position is that Broadwater Parkway be constructed up front but he acknowledged the funding difficulties and delays in obtaining the road corridor. I think he will be amenable to a temporary intersection for up to about 150 lots as long as Metricon are committed to have the Parkway constructed prior to release of say the 151 lot subject to Council acquiring the corridor.

Item 3 – Finalising Draft Development Control Plan and Section 94 Plan

Vince and Patrick indicated that they do not support Altitude 1 until the Development Control Plan and Section 94 Plan are in place. They indicated that this could be done within about four months and Vince is to submit a report to Council hopefully to the May meeting advising Councillors of the present status of the Development Control Plan and the proposed way forward.

Item 4 – Section 94 Contributions

Patrick Knight advised that unless all applicable contributions were paid Council could not support Altitude 1 as funds would not be available from any other source to provide the infrastructure. As this would exceed the \$20000 cap the Department of Planning would have to agree to the final amount. I advised the meeting that I had forwarded an email request to Chris Wilson at the Department of Planning seeking his advice in relation to the Department agreeing to an amount greater than \$20000.

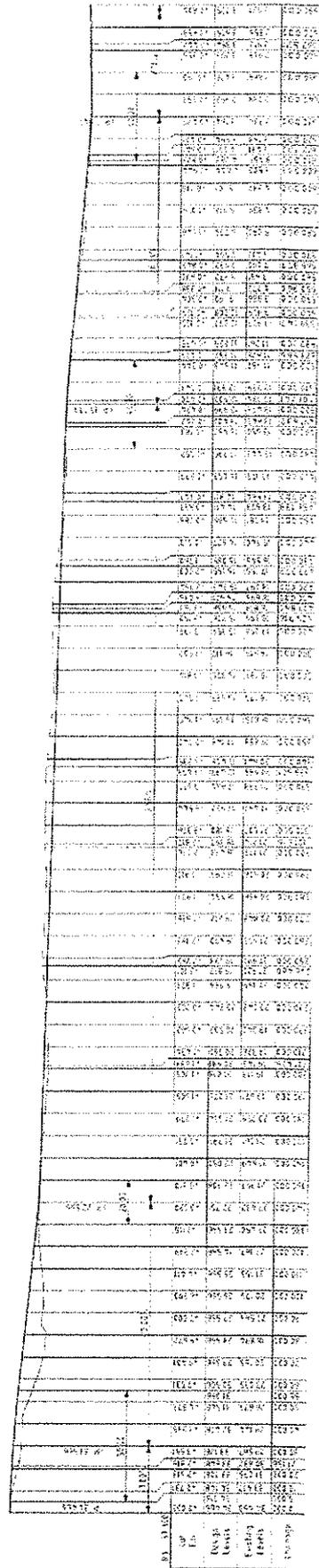
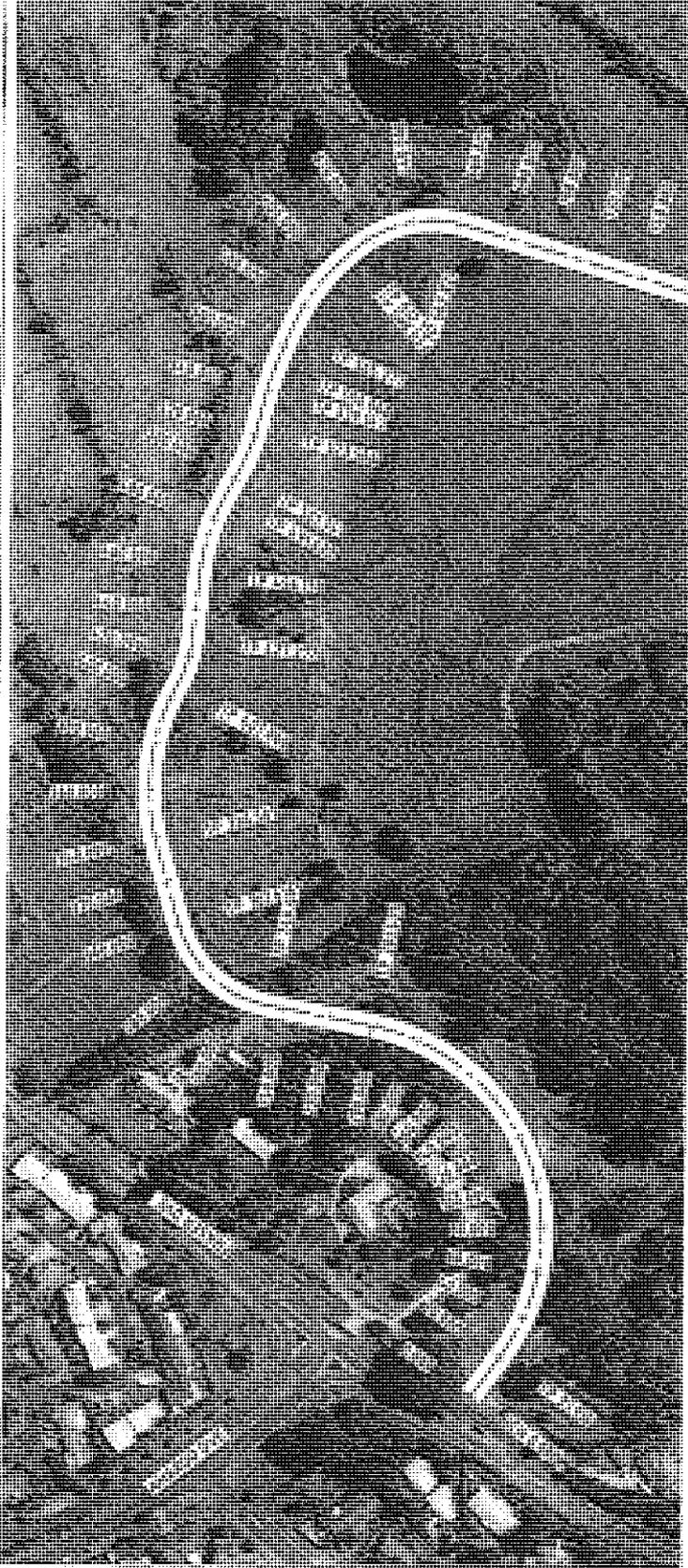
It was agreed that because Attitude 1 is within a discrete catchment and includes independent stormwater quality management measures a credit for the total Area E stormwater contribution should be justifiable. On that basis contributions would be as follows:

Draft Section 94 Plan No. 27 – Tweed Shire Urban Release Area E

Active Open Space	2584.40
Casual Open Space	Not applicable to Altitude 1 as casual open space will be dedicated and embellished on site.
Wetland	1154.84
Habitat	483.21
Community Buildings	1382.24
Cycleway	335.47
Stormwater	A credit should apply as Altitude 1 will provide independent stormwater management facilities.
SUBTOTAL	5940.16

Current Section 94 Plans

Tweed Shire Council Administration	1759.90
Cycleway	447.00
TRCP	13527.00
Library	792.00
Bus Shelter	60.00
Cemetery	120.00



001202

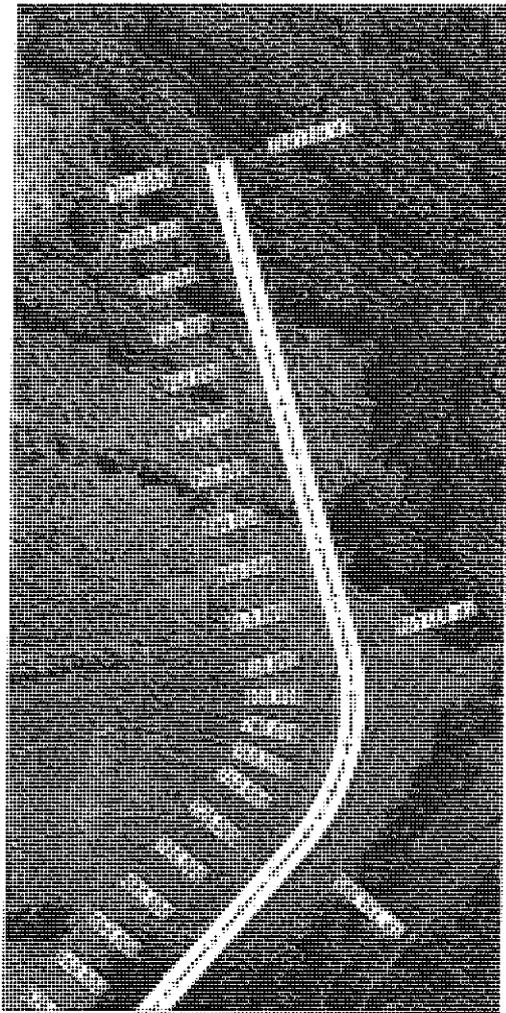
PROJECT: MAHERS LANE - FRASER DRIVE, BANDORA PT
 DRAWING NUMBER: []

PLAN TITLE: PROPOSED CONNECTION ROAD
 SHEET 1 OF 3 SHEETS
 ISSUE: A

DATE: []
 DESIGN ENGINEER: []
 CHECK ENGINEER: []
 DESIGN NO.: []
 SHEET NO.: []
 REVISION NO.: []

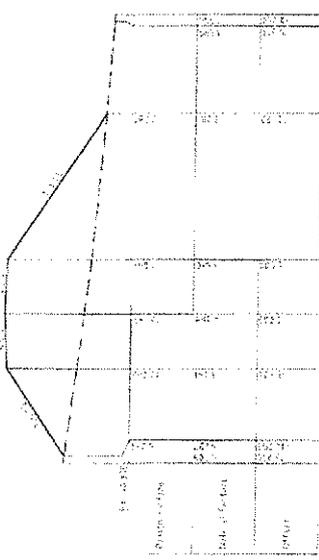
DESIGN UNIT: []
 TWEED SHIRE COUNCIL

THIS SHEET MAY BE REDUCED

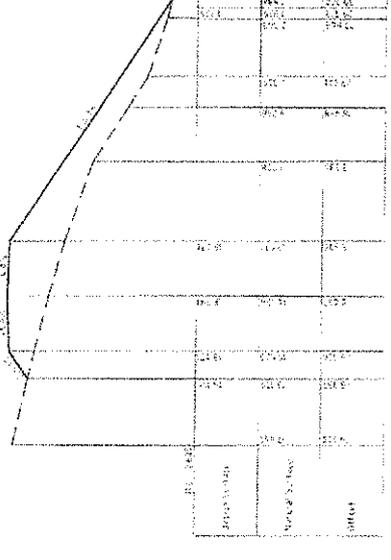


PLAN
 AT SCALE 1:1000 0 10 20 30 40 50 60 70 80 90 100 110 120 m
 AS SCALE 1:2500

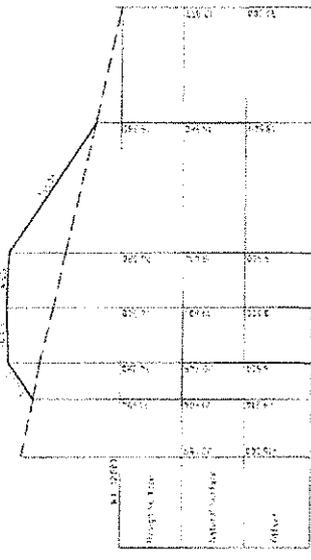
VOLUMES		NET (FILL)
CUT	FILL	
18804 Cu. M.	38375 Cu. M.	19481 Cu. M.



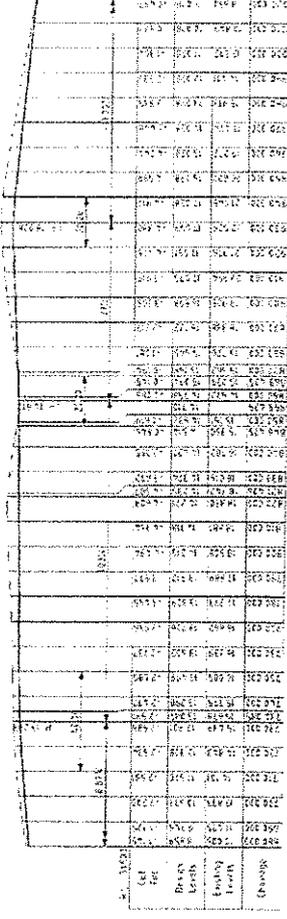
Ch 240.000



Ch 180.000



Ch 120.000



LONG SECTION
 AT SCALE 1:200 (VERTICAL AS APPLICABLE)

TWEED SHIRE COUNCIL

DESIGN UNIT
 COUNCIL OFFICE
 TWEED HEADQUARTERS, 114
 MOORE ST, TWEED HEAD
 PHONE 01 674 240
 WEBSITE www.tweedshire.nsw.gov.au

PROJECT: MAHERS LANE - FRASER DRIVE, BANORA PT
 PROPOSED CONNECTION ROAD
 PLAN, LONG SECTION, VOLUMES
 AND SAMPLE CROSS SECTIONS

DRAWING NUMBER: 0015021
 SHEET 2 OF 3 SHEETS
 ISSUE: A

DATE: _____
 CHECKED BY: _____
 DESIGNED BY: _____
 DRAWN BY: _____
 PROJECT NO: 2700
 SURVEY NO: _____
 DESIGN NO: _____
 COORDINATOR: _____

ACAD FILE NO: C:\ARCHCAD\PLAN\118\118.PIC

Brian Lees

From: Peter Pennycuick [PeterP@TWEED.nsw.gov.au]
Sent: Tuesday, 4 May 2010 11:54 AM
To: Brian Lees
Cc: Anthony Burnham; Cheryl Jackson
Subject: Area E - Altitude Sewer Connection
Attachments: image001.png; image002.png

Brian,

My preliminary analysis of the receiving sewer system proposed for Altitude shows that:

1. The PWWF from Altitude is 23L/s
2. The PWWF from Terranora Village is 39.3L/s
3. Other gravity flows into the receiving sewer system prior to the collector manhole is 18.3L/s
4. Total PWWF into SPS3018 is 104L/s without Altitude and 127L/s with it.
5. The Receiving Gravity Sewer has two controlling reaches.
 - a. One with capacity of 60.3L/s where the total flow is 62.3L/s. – An interconnection between this and a parallel 225 sewer will permit overflow to be transported satisfactorily provided the interconnection does actually work.
 - b. One with a capacity of 76.1L/s where the total flow is 80.6L/s. This section may work satisfactorily under head but a proper hydraulic analysis would be necessary to confirm.
6. The current theoretical capacity of the SPS3018 pumps is 91L/s at 36.4m head, but a recent test indicated performance at 75L/s. Investigations into the condition of the pumps has been ordered, but the upgrade that would be required to pump the total flow including Altitude would require pumps with a duty of 127L/s at 58m head. That equates to 120kW pumps based on an efficiency of 60%, not allowing for some degradation over time. This is a significant upgrade over the existing 55kW pumps and may not be able to be accommodated on the site. Capacity of the wet well is another issue that has not been investigated to date, but the volume for the ten starts per hour criterion indicates that an operating range in excess of 1.6m in the current well would be necessary. This would drown the inlet and reticulation system.

Consequently, it is difficult to give an indication that the proposed connection to the gravity sewer in Fraser Drive is possible. At best, I would be reluctant to give an approval for a peak flow of 5 to 8 L/s as an interim solution which would not be adequate for the proposed development.

The full development of 300 lots will require some implementation of infrastructure proposed for the total development of Area E.

Peter Pennycuick Strategic and Assets Engineer
Community and Natural Resources - Water Unit



p (02) 6670 2638 f (02) 6670 2751 e peterp@tweed.nsw.gov.au w www.tweed.nsw.gov.au
Civic and Cultural Centre Tumbulgum Road Murwillumbah NSW 2484 PO Box 816 Murwillumbah NSW 2484 ABN: 90 178 732 496

Customer Service: (02) 6670 2400 : 1300 292 872

Our values: transparency · customer focus · fairness · reliability · progressiveness · value for money · collaboration

Please consider the environment before printing this document. If you do not need this document, please do not print it.

From: Fredy Reys [mailto:Fredy@bradlees.com.au]
Sent: Wednesday, 24 March 2010 1:11
To: Peter Pennycuick
Cc: Brian Lees
Subject: RE: File Note BradLees Consulting Mtg 11-3-2010.doc

Hi Peter,

Thanks for the information - although not quite what we wanted to hear!

We shall await the outcome of Friday's meeting.

Should you require any further information please do not hesitate to contact our office.

Regards

Fredy

Fredy Reyes
Civil Designer
for and on behalf of
BradLees Consulting

Level 1, 34 Thomas Drive, Chevron Island QLD 4217 - PO Box 2293, Southport QLD 4215 Ph. 07 5528 6411 Fax 07 55286422

8 Pikki Street, Maroochydore QLD 4558 - PO Box 1722, Sunshine Plaza QLD 4558 Ph. 07 5451 1994 Fax 07 5451 1963

Unit 29, 11 - 13 Pearl Street, Kingscliff NSW 2487 - PO Box 1623, Kingscliff NSW 2487 - Ph 02 6674 8133 Fax 02 6674 5003

From: Peter Pennycuick [mailto:PeterP@TWEED.nsw.gov.au]
Sent: Wednesday, 24 March 2010 7:17 AM
To: Fredy Reyes
Subject: RE: File Note BradLees Consulting Mtg 11-3-2010.doc

Fredy, Brian,

My manager has vetoed the possibility of using the supply from the 600mm trunk main, so I don't know where that leaves your project.

The proponents are apparently coming to DAP on Friday and the information I am preparing for that meeting will exclude the 600mm main option.

Regards

Peter Pennycuick Strategic and Assets Engineer
Community and Natural Resources - Water Unit



p (02) 6670 2638 f (02) 6670 2751 e peterp@tweed.nsw.gov.au w www.tweed.nsw.gov.au
Civic and Cultural Centre Tumbulgum Road Murwillumbah NSW 2484 PO Box 816 Murwillumbah NSW 2484 ABN: 90 178 732 496

Customer Service: (02) 6670 2400 : 1300 292 872

Our values: transparency · customer focus · fairness · reliability · progressiveness · value for money · collaboration

Please consider the environment before printing. This document is confidential and for the use of the person named. If you are not the named person, please do not disseminate or act on the information contained in this document.

From: Fredy Reyes [mailto:Fredy@bradlees.com.au]
Sent: Wednesday, 17 March 2010 4:01
To: Peter Pennycuick
Subject: RE: File Note BradLees Consulting Mtg 11-3-2010.doc

Hi Peter,

Brian Lees

From: Brian Lees
Sent: Monday, 7 June 2010 4:12 PM
To: 'peterp@tweed.nsw.gov.au'
Cc: 'shaunnicholson@metricon.com.au'
Subject: Altitude 1 - Water and Sewer Servicing

Peter,

Thank you for your previous emails regarding the above.

We note comments provided in DAP meeting notes dated 26 March 2010, that interim options to provide supply directly from the 600 mm dia trunk main (previously canvassed at our meeting dated 11 March 2010) are no longer offered and that the section of main through the site is vulnerable to failure.

However, given that our Client, Metricon, has no ability to acquire land as proposed by Council's LEP to construct the ultimate 3 ML reservoir in the south west corner of the estate, and economically it is just not feasible to construct such infrastructure prior to development of Altitude 1, could you please confirm what works could be constructed and what capacity does the existing 600mm dia Duroby main have to service Altitude 1 as an interim measure ?(notwithstanding the trunk main's vulnerability to failure).

In relation to your email dated 4 May 2010 regarding sewer, we understand the difficulty, based on the detail you have provided, in giving approval for a peak flow of 5 to 8 l/s as an interim solution. Although your email suggests that for the 300 lots associated with Altitude 1 some implementation of infrastructure proposed for the total development of Area 'E' will be required.

Can you please confirm or clarify just what infrastructure you are referring to so that we may consider the impacts associated with Altitude 1 ?

We look forward to your reply.

Regards,

Brian Lees
for and on behalf of
BradLees Consulting

Email: brian@bradlees.com.au

Level 1, 34 Thomas Drive, Chevron Island QLD 4217 - PO Box 2293, Southport QLD 4215 Ph. 07 5528 6411 Fax 07 55286422

8 Pikki Street, Maroochydore QLD 4558 - PO Box 1722, Sunshine Plaza QLD 4558 Ph. 07 5451 1994 Fax 07 5451 1963

Unit 29, 11 - 13 Pearl Street, Kingscliff NSW 2487 - PO Box 1623, Kingscliff NSW 2487 - Ph 02 6674 8133 Fax 02 6674 5003

Please Note: We have relocated to level 1, 34 Thomas Drive, Chevron Island. Our phone, fax and PO Box will remain the same.

Brian Lees

From: Peter Pennycuick [PeterP@TWEED.nsw.gov.au]
Sent: Thursday, 14 October 2010 7:32 AM
To: Brian Lees
Cc: Anthony Burnham; Cheryl Jackson
Subject: RE: Altitude 1 - Water and Sewer Servicing
Attachments: image001.png; image002.png; image003.jpg

Brian,

As a brief update, we are currently looking at alternative strategies to service the proposed Altitude development.

Water:

About 2ML reservoir at Chambers Reservoir of which 1/3 capacity would be for Altitude and balance for future densification within the existing Chambers Zone. It may be possible for a smaller size if we think we will get better demand management over time. Note, our sizing is based on the new version of our D11 which was released about 6 weeks back – see the Website.

The terrain would require a booster pump station for the upper levels and several pressure reducing valves for the lower levels. It would be necessary for the reservoir to be built as a priority with the first stage as Chambers is already fully committed with its current zone.

Mains to and from the reservoir need to be looked at to determine any upgrades but it is thought that a main from the reservoir to Altitude would be necessary for PH demand.

Sewer:

Our thinking is that the point of connection would be the Banora Point WWTP with possible earlier stage connection points. I have started to construct a model of the gravity system to confirm whether there is capacity leading to SPS3018. The option is to construct a main to SPS 3018 rising mains and inject into one of them (parallel mains) and how we work that. The extreme situation may require a new SRM to the inlet works – an extra 2k in a crowded corridor.

With the gravity suggestion, the first reaches should be no problem but once it reaches the flat section where there is an interconnection with the local gravity system, capacity at PWWF may become an issue. Also, the capacity of the SPS and whether we can upgrade it further may be a limit.

I hope to investigate these issues further and see if we can get a clear strategy for the way forward during the next couple of weeks.

Regards

Peter Pennycuick Strategic and Assets Engineer
Community and Natural Resources - Water Unit



p (02) 6670 2638 f (02) 6670 2751 e peterp@tweed.nsw.gov.au w www.tweed.nsw.gov.au
Civic and Cultural Centre Tumbulgum Road Murwillumbah NSW 2484 PO Box 816 Murwillumbah NSW 2484 ABN: 90 178 732 496

Customer Service: (02) 6670 2400 | 1300 292 872

Our values: transparency | customer focus | fairness | reliability | progressiveness | value for money | collaboration

we also consider the environment | www.tweed.nsw.gov.au | www.tweed.nsw.gov.au | www.tweed.nsw.gov.au | www.tweed.nsw.gov.au | www.tweed.nsw.gov.au

From: Brian Lees [<mailto:brian@bradlees.com.au>]
Sent: Monday, 11 October 2010 3:03
To: Peter Pennycuick
Subject: RE: Altitude 1 - Water and Sewer Servicing

Brian Lees

From: Peter Pennycuick [PeterP@TWEED.nsw.gov.au]
Sent: Thursday, 25 November 2010 7:52 AM
To: Brian Lees; Darryl Anderson
Cc: Anthony Burnham; Vince Connell; Patrick Knight; Iain Lonsdale; Joshua Townsend; Rowena Michel; Cheryl Jackson
Subject: Altitude Aspire MP09_0166 - Area E
Attachments: image001.png; image002.png; Altitude Preliminary Stand Alone Sewer Strategy.pdf; Altitude Preliminary Stand Alone Water Strategy.pdf

Brian Lees (BradLees Consulting),
Darryl (Darryl Anderson Consulting),

Attached are the preliminary strategy plans for the servicing of Altitude Aspire as a stand alone development that were tabled by Water Unit at the meeting on Wednesday 24 November.

Please note that these have not been finalised and sizing and staging, if any, of the works has not been determined.

With reference to sewer, much depends upon whether it is physically possible to upgrade SPS3018 sewer pump station on its existing site. The proposed strategy as presented has a local sewer pump station in the development with a rising main to the gravity sewer in Fraser Drive, a significant upgrade of the SPS 3018 which will also need to include any upgrade for the current loading on SPS3018 which appears to be greater than the current pumps were sized for, and a new parallel main to the Banora Point WWTP. If SPS3018 cannot be adequately upgraded on the existing site, the rising main from the Altitude SPS may have to bypass the section of gravity sewer in Fraser Drive and connect to the proposed parallel main. A full analysis of the total system has not yet been completed.

The water supply strategy features a new reservoir at Chambers Reservoir, a distribution main from the reservoir to the development and three distinct pressure zones – a high level area above 70mAHD requiring a pressure boosting pump station, a low level zone below 35mAHD requiring a number of pressure reducing valve (PRV) installations and the zone between those levels fed directly from the proposed reservoir. It is possible, but not yet confirmed by analysis, that the existing main that fills Chambers reservoir and WPS 22 on Fraser Drive will be adequate for the filling of the new reservoir as well. The new reservoir should be built to have the same elevations for floor and TWL as the existing reservoir so that they will both operate together.

Further analysis of these strategies will be required to confirm the extent of works necessary.

Peter Pennycuick Strategic and Assets Engineer
Community and Natural Resources - Water Unit



p (02) 6670 2638 f (02) 6670 2751 e peterp@tweed.nsw.gov.au w www.tweed.nsw.gov.au
Civic and Cultural Centre Tumbulgum Road Murwillumbah NSW 2484 PO Box 816 Murwillumbah NSW 2484 ABN: 90 178 732 496

Customer Service: (02) 6670 2400 1300 292 872

Our values: transparency · customer focus · fairness · reliability · progressiveness · value for money · collaboration

... consider the environment

This email (including any attachments) is confidential and must only be used by the intended recipient(s) for the purpose(s) for which it has been sent. It may also be legally privileged and/or subject to copyright.

If you are not an intended recipient, any disclosure, distribution, copying or use of or reliance on this email (or any attachment) is strictly prohibited. If you have received this email in error, please promptly notify the sender by return email and then delete all copies of this email (and any attachments).

If you forward or otherwise distribute this email (or any attachment) you may be personally liable for a breach of confidentiality, an infringement of copyright, defamation or other legal liability.
Any opinions, views or conclusions expressed in this email (or any attachment) are those of the individual sender and may not necessarily reflect the official position of the Council.
www.tweed.nsw.gov.au

This email has been scanned by the MessageLabs Email Security System

Legend

PMP_ST

NODE_TYPE

- Proposed SPS
- Proposed Upgrade
- Existing_Manholes

Rising_Mains

PIPE_TYPE

- Existing Rising Mains
- Proposed Rising Mains

Gravity_Mains

PIPE_TYPE

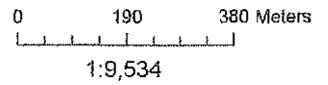
- Proposed Gravity
- Existing Gravity

TSC_cadastre_July2010

Banora Point Sewerage Treatment Plant (STP)

SPS 3018
Proposed Upgrade

Proposed SPS



Altitude Aspire Stand Alone Sewer Strategy

Information and/or data supplied by the Council is for general guidance only and should not be used for survey or construction purposes and prior to any excavations a "Dial before You Dig" enquiry must be made by calling 1100. The information contained on this document remains valid for 30 days only from the date of supply.

Disclaimer: While every care is taken to ensure the accuracy of this data, Tweed Shire Council makes no representations or warranties expressed or implied, statutory or otherwise, about its accuracy, reliability, completeness or suitability for any particular purpose and disclaim all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which may be incurred as a result of data being inaccurate in any way and for any reason. This information is supplied for the general guidance and is to be considered indicative and diagrammatic only. It should not be used for survey or construction purposes and prior to any excavations a "Dial before You Dig" enquiry must be made by calling 1100. The information contained on this document remains valid for 30 days only from the date of supply.



Cadastre 14 October, 2008
© Dept. of Lands & Tweed Shire Council

Coordinate System - MGA Zone 56
Datum - GDA 94

DO NOT SCALE
COPY ONLY - NOT CERTIFIED

Civic and Cultural Centre
3 Tumbulgum Road
Murwillumbah NSW 2484
PO Box 816
Murwillumbah NSW 2484

T | (02) 6570 2400 / 1300 282 872
F | (02) 6570 2429
W | www.tweed.nsw.gov.au
E | planning@tweed.nsw.gov.au



TWEED
SHIRE COUNCIL

David Holstein

From: David Holstein
Sent: Wednesday, 27 June 2012 4:10 PM
To: Peter Pennycuick - TSC
Subject: Altitude Aspire - Sewerage

Peter

Thanks again for your time today.

As discussed, I have used the WSA method to determine PWWF for the RSPS catchment (including SPS3033 and Parkes Lane development). The table below includes these calculations.

As per our conversation, I have calculated the peaking factor and rainfall intensity factor assuming the whole of the RSPS gravity catchment (Altitude, Parkes Lane and Fraser Drive Precinct) and used this to calculate the PWWF for each of these three sub-catchments.

Stage (sub-catchment)	Transitional Lots/Large Lots	Suburban Lots	Small Lot and Medium Density Lots	Neighbourhood Planning Housing	Shop-top & Village Centre Residential	Equivalent Tenament (ET)	Equivalent Population (EP)	ADWF (L/s)
Altitude Aspire						321	1027	2.16
Parkes Lane						110	352	0.74
SPS3033						491	1571	3.30
Fraser Drive Precinct	0	12	0	32	0	44	141	0.30
Mahers Lane Precinct	8	428	174	0	0	602	1926	4.05
Central Precinct	60	265	58	114	120	437	1398	2.94
TOTALS	68	705	232	146	120	2005	6416	13.4

The PWWF:ADWF ratio's are a little on the high side (10 – 17) but as you pointed out last time we spoke, using 240L/EP/day for the ADWF, these become closer to the expected 6 - 8.

Can you please advise if you have any issues with these numbers?

You advised today that 82l/s modelled in SWMM did not surcharge the 300dia gravity line, but may result in surcharging of (connecting) downstream pipes (near to SPS3018) – augmentation of a small section of line may be required to prevent this occurring. Note that discharge through this 300dia main is a temporary connection, and a VFD can be used on the pumps at the RSPS to reduce the flow rate during most periods (except PWWF events).

Our strategy is to delay the construction of the RM from the RSPS as long as possible due to the constraints with the alignment we discussed (private property, EEC's, existing pipework alignment).

As discussed, can you also please advise if there are any other factors or constraints within the system that you have identified that may impact on this strategy?

Please feel free to call me at any time to discuss.

Regards,
David Holstein
BE (Civil Hons) BBus MIE Aust

Email : davidh@bradleys.com.au



Bradleys
Civil Consulting

Bradford Lees Pty Ltd ABN 29 064 159 191

Ph 07 5528 6411 Fax 07 5528 6422

Web www.bradleys.com.au Email mail@bradleys.com.au

Postal PO Box 2293, Southport QLD 4215

Gold Coast Office Level 1, 34 Thomas Drive, Chevron Island QLD 4217

David Holstein

From: David Holstein
Sent: Tuesday, 10 July 2012 11:28 AM
To: Peter Pennycuick - TSC
Subject: FW: Altitude Aspire - Sewerage

Peter

Thanks for your time again today.

Our main focus is to ensure there are no 'showstoppers' to using the 300dia gravity main up to 82l/s.

I understand that you are very busy and appreciate any time you can spare to have a close look at this.

As discussed, I will call you in another couple of days.

Regards,
David Holstein
BE (Civil Hons) BBus MIE Aust

Email : davidh@bradlees.com.au



Bradlees
Civil Consulting

Bradford Lees Pty Ltd ABN 29 064 159 191

Ph 07 5528 6411 Fax 07 5528 6422

Web www.bradlees.com.au Email mail@bradlees.com.au

Postal PO Box 2293, Southport QLD 4215

Gold Coast Office Level 1, 34 Thomas Drive, Chevron Island QLD 4217

From: David Holstein
Sent: Wednesday, 27 June 2012 4:10 PM
To: Peter Pennycuick - TSC
Subject: Altitude Aspire - Sewerage

Peter

Thanks again for your time today.

As discussed, I have used the WSA method to determine PWWF for the RSPS catchment (including SPS3033 and Parkes Lane development). The table below includes these calculations.

As per our conversation, I have calculated the peaking factor and rainfall intensity factor assuming the whole of the RSPS gravity catchment (Altitude, Parkes Lane and Fraser Drive Precinct) and used this to calculate the PWWF for each of these three sub-catchments.

Stage (sub-catchment)	Transitional Lots/Large Lots	Suburban Lots	Small Lot and Medium Density Lots	Neighbourhood Planning Housing	Shop-top & Village Centre Residential	Equivalent Tenament (ET)	Equivalent Population (EP)	ADWF (L/s)
Altitude Aspire						321	1027	2.16
Parkes Lane						110	352	0.74
SPS3033						491	1571	3.30
Fraser Drive Precinct	0	12	0	32	0	44	141	0.30
Mahers Lane Precinct	8	428	174	0	0	602	1926	4.05
Central Precinct	60	265	58	114	120	437	1398	2.94
TOTALS	68	705	232	146	120	2005	6416	13.4

The PWWF:ADWF ratio's are a little on the high side (10 – 17) but as you pointed out last time we spoke, using 240L/EP/day for the ADWF, these become closer to the expected 6 - 8.

Can you please advise if you have any issues with these numbers?

You advised today that 82l/s modelled in SWMM did not surcharge the 300dia gravity line, but may result in surcharging of (connecting) downstream pipes (near to SPS3018) – augmentation of a small section of line may be required to prevent this occurring. Note that discharge through this 300dia main is a temporary connection, and a VFD can be used on the pumps at the RSPS to reduce the flow rate during most periods (except PWWF events).

Our strategy is to delay the construction of the RM from the RSPS as long as possible due to the constraints with the alignment we discussed (private property, EEC's, existing pipework alignment).

As discussed, can you also please advise if there are any other factors or constraints within the system that you have identified that may impact on this strategy?

Please feel free to call me at any time to discuss.

Regards,
David Holstein
 BE (Civil Hons) BBus MIE Aust

Email : davidh@bradleys.com.au



Bradlees
 Civil Consulting

Bradford Lees Pty Ltd ABN 29 064 159 191

Ph 07 5528 6411 Fax 07 5528 6422

Web www.bradlees.com.au Email mail@bradlees.com.au

Postal PO Box 2293, Southport QLD 4215

Gold Coast Office Level 1, 34 Thomas Drive, Chevron Island QLD 4217

David Holstein

From: Peter Pennycuick <PeterP@TWEED.nsw.gov.au>
Sent: Wednesday, 18 July 2012 12:01 PM
To: David Holstein
Subject: RE: Altitude Aspire - Sewerage

Hi David.

I have reviewed the flows you calculated and note that the two main areas of difference between my PWD calcs and your WSA calcs are the storm allowance from the Parkes Lane Area and the area and number of ETs for the balance of Area E.

In relation to the latter, I had a larger area but fewer ETs. I have adjusted my area and ETs to match your calculation as it was probably based off better information than mine. Mine was a rough total area and average rate across that area.

I agree that my Parkes Lane figure for storm allowance based on area may be high but basing it on per connection may be low. Your flow from the area is between my two extremes, so I am happy to agree with WSA here.

The only other real mystery in your calcs is how you arrived at the rainfall intensity of 65.289 mm/hr. My WSA spreadsheet calculates the size factor as 0.945 which results in an intensity of 63.884mm/hr and hence a slightly less flow.

Consequently, I have no issue with accepting your calculated flows for the catchment, perhaps rounded out to a total of 165L/s.

I have not yet had a chance to look at the flow in the gravity system again.

Peter Pennycuick | Acting Manager
Community and Natural Resources - Water Unit



p (02) 6670 2638 | f (02) 6670 2751 | e peterp@tweed.nsw.gov.au | w www.tweed.nsw.gov.au
Civic and Cultural Centre Tumbulgum Road Murwillumbah NSW 2484 | PO Box 816 Murwillumbah NSW 2484 | ABN: 90 178 732 496

Customer Service: (02) 6670 2400 | 1300 292 872

Our values: transparency | customer focus | fairness | reliability | progressiveness | value for money | collaboration

Please consider the environment before printing this email. One tonne of paper is equivalent to 13 trees and 30 kL of water

From: David Holstein [<mailto:DavidH@bradleys.com.au>]
Sent: Wednesday, 18 July 2012 10:24
To: Peter Pennycuick
Subject: RE: Altitude Aspire - Sewerage

Peter

Please refer below.

Regards,
David Holstein
BE (Civil Hons) BBus MIE Aust