Our Ref: Q144007
Our Contact: Mr Dominic Hammersley
Council Ref: 8/13/1481(3693529)

15 April 2015

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Chief Executive Officer
Douglas Shire Council
PO Box 723
MOSSMAN QLD 4873

BY EMAIL: neil.beck@douglas.qld.gov.au

ATTENTION: NEIL BECK

Dear Neil,

RESPONSE TO FURTHER ISSUES (MARCH 2015) - RECONFIGURING A LOT (1 INTO 72 LOTS AND PARK) VIXIES ROAD, WONGA BEACH Property Description: Lot 32 on SP126925

Property Location: Vixies Road, Wonga Beach

Council Reference: 8/13/1481

Further to the Douglas Shire Council (Council) email communication dated 17 March 2014 please find following our response to Council's final information request.

Council's information requests are presented in bold and italics, followed by our response.

A. Drainage

On initial review the Flood Study report appears to address most of items 1a. to 1i. of Council's letter.

The outcomes are peak water levels in the range 3.15 to 3.45m which is generally consistent with the historical development levels in the local areas and beach suburbs in Far North Queensland.

Council considers that levels in this range are likely to have expected immunity from stormtide for lots outside the wave effects zone.

On further review Council has the following additional queries and requests advice on these from the applicant:

1 Level data

a. The source of site levels is advised as being LIDAR data sourced from DNRM. A comparison to Council's LIDAR level data appears to show significant differences in levels (up to 1m). The applicant is requested to confirm the veracity and application of the data and any field checking done to confirm the datum.

It is noted that Council's request of 2012 was for detailed site survey with the following advices provided in that letter:

> ***"For a site this size and proximity to adjacent drainage corridors the assessment should have regard to detailed site conto ur data.***
> ***The lack of detailed survey data impacts on the ability to fully assess the si te constraints."***

Response:

We confirm that the Lidar data was obtained from DNRM. The Lidar was part of the "2010 Cairns Lidar DEM" dataset.

We also confirm that a detailed survey of the road culverts on Vixies Road was undertaken. In addition, spot levels within the subject site were surveyed by C&B Group in November 2007. A copy of this survey is attached as drawing 62786-3a as received from Conics. A comparison of the surveyed spot levels in the vicinity of Lots 37, 38 and 39 to the Lidar levels is shown in Table 1 below.

Table 1. Comparison of Survey Levels

Survey Point	C&B Level (mAHD)	Lidar Level (mAHD)	Difference (m)
9002	5.11	5.16	+0.05
9015	2.24	2.28	+0.04
9015 (East)	2.98	3.02	+0.04
9016	3.12	3.18	+0.06
9017	3.37	3.56	+0.19
9018	3.40	3.54	+0.14
9019	3.57	3.75	+0.18
9020	3.49	3.68	+0.19
9034	3.44	3.63	+0.19
9034 (East)	3.54	3.55	+0.01
9038	3.20	3.36	+0.16
9038 (East)	3.45	3.49	+0.04
9039	3.24	3.33	+0.09
9039 (East)	2.96	3.02	+0.06

These results demonstrate that the Lidar levels are within a range of 0 to 190mm higher than the surveyed ground levels.

Consequently, the Lidar levels are considered reliable and acceptable to use for the Flood Study of the subject site. Given that the Lidar levels are consistently higher than the surveyed ground levels, it is considered that the resultant flood levels are also high and therefore conservative.

b. From Council's comparison of levels, Cardno's plans show Lot 37/38 levels to be 1m higher than the overlay of Council LIDAR would suggest;

Response:

Refer response to Item 1(a).

c. For Lot 39 the overlay of Council's LIDAR suggests that none of the lot is above the 3.15m flood level. The flood mapping showing the building area free in the predevelopment scenarios appears inconsistent with this;

Response:

Refer response to Item 1(a).

2. Modelling

a. Does the modelling rely on flow restrictions at the upstream culverts and would this have any impact if they were upgraded to have increased capacity in the future?

Response:

The peak flood levels within the site are controlled by downstream conditions, including:

- the dense vegetation in the swales downstream of the site;
- the relatively long distance along the drainage swales to the ocean outfall; and
- the adopted tailwater level boundary conditions (e.g. HAT, Storm Surge, etc.).

Therefore, possible future upgrading of the culverts under Vixies Road by Council would not impact on the peak flood levels in the drainage swales through the subject site.

b. Does the modelling already include the proposed filling on the lots? If so, please confirm the fill boundary assumption.

Response:

The modelling does not include any proposed filling on the lots. It is assumed that balanced cut-to-fill earthworks will be carried out within each lot to provide the required fill pads. As shown by the flood model results for developed conditions, the construction of these pads will not affect flood levels within the site.

b. What is the cutting and filling proposed and the resulting freeboard that will be provided to the building envelopes? Is fill proposed to be won from cut and fill on site or is fill to be imported as part of the development?

Response:

Cutting and filling is proposed only to the extent that local depressions are filled and so that all lots will either drain to the road drain, the side drains or the main drainage swale. It is proposed that a minimum freeboard of 300 mm will be provided to all habitable floor levels.

c. Does the modelling consider the implications (afflux, channel restrictions) for the proposed crossing of the drainage channel for the access to proposed lot 39 off South arm drive.

Response:

It is not proposed to construct a road access to Lot 39 from South Arm Drive. An access will now be provided from the internal road within the site. A revised development layout plan showing this access is attached on drawing C03.

e. Does the topographical data in the model include sufficient detail to reflect the access crossing to the north of lot 38 that exists now?

Response:

It is assumed that this query relates to the existing access crossing to the north of Lot 28, not Lot 38. The existing beach access road through Lot 28 is included in the model. The minimum level of the access road over the swale through Lot 28 is approximately 2.4 m AHD. The topographical detail in this area is shown in Cardno Drawing Q144007-001-C02 in Appendix D of the Flood Study.

f. Similarly, does the modelling consider the road link to South Arm Drive between lots 27/28

Response:

The modelling does not include the future road link to South Arm Drive between Lots 27 and 28. The design of this crossing is a detailed design issue and will be carried out as part of the Operational Works application. However, as discussed in the response to Item 2a, the peak flood levels through the site are controlled by downstream conditions. The peak velocities in the drainage swales are extremely low, generally less than 0.2 m/s. As a result, the construction of any road crossings over the drainage swales will not cause a significant impact on flood levels.

g. Are lots 70 to 72 still included as no contours are provided and they are not included in the flood levels in Table 4-5 of the Flood Study? If these lots are included (noting it is an ROL 1 into 72), what are the drainage crossings proposed and the implications for flooding?

Response:

Lots 70 to 72 are included. Contours for these lots are provided in Cardno Drawings Q144007-001-C01 to C03 in Appendix D of the Flood Study. The Drawings also show that access to Lot 70 is between Lots 61 & 62; access to Lots 71 & 72 is between Lots 48 & 49. A revised development layout plan is attached clarifying the access to Lot 71. The peak flood levels in the Major Drainage Swales affecting these lots are as follows:

- Lot 70 – 3.40 mAHD
- Lot 71 – 3.30 mAHD
- Lot 72 – 3.20 mAHD

3 Additional drainage comments:

a. ***Per page 2 bullet F; the existing swales are not proposed to be in drainage reserve or easements. What blockage factors have been applied within these swales as no access is provided for maintenance in the applicants' proposal. Council officers do not support this.***

Response:

We refer to section 4.9 of the Flood Study:

> *A sensitivity analysis was carried out assuming a higher roughness in the major drainage swales through and adjacent to the site. The results showed that the peak flood levels in the site increased by approximately 100 to 250 mm.*

The vegetation in the drainage swales is unlikely to be maintained in the long term. Therefore, it is recommended that the flood levels calculated using the higher roughness values be used to determine development levels in the site.

Therefore, the peak flood levels are based on the assumption that no maintenance work will be carried out in the drainage swales.

The applicant accepts that an easement may be necessary if Council insists. It is pointed out that the entire drainage swale is to be covered by a covenant to prevent tree clearing as required by DEHP.

b. The property side drains connecting the roadside table drains to the swales are proposed to be in easements but will not connect to a lawful discharge point. Please advise what alternative form of tenure/controls will be applying to the swales.

Response:

It is considered that the drainage swales are in fact a lawful discharge point. However, if necessary the Applicant will accept a drainage easement over the drainage swales.

c. Access within the side boundary easements; the text advises that these will be made wider to allow access, please provide a typical section and confirm dimensions to facilitate this.

Response:

Drawing C01 has been amended to show the drain and access detail.

B. Sewerage

Cardno's letter of response references the previous Projex North data.

The letter advises that: "The subdivision site is known to have sandy soil with a groundwater table approximately 2.7m from natural surface level (refer Attachment A). Therefore, a secondary sewage treatment system would be expected to be adequate in this environment. A supplier of onsite sewerage treatment systems has advised that for a secondary system 0.6m clearance to the groundwater is generally required. This is also set out in AS 1547. "

Council notes that groundwater levels can vary throughout the year and can also fluctuate with groundwater movement in high rainfall periods.
Recent developments proposed for Wonga Beach have proposed additional filling to ensure appropriate vertical separation clearance for the effluent disposal areas from the groundwater as required under the code.

With reference to the site level queries above, please provide additional advice on the proposed finished building envelope levels compared with the flood levels and provide comment on how the proposed filling will ensure the appropriate minimum separation distance is achieved for the on-site effluent disposal areas.

Response:

It is agreed that ground water table levels vary throughout the year. However, the evidence available to us suggests that the water table will not rise sufficient to cause a problem for well sited irrigation areas for sewage effluent disposal.

We draw your attention to the attached extracts from an in-depth investigation into effluent treatment and disposal by Gilbert & Sullivan on the property immediately to the south on Lot 51 on SP155078, Vixies Road in March 2013. Clause 3.2.2 states that ground water table levels in the area shown on the attached plan of test locations varied from RL 1.8 to 2.2.

In addition, Projex North, who also undertook extensive studies of the proposed development site and which have been made available to Council previously, found that test holes indicated ground water depths in excess of 1.5m below ground level. Our drawings C01 to C03 have been amended (attached) to indicate the location of the test holes. Based on existing ground levels of RL 3.0 to RL 4.2 the ground water table at the time was no higher than RL 1.7 which correlates well with the southern development investigation.

Whilst the Operational Works detailed design will investigate this matter further we are of the opinion that ground water levels will not exceed a level above 600mm below ground level in the areas to be allocated to site disposal. Additionally, design of individual lot systems will need to take all these factors into account at the time of Building application.

We note that the changed development application continues to remain in the decision making period and we look forward to Council's favourable response.

If you have any questions or require additional information please contact me on (07) 4051 0288 or via email at dominic.hammersley@cardno.com.au.

Yours faithfully,
CARDNO HRP

DOMINIC HAMMERSLEY
BUSINESS DEVELOPMENT MANAGER AND SENIOR PLANNER

Enc. Attachment A – Revised Reconfiguring a Lot Plans

Attachment A – Revised Reconfiguring a Lot Plans
Prepared by Cardno

SOUTH ARM DRIVE

VIXIES ROAD

NORTH

ST1

ST10

ST9

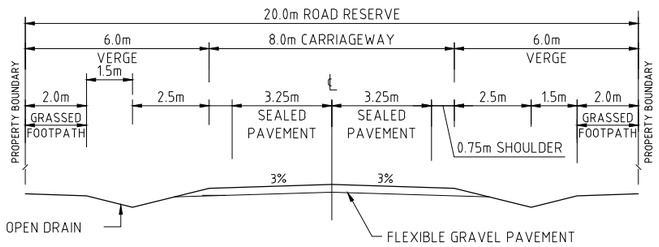
1 6359m²
2 4312m²
3 4030m²
4 4015m²
5 4767m²
6 6073m²
7 4010m²
8 4000m²
9 4000m²
10 4004m²
11 5178m²
12 5019m²
13 5291m²
14 5428m²
15 5473m²
16 5348m²
17 4890m²
18 4756m²
58 5008m²
59 5108m²
60 5147m²
61 5470m²
62 5686m²
63 4647m²
64 4528m²
65 4064m²
66 4024m²
67 4023m²
68 4020m²
69 4000m²
70

2
RP734708

LEGEND:

- 5.0m CONTOUR
- 4.0m CONTOUR
- 3.0m CONTOUR
- 2.0m CONTOUR
- REMNANT VEGETATION
- ST1 SOIL TEST SITES

CONTOUR AND DRAINAGE PLAN - SHEET 1 OF 3
SCALE 1:1000



TYPICAL CROSS SECTION
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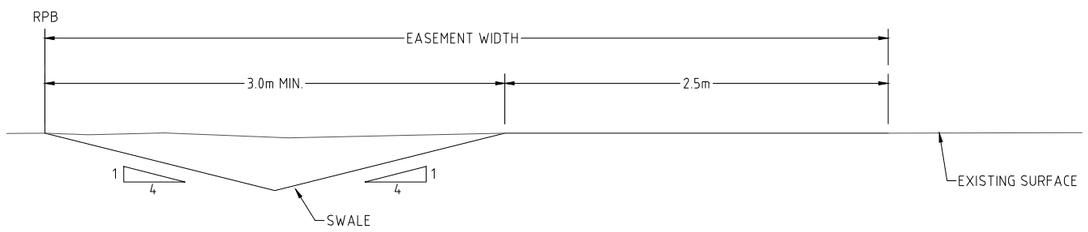

SIDE DRAIN AND ACCESS DETAIL
SCALE 1:20

0 0.5 1 1.5 2m
SCALE 1:20 @A1

0 1 2 4 6 8 10m
SCALE 1:100 @A1

0 20 40 60 80 100m
SCALE 1:1000 @A1

Rev	Date	Description	Des.	Verif.	Appr.
03	25.03.2015	SOIL TEST LOCATIONS ADDED AND DRAIN ACCESS AMENDED			
02	20.11.2014	FOR COUNCIL TOWN PLANNING APPROVAL	AGP	BNC	BNC
01	17.11.2014	PRELIMINARY ISSUE	AGP	BNC	BNC

Verified B.N.CLAYTON Date 24.03.2015
Approved B.N.CLAYTON RPEQ No. 776 Date 24.03.2015

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Drawn AGP Date 24.03.2015
Checked BNC Date 24.03.2015
Designed BNC Date 24.03.2015

Client VIC SCOMAZZON
LOT 32 VIXIES ROAD WONGA BEACH
CONTOUR AND DRAINAGE PLAN - SHEET 1 OF 3

Status FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION PURPOSES
Datum A.H.D. | Date 24.03.2015 | Scale AS SHOWN | Size A1
Drawing Number Q144007-001-C01 | Revision 03

DATE PLOTTED: 30 March 2015 3:35 PM
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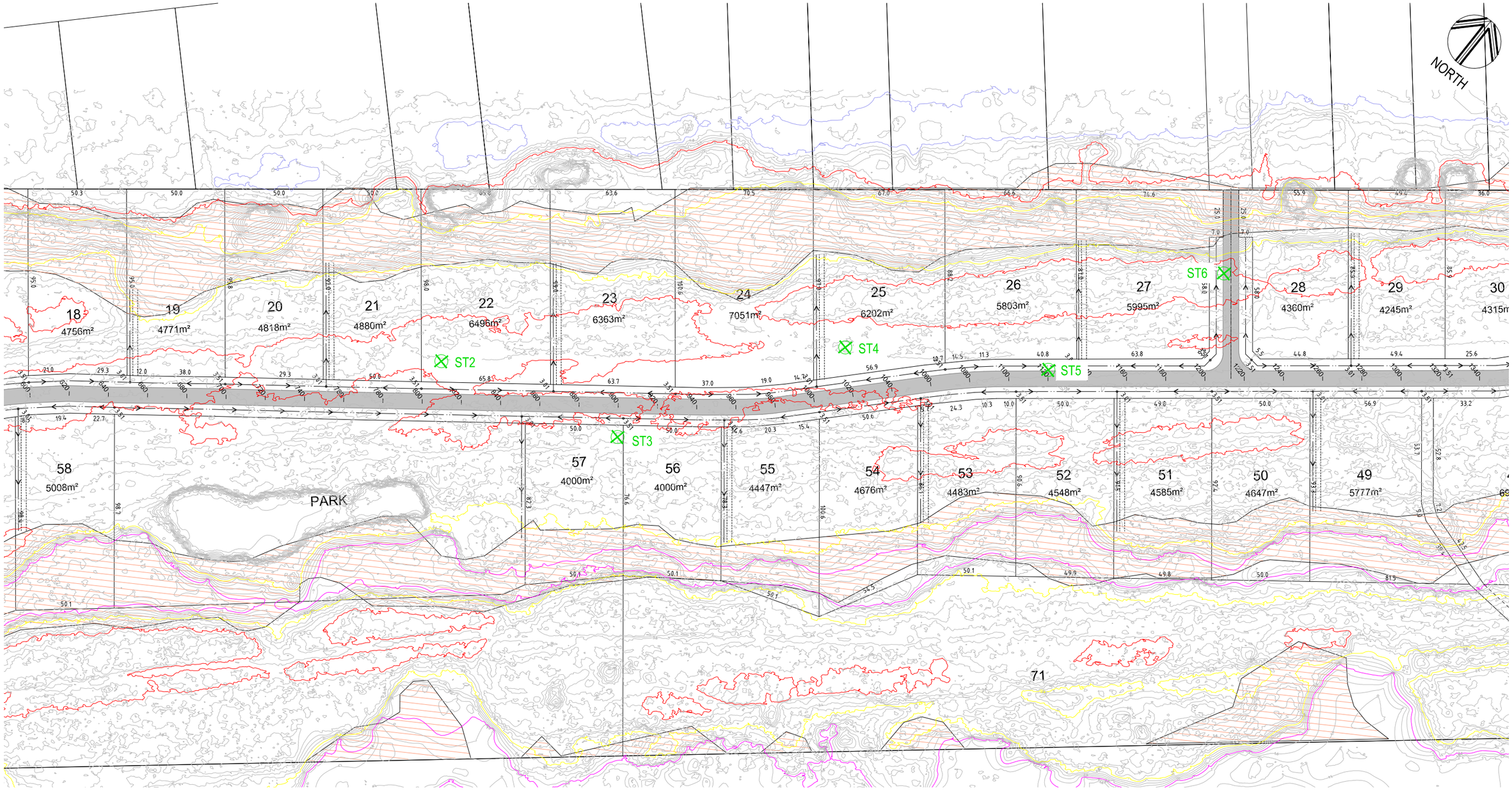

LEGEND:

- 5.0m CONTOUR
- 4.0m CONTOUR
- 3.0m CONTOUR
- 2.0m CONTOUR
- REMNANT VEGETATION
- ST1 SOIL TEST SITES

CONTOUR AND DRAINAGE PLAN - SHEET 2 OF 3

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SCALE 1:1000 @A1

DATE PLOTTED: 30 March 2015 3:35 PM

CAD FILE: H:\2014\144007 - Vixies Road\Design\Acad\Q0144007-001-C02.dwg

Rev	Date	Description	Des.	Verif.	Appr.
03	25.03.2015	SOIL TEST SITES ADDED AND DRAIN ACCESS AMENDED			
02	20.11.2014	FOR COUNCIL TOWN PLANNING APPROVAL	AGP	BNC	BNC
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LOT 32 VIXIES ROAD WONGA BEACH

CONTOUR AND DRAINAGE PLAN - SHEET 2 OF 3

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Datum A.H.D. | Date 24.03.2015 | Scale AS SHOWN | Size A1

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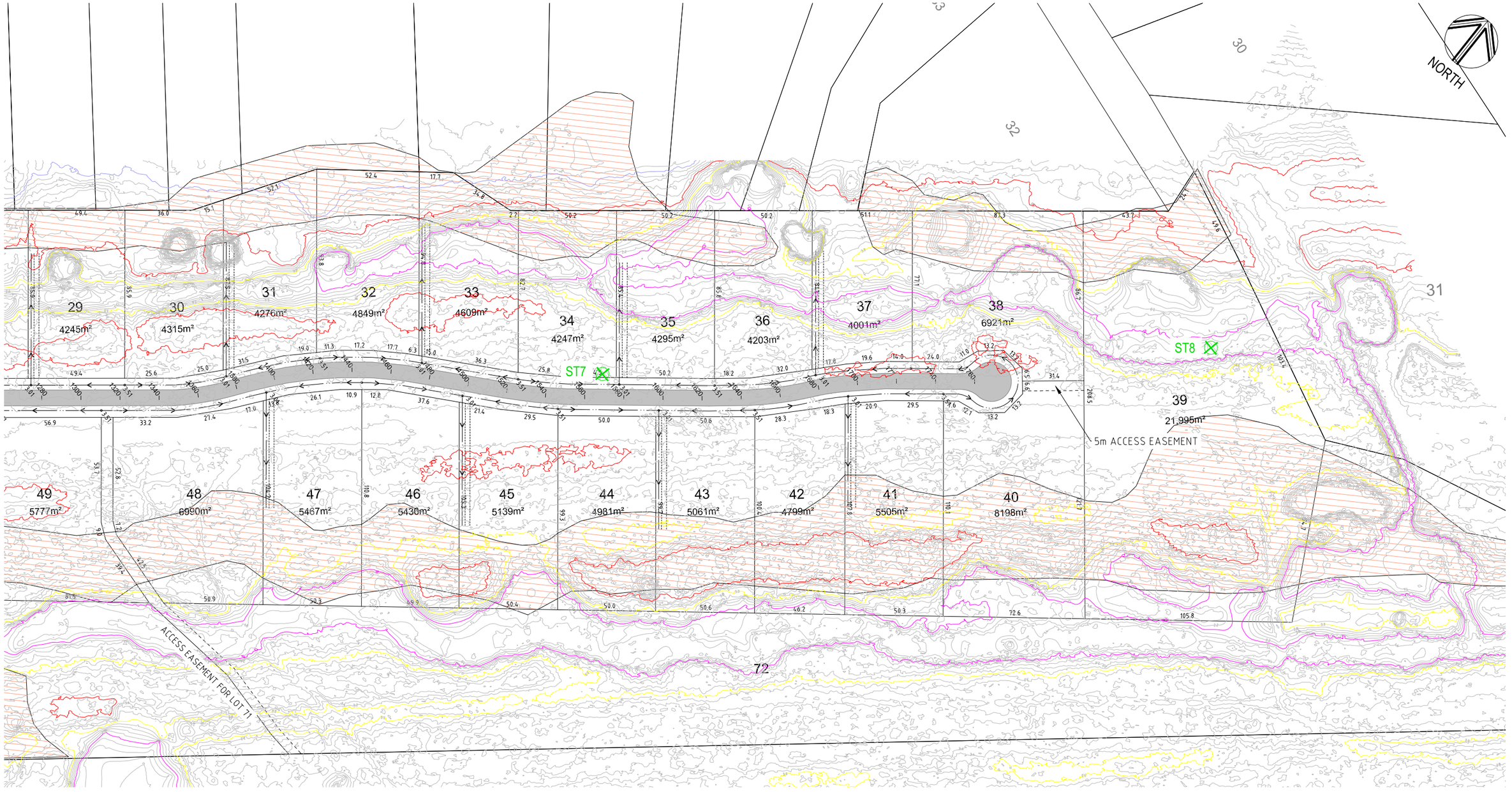

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- 5.0m CONTOUR
- 4.0m CONTOUR
- 3.0m CONTOUR
- 2.0m CONTOUR
- REMNANT VEGETATION
- ST1 SOIL TEST SITES

CONTOUR AND DRAINAGE PLAN - SHEET 3 OF 3

SCALE 1:1000

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SCALE 1:1000 @A1

DATE PLOTTED: 30 March 2015 3:35 PM

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03	24.03.2015	SOIL TEST SITES ADDED AND DRAIN ACCESS AMENDED			
02	20.11.2014	FOR COUNCIL TOWN PLANNING APPROVAL	AGP	BNC	BNC
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Client VIC SCOMAZZON

LOT 32 VIXIES ROAD WONGA BEACH

CONTOUR AND DRAINAGE PLAN - SHEET 3 OF 3

Status FOR APPROVAL
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Datum	Date	Scale	Size
A.H.D.	24.03.2015	AS SHOWN	A1

Drawing Number Q144007-001-C03

Revision 03