coffey geotechnics
SPECIALISTS MANAGING THE EARTH

PROPOSED SUBDIVISION - RIVERSIDE ESTATE PROJECT APPLICATION AND CONCEPT PLAN AREA, TEA GARDENS

Tattersall Lander Pty Ltd

GEOTWARA21006AB-AA
4 April 2011

Coffey Geotechnics Pty Ltd ABN 93 056 929 483
19 Warabrook Boulevard Warabrook NSW 2304 Australia

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

4 April 2011

Tattersall Lander Pty Ltd
PO Box 54
RAYMOND TERRACE NSW 2324

Attention: Bob Lander

Dear Bob

RE: PROPOSED SUBDIVISION

RIVERSIDE ESTATE PROJECT APPLICATION & CONCEPT PLAN AREA, TEA GARDENS

ACID SULFATE SOILS ASSESSMENT

Please find enclosed our report on the above project.

The purpose of the assessment was to provide comments and recommendations on acid sulfate soil conditions within the proposed development area.

Further advice on the uses and limitations of this report is presented in the attached document, *'Important Information about your Coffey Report'.*

If you have any questions regarding this matter please contact Robert Pearce or the undersigned.

For and on behalf of Coffey Geotechnics Pty Ltd.

Arthur Love

Principal Geotechnical Engineer

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1 INTRODUCTION

This report presents the results of an acid sulfate soils (ASS) assessment carried out by Coffey Geotechnics Pty Ltd (Coffey) on behalf of Tattersall Surveyors Pty Ltd for the proposed Riverside Estate Concept Plan area, Tea Gardens.

The work was originally commissioned by Bob Lander of Tattersall Surveyors Pty Ltd on behalf of Crighton Properties Pty Ltd by way of two faxed Authorisation to Proceed forms dated 16 March and 5 April 2007.

The proposed Riverside Estate Project Application is understood to involve the subdivision of the site into a total of 390 dwellings, including dual occupancy dwellings and small lot / medium density development and construction of associated subdivision roads. The proposed Riverside Estate Concept Plan area is located to the north and north east of the Riverside Estate Project Application and is understood to involve the subdivision of the site.

A set of engineering drawings of the proposed development were provided by the client in early February 2009.

2 BACKGROUND

Coffey previously reported the results of this ASS assessment as part of an overall geotechnical assessment of the site (ref: Coffey Report No. GEOTSGTE20248AA-AE, dated 24 October 2007). This report has now been updated to reflect a new concept plan proposal which includes significant less earthworks that the previous proposal. A subsequent report has been prepared in response to a letter prepared by The Department of Environment and Conservation NSW (ref: DOC00/55330; FIL08/2053, dated 19-12-08) and subsequent correspondence with Department of Environment and Climate Change NSW (DECC) staff.

This report presents of the results of the previous field investigation and laboratory testing and provides discussion and recommendations on ASS conditions within the new proposed development area.

3 SITE CONDITIONS

3.1 Site Location

The site is located at Tea Gardens, on the New South Wales mid north coast, within the Great Lakes Council local government area. The site is bounded by Toonang Drive and an existing residential subdivision to the north, undeveloped low lying land adjoining the Myall River to the east, the recently constructed Myall Quays Estate to the south and Myall Way to the west. The site is shown on the attached Site Detail Survey plan.

The total site area is 222.5 ha and comprises proposed development over approximately half this area. Within a concept plan application.

Reference to the Acid Sulfate Soils Risk Map for Port Stephens indicates that the site is located in an area where there is a low probability of occurrence of acid sulfate soil materials within 1m to 3m below the ground surface. The map also indicates that ASS materials, if present, are sporadic and may be buried by alluvium or windblown sediments.

Reference to the Port Stephens Soil Landscape Series Sheet 9332 indicates that the site is underlain by the Tea Gardens soil landscape group. The Tea Gardens landscape is described as narrow beach ridges and swales on Pleistocene quartz sand with local relief <1m, slope gradients <5% and elevation generally between 5m to 8m. Ridges are described as being well drained and swales are described as being often waterlogged.

3.2 Site Attributes

Topographically the site is located on a low sand plain. The site is flat to slightly sloping and is subject to prolonged water logging during periods of wet weather. Surface elevations across the site range from about RL0.75m AHD in the south eastern corner of the site to about RL5m near the northern site boundary.

The majority of the site has been cleared, with vegetation comprising an established cover of medium to tall grasses and scattered medium sized eucalypts.

Geology

Reference to the Newcastle 1:250,000 Geological Series Sheet SI 56-2, indicates the site is underlain by Quaternary aged deposits comprising gravel, sand, silt and clay.

The typical soil types encountered at test pit and borehole locations during the field investigations have been divided into geotechnical units as summarised in Table 1.

TABLE 1 – SUMMARY OF GEOTECHNICAL UNITS AND SOIL TYPES ENCOUNTERED AT TEST LOCATIONS

GEOTECHNICAL UNIT	SOIL TYPE	DESCRIPTION
UNIT 1	Topsoil	Typically Silty Clayey SAND and Silty SAND, fine to medium grained and Sandy Silty CLAY / Silty Sandy CLAY, dark brown and dark grey, root affected to depths of between 0.15m to 0.45m.
UNIT 2	Clay	Sandy CLAY and CLAY, medium to high plasticity, dark brown, dark grey and grey brown mottled orange of stiff consistency and Clay SAND, fine to medium grained, typically pale brown, pale grey and grey brown.
UNIT 3	Sand	SAND, fine to medium grained, pale grey to white, pale grey brown, grey brown and dark brown, moist to wet and medium dense to very dense.
UNIT 4	Possible Indurated / Indurated Sand	Clayey SAND and Silty SAND, fine to medium grained, dark brown, pale brown and orange brown, dense to very dense, with cemented sand nodules.

Table 2 provides a summary of the distribution of the above geotechnical units at each test location.

TABLE 2 – SUMMARY OF DISTRIBUTION OF GEOTECHNICAL UNITS AT TEST LOCATIONS

TEST LOCATION	UNIT 1	UNIT 2	UNIT 3	UNIT 4	GROUNDWATER INFLOW / WATERTABLE
	DEPTH (m)				
TP1	0.0 - 0.3	0.3 - 0.6	0.6 - >1.9	-	1.9
TP2	0.0 - 0.4	0.4 - 1.5	1.5 - >1.9	-	1.5
TP3	0.0 - 0.5	0.5 – 0.8	0.8 - >1.8	-	1.7
TP4	0.0 - 0.4	0.4 - 2.0	2.0 - >2.1	-	2.0
TP5	0.0 – 0.4	0.4 – 0.75	0.75 - >1.9	-	1.4
TP6	0.0 - 0.6	-	1.1 - >2.1	0.6 - 1.1	2.0
TP7	-	0.0 - > 1.0	-	-	0.9
TP8	-	0.0 - > 0.6	-	-	-
TP9	0.0 - 0.6	-	1.1 - >2.0	0.6 – 1.1	1.8
TP10	0.0 - 0.45	-	0.8 - >1.9	0.45 – 0.8	-
TP11	0.0 - 0.2	0.2 – 0.45	1.0 - >1.9	0.45 – 1.0	1.8
TP12	0.0 - 0.4	0.4 - 1.0	1.0 - >2.0	-	2.0
TP13	0.0 - 0.6	-	-	0.4 - >2.0	1.9
TP14	0.0 - 0.4	0.4 - > 1.8	-	-	-
TP15	0.0 – 0.5	-	0.5 - >1.7	-	-
TP16	0.0 - 0.25	-	0.25 – 1.7	1.7 - >1.8	1.7
TP17	0.0 – 0.5	-	1.1 - >2.0	0.5 – 1.1	1.7
TP18	0.0 – 0.4	0.4 – 0.8	0.8 - >1.9	-	1.3
TP19	0.0 – 0.35	0.35 – 1.2	1.2 - >1.8	-	1.6
TP20	0.0 – 0.2	0.2 - > 1.7	-	-	1.7

TEST LOCATION	UNIT 1	UNIT 2	UNIT 3	UNIT 4	GROUNDWATER INFLOW / WATERTABLE
	DEPTH (m)				
TP21	0.0 – 0.35	-	0.6 - >2.0	0.35 – 0.6	1.7
TP22	0.0 – 0.5	0.5 – 0.8	1.2 - >1.9	0.8 – 1.2	1.8
TP23	0.0 – 0.3	0.3 – 0.8	0.8 - >2.0	-	-
TP24	0.0 – 0.4	0.4 – 0.7	0.7 - >2.0	-	1.4
TP25	0.0 – 0.5	-	-	0.5 – >2.0	1.9
TP26	0.0 – 0.3	-	0.3 - >1.5	-	1.5
TP27	0.0 – 0.6	-	0.8 - >1.8	0.6 - 0.8	1.7
TP28	0.0 – 0.6	-	1.2 - >1.8	0.6 – 1.2	1.7
TP29	0.0 – 0.5	0.5 – 1.4	1.4 - >1.7	-	1.7
TP30	0.0 – 0.3	-	0.3 - 1.7	-	0.3
TP31	0.0 – 0.1	0.1 – 1.1	1.1 - >1.8		0.7 & 1.1
TP32	0.0 – 0.3	0.3 - > 1.7	-	-	0.3 & 0.8
TP33	0.0 – 0.25	0.25 – 1.9	-	1.9 - >2.0	0.75
TP34	0.0 – 0.25	0.25 – 1.9	1.9 - >2.0	-	0.55
BH35	-	-	0.0 - >4.0	-	0.3
BH36	-	-	0.0 - 4.0	4.0 - >7.0	0.7
BH37	-	-	0.0 – 3.8	3.8 - >7.0	0.8
BH38	0.0 – 0.1	0.1 – 2.2	2.2 - >7.0	-	1.8
TP39	0.0 – 0.15	0.15 – 1.4	1.4 - >1.7	-	1.45
TP40	0.0 – 0.2	0.2 – 1.1	1.1 - >1.7	-	1.5
TP41	0.0 – 0.3	0.3 – 1.5	1.5 - >2.5	-	2.2

TEST LOCATION	UNIT 1	UNIT 2	UNIT 3	UNIT 4	GROUNDWATER INFLOW / WATERTABLE
	DEPTH (m)				
TP42	0.0 – 0.3	0.3 – 1.1	1.1 - >1.7	-	1.7
TP43	0.0 – 0.15	-	0.15 - >1.85	-	1.7
TP44	0.0 – 0.3	-	0.3 - >1.8	-	-
BH45	-	-	0.0 - >10.45	-	2.3
BH46	0.0 – 0.25	-	0.25 - >7.45	-	0.9

4 PROPOSED EXCAVATION AND DEWATERING

Excavations proposed as part of the development are up to a maximum depth of about 5m and are associated with the creation of numerous drainage basins. The total volume of excavation proposed as part of the development is about 260,000m^2. Excavated spoil from drainage basins will be used as shown on the attached Bulk Earthworks Plan (ref: Tattersall Lander Bulk Earthworks Plan Job No. 201479, Sheet No. 6, Rev. A). The extent and depth of proposed excavations are shown on the attached Site Cut-Fill Plan (ref: Tattersall Lander Job No. 201479, Sheet No. 12, Rev. B). The volume of proposed excavations is shown on the attached Bulk Earthworks Plan (ref: Tattersall Lander Job No. 201479, Sheet No. 6, Rev. A).

It is understood that excavations are proposed to be carried out in the dry. Dry excavation is preferred over dredging for the following reasons:

- A cutter suction dredge would have difficulty achieving the required batters;
- Local contractors are more experienced in dry excavation;
- Previous excavations on the adjoining Myall Quays Estate were constructed in the dry;
- The costs of excavation in the dry are much lower than dredging;
- The dry excavation could be carried out more quickly and efficiently;
- Dry excavation allows visible recognition of clay during excavation, promoting easier separation and treatment.

Construction works will be staged and will comprise the creation of drainage basins and branches initially as indicated on the attached Construction Activity Staging Plan (ref: Tattersall Lander Job No. 201479, Sheet No. 10, Rev. A). The duration of the works is not known, however based on previous experience construction of each of the larger drainage basins is expected to take less than about two months.

5 SOIL SAMPLING AND TESTING

5.1 Field Work

Field work was carried out between from 4 April to 5 June 2007 and consisted of:

- Excavation of 40 test pits (TP1 to TP34 and TP39 to TP44) across the site using a rubber tyred backhoe to depths of up to 2.5m. Disturbed samples of representative materials were taken for acid sulfate soils testing;
- Drilling of six boreholes (BH35 to BH38 and BH45 and BH46) at the site using a 4WD mounted drilling rig to depths of up to 10.45m. Disturbed samples of representative materials were taken for acid sulfate soils testing;
- Site observations and mapping of relevant site features.

Disturbed samples were placed in small plastic bags which were tightly sealed and stored in an ice filled esky while on site. In the laboratory, samples were stored in either the refrigerator or freezer until testing. Field work was carried out in the full time presence of an Engineering Geologist who located the test pits and boreholes, carried out the sampling and testing and produced engineering logs of the test pits and boreholes. Engineering logs of the test pits and boreholes are presented in Appendix A, together with explanation sheets defining the terms and symbols used in their preparation.

The test pit and borehole locations were pegged by the client prior to the investigation. Test pit and borehole locations are shown on Figure 1.

5.2 Laboratory Testing

5.2.1 Screening Tests

Samples obtained during the field investigation were screened for the presence of actual and potential acid sulfate soils using methods 21Af and 21Bf of the 1998 ASSMAC Guidelines. The results of screening tests are presented in Appendix B and are summarised below:

- pH values in 1:5 soil to distilled water mix ranged from 4.09 to 7.68. A pH of <4 in this test can indicate the presence of actual ASS;
- pH values of soil in 30% H_2O_2 were between 1.43 to 5.77. A pH of <3 in this test can indicate the presence of potential ASS;
- A maximum pH change of 4.99 after oxidation with H_2O_2 was recorded. Significant pH changes (>2) after oxidation with H_2O_2 can indicate potential ASS. pH changes >2 were recorded in 19 of the 105 samples screened for ASS;
- Slight to moderate effervescence was observed in 29 of the 105 samples tested. Vigorous effervescent reactions with oxidation in 30% H_2O_2 can indicate potential ASS;
- An odour was released upon oxidation with H_2O_2 in 18 of the 105 samples tested. A sulphurous odour is often associated with oxidising potential ASS;
- Temperatures of 19.5°to 33°were recorded in all H_2O_2 oxidation screening tests. Generally the oxidation of significant quantities of pyrite in this test will generate temperatures to >60℃.

5.2.2 Laboratory Analysis

Based on the results of screening tests, selected samples were sent in an ice filled esky to a NATA registered chemical laboratory under chain of custody conditions for either SPOCAS or SCR technique analysis. Laboratory test results for samples sent for SPOCAS / SCR technique analysis are summarised in Table 3.

TABLE 3 – SUMMARY OF ASS TEST RESULTS

TEST LOCATION	SAMPLE DEPTH (m)	GEOTECH. UNIT	SCREENING TEST RESULT		S_{POS} / S_{CR} (%)	TPA / NET ACIDITY (mol H+ / tonne)
			pH_F	pH_{FOX}		
TP6	2.0 – 2.1	UNIT 3	4.94	4.06	0.02	16
TP14	0.6 – 0.7	**UNIT 2**	5.20	3.26	**0.14**	**84**
TP19	0.5 – 0.6	UNIT 2	4.96	3.70	0.08	49
TP25	1.9 – 2.0	**UNIT 4**	4.36	3.26	**0.12**	**76**
TP26	1.5 – 1.6	UNIT 3	4.71	2.60	<0.02	<10
TP27	1.1 – 1.2	**UNIT 3**	4.47	3.35	0.03	**21**
TP28	0.6 – 0.7	**UNIT 4**	4.95	3.55	**0.08**	**53**
TP30	1.5 – 1.6	**UNIT 3**	5.25	2.81	**0.09**	**58**
TP32	1.6 – 1.7	**UNIT 2**	6.40	1.43	**0.13**	**84**
TP33	1.1 – 1.2	**UNIT 2**	6.34	1.45	**0.12**	**77**
TP34	1.0 – 1.1	**UNIT 2**	6.35	1.36	**0.19**	**117**
BH36	0.5 – 1.0	**UNIT 3**	5.03	4.24	**0.04**	**26**
BH36	3.5 – 4.0	UNIT 3	5.75	3.26	<0.02	11
BH37	0.5 – 1.0	UNIT 3	5.85	4.67	0.02	14
BH37	2.0 – 2.5	**UNIT 3**	5.55	3.92	**0.07**	**44**
BH37	5.0 – 5.5	**UNIT 4**	5.83	3.27	**0.15**	**93**
BH37	6.5 – 7.0	**UNIT 4**	5.73	3.07	**0.17**	**104**
BH38	0.5 – 1.0	**UNIT 2**	5.19	4.20	**0.24**	**147**

TEST LOCATION	SAMPLE DEPTH (m)	GEOTECH. UNIT	SCREENING TEST RESULT		S_{POS} / S_{CR} (%)	TPA / NET ACIDITY (mol H+ / tonne)
			pH_F	pH_{FOX}		
BH38	6.5 – 7.0	UNIT 3	5.63	4.26	<0.02	11
TP39	1.0 – 1.1	**UNIT 2**	6.75	3.86	0.006	**56**
TP40	1.5 – 1.6	UNIT 3	5.90	4.73	<0.005	9
TP41	0.5 – 0.6	**UNIT 2**	5.20	3.86	<0.005	**39**
TP42	1.0 – 1.1	**UNIT 2**	5.25	4.19	0.007	**37**
TP43	1.7 – 1.8	UNIT 3	5.83	5.18	<0.005	7
BH45	5.5 – 5.9	**UNIT 3**	6.17	4.80	0.011	**22**
BH46	1.0 – 1.1	**UNIT 3**	6.57	2.28	0.028	**20**
BH46	2.5 – 3.0	**UNIT 3**	6.70	4.38	0.016	**18**
BH46	5.5 – 6.0	UNIT 3	7.68	5.33	0.013	10
ASSMAC Action Criteria	-	-	-	-	0.1* 0.03**	62* 18**
Levels of Concern for Screening Test	-	-	4	3	-	-

NOTE:

** Action criteria shown are those for fine textured soils (ie clays) and management of excavations involving disturbance of less than 1000 tonnes of soil;*

*** Action criteria shown are those for course textured soils (ie sands) and management of excavations involving disturbance of more than 1000 tonnes of soil;*

S_{POS} – Percentage of oxidisable Sulfur;

S_{CR} – Percentage of chromium reducible Sulfur;

TPA – Total Potential Acidity.

6 DISCUSSION AND RECOMMENDATIONS

6.1 Interpretation of Results

Results of screening tests indicate that none of the 105 samples tested are actual ASS. Results of SPOCAS / SCR technique analysis indicate that some samples tested from Units 2, 3 and 4, i.e. both Clays and Sands show low ASS potential and that their occurrence across the site is sporadic.

Unit 3 and 4 Sands from above the water table would be considered oxidised and therefore probably not potential ASS. Based on the results of testing, it is recommended that Unit 2 Clay and Unit 3 and 4 Sands from below the water table should be treated as potential ASS.

Nineteen out of the twenty eight samples tested exceeded the Acid Sulfate Soil Management Advisory Committee (ASSMAC) action criteria. Works involving disturbance of soils that exceed these action criteria must prepare an Acid Sulfate Soils Management Plan.

6.2 Acid Sulfate Soils (ASS) Management

An ASS Management Plan for the proposed development has been prepared prior to construction works commencing. The ASS Management Plan is included in Appendix C.

7 CONSTRUCTION RISK

The extent of testing associated with this assessment is limited to discrete test pit and borehole locations and variations in ground conditions can occur between and away from such locations. If subsurface conditions encountered during construction differ from those given in this report further advice should be sought without delay.

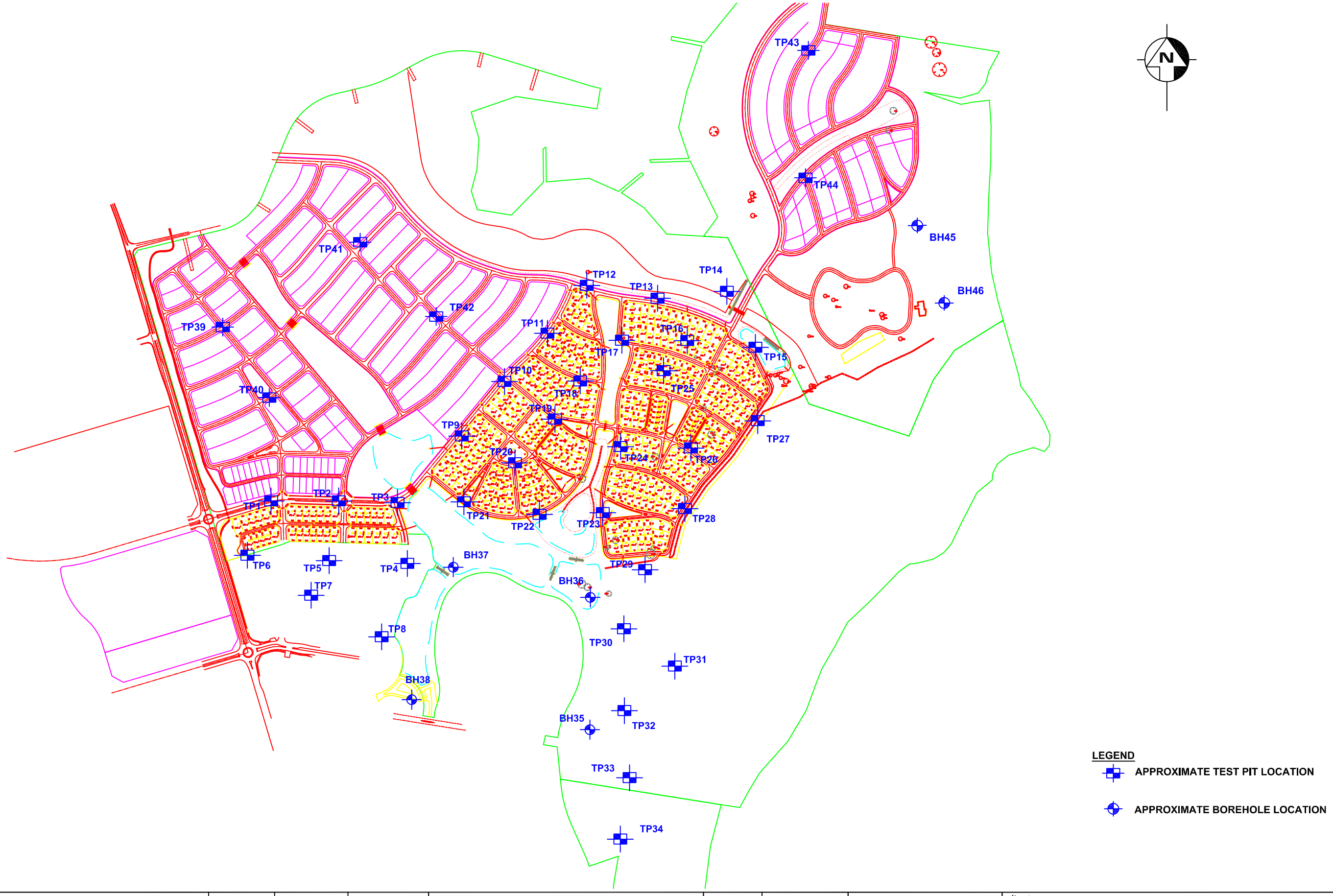
Further advice on the uses and limitations of this report is presented in the attached document, '*Important Information about your Coffey Report*'.

For and on behalf of Coffey Geotechnics Pty Ltd

Arthur Love

Principal Geotechnical Engineer

Figures



revision	description	drawn	approved	date

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Scale (metres)

drawn	NLS
approved	ABL
date	05-04-11
scale	1:8000
original size	A3

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SPECIALISTS MANAGING THE EARTH

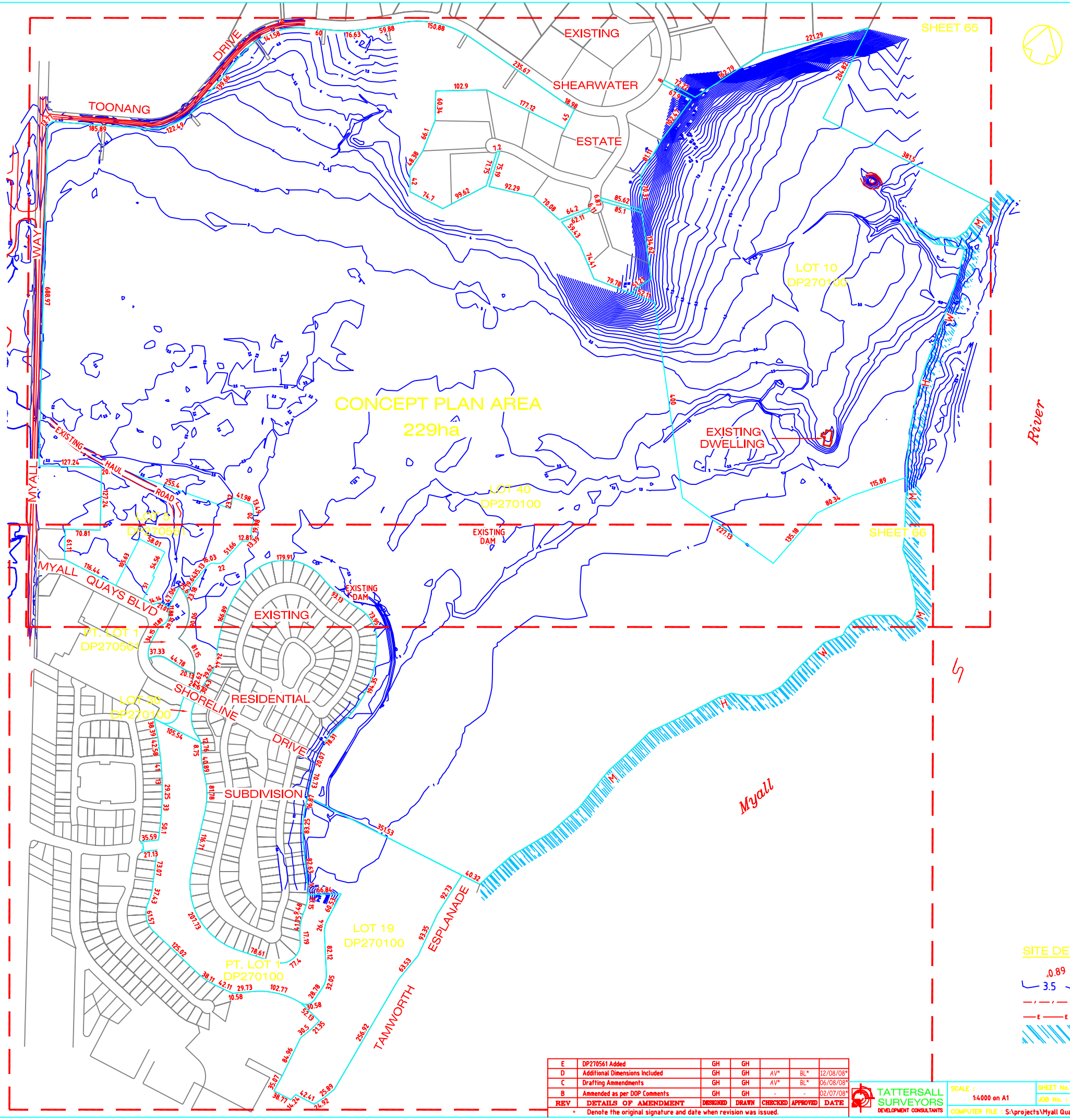
client: TATTERSALL SURVEYORS PTY LTD

project: PROPOSED SUBDIVISION
RIVERSIDE ESTATE PROJECT APPLICATION
AND CONCEPT PLAN AREA, TEA GARDENS

title: TESTPIT/BOREHOLE LOCATION PLAN

project no: GEOTWARA21006AB

figure no: 1



SITE DETAIL SURVEY

- 0.89 — SPOT HEIGHT
- 3.5 — EXISTING CONTOURS (0.5m INTERVAL)
- EXISTING FENCING
- E — E — EXISTING OVERHEAD POWER LINE
- FORESHORE BOUNDARY

REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE
E	DP270561 Added	GH	GH			
D	Additional Dimensions Included	GH	GH	AV*	BL*	12/08/08*
C	Drafting Ammendments	GH	GH	AV*	BL*	06/08/08*
B	Ammended as per DOP Comments	GH	GH	-	-	02/07/08*

* Denote the original signature and date when revision was issued.

TATTERSALL SURVEYORS
DEVELOPMENT CONSULTANTS

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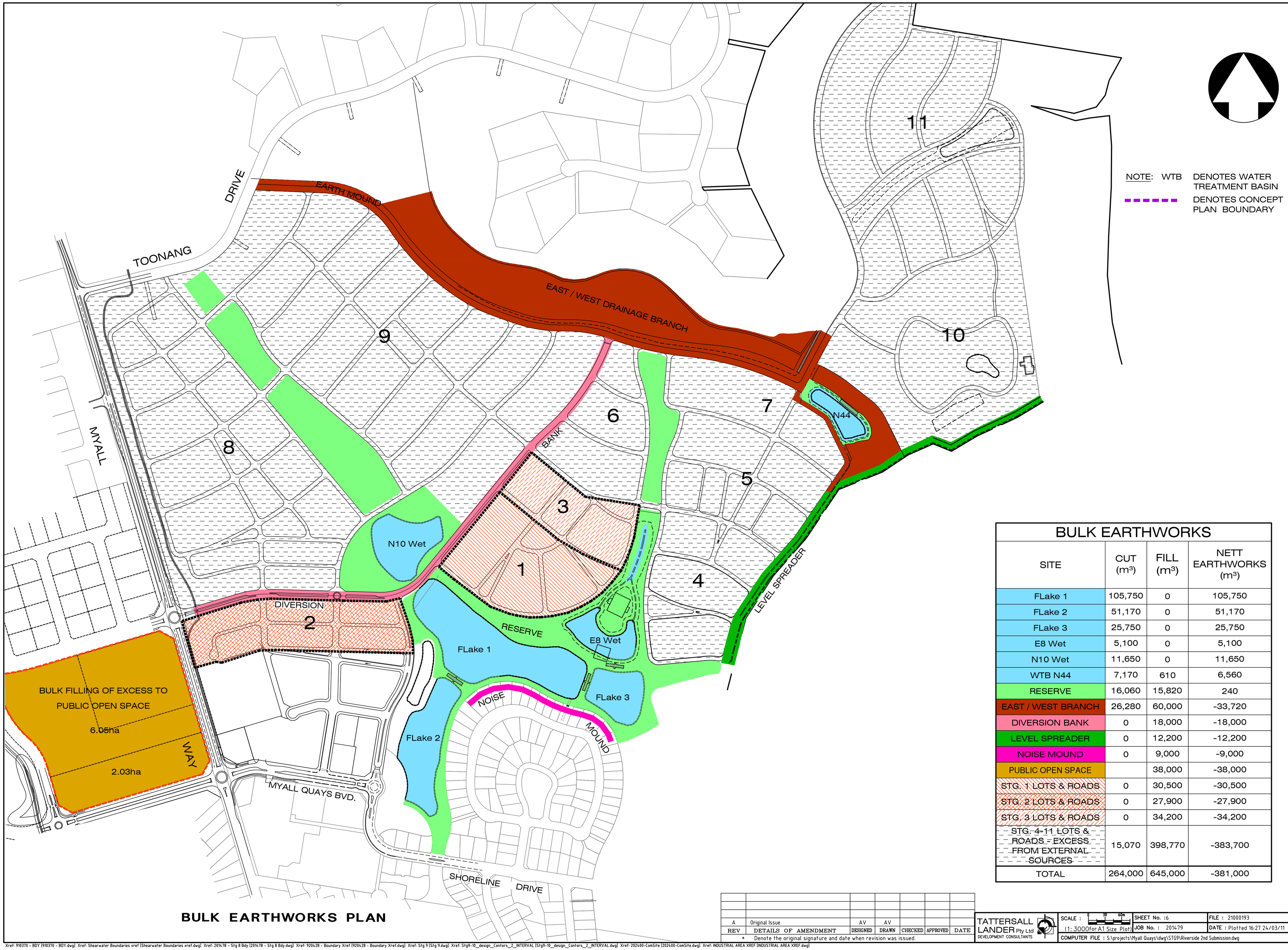

BULK EARTHWORKS

SITE	CUT (m^3)	FILL (m^3)	NETT EARTHWORKS (m^3)
FLake 1	105,750	0	105,750
FLake 2	51,170	0	51,170
FLake 3	25,750	0	25,750
E8 Wet	5,100	0	5,100
N10 Wet	11,650	0	11,650
WTB N44	7,170	610	6,560
RESERVE	16,060	15,820	240
EAST / WEST BRANCH	26,280	60,000	-33,720
DIVERSION BANK	0	18,000	-18,000
LEVEL SPREADER	0	12,200	-12,200
NOISE MOUND	0	9,000	-9,000
PUBLIC OPEN SPACE		38,000	-38,000
STG. 1 LOTS & ROADS	0	30,500	-30,500
STG. 2 LOTS & ROADS	0	27,900	-27,900
STG. 3 LOTS & ROADS	0	34,200	-34,200
STG. 4-11 LOTS & ROADS - EXCESS FROM EXTERNAL SOURCES	15,070	398,770	-383,700
TOTAL	264,000	645,000	-381,000

BULK EARTHWORKS PLAN

REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE
A	Original Issue	AV	AV			
*	Denote the original signature and date when revision was issued.					

TATTERSALL LANDER Pty Ltd
DEVELOPMENT CONSULTANTS

SCALE : 0 30 60m (1: 3000for A1 Size Plot)
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JOB No. : 201479
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DATE : Plotted 16:27 24/03/11
SHEET SIZE A1
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EXISTING "SHEARWATER ESTATE"
RURAL RESIDENTIAL SUBDIVISION

DRIVE

TOONANG

EXISTING
INDUSTRIAL
SUBDIVISION

MYALL

WAY

FUTURE
INDUSTRIAL
SUBDIVISION

EXISTING
COMMERCIAL
SUBDIVISION

EXISTING
RESIDENTIAL
ESTATE

EXISTING
"MYALL
QUAYS"
RESIDENTIAL
SUBDIVISION

LEGEND

- -4m to -2m
- -2m to -1m
- -1m to 0m
- 0m to 0.5m
- 0.5m to 1m
- 1m to 1.5m
- 1.5m to 2m

VOLUME SUMMARY

CUT	=	264,000 m³
FILL	=	645,000 m³
SELECT IMPORT	=	49,000 m³
NET	=	332,000 m³

0 10 20 40 80m
1:3000 for A1 Size Plot

SITE CUT-FILL PLAN

REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE
B	Revised East-West Branch Corridor	AV	AV			
A	Original Issue	AV	AV	-	-	30/09/10*

* Denote the original signature and date when revision was issued.

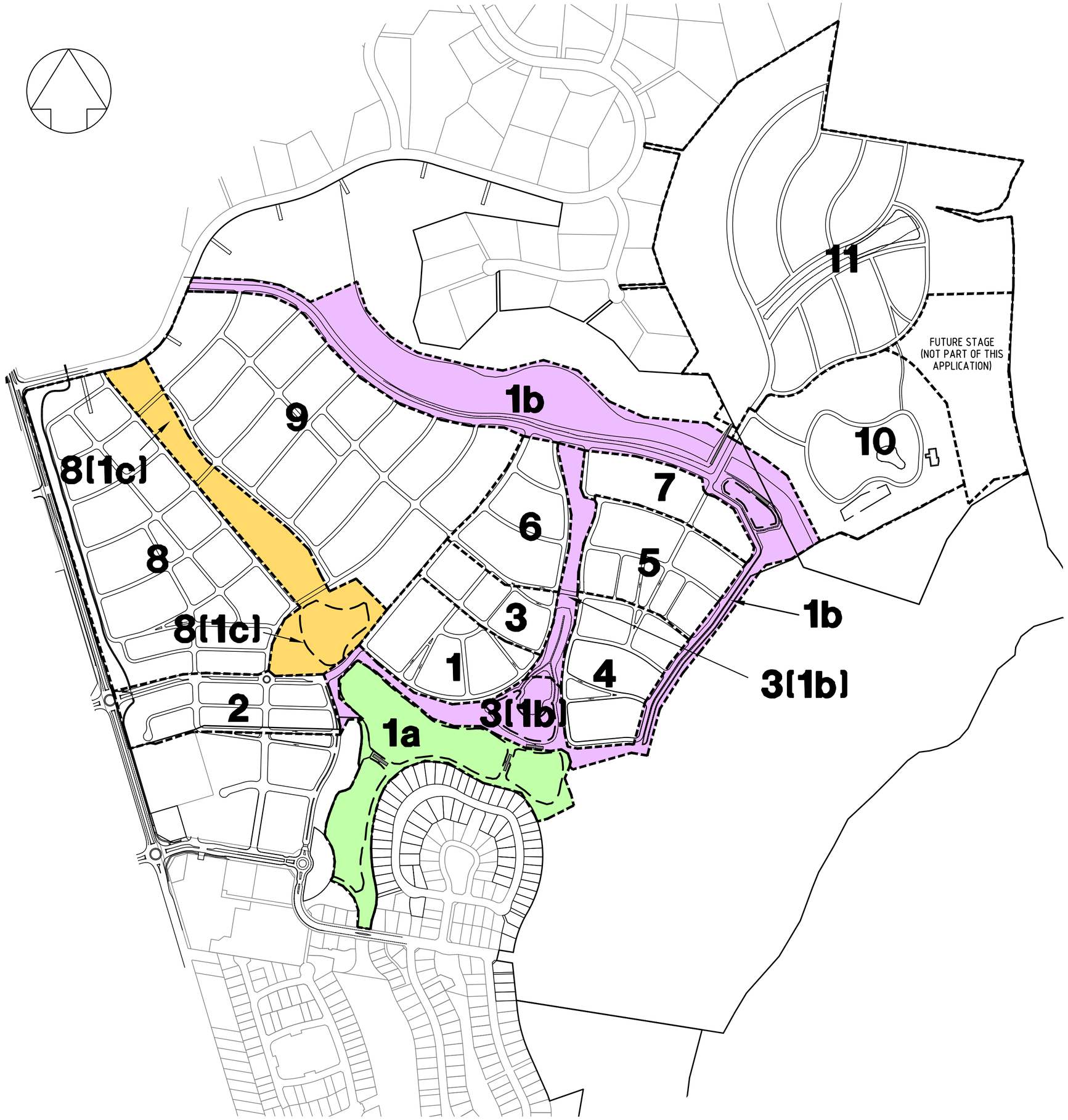
TATTERSALL LANDER PTY LTD
DEVELOPMENT CONSULTANTS
ENGINEERING, SURVEYING & PLANNING
2 Bourke St. P.O.Box 580
RAYMOND TERRACE 2324
Fax (02) 49871733 Phone (02) 49871500

PLAN SHOWING PRELIMINARY
CUT/FILL CONTOURS
RIVERSIDE ESTATE
TEA GARDENS

COUNCIL: GREAT LAKES	REFERENCE: 21000160
PARISH	SHEET SIZE: A1
SCALE: 1:3000	SHEET No.: 12
DATE : Plotted 15:34 24/03/11	

CLIENT: CRIGHTON PROPERTIES | JOB No.: 201479 | COMPUTER FILE : S:\projects\Myall Quays\dwg\STG9\Riverside DA Cut Fill Plans.dwg

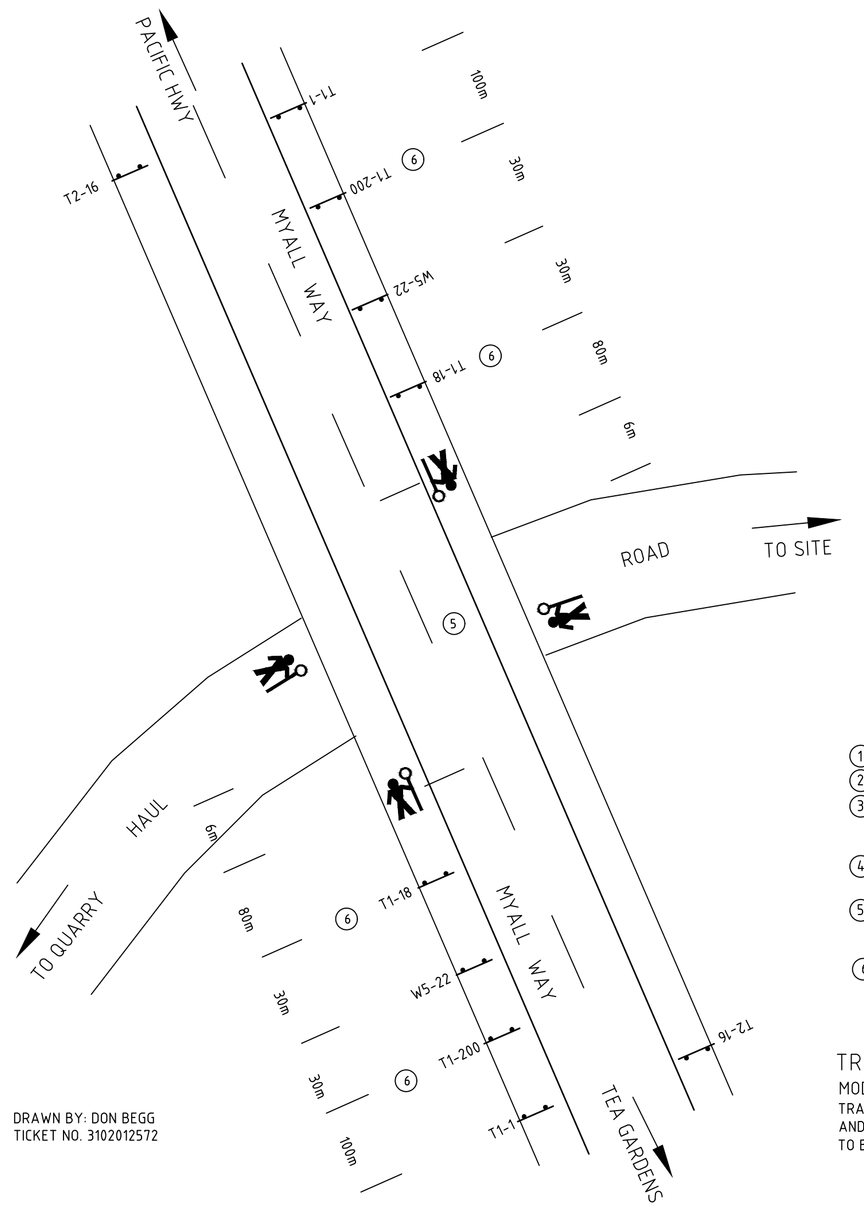
Xref: 920428 - Boundary Xref [920428 - Boundary Xref.dwg] Xref: Stg 9 [Stg 9.dwg] Xref: 202400-ComSite [202400-ComSite.dwg] Xref: INDUSTRIAL AREA XREF [INDUSTRIAL AREA XREF.dwg]



CONSTRUCTION ACTIVITY STAGING PLAN INDICATING STAGE 1 ACTIVITIES

1:5000

1 CONSTRUCTION OF PRECINCT & ASSOCIATED INFRASTRUCTURE
1a CONSTRUCTION OF LAKE AND WORKS IN FINAL FORM
1b PARTIAL CONSTRUCTION OF 'EAST-WEST' DRAINAGE BRANCH & ROAD EMBANKMENT. ESTABLISHMENT OF FINAL FINISHED LEVELS FOR LEVEL SPREADER AND DRAINAGE SWALES
1c PARTIAL CONSTRUCTION OF WETLAND AND 'EAST' & 'WEST' DRAINAGE BRANCHES
2 CONSTRUCTION OF PRECINCT & ASSOCIATED INFRASTRUCTURE
3 CONSTRUCTION OF PRECINCT & ASSOCIATED INFRASTRUCTURE
4 CONSTRUCTION OF PRECINCT & ASSOCIATED INFRASTRUCTURE
5 CONSTRUCTION OF PRECINCT & ASSOCIATED INFRASTRUCTURE
6 CONSTRUCTION OF PRECINCT & ASSOCIATED INFRASTRUCTURE
7 CONSTRUCTION OF PRECINCT & ASSOCIATED INFRASTRUCTURE
8 CONSTRUCTION OF PRECINCT & ASSOCIATED INFRASTRUCTURE
9 CONSTRUCTION OF PRECINCT & ASSOCIATED INFRASTRUCTURE
10 CONSTRUCTION OF PRECINCT & ASSOCIATED INFRASTRUCTURE
11 CONSTRUCTION OF PRECINCT & ASSOCIATED INFRASTRUCTURE

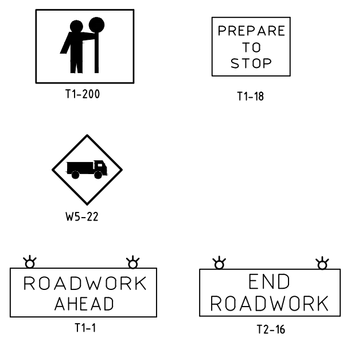


DRAWN BY: DON BEGG
TICKET NO. 3102012572

TRAFFIC CONTROL PLAN

NOT TO SCALE

RTA STANDARD SIGNS



NOTES

1. THIS PLAN IS NOT TO SCALE
2. ALL DISTANCES ARE IN METRES
3. SIGN SPACINGS TO MEASUREMENTS WHERE POSSIBLE SIGNS TO BE PLACED ON LEEWARD SIDE OF DRIVEWAYS SIGHT DISTANCES ARE TO BE MAINTAINED
4. THIS PLAN IS DESIGNED FOR USE OF HAUL ROAD ONLY DURING DAYLIGHT HOURS
5. IF MYALL WAY PAVEMENT AFFECTED THEN APPROPRIATE ROAD SIGNS TO BE USED TO HIGHLIGHT THE CONDITION AND MEASURES TAKEN TO REDUCE OR ELIMINATE CONDITION
6. SIGNS T1-200 AND T1-18 TO BE COVERED WHEN TRAFFIC CONTROLLER IS ABSENT

TRAFFIC CONTROL PLAN

MODIFICATION MADE TO RTA TCP No's 44 AND 56
TRAFFIC CONTROL AT WORK SITES - LOCATION RISK ASSESSMENT AND CHECK LIST FROM RTA TRAFFIC CONTROL MANUAL (APPENDIX D) TO BE USED WHEN IMPLEMENTING THIS TCP

REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE
A	Original Issue	AV	AV			
*	Denote the original signature and date when revision was issued.					

TATTERSALL LANDER Pty Ltd
DEVELOPMENT CONSULTANTS

SCALE : 0 50 100m (1:5000for A1 Size Plot)
SHEET No. :10
FILE : 21000197
JOB No. : 201479
DATE : Plotted 09:49 30/03/11
SHEET SIZE A1
COMPUTER FILE : S:\projects\Myall Quays\dwg\STG9\construction man details.dwg

Xref: 910370 - BDY [910370 - BDY.dwg] Xref: 201478 - Stg 8 Bdy [201478 - Stg 8 Bdy.dwg] Xref: Shearwater Boundaries xref [Shearwater Boundaries xref.dwg] Xref: Stg 9 [Stg 9.dwg] Xref: 202400-ComSite [202400-ComSite.dwg]