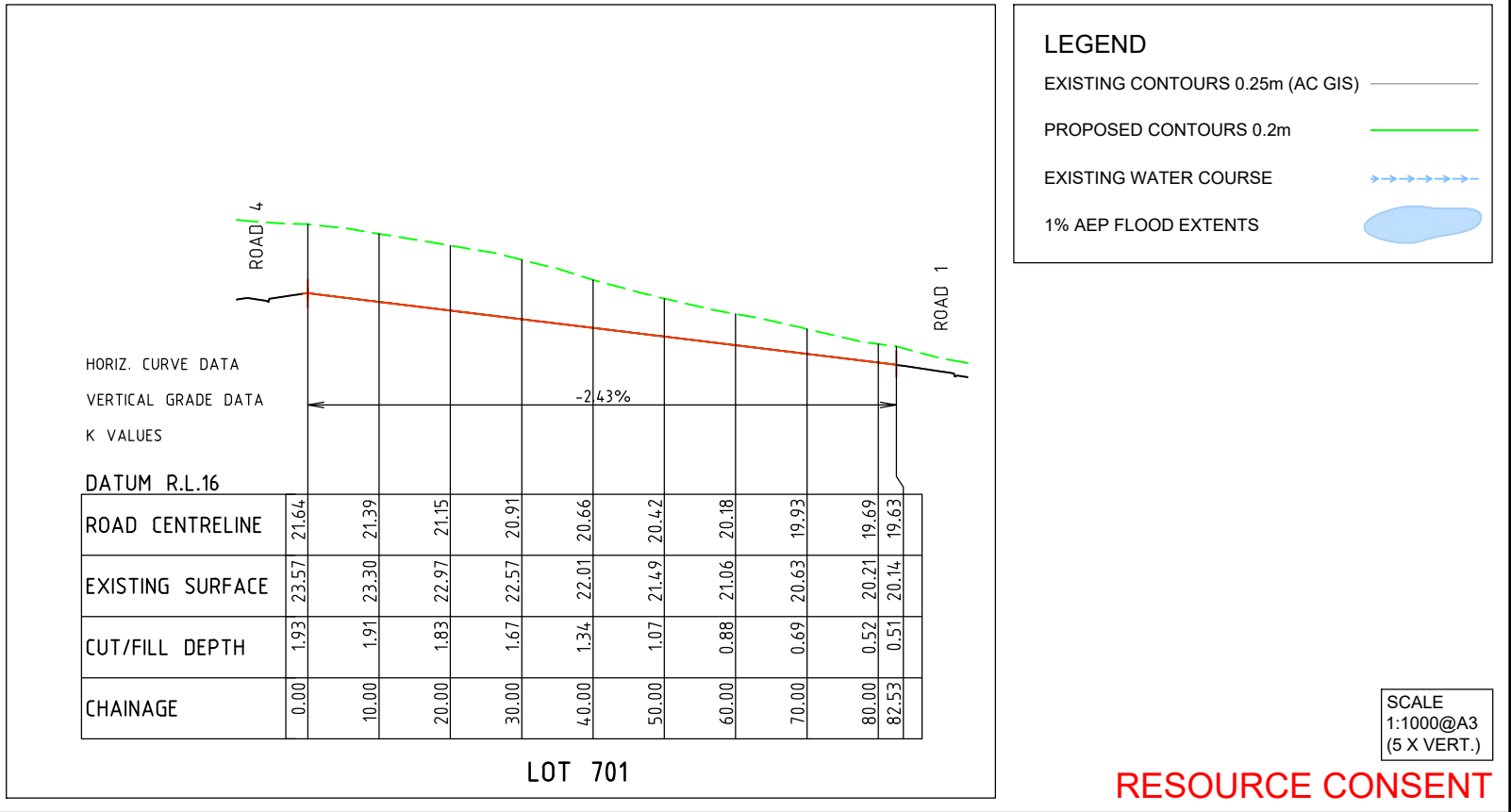
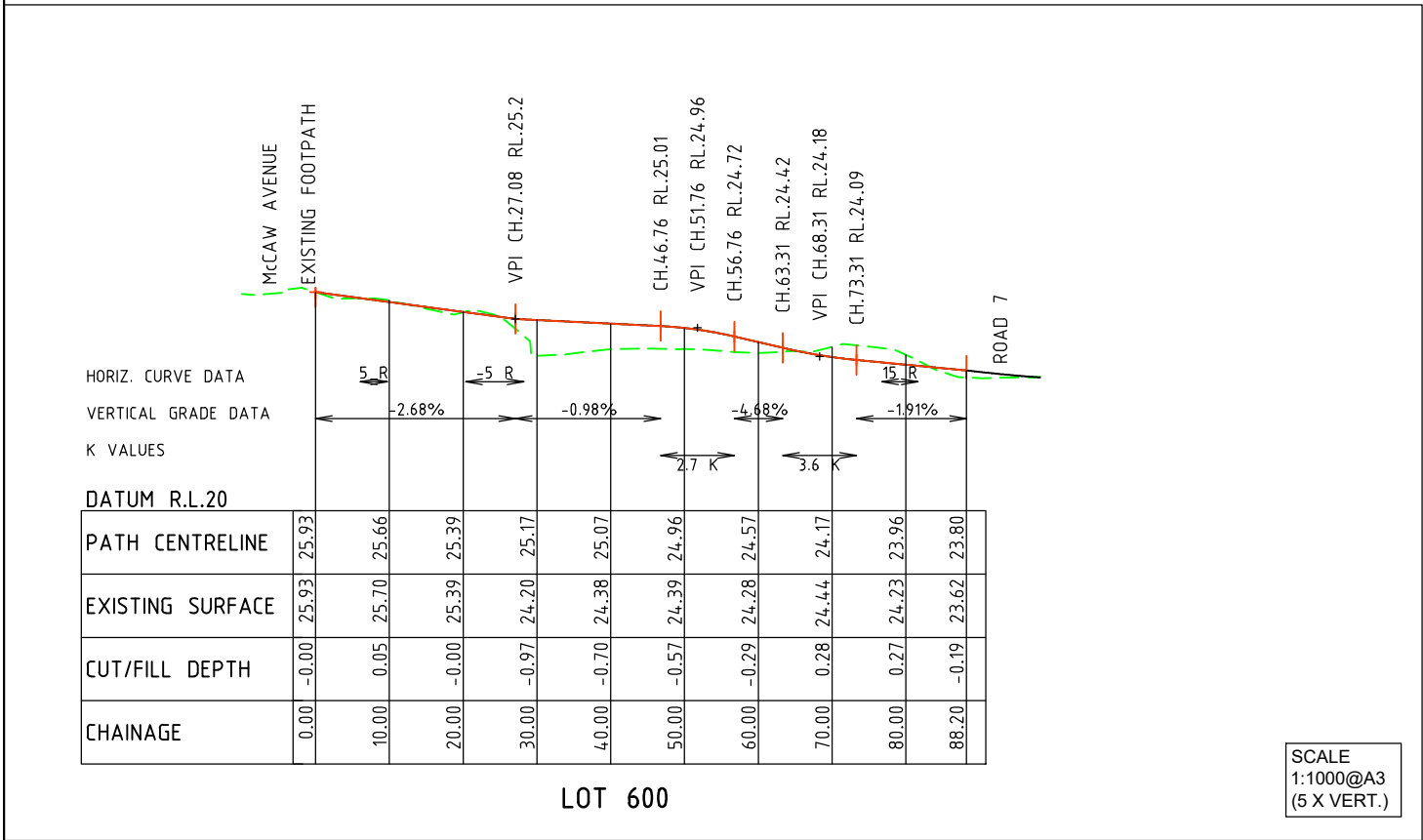
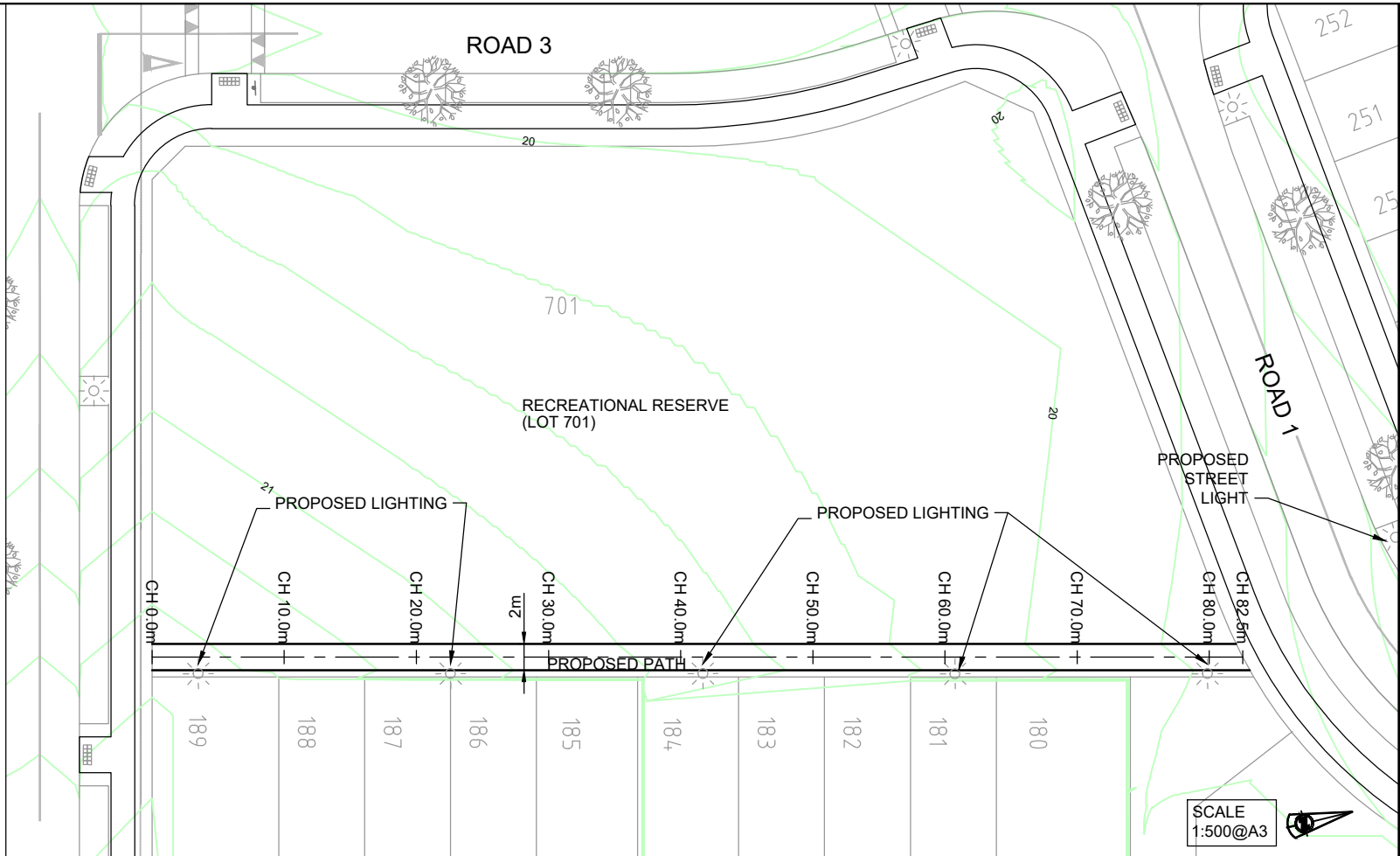
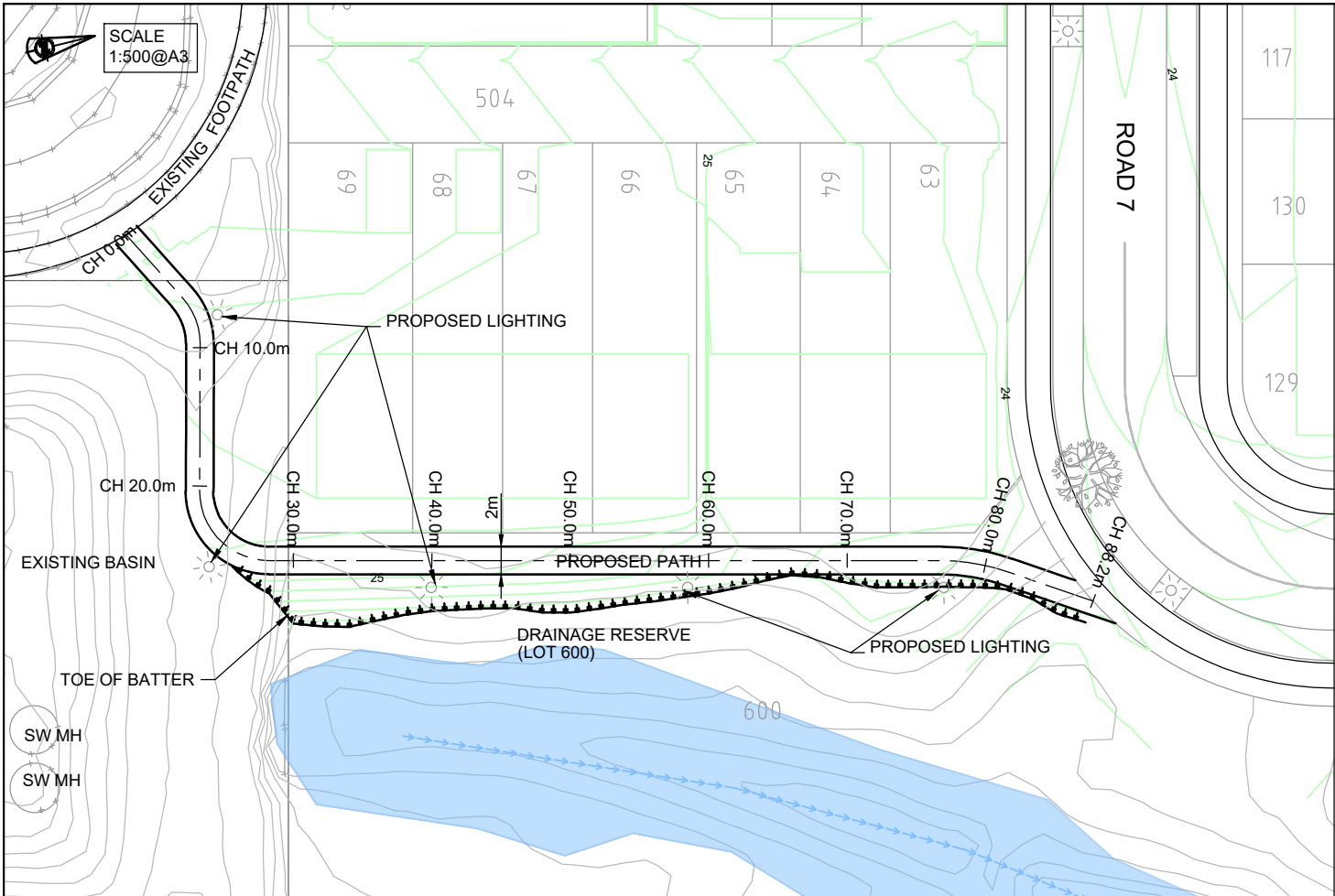




RESOURCE CONSENT

Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	BJ	01/12/2022

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF

THE NEIL GROUP

THE NEIL GROUP LIMITED
LEVEL 3 BUILDING B
8 NUGENT STREET
GRAFTON

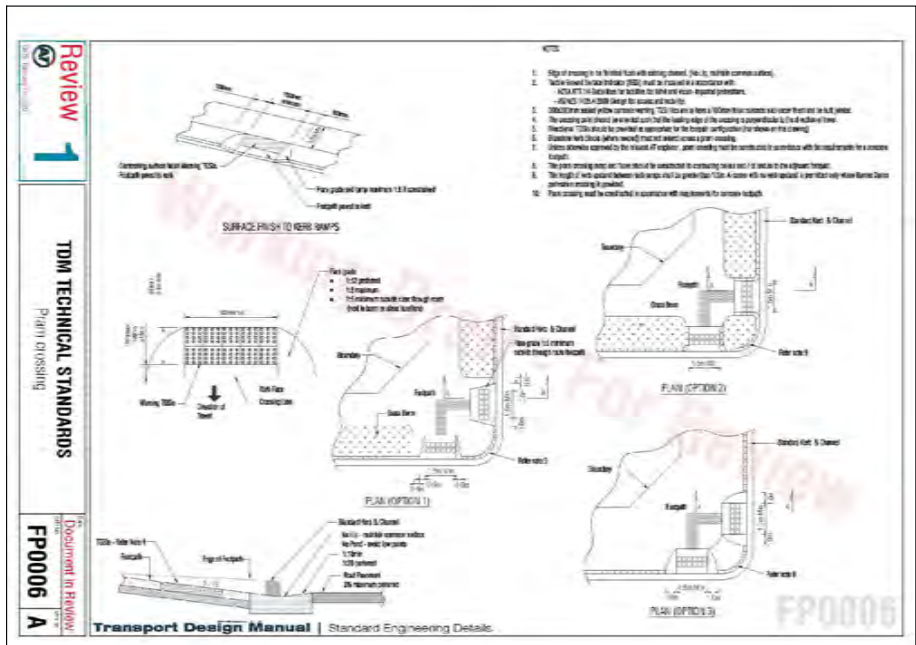
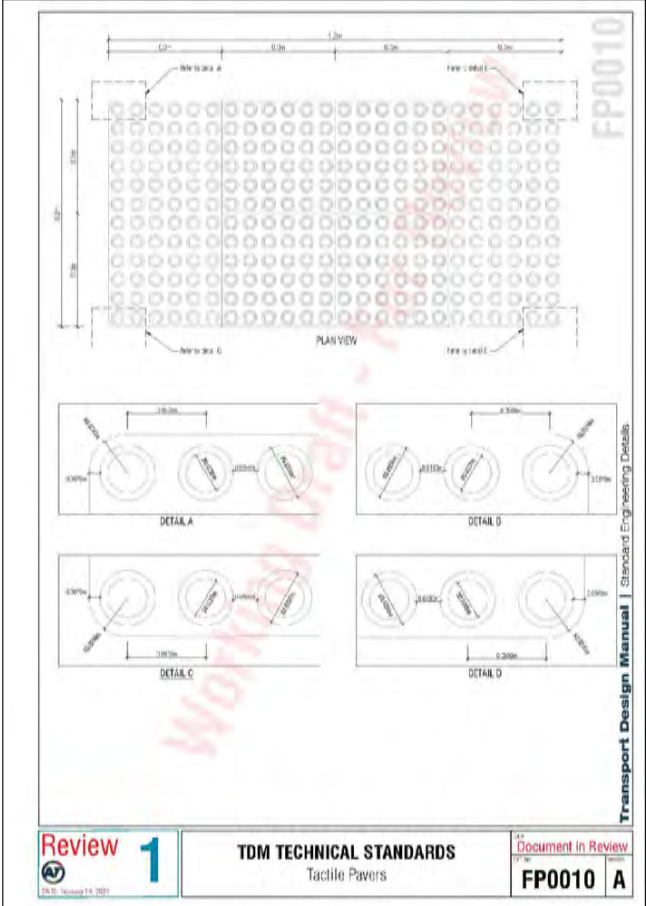
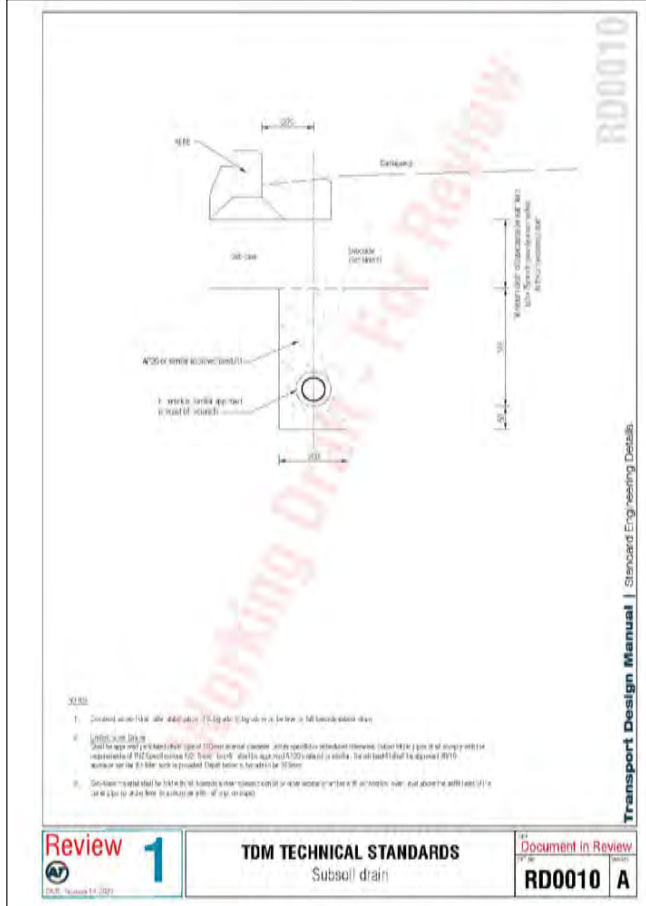
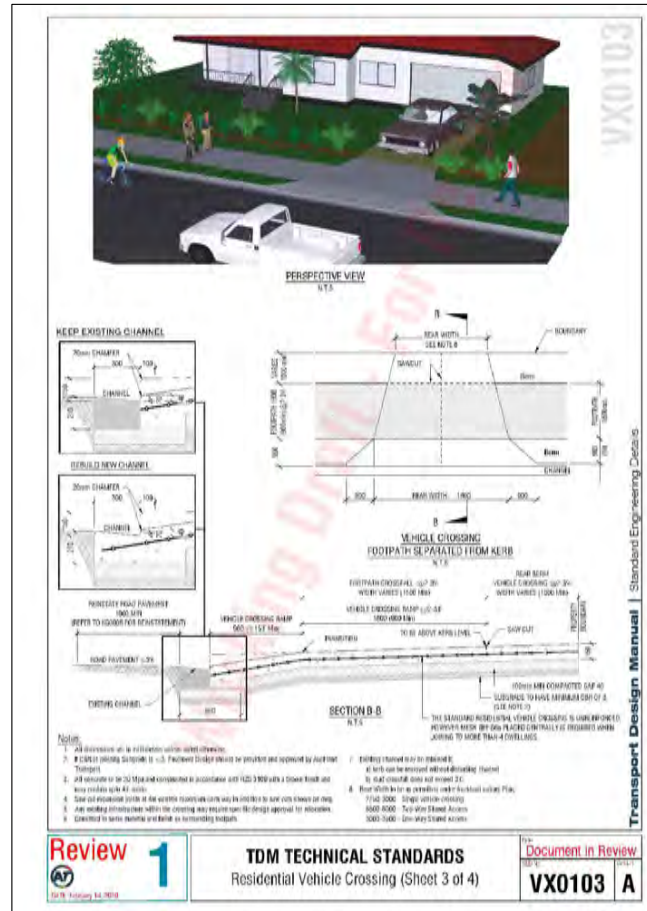
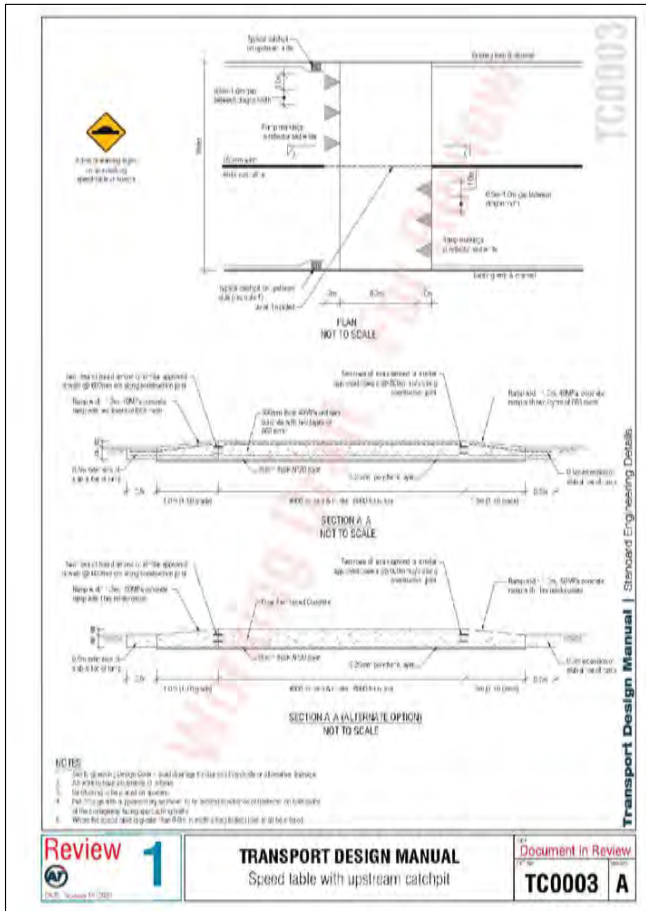
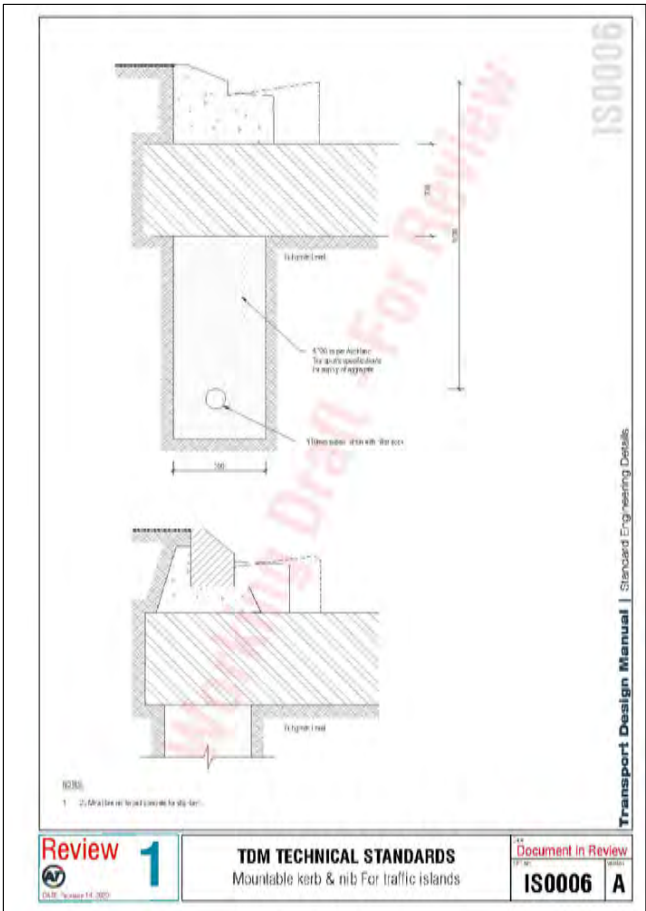
NEIL CONSTRUCTION LIMITED
LAND DEVELOPERS

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND
TELEPHONE: +64 9 918 6565
FAX/MAIL: +64 9 918 6567
WEB: www.neilgroup.co.nz

Job Title	98-102 TOTARA ROAD WHENUAPAI GREEN WHENUAPAI
-----------	--

Drawing Title	PEDESTRIAN NETWORK LOCAL PATHS LONG SECTIONS
---------------	--

By	Date	Scale	Job No.	4520
Survised: CP/MS		AS SHOWN	Drawing No.	4520-01-RD-381
Designed: KLP	10/2022			
Drawn: KLP				
Approved: BJ				
CAD FILE				



RESOURCE CONSENT

Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	BJ	01/12/2022

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF

THE NEIL GROUP
NEIL CONSTRUCTION LIMITED
LAND DEVELOPERS

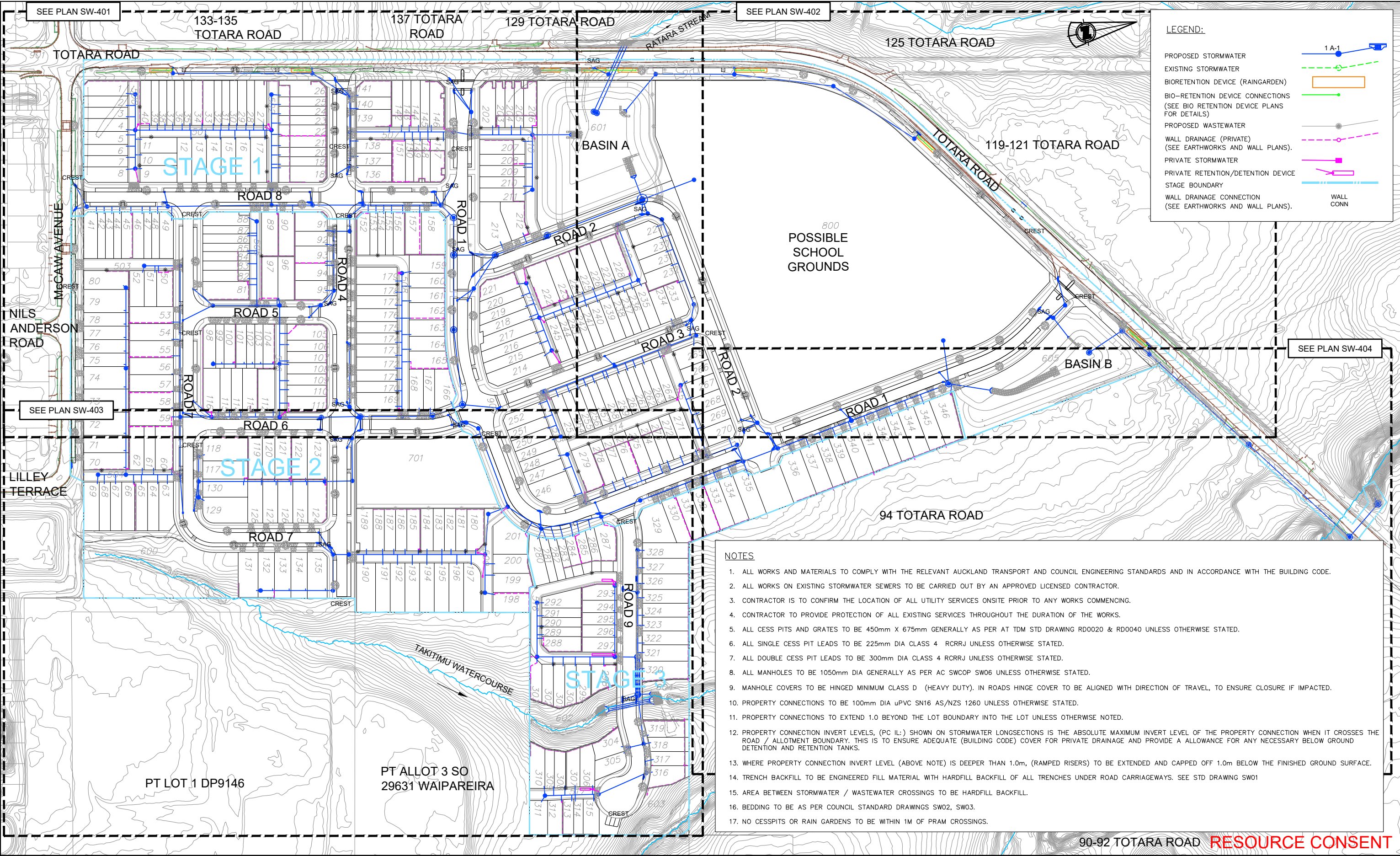
THE NEIL GROUP LIMITED
LEVEL 3, BUILDING 5
8 NUGENT STREET
GRAFTON

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND
TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

Job Title	98-102 TOTARA ROAD WHENUAPAI GREEN WHENUAPAI
-----------	--

Drawing Title	ROADWORKS STANDARD DETAILS DRAWINGS
---------------	---

By	Date	Scale	Job No.	4520-01
Survised:	MS / CP	N.T.S.	Drawing No.	4520-01-RD-391
Designed:	KLP			
Drawn:	KLP	12/2022		
Approved:	BJ			
CAD FILE				



Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	BJ	01/12/2022

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF
NEIL CONSTRUCTION LIMITED
LAND DEVELOPERS

THE NEIL GROUP LIMITED
LEVEL 3, BUILDING 8
8 NUGENT STREET
GRAFTON

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND
TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

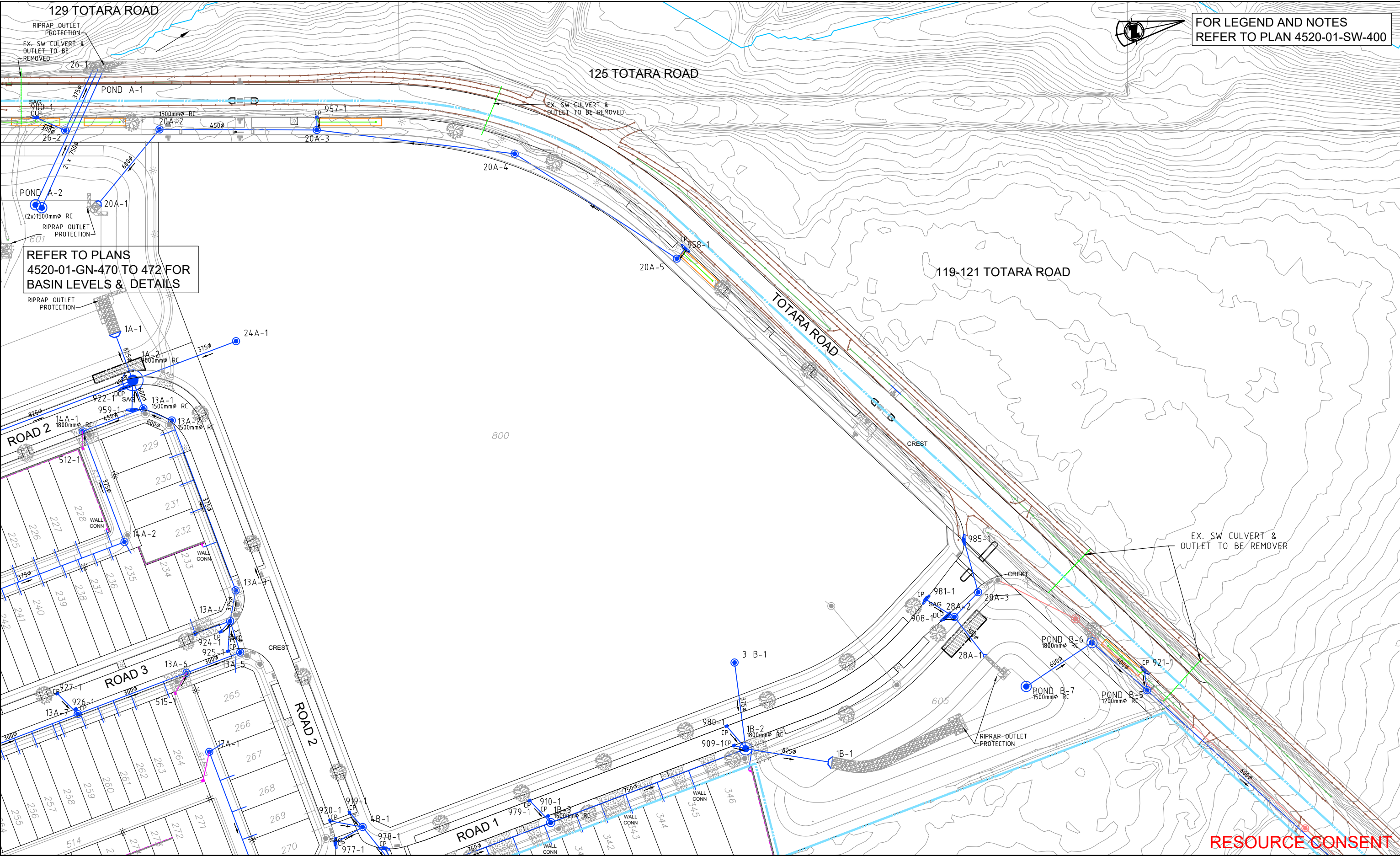
Job Title

98-102 TOTARA ROAD
WHENUAPAI GREEN
WHENUAPAI

Drawing Title

STORMWATER DRAINAGE
LOCATION PLAN

By	Date	Scale	Job No.	Drawing No.	Rev
Surveyed: MS		1:2000@A3	4520	4520-01-SW-400	A
Designed: KLP					
Drawn: KLP	12/2022				
Approved: BJ					



FOR LEGEND AND NOTES
REFER TO PLAN 4520-01-SW-400

REFER TO PLANS
4520-01-GN-470 TO 472 FOR
BASIN LEVELS & DETAILS

RESOURCE CONSENT

Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	BJ	01/12/2022



THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF
NEIL CONSTRUCTION LIMITED
LAND DEVELOPERS

THE NEIL GROUP LIMITED
LEVEL 3, BUILDING B
8 NUGENT STREET
GRAFTON

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND
TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

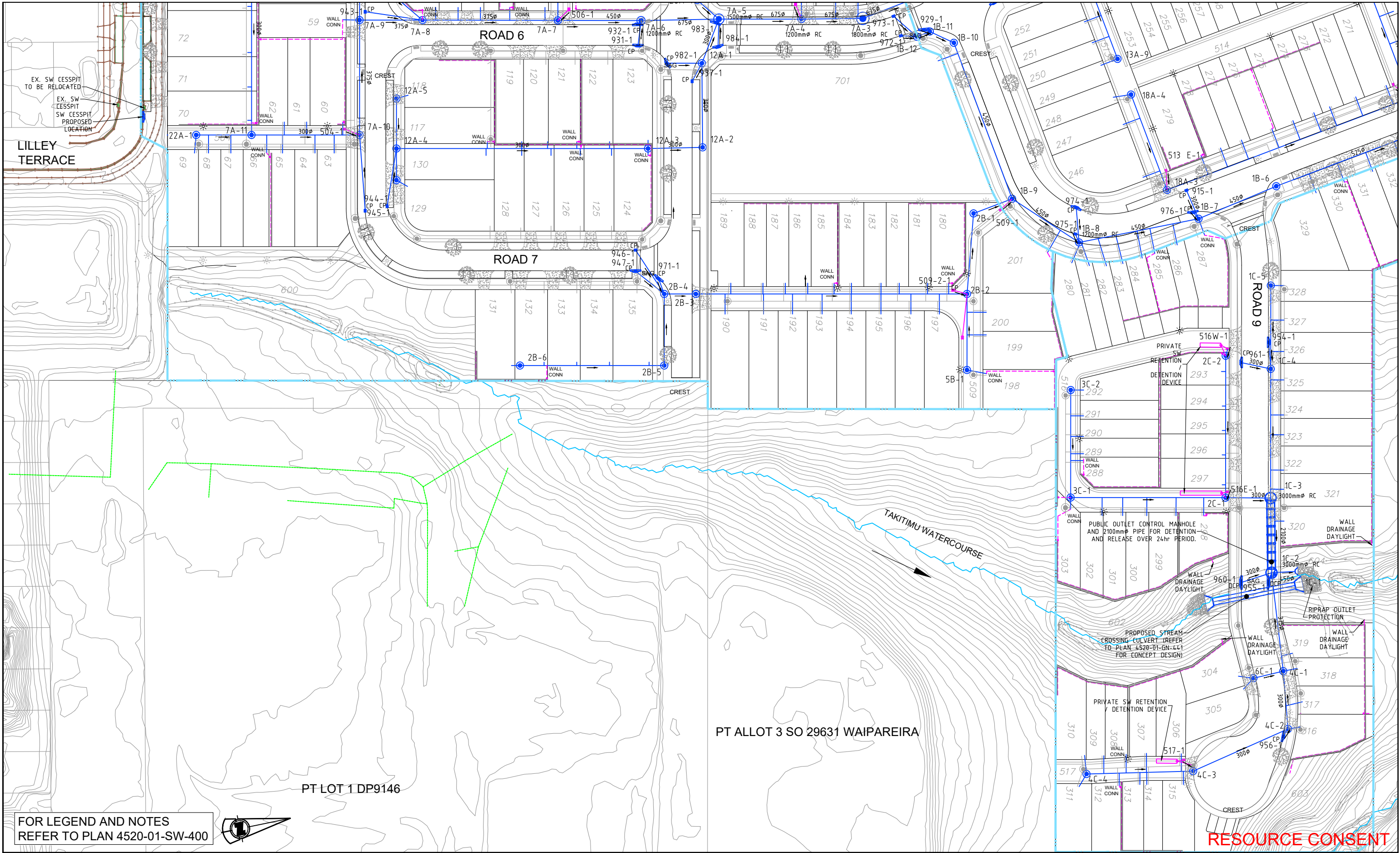
Job Title

**98-102 TOTARA ROAD
WHENUAPAI GREEN
WHENUAPAI**

Drawing Title

**STORMWATER DRAINAGE
LAYOUT PLAN**

By	Date	Scale	Job No.	Drawing No.	Rev
Surveyed: MS		1:500@A3	4520	4520-01-SW-402	A
Designed: KLP	12/2022				
Drawn: KLP					
Approved: BJ					



FOR LEGEND AND NOTES
REFER TO PLAN 4520-01-SW-400

Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	BJ	01/12/2022

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF
THE NEIL GROUP
LAND DEVELOPERS

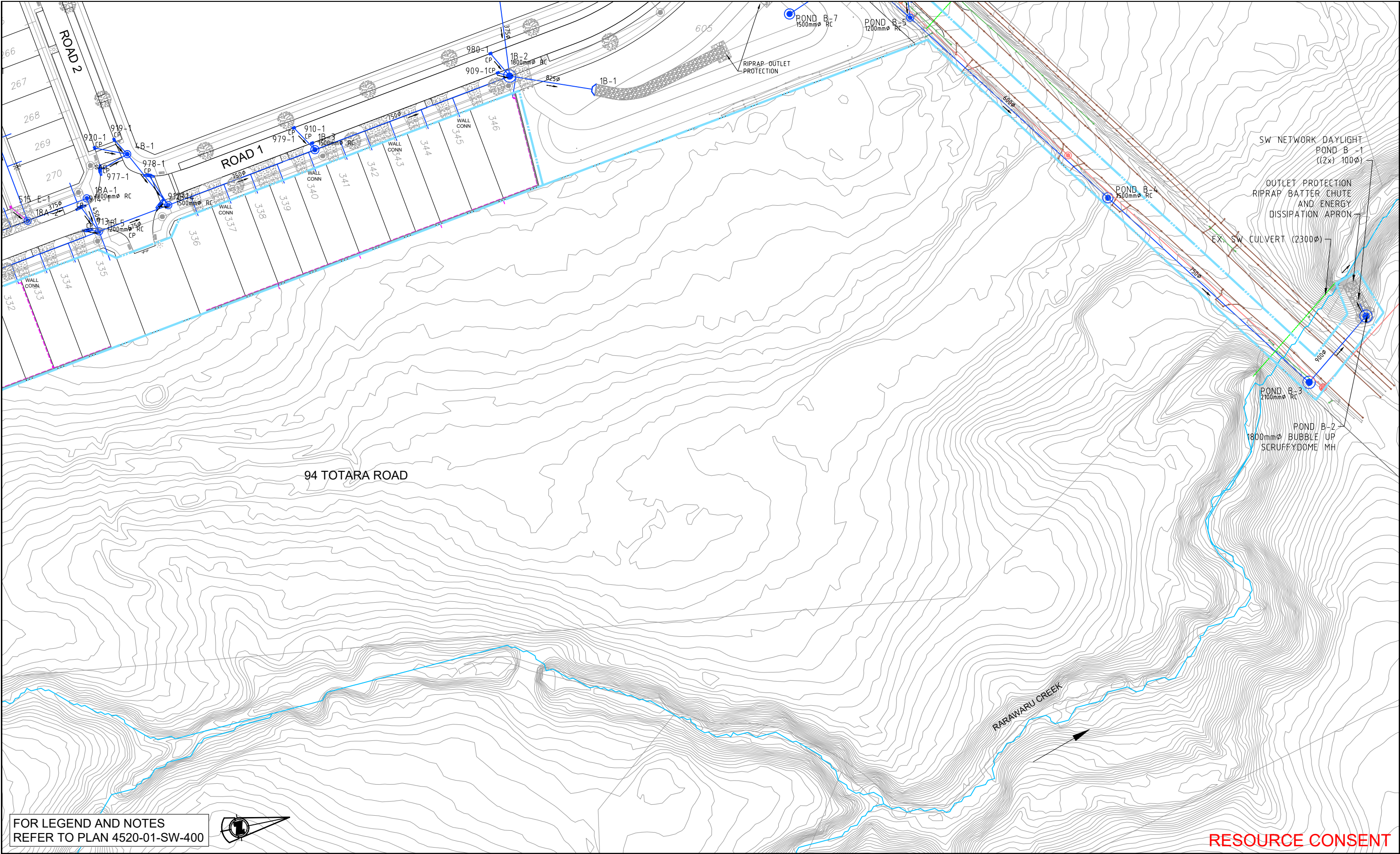
THE NEIL GROUP LIMITED
LEVEL 3, BUILDING B
8 NUGENT STREET
GRAFTON

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND
TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

Job Title
**98-102 TOTARA ROAD
WHENUAPAI GREEN
WHENUAPAI**

Drawing Title
**STORMWATER DRAINAGE
LAYOUT PLAN**

By	Date	Scale	Job No.	Drawing No.	Rev
Surveyed: MS		1:500@A3	4520	4520-01-SW-403	A
Designed: KLP					
Drawn: KLP	12/2022				
Approved: BJ					



FOR LEGEND AND NOTES
REFER TO PLAN 4520-01-SW-400



RESOURCE CONSENT

Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	BJ	01/12/2022



THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF
NEIL CONSTRUCTION LIMITED
LAND DEVELOPERS

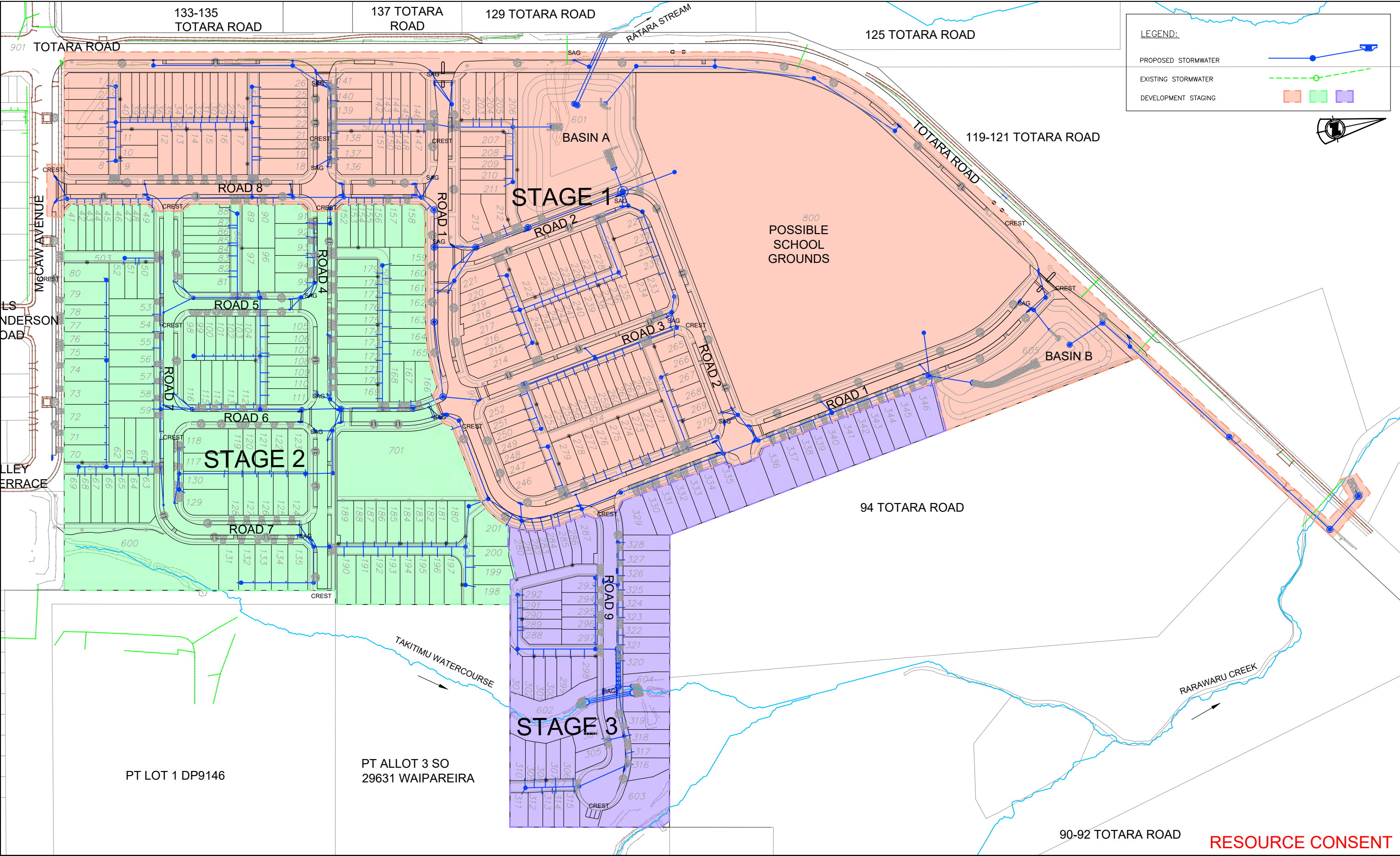
THE NEIL GROUP LIMITED
LEVEL 3, BUILDING B
8 NUGENT STREET
GRAFTON

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND
TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

Job Title	98-102 TOTARA ROAD WHENUAPAI GREEN WHENUAPAI
-----------	--

Drawing Title	STORMWATER DRAINAGE LAYOUT PLAN
---------------	------------------------------------

By	Date	Scale	Job No.	4520	Rev
Surveyed: MS		1:500@A3	Drawing No.	4520-01-SW-404	A
Designed: KLP					
Drawn: KLP	12/2022				
Approved: BJ					



Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	BJ	01/12/2022

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF
THE NEIL GROUP
LAND DEVELOPERS

THE NEIL GROUP LIMITED
LEVEL 3, BUILDING B
8 NUGENT STREET
GRAFTON

P.O. BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND
TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

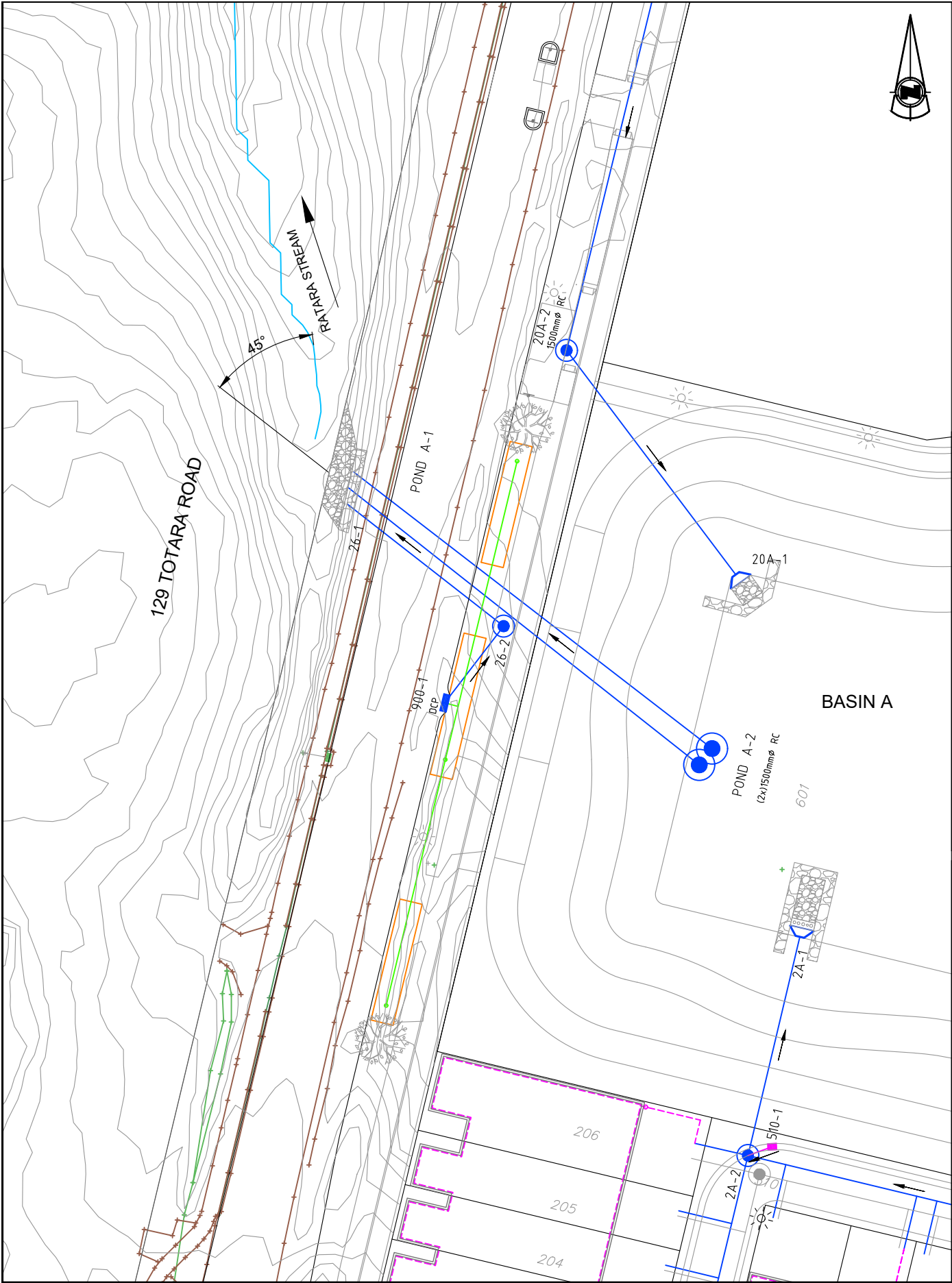
Job Title

98-102 TOTARA ROAD
WHENUAPAI GREEN
WHENUAPAI

Drawing Title

STORMWATER DRAINAGE
DEVELOPMENT STAGING

By	Date	Scale	Job No.	Drawing No.	Rev
Surveyed: MS		1:500@A3	4520	4520-01-SW-405	A
Designed: KLP					
Drawn: KLP	12/2022				
Approved: BJ					



ENERGY DISSIPATION CALCULATION

$F_o = v / (g \times d_p)^{0.5}$
 $F_o = 1.06 / (9.81 \times 0.19)^{0.5}$

10% AEP FROUDE NUMBER = 0.78
 $F_o < 1.7 \rightarrow$ HEADWALL & APRON

RIPRAP (ROCK SIZE)
 $D_{50} = 0.25 \times D_o \times F_o$
 $D_{50} = 0.25 \times 0.3 \times 0.78$
 $D_{50} = 0.06m$ (150mm MINIMUM)

APRON DIMENSIONS
 $W_a \geq 3 \times D_o$
 $W_a = 0.9m$

$L_a = D_o (8 + 17 \log F_o)$
 $L_a = 0.3 [8 + 17 \log(0.78)]$
 $L_a = 2m$

ENERGY DISSIPATION CALCULATION

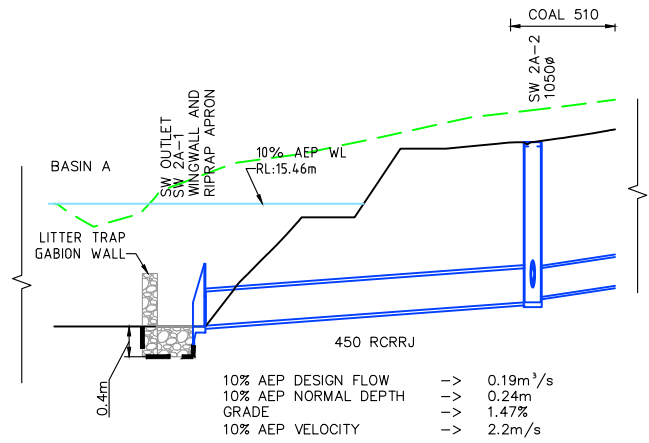
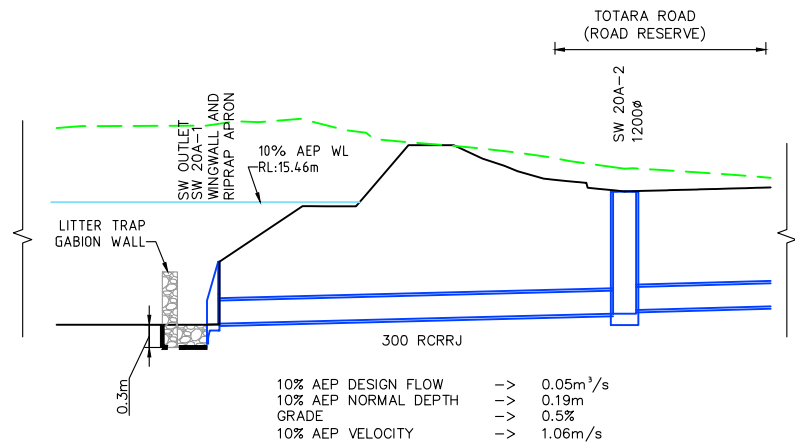
$F_o = v / (g \times d_p)^{0.5}$
 $F_o = 2.2 / (9.81 \times 0.24)^{0.5}$

10% AEP FROUDE NUMBER = 1.4
 $F_o < 1.7 \rightarrow$ HEADWALL & APRON

RIPRAP (ROCK SIZE)
 $D_{50} = 0.25 \times D_o \times F_o$
 $D_{50} = 0.25 \times 0.45 \times 1.4$
 $D_{50} = 0.16m$ (200mm)

APRON DIMENSIONS
 $W_a \geq 3 \times D_o$
 $W_a = 1.35m$

$L_a = D_o (8 + 17 \log F_o)$
 $L_a = 0.45 [8 + 17 \log(1.4)]$
 $L_a = 4.7m$



RESOURCE CONSENT

Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	BJ	01/12/2022

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF

THE NEIL GROUP

NEIL CONSTRUCTION LIMITED
LAND DEVELOPERS

THE NEIL GROUP LIMITED
LEVEL 3, BUILDING 8
8 NUGENT STREET
GRAFTON

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND

TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

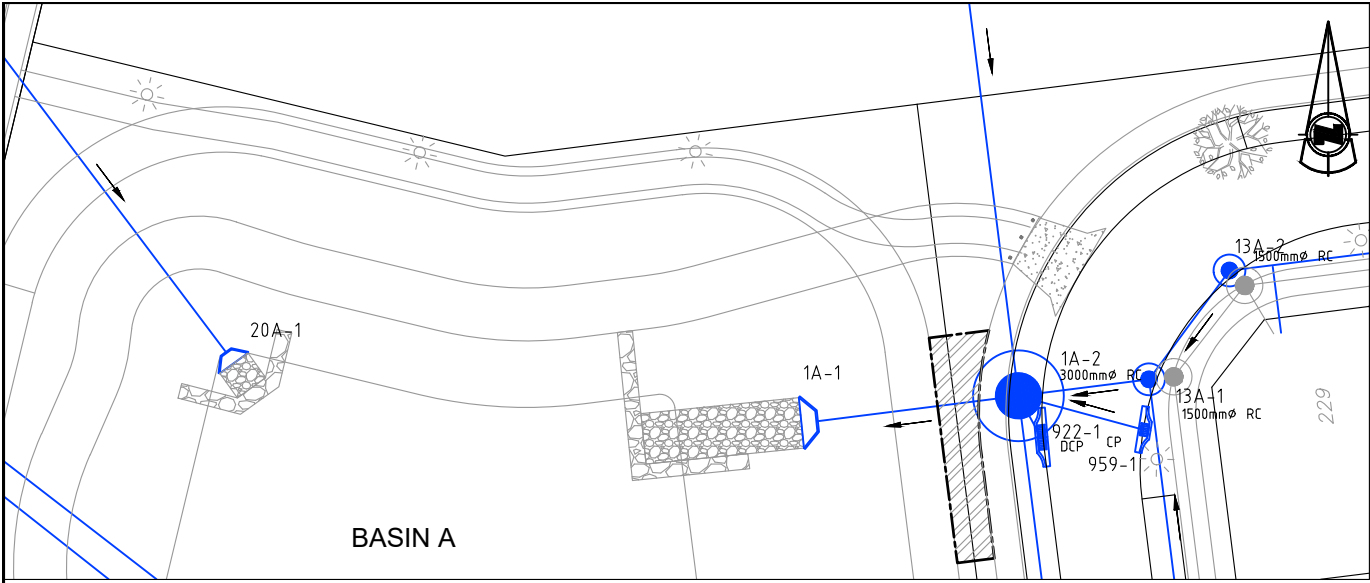
Job Title

**98-102 TOTARA ROAD
WHENUAPAI GREEN
WHENUAPAI**

Drawing Title

**STORMWATER DRAINAGE
ENERGY DISSIPATION &
OUTLET DESIGN**

By	Date	Scale	Job No.	Drawing No.	Rev
Surveyed: MS		1:500@A3	4520	4520-01-SW-406	A
Designed: KLP	12/2022	5 X VERT.			
Drawn: KLP					
Approved: BJ					



ENERGY DISSIPATION CALCULATION

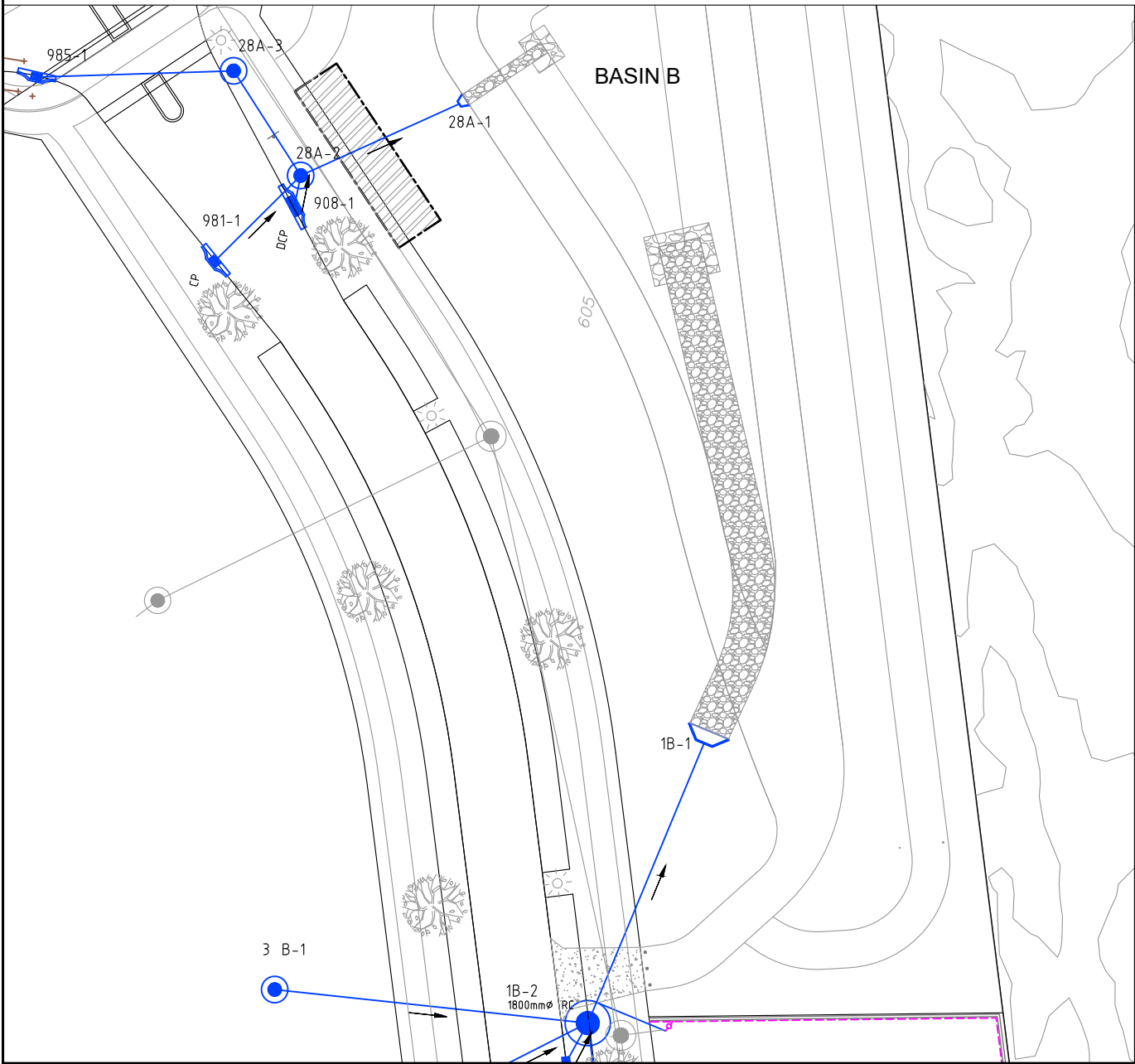
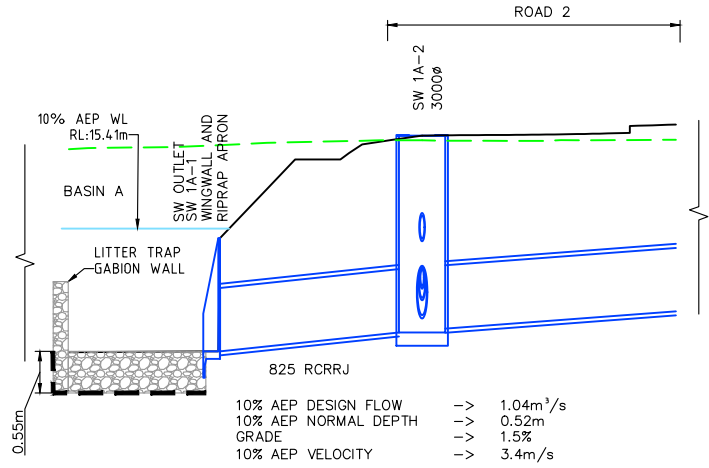
$F_o = v / (g \times d_o)^{0.5}$
 $F_o = 3.4 / (9.81 \times 0.52)^{0.5}$

10% AEP FROUDE NUMBER = 1.5
 $F_o < 1.7 \rightarrow$ HEADWALL & APRON

RIPRAP (ROCK SIZE)
 $D_{50} = 0.25 \times D_o \times F_o$
 $D_{50} = 0.25 \times 0.825 \times 1.5$
 $D_{50} = 0.31m$ (350mm)

APRON DIMENSIONS
 $W_a \geq 3 \times D_o$
 $W_a = 2.5m$

$L_a = D_o (8+17 \log F_o)$
 $L_a = 0.825 [8+17 \log(1.5)]$
 $L_a = 9.1m$



ENERGY DISSIPATION CALCULATION

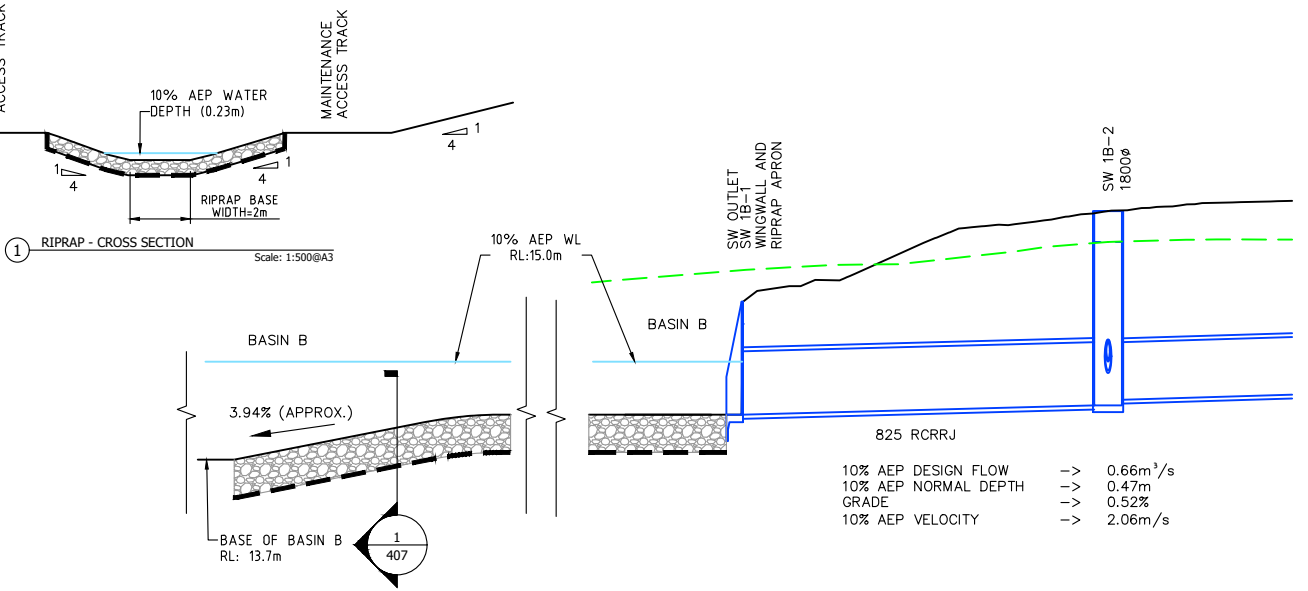
$F_o = v / (g \times d_o)^{0.5}$
 $F_o = 2.06 / (9.81 \times 0.47)^{0.5}$

10% AEP FROUDE NUMBER = 0.96
 $F_o < 1.7 \rightarrow$ HEADWALL & APRON

RIPRAP (ROCK SIZE)
 $D_{50} = 0.25 \times D_o \times F_o$
 $D_{50} = 0.25 \times 0.825 \times 0.96$
 $D_{50} = 0.2m$ (250mm)

APRON DIMENSIONS
 $W_a \geq 3 \times D_o$
 $W_a = 2.5m$

$L_a = D_o (8+17 \log F_o)$
 $L_a = 0.825 [8+17 \log(0.96)]$
 $L_a = 6.4m$



ENERGY DISSIPATION CALCULATION

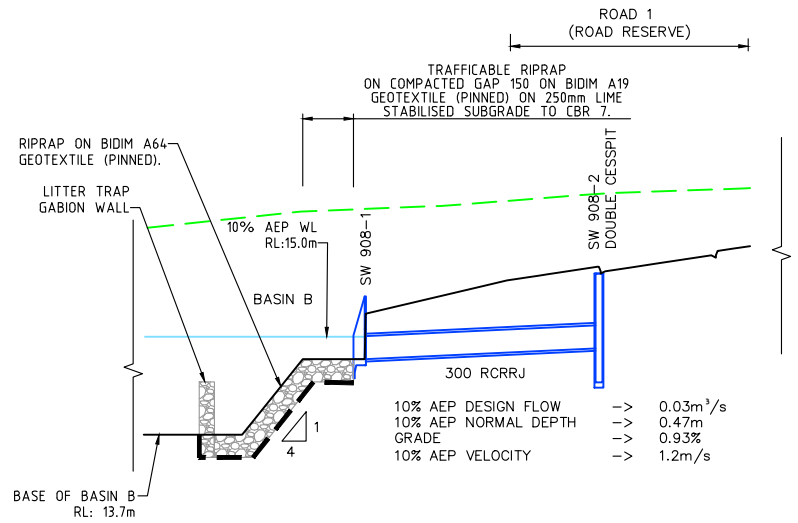
$F_o = v / (g \times d_o)^{0.5}$
 $F_o = 1.2 / (9.81 \times 0.12)^{0.5}$

10% AEP FROUDE NUMBER = 1.11
 $F_o < 1.7 \rightarrow$ HEADWALL & APRON

RIPRAP (ROCK SIZE)
 $D_{50} = 0.25 \times D_o \times F_o$
 $D_{50} = 0.25 \times 0.3 \times 1.11$
 $D_{50} = 0.08m$ (150mm MINIMUM)

APRON DIMENSIONS
 $W_a \geq 3 \times D_o$
 $W_a = 0.9m$

$L_a = D_o (8+17 \log F_o)$
 $L_a = 0.3 [8+17 \log(1.11)]$
 $L_a = 2.7m$



RESOURCE CONSENT

Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	BJ	01/12/2022

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF

THE NEIL GROUP

NEIL CONSTRUCTION LIMITED
LAND DEVELOPERS

THE NEIL GROUP LIMITED
LEVEL 3, BUILDING B
8 NUGENT STREET
GRAFTON

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND

TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

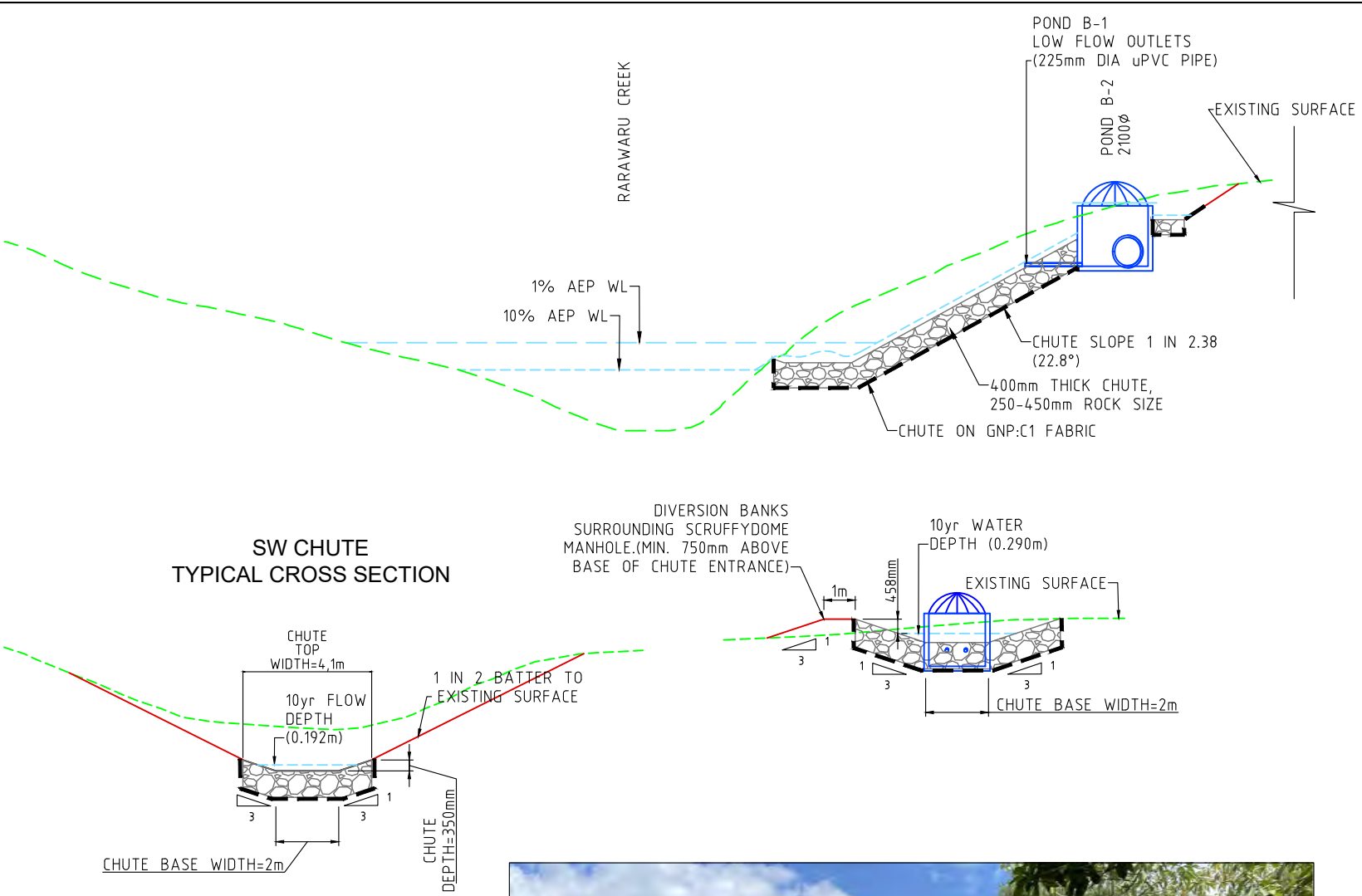
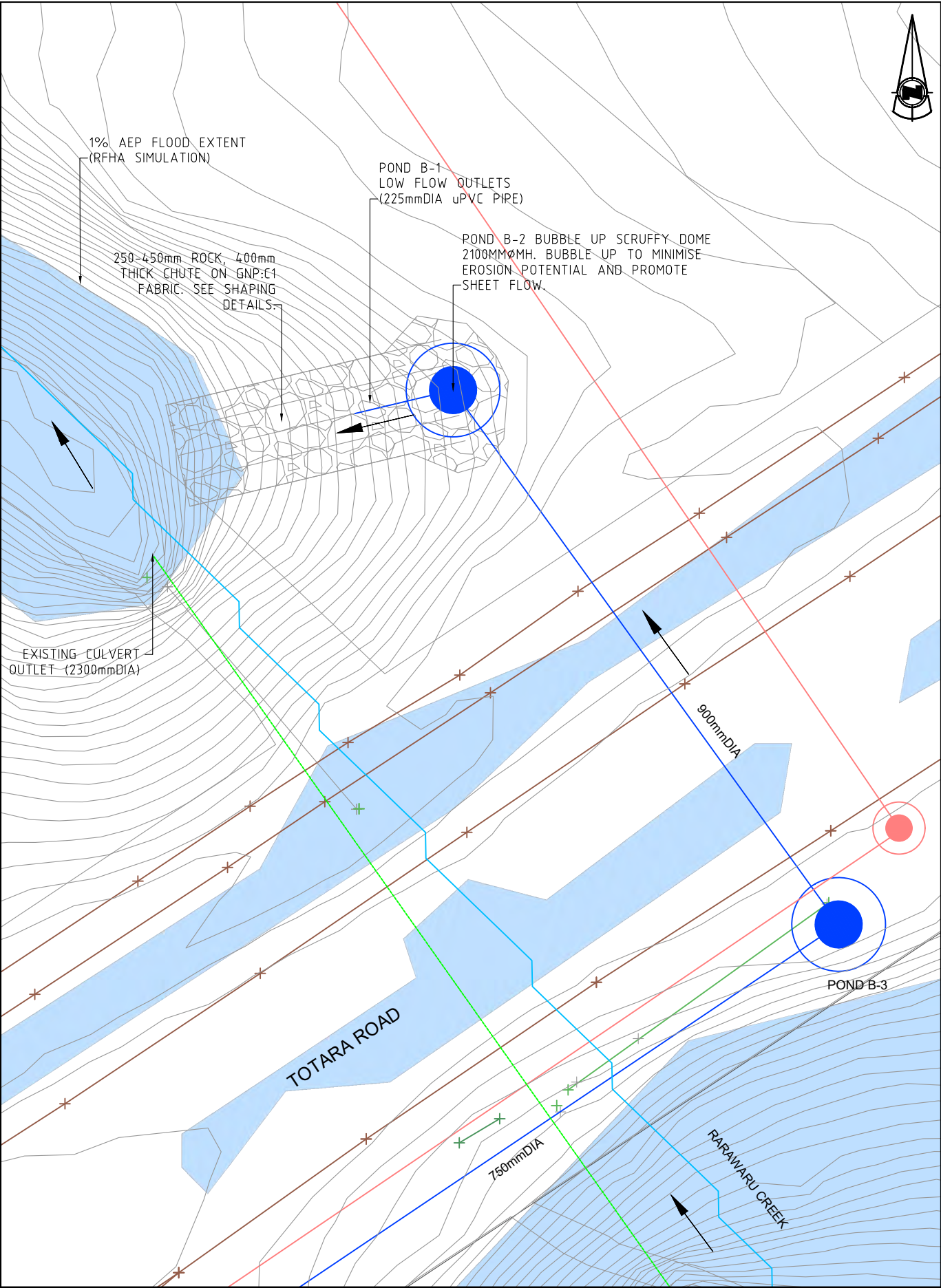
Job Title

98-102 TOTARA ROAD
WHENUAPAI GREEN
WHENUAPAI

Drawing Title

STORMWATER DRAINAGE
ENERGY DISSIPATION &
OUTLET DESIGN

By	Date	Scale	Job No.	4520	Drawing No.	Rev
Surveyed: MS		1:500@A3				
Designed: KLP		5 X VERT.				
Drawn: KLP	12/2022					
Approved: BJ						
			4520-01-SW-407		A	



EXAMPLE BUBBLE UP OUTFALL AND ROCK CHUTE.

RESOURCE CONSENT

Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	BJ	01/12/2022

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF

THE NEIL GROUP

THE NEIL GROUP LIMITED
LEVEL 3, BUILDING 8
8 NUGENT STREET
GRAFTON

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND
TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

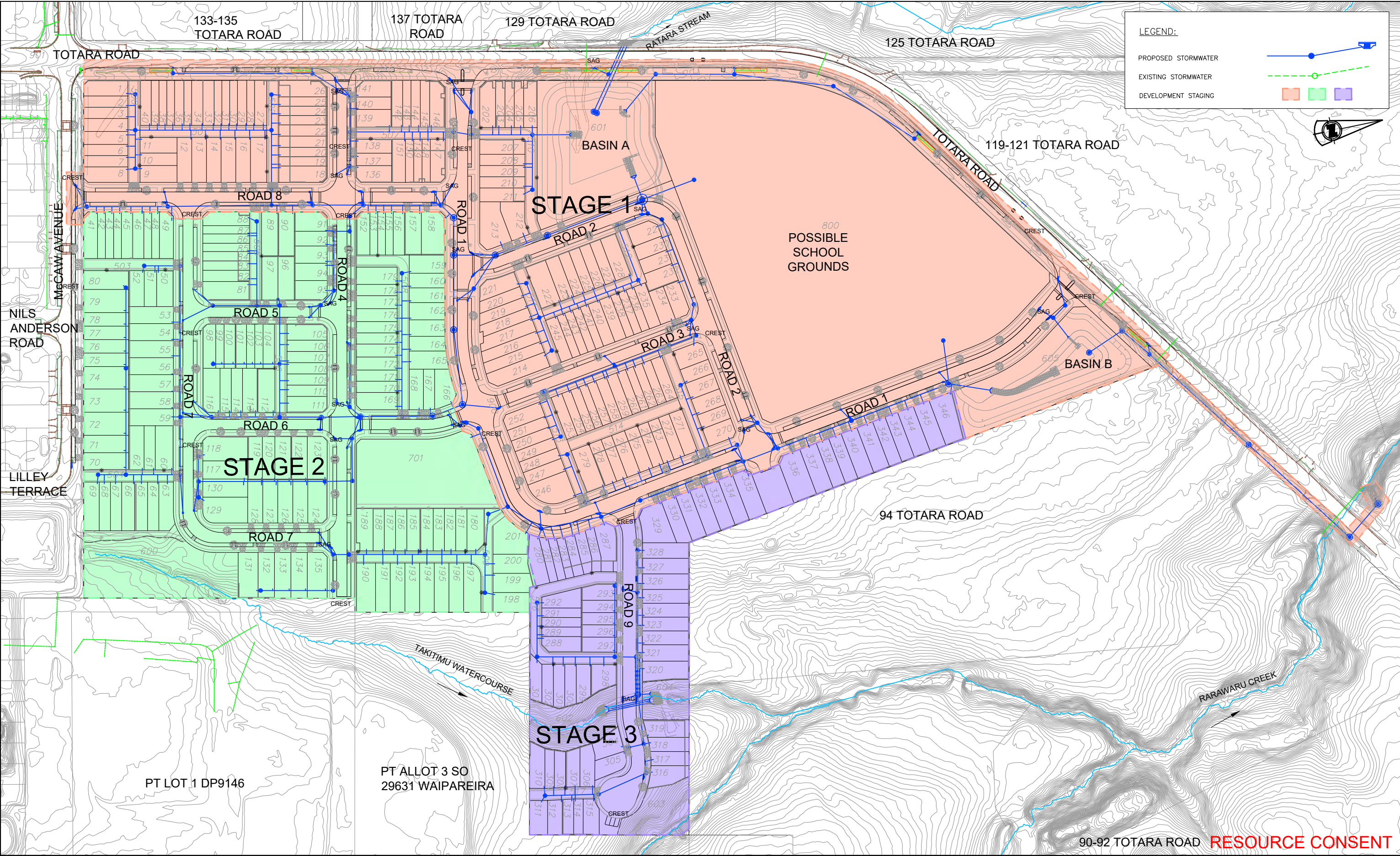
Job Title

**98-102 TOTARA ROAD
WHENUAPAI GREEN
WHENUAPAI**

Drawing Title

**STORMWATER DRAINAGE
ENERGY DISSIPATION &
OUTLET DESIGN**

By	Date	Scale	Job No.	Drawing No.	Rev
MS		1:500@A3	4520	4520-01-SW-408	A
Designed:	KLP				
Drawn:	KLP	12/2022			
Approved:	BJ				



Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	BJ	16/12/2022

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF

THE NEIL GROUP

THE NEIL GROUP LIMITED
LEVEL 3, BUILDING B
8 NUGENT STREET
GRAFTON

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND
TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

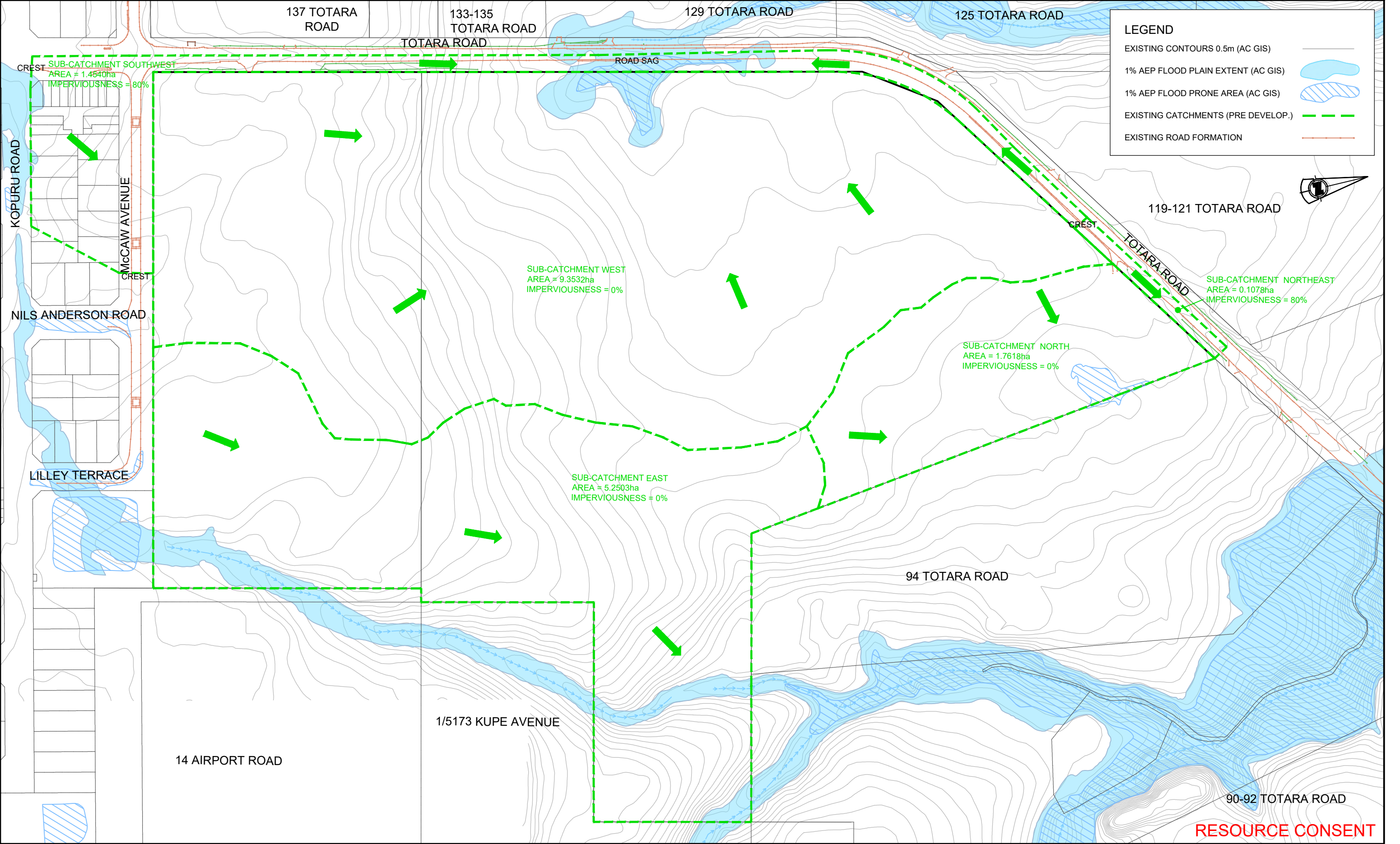
Job Title

**98-102 TOTARA ROAD
WHENUAPAI GREEN
WHENUAPAI**

Drawing Title

**STORMWATER DRAINAGE
DEVELOPMENT STAGING PLAN**

By	Date	Scale	Job No.	Drawing No.	Rev
MS		1:2000@A3	4520	4520-01-SW-413	A
KLP	12/2022				
BJ					



Rev	Description	By	Date
---	ISSUED FOR RESOURCE CONSENT	BJ	16/12/2022



THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF

NEIL CONSTRUCTION LIMITED
LAND DEVELOPERS

THE NEIL GROUP LIMITED
LEVEL 3, BUILDING B
8 NUGENT STREET
GRAFTON

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND
TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

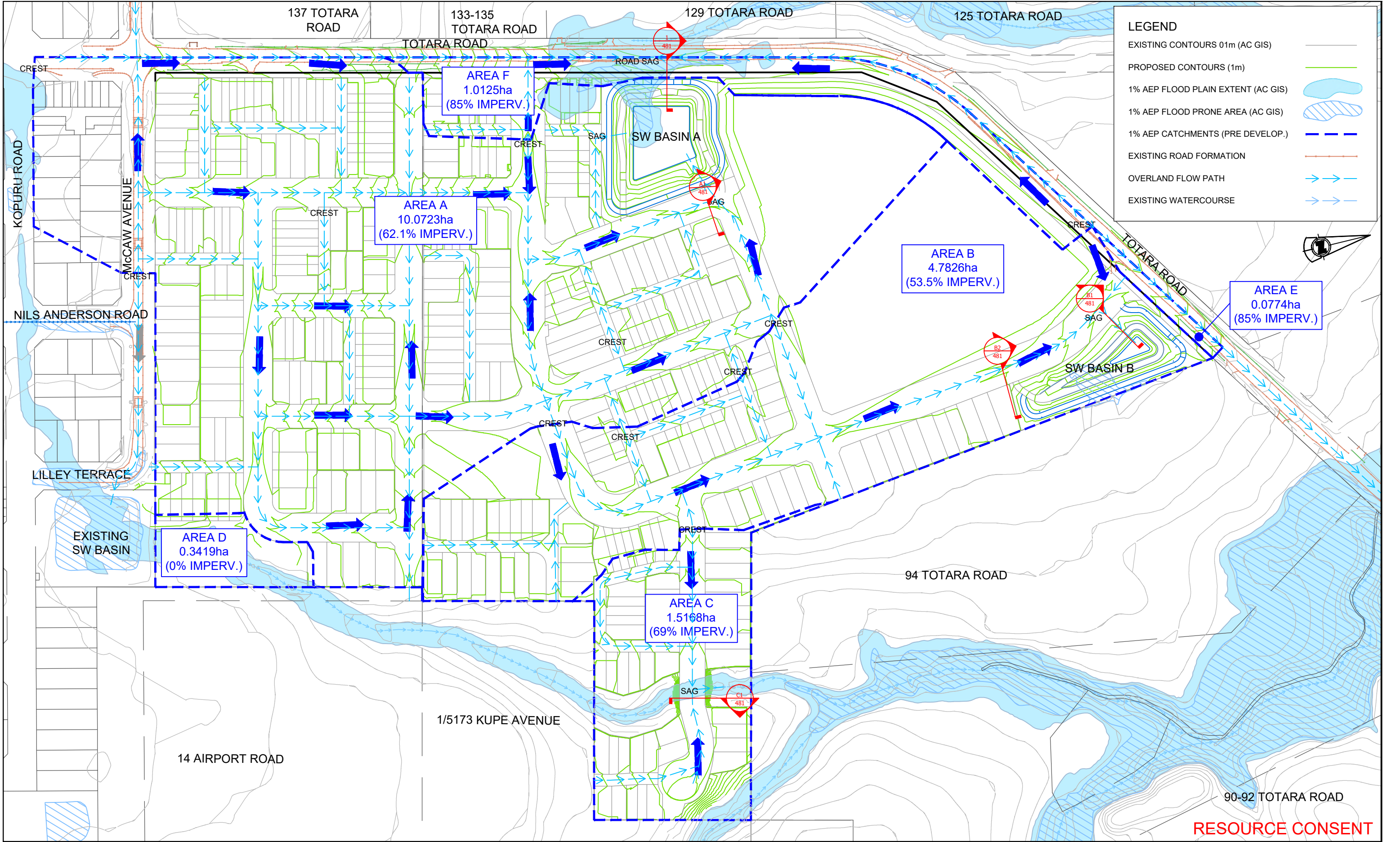
Job Title

WHENUAPAI GREEN
98-102 TOTARA ROAD
WHENUAPAI

Drawing Title

STORMWATER DRAINAGE
1% AEP EXISTING (PRE-DEVELOP.)
CATCHMENT AREAS

	By	Date	Scale	Job No.	4520	
Surveyed:	CP / MS		1:2000@A3	Drawing No.	4520-01-SW-430	Rev
Designed:	KLP			A		
Drawn:	KLP	12/2022				
Approved:	BJ					



Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	BJ	16/12/2022



THE NEIL GROUP

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF

NEIL CONSTRUCTION LIMITED

LAND DEVELOPERS

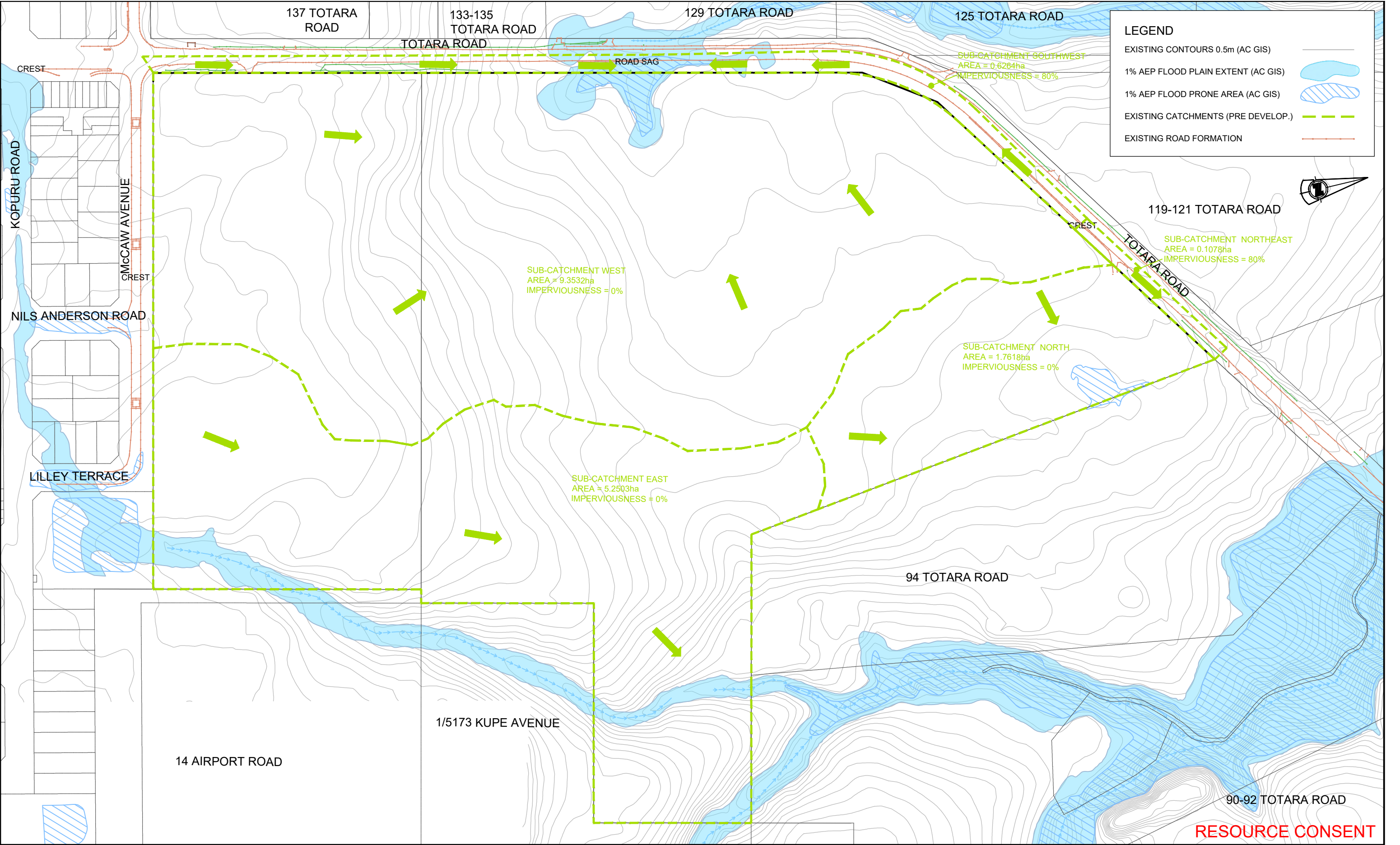
THE NEIL GROUP LIMITED
LEVEL 3, BUILDING B
8 NUGENT STREET
GRAFTON

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND
TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

Job Title	WHENUAPAI GREEN 98-102 TOTARA ROAD WHENUAPAI
-----------	--

Drawing Title	STORMWATER DRAINAGE 1% AEP PROPOSED DEVELOPMENT CATCHMENT AREAS
---------------	---

	By	Date	Scale	Job No.	4520	
Surveyed:	CP / MS		1: 2000@A3	Drawing No.		Rev
Designed:	KLP			4520-01-SW-431		A
Drawn:	KLP	12/2022				
Approved:	BJ					



Rev	Description	By	Date
---	ISSUED FOR RESOURCE CONSENT	BJ	16/12/2022



THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF

NEIL CONSTRUCTION LIMITED
LAND DEVELOPERS

THE NEIL GROUP LIMITED
LEVEL 3, BUILDING B
8 NUGENT STREET
GRAFTON

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND
TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

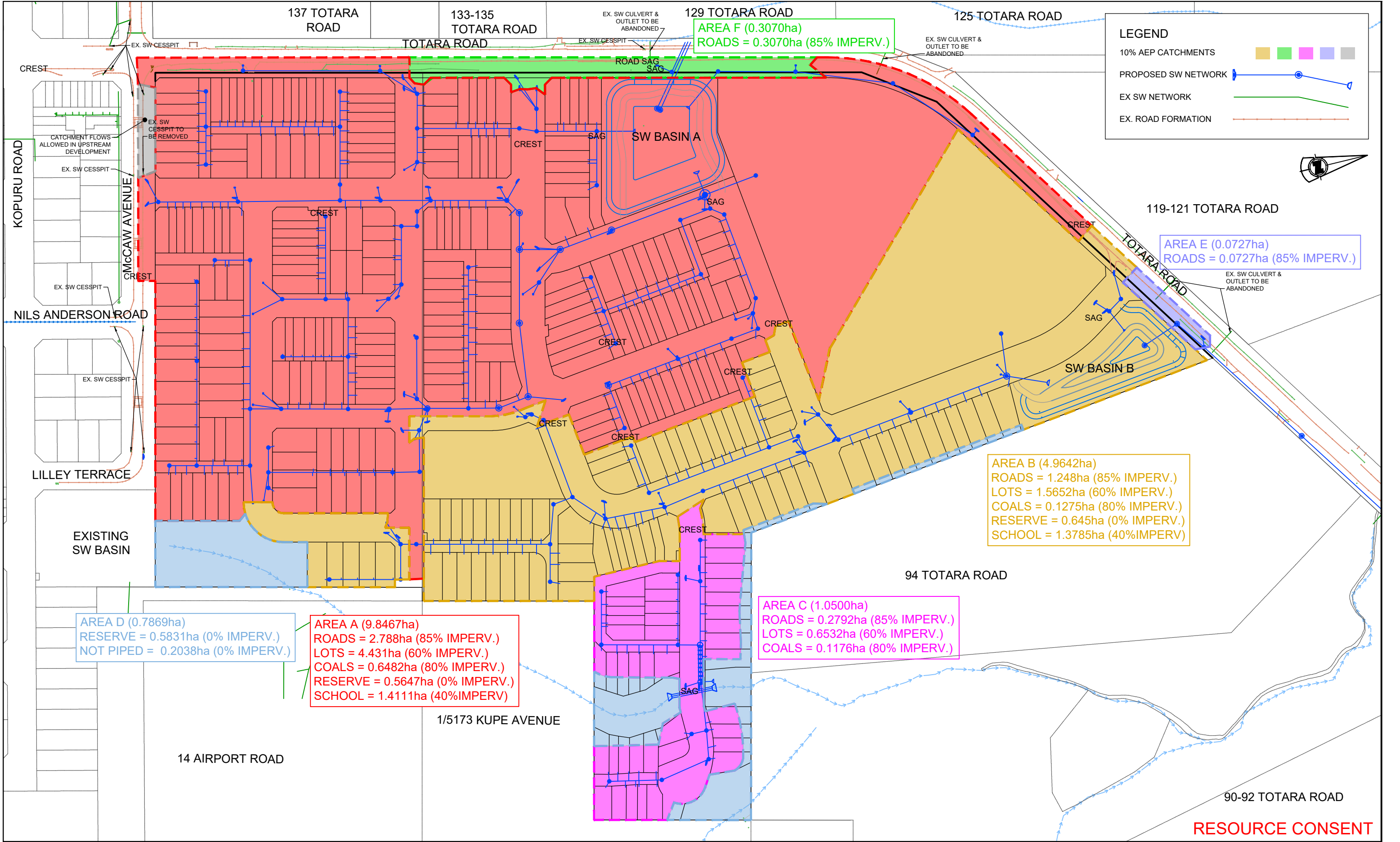
Job Title

WHENUAPAI GREEN
98-102 TOTARA ROAD
WHENUAPAI

Drawing Title

STORMWATER DRAINAGE
0% AEP EXISTING (PRE-DEVELOP.)
CATCHMENT AREAS

	By	Date	Scale	Job No.	4520	
Surveyed:	CP / MS		1: 2000@A3	Drawing No.	4520-01-SW-432	Rev
Designed:	KLP			A		
Drawn:	KLP	12/2022				
Approved:	BJ					



Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	BJ	16/12/2022



THE NEIL GROUP

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF

NEIL CONSTRUCTION LIMITED

LAND DEVELOPERS

THE NEIL GROUP LIMITED
LEVEL 3, BUILDING B
8 NUGENT STREET
GRAFTON

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND
TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

Job Title

WHENUAPAI GREEN

98-102 TOTARA ROAD

WHENUAPAI

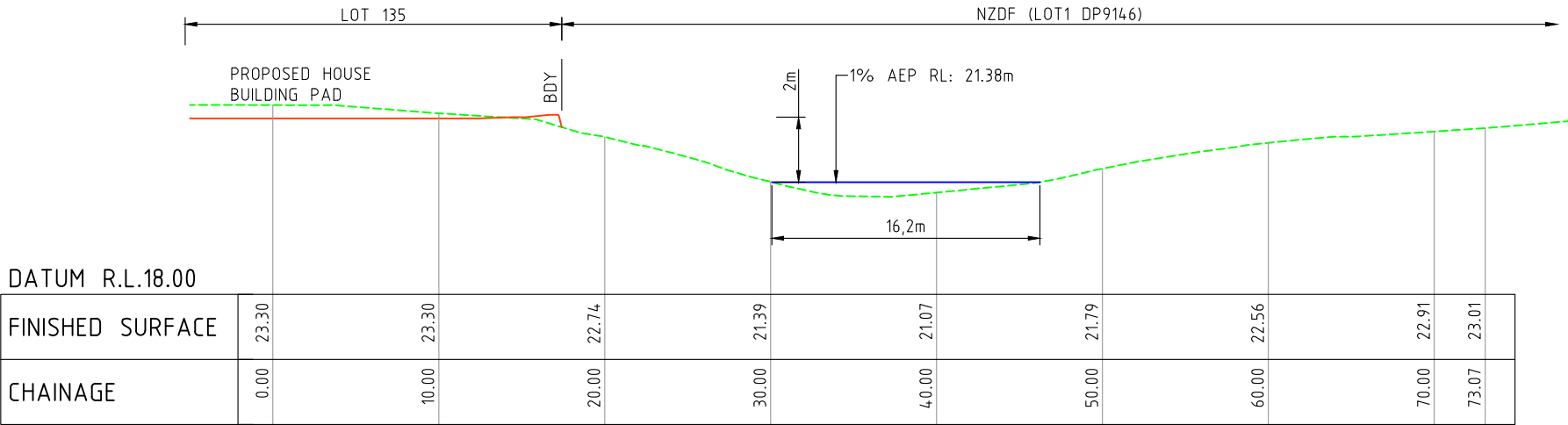
Drawing Title

STORMWATER DRAINAGE

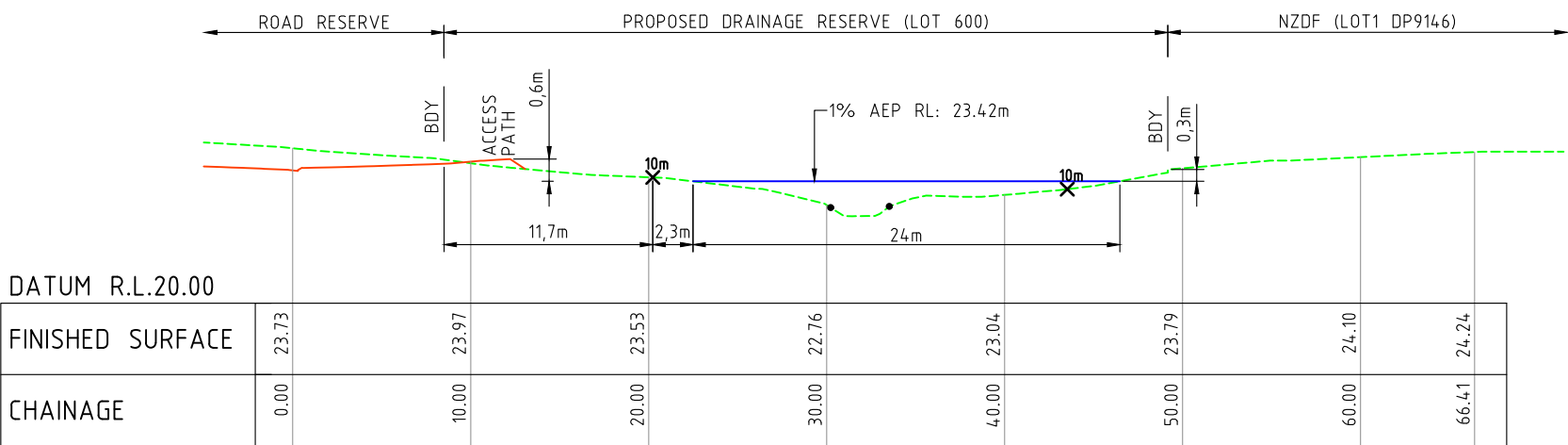
10% AEP PROPOSED DEVELOPMENT

CATCHMENT AREAS

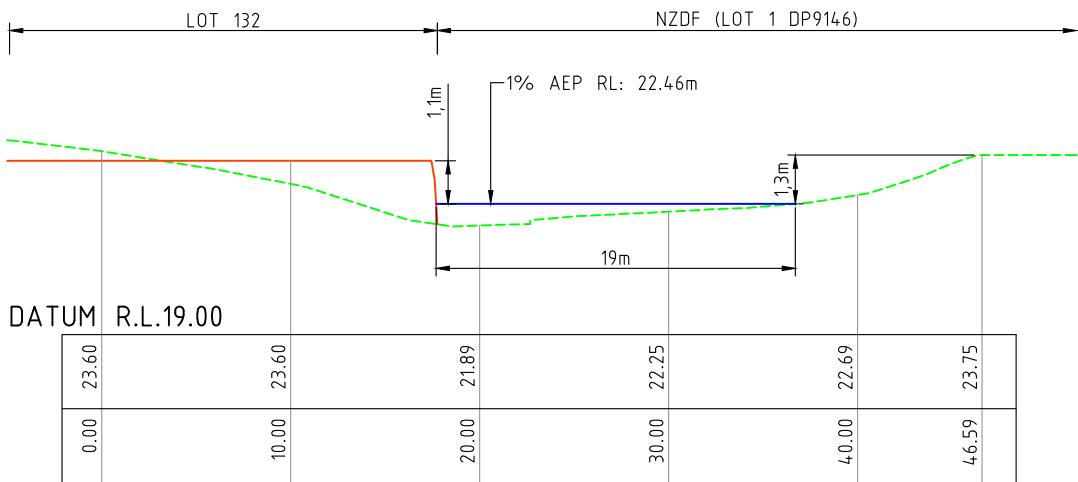
By	Date	Scale	Job No.	4520	Drawing No.	Rev
Surveyed: CP / MS		1:2000@A3	4520-01-SW-433		A	
Designed: KLP						
Drawn: KLP	12/2022					
Approved: BJ						



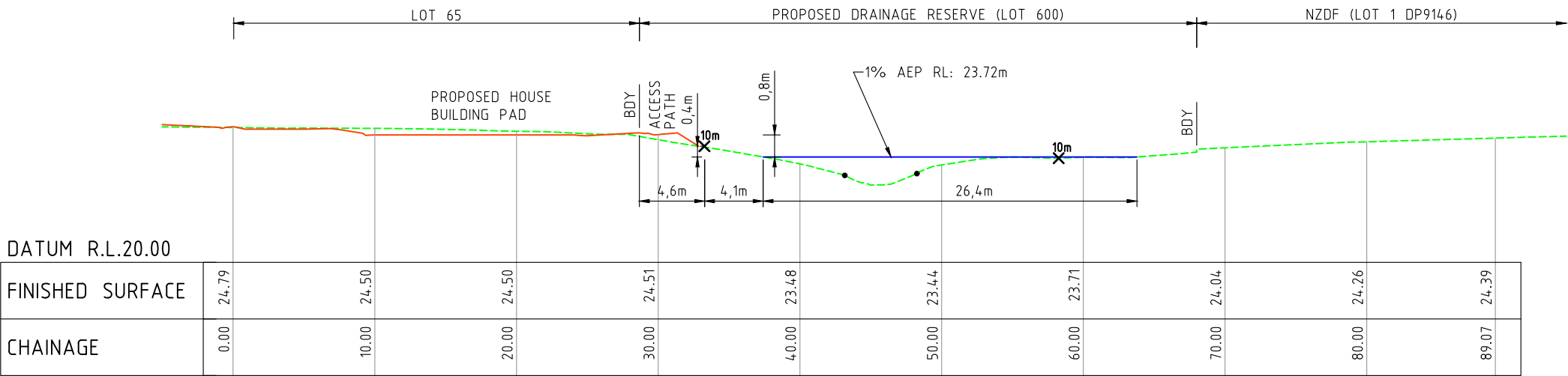
OUTLET 2 SECTION 3 (EXISTING PIPE IGNORED)



OUTLET 2 SECTION 2



LOT 132 SECTION (EXISTING PIPE IGNORED)



OUTLET 2 SECTION 1

KEY:

FINISHED SURFACE ———

EXISTING SURFACE - - - - -

TOP OF BANK (TOB) •

10m OFFSET FROM TOB X

RESOURCE CONSENT

Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	BJ	16/12/2022

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF

THE NEIL GROUP

NEIL CONSTRUCTION LIMITED

LAND DEVELOPERS

THE NEIL GROUP LIMITED
LEVEL 3, BUILDING 8
8 AUGUST STREET
GRAFTON

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND
TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

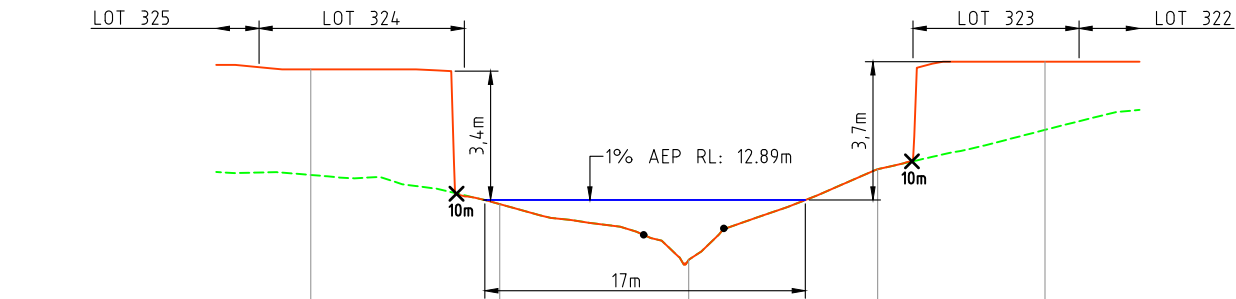
Job Title

WHENUAPAI GREEN
98-102 TOTARA ROAD
WHENUAPAI

Drawing Title

STORMWATER DRAINAGE
RAPID FLOOD HAZARD
ASSESSMENT CROSS SECTIONS

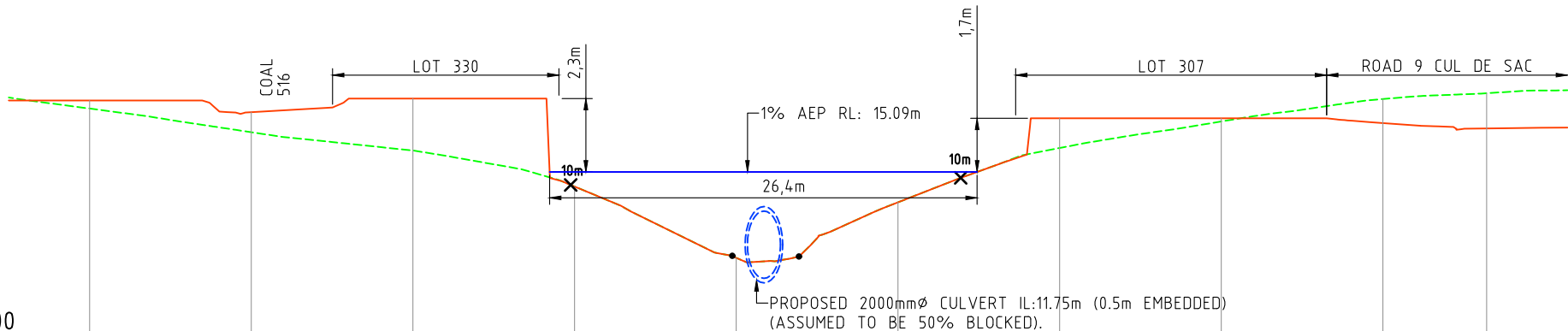
By	Date	Scale	Job No.	4520	Rev
Surveyed:	CP / MS	1:400@A3	Drawing No.		
Designed:	KLP	5 x VERT	4520-01-SW-435		
Drawn:	KLP	12/2022			
Approved:	BJ				A



DATUM R.L.9.00

FINISHED SURFACE	16.35	12.78	11.31	13.71	16.55
CHAINAGE	0.00	10.00	20.00	30.00	38.86

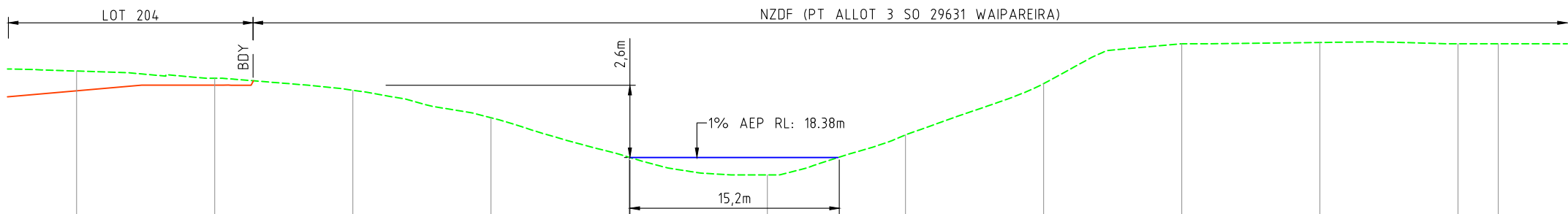
ROAD 9 CULVERT DS SECTION



DATUM R.L.10.00

FINISHED SURFACE	17.30	16.94	17.36	14.64	12.43	14.15	16.75	16.75	16.60	16.44
CHAINAGE	0.00	10.00	20.00	30.00	40.00	50.00	60.00	70.00	80.00	86.42

ROAD 9 CULVERT US SECTION



DATUM R.L.15.00

FINISHED SURFACE	20.80	21.00	20.82	19.82	18.39	17.75	19.20	21.05	22.50	22.55	22.50	22.50
CHAINAGE	0.00	10.00	20.00	30.00	40.00	50.00	60.00	70.00	80.00	90.00	100.00	102.91

KEY:
FINISHED SURFACE ———
EXISTING SURFACE - - - - -
TOP OF BANK (TOB) •
10m OFFSET FROM TOB X

OUTLET 2 SECTION 4

RESOURCE CONSENT

Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	BJ	16/12/2022

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF

THE NEIL GROUP

NEIL CONSTRUCTION LIMITED
LAND DEVELOPERS

THE NEIL GROUP LIMITED
LEVEL 3, BUILDING B
8 NUGENT STREET
GRAFTON

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND
TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

Job Title

**WHENUAPAI GREEN
98-102 TOTARA ROAD
WHENUAPAI**

Drawing Title

**STORMWATER DRAINAGE
RAPID FLOOD HAZARD
ASSESSMENT CROSS SECTIONS**

By	Date	Scale	Job No.	4520	Drawing No.	Rev
Surveyed:	CP / MS	1:400@A3 5 x VERT	4520-01-SW-436			A
Designed:	KLP					
Drawn:	KLP	12/2022				
Approved:	BJ					

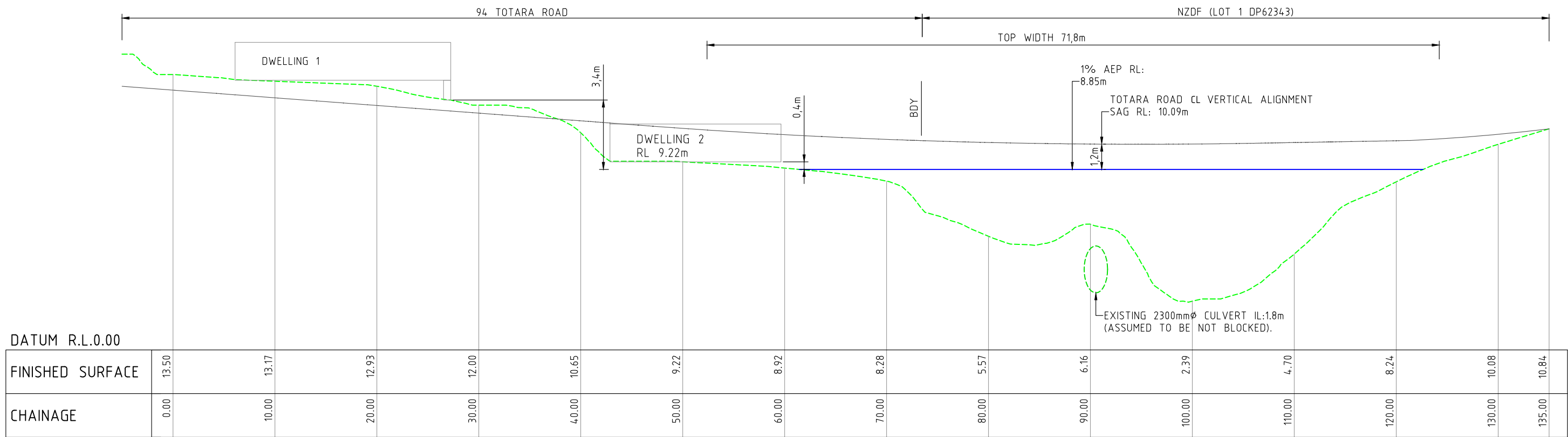
KEY:

FINISHED SURFACE

EXISTING SURFACE

TOP OF BANK (TOB)

10m OFFSET FROM TOB



TOTARA ROAD CULVERT US SECTION

RESOURCE CONSENT

Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	BJ	16/12/2022

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF

THE NEIL GROUP

NEIL CONSTRUCTION LIMITED

LAND DEVELOPERS

THE NEIL GROUP LIMITED

LEVEL 3, BUILDING B

8 AUGUST STREET

GRAFTON

PO BOX 8751, SYMONDS STREET

AUCKLAND, NEW ZEALAND

TELEPHONE: +64 9 918 6565

FACSIMILE: +64 9 918 6567

WEB: www.neilgroup.co.nz

Job Title

WHENUAPAI GREEN

98–102 TOTARA ROAD

WHENUAPAI

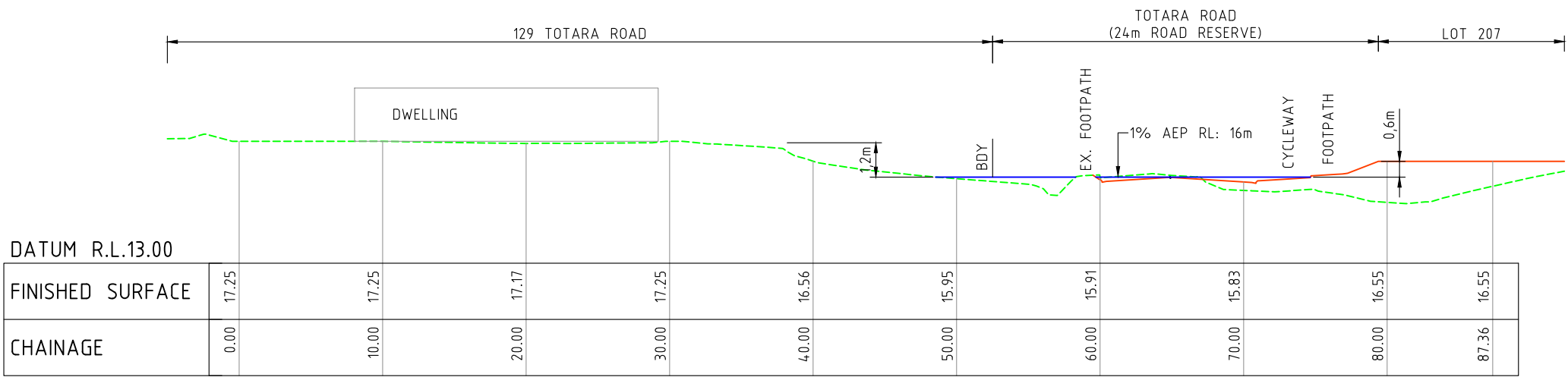
Drawing Title

STORMWATER DRAINAGE

RAPID FLOOD HAZARD

ASSESSMENT CROSS SECTIONS

	By	Date	Scale	Job No.	4520	
Surveyed:	CP / MS		1:400@A3 5 x VERT	Drawing No. 4520–01–SW–437		Rev A
Designed:	KLP					
Drawn:	KLP	12/2022				
Approved:	BJ					



KEY:

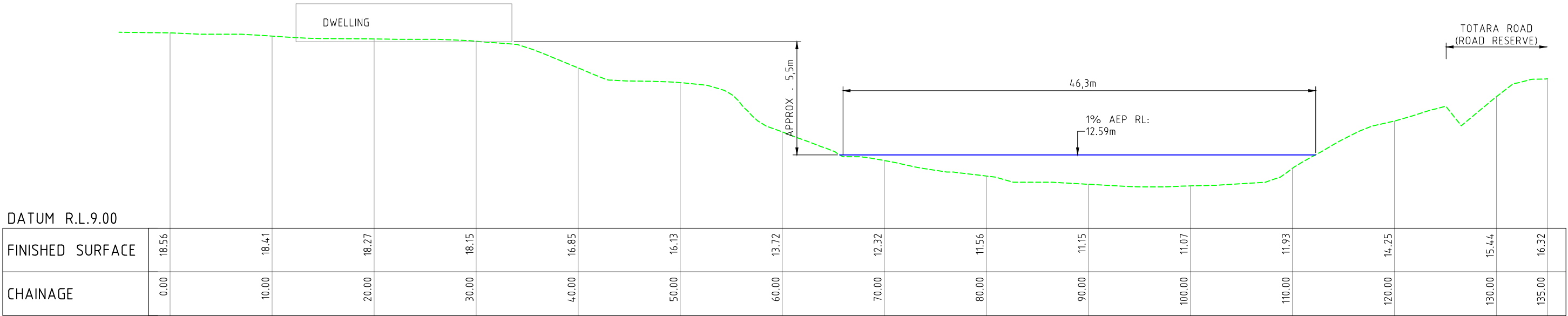
FINISHED SURFACE ———

EXISTING SURFACE - - - - -

TOP OF BANK (TOB) •

10m OFFSET FROM TOB X_{10m}

SECTION 129 TOTARA ROAD



SECTION 125 TOTARA ROAD

RESOURCE CONSENT

Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	BJ	16/12/2022

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF

THE NEIL GROUP

NEIL CONSTRUCTION LIMITED
LAND DEVELOPERS

THE NEIL GROUP LIMITED
LEVEL 3, BUILDING B
8 NUGENT STREET
GRAFTON

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND
TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

Job Title

**WHENUAPAI GREEN
98-102 TOTARA ROAD
WHENUAPAI**

Drawing Title

**STORMWATER DRAINAGE
RAPID FLOOD HAZARD
ASSESSMENT CROSS SECTIONS**

	By	Date	Scale	Job No.	4520	
Surveyed:	CP / MS		1:400@A3	Drawing No.		Rev
Designed:	KLP		5 x VERT	4520-01-SW-438		A
Drawn:	KLP	12/2022				
Approved:	BJ					

RAINFALL TO RUNOFF ROUTING SUMMARY

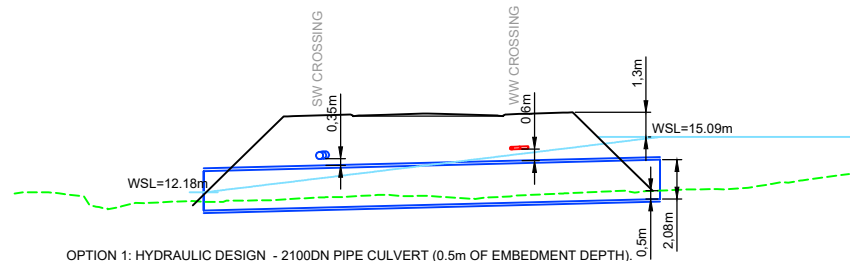
PROJECT DATA

PROJECT NO.:		4520	BY:		KLP
DATE:		Dec-22	Rev		A
SITE DESCRIPTION:		98-102 TOTARA ROAD, WHENUAPAI			

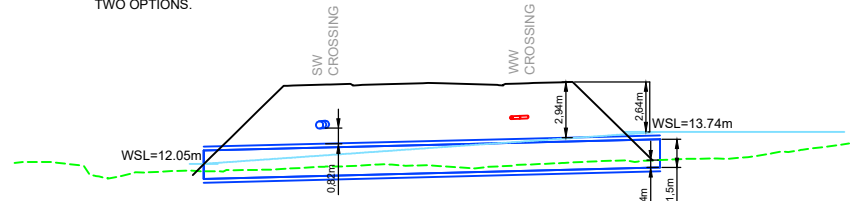
1% AEP STORM EVENT CATCHMENT FLOWS CALCULATIONS (TP108):

Note: - Rainfall data from TP108 - Appendix A - Figure A.6 (WITH CLIMATE CHANGE as per Auckland CoP 4.2.10)
- Catchment data as per Whenuapai 2 Stormwater Management Plan (March 2016)

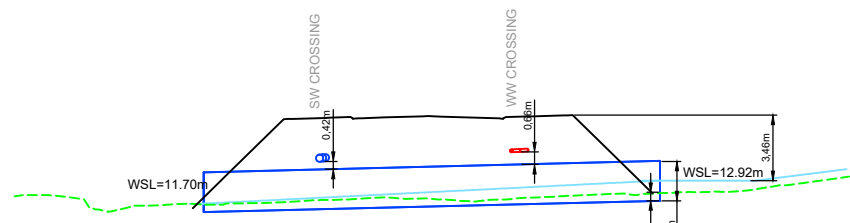
ID		1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18		19	
CATHMENTS		DS1 (perv & imperv)		DS2 (perv & imperv)		DS3 (perv & imperv)		DS4 (perv & imperv)		DS5 (perv & imperv)		DS6 (perv & imperv)		DS7 (perv & imperv)		WHENUAPI 2 (perv & imperv)		ITM WETLAND (perv & imperv)		AREA B (perv & imperv)		RATARA 1 (perv & imperv)		RATARA 2 (perv & imperv)		RATARA 3 (perv & imperv)		RATARA 4 (perv & imperv)		RATARA 5 (perv & imperv)		RATARA 6 (perv & imperv)		RATARA 7 (perv & imperv)		AREA A (perv & imperv)		AREA F (perv & imperv)	
Catchment Area	ha	5.904		6.001		67.700		5.510		5.580		33.440		21.460		12.740		3.9400		4.296		2.547		22.140		6.280		2.220		5.948		5.589		3.755		10.560		1.013	
Perv/Imperv		Perv	Imperv	Perv	Imperv	Perv	Imperv	Perv	Imperv	Perv	Imperv	Perv	Imperv	Perv	Imperv	Perv	Imperv	Perv	Imperv	Perv	Imperv	Perv	Imperv	Perv	Imperv	Perv	Imperv	Perv	Imperv	Perv	Imperv	Perv	Imperv	Perv	Imperv	Perv	Imperv	Perv	Imperv
Catchment slope	m/m	1.181	4.723	1.200	4.801	13.540	54.160	1.102	4.408	1.116	4.464	6.688	26.752	4.292	17.168	2.548	10.192	0.788	3.152	0.859	3.437	0.509	2.037	4.428	17.712	1.256	5.024	0.444	1.776	1.190	4.758	1.118	4.471	0.751	3.004	4.002	6.558	0.152	0.861
Catchment length	km	0.03		0.03		0.02		0.03		0.03		0.02		0.02		0.00569		0.03		0.04		0.04		0.01		0.025		0.05		0.05		0.1		0.1		0.035		0.03	
Imperviousness	%	80%		80%		80%		80%		80%		80%		80%		80%		80%		80%		80%		80%		80%		80%		80%		80%		80%		80%		80%	
Channel factor		0.6	0.8	0.6	0.8	0.6	0.8	0.6	0.8	0.6	0.8	0.6	0.8	0.6	0.8	0.6	0.8	0.6	0.8	0.6	0.8	0.6	0.8	0.6	0.8	0.6	0.8	0.6	0.8	0.6	0.8	0.6	0.8	0.6	0.8	0.6	0.8		
SVS Curve Number	mm	74	98	74	98	74	98	74	98	74	98	74	98	74	98	74	98	74	98	74	98	74	98	74	98	74	98	74	98	74	98	74	98	74	98	74	98		
Weighted CN	mm	93.2		93.2		93.2		93.2		93.2		93.2		93.2		93.2		93.2		93.2		93.2		93.2		93.2		93.2		93.2		93.2		88.9		94.4			
Weighted Ia	mm	5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0		
Runoff C	--	0.00	0.87	0.00	0.87	0.00	0.87	0.00	0.87	0.00	0.87	0.00	0.87	0.00	0.87	0.00	0.87	0.00	0.87	0.00	0.87	0.00	0.87	0.00	0.87	0.00	0.87	0.00	0.87	0.00	0.87	0.00	0.87	0.00	0.87	0.00	0.87		
Tc	min	12.2min	12.4min	10.0min	10.0min	23.8min	24.2min	10.0min	10.2min	11.0min	11.2min	27.0min	27.5min	20.0min	20.3min	20.1min	20.5min	10.0min	10.0min	10.0min	10.0min	10.0min	10.0min	30.3min	30.8min	11.2min	11.3min	10.0min	10.0min	10.0min	10.0min	10.0min	10.0min	10.0min	10.0min	10.1min	10.3min		
tp	min	8.2min	8.3min	6.7min	6.7min	15.9min	16.1min	6.7min	6.8min	7.4min	7.5min	18.0min	18.3min	13.3min	13.6min	13.4min	13.7min	6.7min	6.7min	6.7min	6.7min	6.7min	6.7min	20.2min	20.6min	7.4min	7.6min	6.7min	6.7min	6.7min	6.7min	6.7min	6.7min	6.7min	6.7min	6.7min	6.8min		
Storage S	mm	89.2	5.2	89.2	5.2	89.2	5.2	89.2	5.2	89.2	5.2	89.2	5.2	89.2	5.2	89.2	5.2	89.2	5.2	89.2	5.2	89.2	5.2	89.2	5.2	89.2	5.2	89.2	5.2	89.2	5.2	89.2	5.2	89.2	5.2	89.2	5.2		
10yr P24hr rainfall	mm	227.8		227.8		227.8		227.8		227.8		227.8		227.8		227.8		227.8		227.8		227.8		227.8		227.8		227.8		227.8		227.8		212.8		212.8			
c*=(P24-2Ia)/ (P24-2Ia+2S)		0.55	0.96	0.55	0.96	0.55	0.96	0.55	0.96	0.55	0.96	0.55	0.96	0.55	0.96	0.55	0.96	0.55	0.96	0.55	0.96	0.55	0.96	0.55	0.96	0.55	0.96	0.55	0.96	0.55	0.96	0.55	0.96	0.53	0.95	0.53	0.95		
q* (from fig.5.1)	Approx!!	0.126	0.158	0.133	0.167	0.100	0.129	0.133	0.166	0.130	0.162	0.095	0.122	0.108	0.138	0.108	0.138	0.133	0.167	0.133	0.167	0.133	0.167	0.090	0.116	0.129	0.162	0.133	0.167	0.133	0.167	0.133	0.167	0.133	0.167	0.130	0.166	0.123	0.158
q peak	m³/s	0.339	1.704	0.364	1.825	3.089	15.934	0.334	1.668	0.330	1.652	1.450	7.465	1.058	5.398	0.626	3.196	0.239	1.198	0.261	1.306	0.154	0.774	0.911	4.678	0.370	1.853	0.135	0.675	0.361	1.809	0.339	1.699	0.228	1.142	1.110	2.314	0.040	0.290
Q24	mm	159	223	159	223	159	223	159	223	159	223	159	223	159	223	159	223	159	223	159	223	159	223	159	223	159	223	159	223	159	223	159	223	145	208	145	208		
V24	m³	1878	10520	1909	10693	21539	120631	1753	9818	1775	9943	10639	59585	6828	38239	4053	22701	1254	7021	1367	7655	810	4538	7044	39449	1998	11190	706	3956	1892	10599	1778	9959	1195	6692	5818	13623	221	1788
Combined Runoff Volume	m³	12398		12602		142171		11571		11718		70224		45066		26754		8274		9022		5348		46493		13187		4662		12491		11737		7886		19442		2009	



- OPTION 1: HYDRAULIC DESIGN - 2100DN PIPE CULVERT (0.5m OF EMBEDMENT DEPTH).**
- SPECIFIC HYDRAULIC PERFORMANCE (VELOCITY/DEPTH/TURBULENCE TO TARGET FISH).
 - NOT POSSIBLE TO UPSIZE PIPE DUE TO NOT HAVING ENOUGH CLEARANCE FROM SW & WW CROSSINGS.
 - PIPE DIAMETER SMALLER THAN STREAM BANKFULL WIDTH (NOT SUITABLE FOR STREAM SIMULATION).
 - HYDRAULIC SIMULATION RESULTED IN THE HIGHEST HEADWATER UPSTREAM COMPARED TO OTHER TWO OPTIONS.



- OPTION 2: STREAM SIMULATION - 3.5m x 1.5m BOX CULVERT (0.4m OF EMBEDMENT DEPTH)**
- SPECIFIC DESIGN DUE TO FILL HEIGHT (>2000mm).
 - HYDRAULIC SIMULATION RESULTED IN THE SECOND HIGHEST HEADWATER UPSTREAM COMPARED TO OTHER TWO OPTIONS.



- OPTION 3: STREAM SIMULATION - 3.25m x 2.11m PIPE-ARCH CULVERT (0.5m OF EMBEDMENT DEPTH)**
- STEEL PIPE (LIGHTER / STRAIGHT FORWARD INSTALLATION).
 - POSSIBLY NOT AS EASILY AVAILABLE TO BE SOURCED FROM.
 - HYDRAULIC SIMULATION RESULTED IN THE LOWEST HEADWATER UPSTREAM COMPARED TO OTHER TWO OPTIONS.

- OPTION 4: STREAM SIMULATION - 3.35m x 1.75m ARCH CULVERT (0.5m OF EMBEDMENT DEPTH)**
- STEEL ARCH FRAME (LIGHTER / STRAIGHT FORWARD INSTALLATION).
 - CONCRETE FOOTING (POSSIBLY MORE COMPLEX DESIGN / INSTALLATION).
 - HYDRAULIC SIMULATION RESULTED IN SIMILAR HEADWATER UPSTREAM COMPARED TO PIPE-ARCH CULVERT (OPTION 3).



OPTION 1 - PIPE CULVERT



OPTION 2 - BOX CULVERT



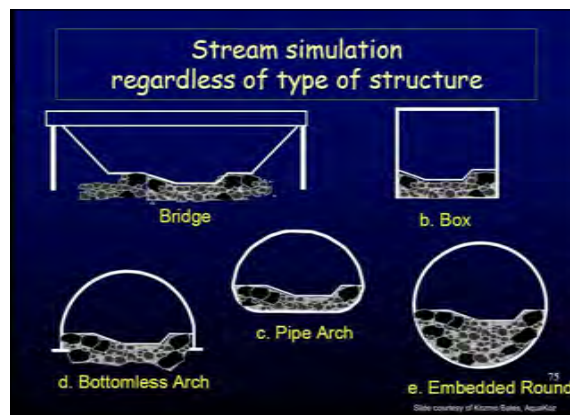
OPTION 3 - PIPE-ARCH CULVERT



OPTION 4 - ARCH CULVERT



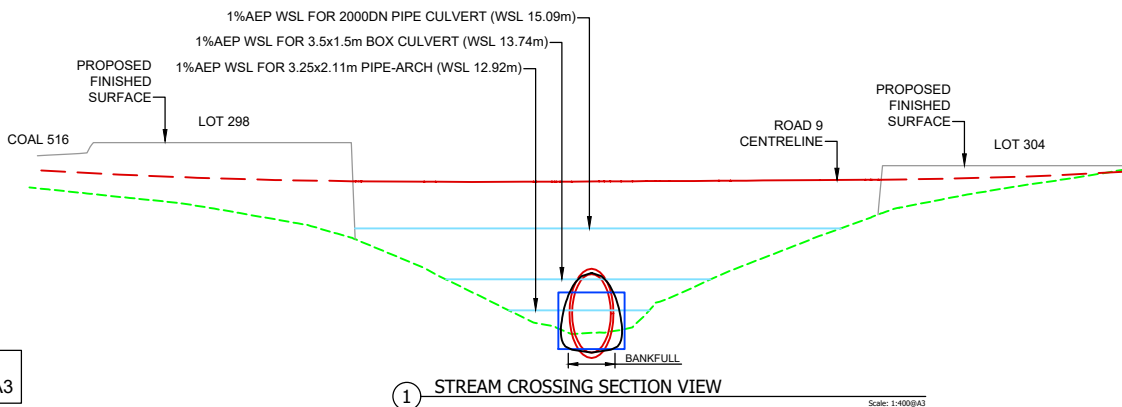
PHOTO A - TAKITIMU WATERCOURSE (LOOKING NORTH)



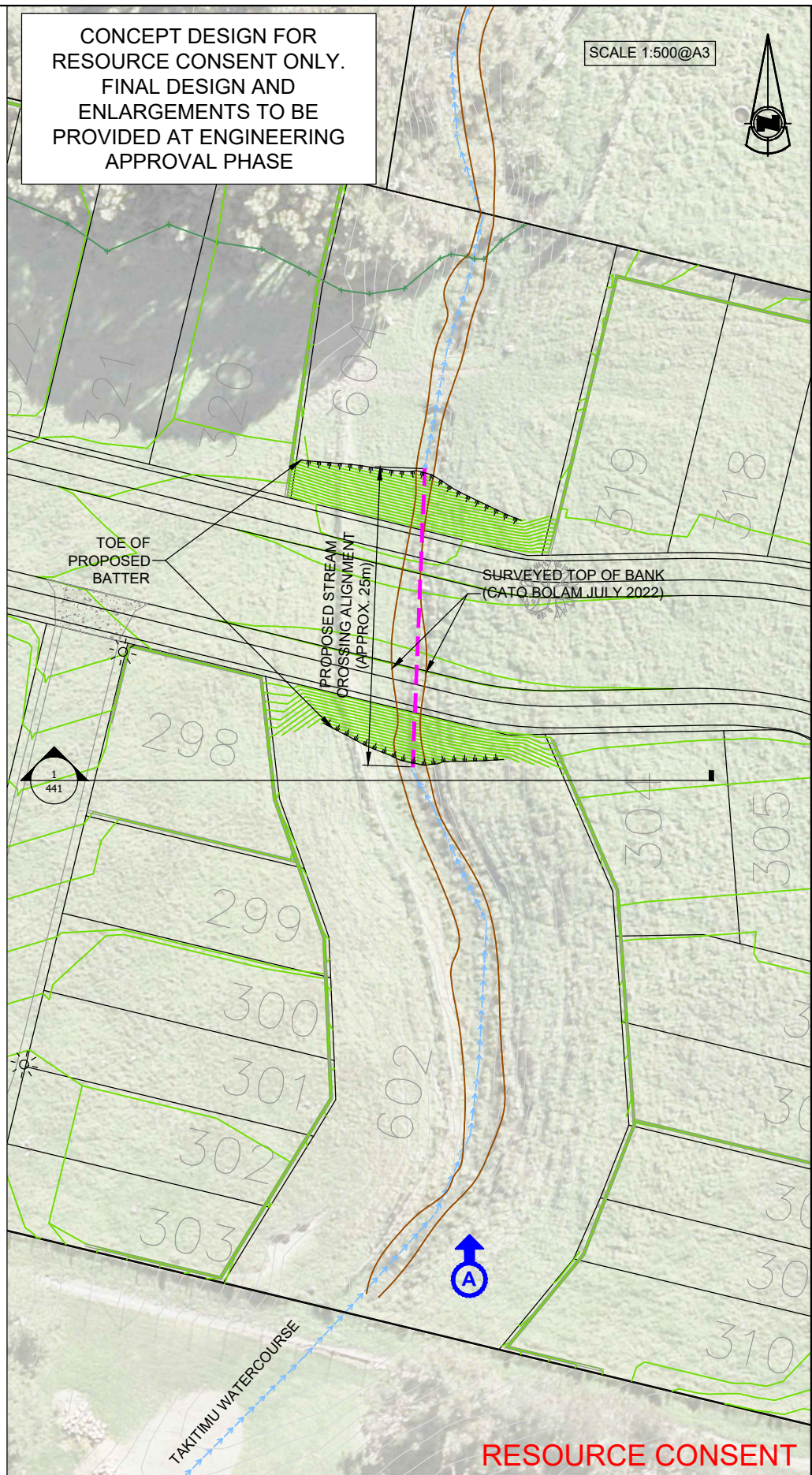
STREAM CROSSING DESIGN PARAMETERS:

- EMBANKMENT HEIGHT = 4.3m±
- EXISTING STREAM BED GRADE = 2.5%
- CALCULATED WEIGHTED STREAM BANKFULL WIDTH = 2.47m (CATO BOLAM, JULY / 2022).
- CULVERT SPAN TO BE 1.3 x BANKFULL WIDTH = 3.2m±
- CROSSING LENGTH = 25m±
- 1% AEP PEAK FLOW = 5.31m³/s
- CULVERT ASSUMED TO BE 50% BLOCKED

SCALE 1:400@A3



① STREAM CROSSING SECTION VIEW



RESOURCE CONSENT

Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	BJ	16/12/2022

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF

THE NEIL GROUP

NEIL CONSTRUCTION LIMITED
LAND DEVELOPERS

THE NEIL GROUP LIMITED
LEVEL 3, BUILDING B
8 NUGENT STREET
GRAFTON

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND
TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

Job Title

**WHENUAPAI GREEN
98-102 TOTARA ROAD
WHENUAPAI**

Drawing Title

**STORMWATER DRAINAGE
STREAM CROSSING
FISH PASSAGE CONCEPT DESIGN**

By	Date	Scale	Job No.	4520	Rev
Surveyed: MS			Drawing No.		
Designed: KLP			4520-01-SW-440		A
Drawn: KLP	12/2022	AS SHOWN			
Approved: BJ					

STORMWATER MANAGEMENT OBJECTIVES - (QUALITY AND QUANTITY):

THE STORMWATER MANAGEMENT OBJECTIVES ARE APPLICABLE TO THIS SITE, AS DEFINED BY:

- AUCKLAND COUNCIL CODE OF PRACTICE CHAPTER 4 - STORMWATER (VERSION 3 JAN 2022)
(WHICH REFERS TO:)
AUCKLAND COUNCIL REGIONAL STORMWATER NETWORK DISCHARGE CONSENT - SCHEDULE 4.
(WHICH REFERS TO:)
AUCKLAND UNITARY PLAN SECTION E10 STORMWATER MANAGEMENT AREA - FLOW 1 (SMAF 1).

ARE SUMMARIZED AS:

STORMWATER MANAGEMENT OBJECTIVES:					
Contributing catchment		Public Road Reserve (Roads 1 to 8) & COALs (500 to 515)	Public Road Reserve (Roads 9) & COALs 516 and 517	Private Dwellings	Totara Road Reserve (half road)
10% AEP - Primary pipe drainage capacity adjusted for climate change.		10% AEP / 10min time of concentration / 2.1degrees climate change adjusted rainfall intensity of 106.1mm/hr used for pipe calculations and sizing.			
At source management and control of stormwater runoff		Dry Basin - 2 Stormwater Basins are proposed, providing detention (Basins A & B)	Underground storage pipe - Appropriated sized public storage pipe located under road reserve, providing detention from road runoff. Appropriated sized private storage pipe located under COAL, providing detention from COALs runoff.	Rain water tanks would be the most appropriately suited device to achieve this outcome. (subject to final house design and build).	Rain garden - bioretention device (due to existing topography), providing detention and treatment.
Stormwater Management Area Flow 1 (SMAF 1)	Retention (volume reduction) of a minimum of 5mm runoff from impervious surfaces.	Retention included with detention volume.	Retention included with detention volume.	Rain water tanks for garden and internal water toilet reuse(subject to final house design and build).	Retention included with detention volume.
	Detention (temporary storage) of modified (pre vs post minus retention volume) 95th percentile 24hr event (35mm) from impervious surfaces calculated as 17.94mm. [being TP108 post runoff depth of 30.49mm minus TP108 pre development runoff depth of 7.55mm minus Flow 1 retention of 5mm].	Detained within the proposed stormwater basins with 24hrs draw down release through an orifice controlled outlet.	Detained within the storage pipe under road reserve, drawing down over 24 hour period through an orifice controlled chamber	Lots 288-238 inclusive. SMAF 1 detention volume managed by a rainwater tank with drawn down via an outlet orifice over 24hrs period. (subject to final house design and build). All other Lots piped to SW basins.	Rain garden - at source appropriately sized device allowing for SMAF 1 detention volume to be stored and released over 24hrs period.
Provision for overland flow paths for secondary flow.		All roads and COALs are used for secondary overland flow. Road 1 and Road 2 sags provides overland flow entry to stormwater basins respectively and Road 9 sag provides overland flow exit to existing watercourse (Takitimu)			
At source water quality treatment of high contaminant generating areas.		No Treatment required. (Not considered as high use road)			Water quality met by SMAF 1 detention / retention volume requirements using proposed raingardens.

Notes:

- It should be noted that only Totara Road is considered to be high used road (> 5000 vehicles per day) and therefore requires stormwater runoff treatment.
- No infiltration is provided due to existing underlying soils.

DRAFT

Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	BJ	16/12/2022



THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF
NEIL CONSTRUCTION LIMITED
LAND DEVELOPERS

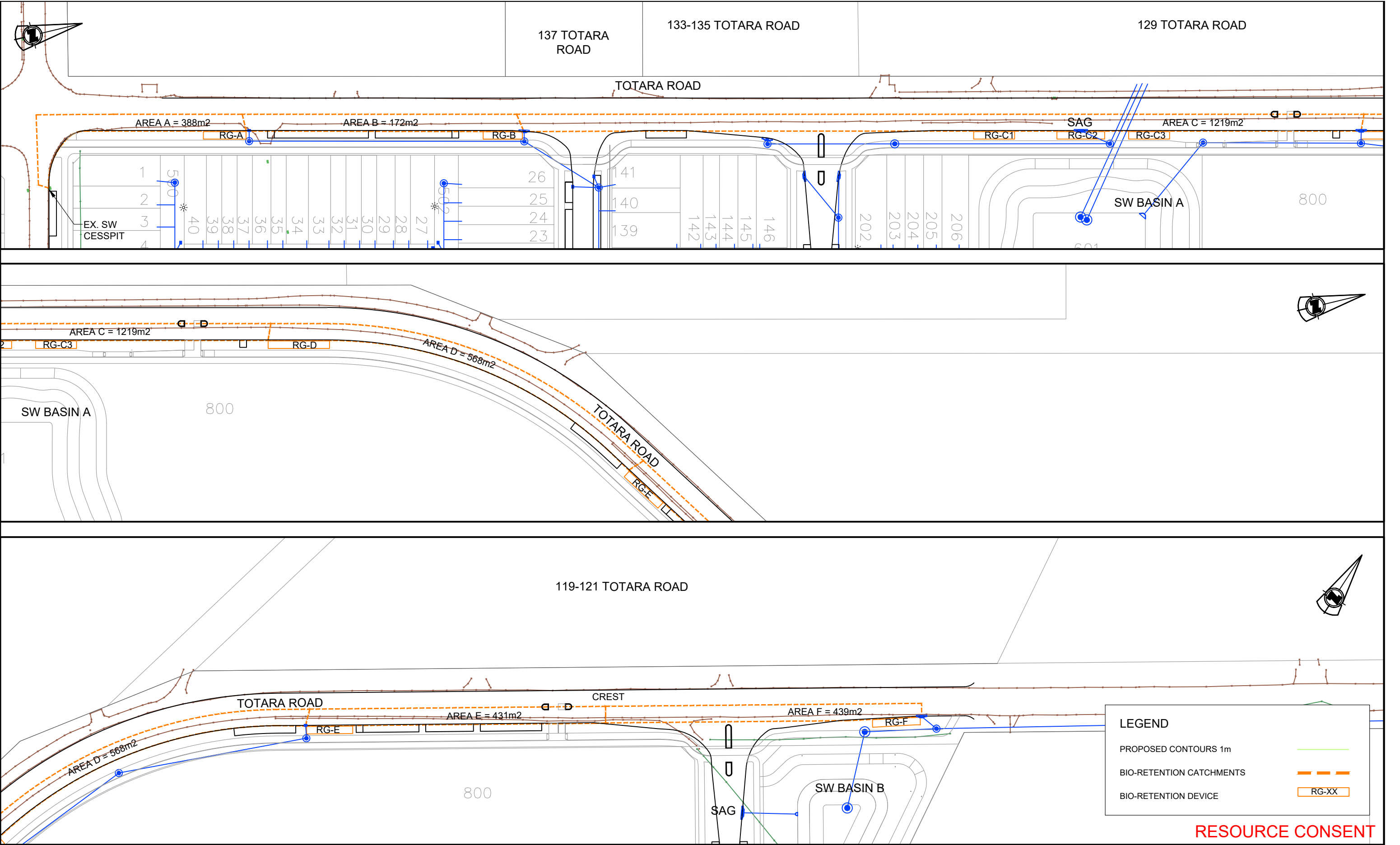
THE NEIL GROUP LIMITED
LEVEL 3, BUILDING 5
8 NUGENT STREET
GRAFTON

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND
TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

Job Title
WHENUAPAI GREEN 98-102 TOTARA ROAD WHENUAPAI

Drawing Title
STORMWATER DRAINAGE MANAGEMENT SUMMARY

	By	Date	Scale	Job No. 4520	
Surveyed: --			AS SHOWN	Drawing No.	Rev
Designed: KLP/CK				4520-01-SW-450	A
Drawn: KLP	12/2022				
Approved: BJ					
CAD FILE					



Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	BJ	16/12/2022



THE NEIL GROUP

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF

NEIL CONSTRUCTION LIMITED
LAND DEVELOPERS

THE NEIL GROUP LIMITED
LEVEL 3, BUILDING B
8 NUGENT STREET
GRAFTON

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND
TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

Job Title

WHENUAPAI GREEN
98-102 TOTARA ROAD
WHENUAPAI

Drawing Title

STORMWATER QUALITY
BIO-RETENTION CATCHMENTS &
LOCATION PLAN

By	Date	Scale	Job No.	Rev
Surveyed: MS		1:1000@A3	Drawing No.	
Designed: KLP			4520-01-SW-460	A
Drawn: KLP	12/2022			
Approved: BJ				

GD01 - STORMWATER DETENTION & RETENTION RUNOFF VOLUME CALCULATIONS
[ON-STREET BIO RETENTION]

PROJECT DATA & PARAMETERS

PROJECT NO.:	4520-01 (whenuapai green)	DATE:	Sep-22	Rev A
SITE DESCRIPTION:	98-102 Toatara road - Road Reserve	BY:	KLP	

STORMWATER SCOPE TO ACHIEVE:

- Retention of 5mm runoff from contributing impervious areas. (as AC SW NDC / SMAF1).
- Detention of 95th percentile contributing impervious areas. (as per AC SW NDC / SMAF1).

Total Site Area (m2):	3354	FALSE	Hydrological Soil Group:	C
Existing Impervious Area (m2):	1656		Pre Impervious SCS curve number (CN):	74
Developed Impervious Area (m2):	3354	100%	re Initial Abstraction Depth Ia (mm):	5
SMAF1 90th 24hr Rainfall Depth (mm):	25.3		Post Impervious SCS curve number (CN):	98
Soil Infiltration Rate (mm/hr):	2.0		Post Initial Abstraction Depth Ia (mm):	0
Evapotranspiration Rate (mm/day):	3.0		Aggregate Void Space (%):	35%
SMAF Retention Depth (mm):	5.00		Media Void Space (%):	30%
			Infiltration Time (hrs):	72

TP108 - PRE DEVELOPMENT RUNOFF DEPTH CALCULATION (SCENARIO B)

PRE DEVELOPMENT		POST DEVELOPMENT	
Soil Storage Parameter S (mm):	89.24	Soil Storage Parameter S (mm):	5.18
Runoff Depth (mm):	3.76	Runoff Depth (mm):	21.00

Post minus Pre Runoff Depth (mm): 17.24

GD01- APPLICABLE DESIGN CRITERIA

Depth Soil Infiltration (mm):	144
Depth Evaporation (mm):	9

DEVICE SELECTION

Considering all site constraints:

Berm located open battered raingarden with 1 in 1 (45 degrees)side slopes.

Device Size and Area Details:		Bioretention Layer Details:	
		All Devices:	
Media top width, a (m):	2.190	Ponding Layer (mm):	200 <i>Min 200mm</i>
Media bottom width,b (m):	1.190	Media Depth (mm):	500 <i>Min 500mm</i>
		Transition Layer (mm):	100 <i>Min 100mm</i>
		Drainage Layer (mm):	200 <i>Min 200mm</i>
		Storage Layer (mm):	450 <i>Min 450mm</i>

Note:

1.Due to existing underlying soil composition (alluvial deposits overlaying clayey sandstone and siltstone of the Waitemata Group), no runoff infiltration is provided. Calculated storage volume to be release over 72 hrs period.

DEVICE SIZING

Bio retention ID:	RG A	RG B	RG C	RG D	RG E	RG F
Catchment Area (m2):	388.39	404.36	1219.42	568.31	431.55	441.34

RUNOFF VOLUME DEPTH CALCULATION

Hydrology Mitigation Volume (m3):	6.69	6.97	21.02	9.80	7.44	7.61
Retention Volume (m3):	1.94	2.02	6.10	2.84	2.16	2.21
Detention Volume (m3):	4.75	4.95	14.92	6.95	5.28	5.40

INFILTRATION

Min Infiltration Area (m2):	12.69	13.21	39.85	18.57	14.10	14.42	*Min for Soil Infiltration and Evap
Min Infiltration Area (m2):	13.59	14.15	42.68	19.89	15.10	15.45	*3.5% of Impervious Catchment

DIMENSIONS

Media top width, a (m):	2.19	2.19	2.19	2.19	2.19	2.19	*Min. 20m2 (AT DTM)
Media bottom width,b (m):	1.19	1.19	1.19	1.19	1.19	1.19	
Length (m):	12.50	13.00	38.00	18.00	13.50	14.00	
Footprint area (m2):	27.375	28.47	83.22	39.42	29.565	30.66	

CALCULATED AREA AND VOLUMES

Ponding depth volume (m3):	5.48	5.69	16.64	7.88	5.91	6.13	
Media Volume (m3):	3.17	3.30	9.63	4.56	3.42	3.55	*Including transition layer
Drainage volume (m3):	1.04	1.08	3.17	1.50	1.12	1.17	
Storage Volume (m3):	2.01	2.09	6.10	2.89	2.17	2.25	*To be released over 72hr period

CHECKS AGAINST REQUIREMENTS

Total Infiltration Surface Area (m2):	14.88	15.47	45.22	21.42	16.07	16.66
Total Retention Volume (m3):	2.01	2.09	6.10	2.89	2.17	2.25
Total Detention Volume (m3):	11.69	12.16	35.55	16.84	12.63	13.10

Infiltration Area Achieved > Min Infiltration Area	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
difference	2.18	2.26	5.37	2.85	1.96	2.24
Retention Vol. Achieved > Min Retention Vol.	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
difference	0.07	0.07	0.01	0.05	0.01	0.04
Detention Vol. Achieved > Min Detention Vol.	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
difference	0.94	7.21	20.63	9.89	7.35	7.70

RESOURCE CONSENT

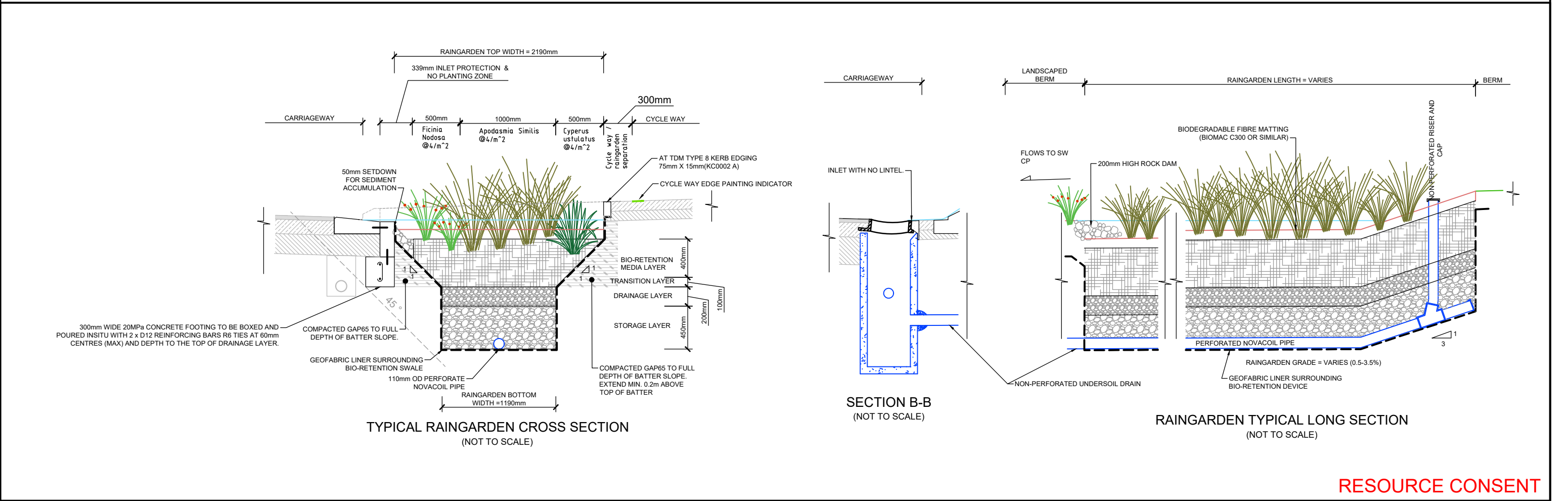
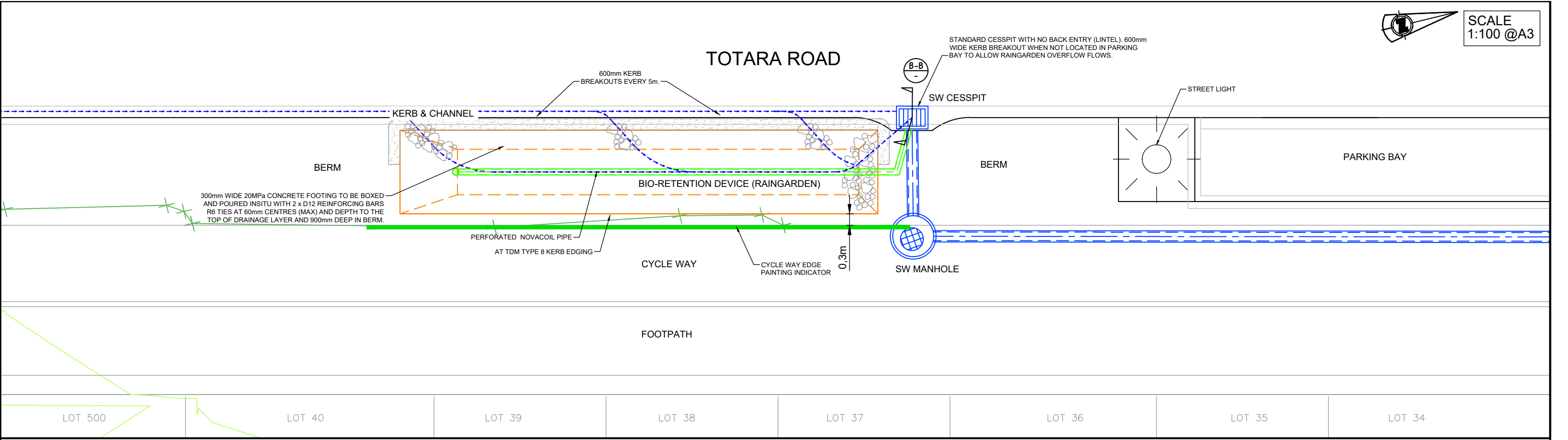
Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	BJ	16/12/2022

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF	
NEIL CONSTRUCTION LIMITED	
LAND DEVELOPERS	
	THE NEIL GROUP LIMITED
	LEVEL 3, BUILDING B
	8 NUGENT STREET
	GRAFTON
PO BOX 8751, SYMONDS STREET	
AUCKLAND, NEW ZEALAND	
TELEPHONE: +64 9 918 6565	
FACSIMILE: +64 9 918 6567	
WEB: www.neilgroup.co.nz	

Job Title	WHENUAPAI GREEN
	98-102 TOTARA ROAD
	WHENUAPAI

Drawing Title	STORMWATER QUALITY
	BIO-RETENTION (RAINGARDEN)
	CALCULATIONS

	By	Date	Scale	Job No.	
Surveyed:	MS		--	Drawing No.	Rev
Designed:	KLP			4520-01-SW-461	A
Drawn:	KLP	12/2022			
Approved:	BJ				



RESOURCE CONSENT

Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	BJ	16/12/2022

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF

THE NEIL GROUP

NEIL CONSTRUCTION LIMITED
LAND DEVELOPERS

THE NEIL GROUP LIMITED
LEVEL 3, BUILDING B
8 NUGENT STREET
GRAFTON

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND
TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

Job Title

WHENUAPAI GREEN
98-102 TOTARA ROAD
WHENUAPAI

Drawing Title

STORMWATER QUALITY
BIO-RETENTION (RAINGARDEN)
DETAILS & SECTIONS

	By	Date	Scale	Job No.	Rev
Surveyed:	MS		AS SHOWN	Drawing No.	
Designed:	KLP			4520-01-SW-462	A
Drawn:	KLP	12/2022			
Approved:	BJ				

PRIVATE ALLOTMENT STORMWATER RETENTION AND DETENTION REQUIREMENTS (SMAF1 AREA):

- TO RETAIN 5mm OF RUNOFF FROM ALL IMPERVIOUS AREAS, AND
- TO DETAIN FOR 24HR, 17.94mm OF RUNOFF FROM ALL IMPERVIOUS AREAS.
- TO PROVIDE THE ABOVE RETAINED AND DETAINED RUNOFF IN COMPLIANT STORMWATER MANAGEMENT DEVICES AS OUTLINED IN AUCKLAND COUNCIL GUIDELINE DOCUMENT 2017/01 (GD01).

(SMAF1) INDICATIVE ALLOTMENT STORMWATER RETENTION & DETENTION VOLUMES

NOTE: Final tank size selection subject to final house design and landscaping impervious area.
Detention orifice to be selected to draw down over 24hrs period

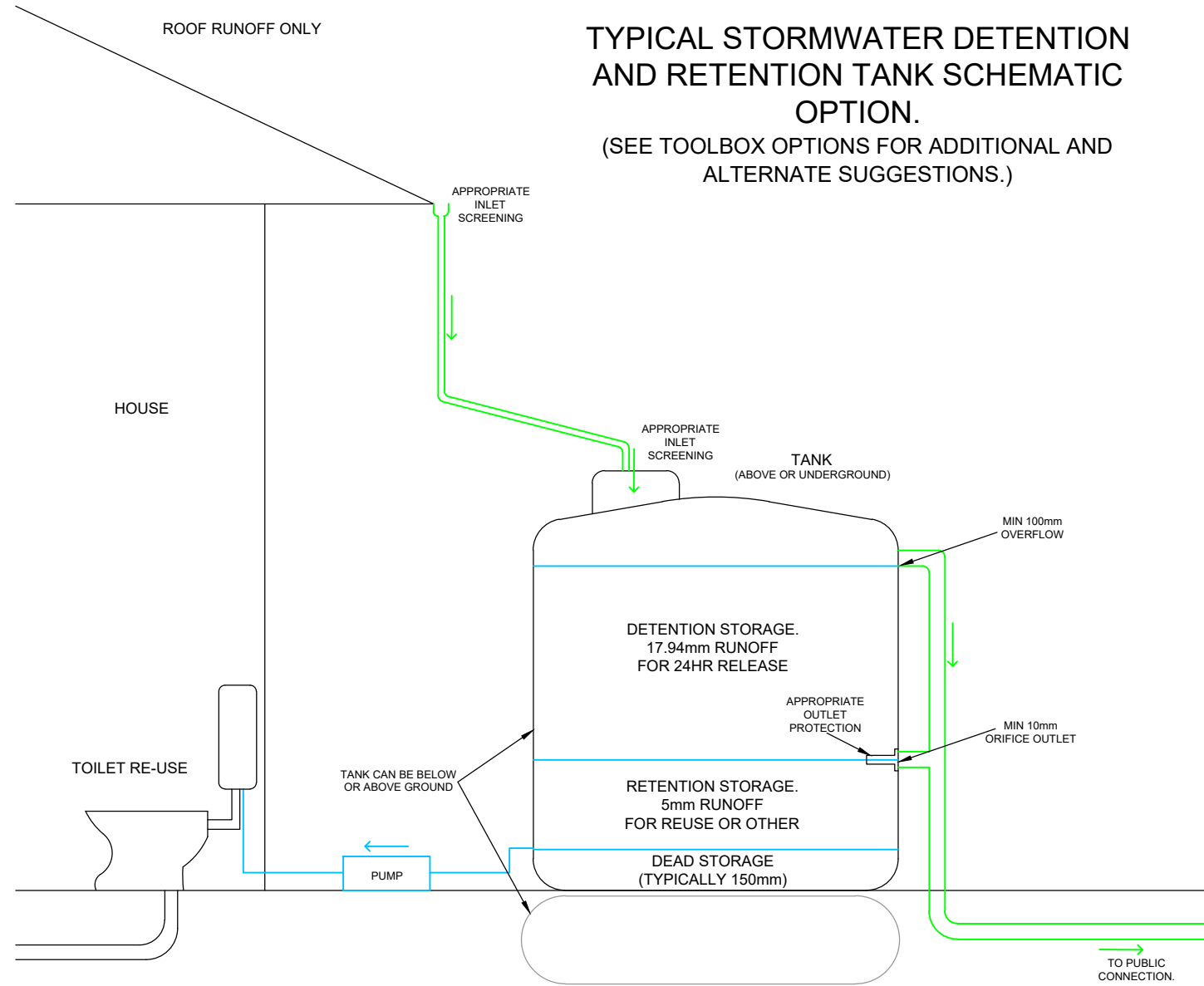
STORMWATER FACTORS

95th percentile runoff depth (P24): (mm)	22.94
SMAF1 Minimum Stormwater Retention (volume reduction) value: (mm)	5
SMAF1 Stormwater Detention value: (mm)	17.94

ALLOTMENT RETENTION & DETENTION VOLUMES

Total Lot Area (A)	% Impervious Area (%IP)	Minimum Site Retention Volume	Site Detention Tank Volume	Total Stormwater Management Volume
(m2)	%	(l)	(l)	(l)
120	60%	360	1292	1652
140	60%	420	1507	1927
160	60%	480	1722	2202
180	60%	540	1938	2478
200	60%	600	2153	2753
250	60%	750	2691	3441
300	60%	900	3229	4129
350	60%	1050	3767	4817

TYPICAL STORMWATER DETENTION AND RETENTION TANK SCHEMATIC OPTION.
(SEE TOOLBOX OPTIONS FOR ADDITIONAL AND ALTERNATE SUGGESTIONS.)



NOTE:

1. INDIVIDUAL ALLOTMENT RETENTION AND DETENTION TANKS TO BE SPECIFICALLY DESIGNED, APPROVED AND BUILT WITH ALLOTMENT BUILDING WORK AND CONSENT. ABOVE PROVIDED FOR INFORMATION ONLY.
2. DETENTION TANK LOW LEVEL OUTLET TO BE CONTROLLED BY A SPECIFICALLY SIZED (BUT MIN 10mm) ORIFICE TO BE RELEASED OVER A 24HR PERIOD.
3. LOTS 288-328 INCLUSIVE REQUIRE BOTH RETENTION AND DETENTION.
4. LOT 800 (POSSIBLE SCHOOL SITE) REQUIRES SPECIFIC DESIGN FOR RETENTION, DETENTION AND WATER QUALITY.
5. ALL OTHER LOTS REQUIRE ON-SITE RETENTION ONLY.

TOOLBOX OPTIONS FOR STORMWATER RETENTION AND DETENTION DEVICES ON ALLOTMENTS.

(TYPICALLY ALL DESIGNED TO AC GD01)

- PERVIOUS PAVING (LINED OR UNLINED).
- BIO RETENTION DEVICE (RAINGARDEN OR TREE PIT).
- BELOW OR ABOVE GROUND RETENTION AND/OR DETENTION RAINWATER TANKS.
- LIVING ROOFS.
- PLANTER BOXES.

RESOURCE CONSENT

Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	BJ	16/12/2022

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF

THE NEIL GROUP

NEIL CONSTRUCTION LIMITED
LAND DEVELOPERS

THE NEIL GROUP LIMITED
LEVEL 3, BUILDING B
8 NUGENT STREET
GRAFTON

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND
TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

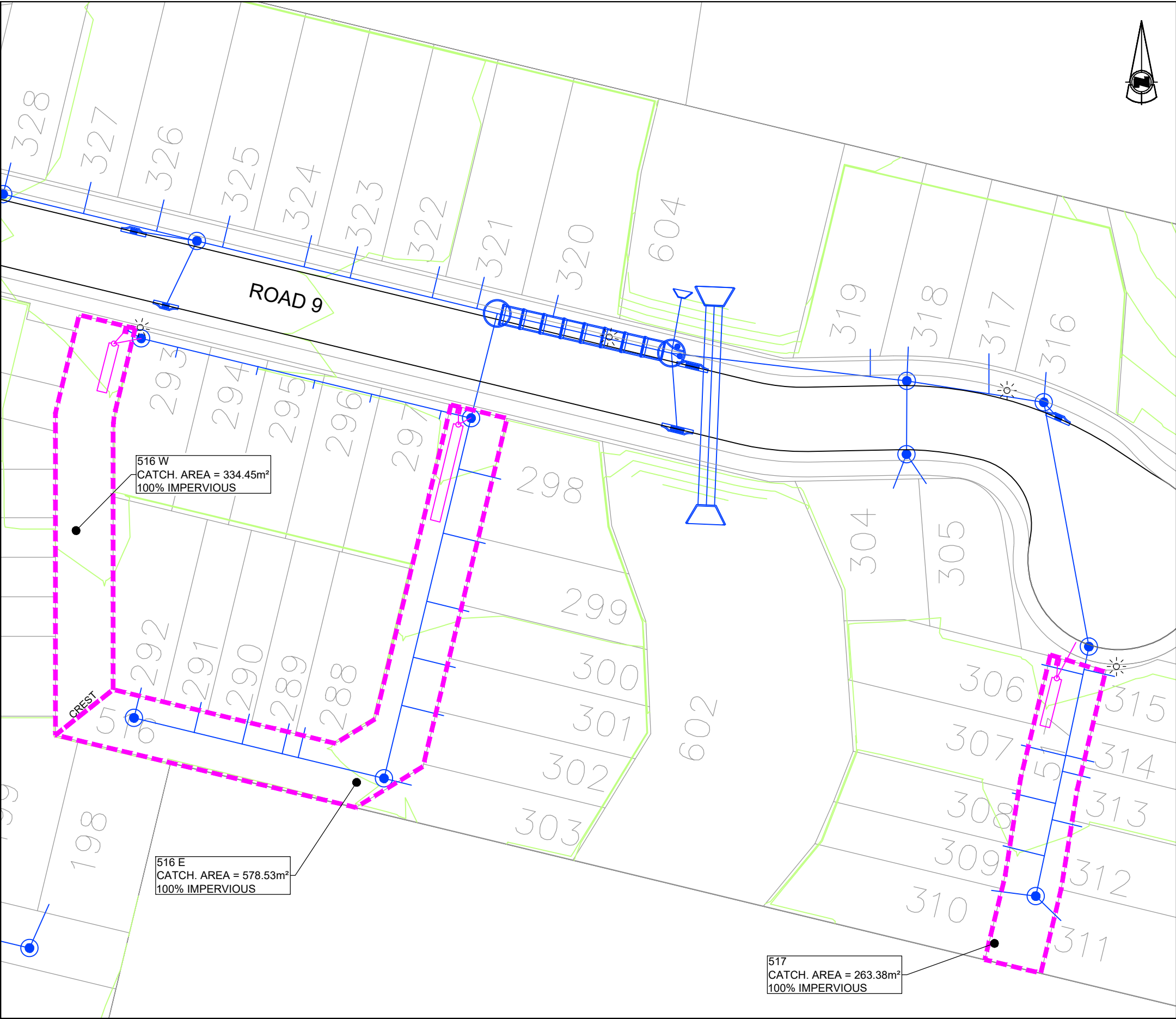
Job Title

WHENUAPAI GREEN
98-102 TOTARA ROAD
WHENUAPAI

Drawing Title

STORMWATER MANAGEMENT
EXAMPLE RESIDENTIAL ON-SITE
RETENTION & DETENTION DEVICE

	By	Date	Scale	Job No.	Rev
Surveyed:	MS		1:1000@A3	Drawing No.	
Designed:	KLP			4520-01-SW-464	A
Drawn:	KLP	12/2022			
Approved:	BJ				



LEGEND

PROPOSED CONTOURS 1m

COAL's CATCHMENTS

ON-SITE RETENTION / DETENTION DEVICE

GD01 - STORMWATER DETENTION & RETENTION RUNOFF VOLUME CALCULATIONS

[UNDERGROUND DETENTION TNAK]

PROJECT DATA & PARAMETERS

PROJECT NO.:	4520-01 (whenuapai green)	DATE:	Dec-22	Rev A
SITE DESCRIPTION:	98-102 Totara road - Road Reserve	BY:	KLP	

- STORMWATER SCOPE TO ACHIEVE:
1. Retention of 5mm runoff from contributing impervious areas. (as AC SW NDC / SMAF1).

2. Detention of 95th percentile contributing impervious areas. (as per AC SW NDC / SMAF1).

Total Site Area (m2):	1176	Hydrological Soil Group:	C
Existing Impervious Area (m2):	1656	Pre Impervious SCS curve number (CN):	74
Developed Impervious Area (m2):	1176	Initial Abstraction Depth Ia (mm):	5
190th 24hr Rainfall Depth (mm):	35	Post Impervious SCS curve number (CN):	98
Soil Infiltration Rate (mm/hr):	2.0	Post Initial Abstraction Depth Ia (mm):	0
Potranspiration Rate (mm/day):	3.0	Aggregate Void Space (%):	35%
SMAF Retention Depth (mm):	5.00	Media Void Space (%):	30%
		Infiltration Time (hrs):	72

TP108 - PRE DEVELOPMENT RUNOFF DEPTH CALCULATION (SCENARIO B)

PRE DEVELOPMENT		POST DEVELOPMENT	
Soil Storage Parameter S (mm):	89.24	Soil Storage Parameter S (mm):	5.18
Runoff Depth (mm):	7.55	Runoff Depth (mm):	30.49

Post minus Pre Runoff Depth (mm):

22.94

DEVICE SIZING

Storage Tank ID:	516-W	516-E	517
Catchment Area (m2):	334.45	578.53	263.38

RUNOFF VOLUME DEPTH CALCULATION

Hydrology Mitigation Volume (m3):	7.67	13.27	6.04	26.98
Retention Volume (m3):	1.67	2.89	1.32	
Detention Volume (m3):	6.00	10.38	4.72	

DEVICE DIMENSIONS

Storage tank diameter, D (m):	1.20	1.20	1.20
Storage tank length/height, L (m):	7.00	12.00	6.00
Storage depth, d (m):	1.20	1.20	1.20
Storage Volume, V (m3):	7.92	13.57	6.79
Volume check:	OK	OK	OK

- Note:
1. Due to existing underlying soil composition (alluvial deposits overlaying clayey sandstone and siltstone of the Waitemata Group),

2. Private on-site detention only required for COAL's 516 & 517. All other COALs drain to stormwater basins.

RESOURCE CONSENT

Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	BJ	16/12/2022

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF

THE NEIL GROUP

NEIL CONSTRUCTION LIMITED

LAND DEVELOPERS

THE NEIL GROUP LIMITED

LEVEL 3, BUILDING B

8 AUGUST STREET

GRAFTON

PO BOX 8751, SYMONDS STREET

AUCKLAND, NEW ZEALAND

TELEPHONE: +64 9 918 6565

FACSIMILE: +64 9 918 6567

WEB: www.neilgroup.co.nz

Job Title

WHENUAPAI GREEN

98-102 TOTARA ROAD

WHENUAPAI

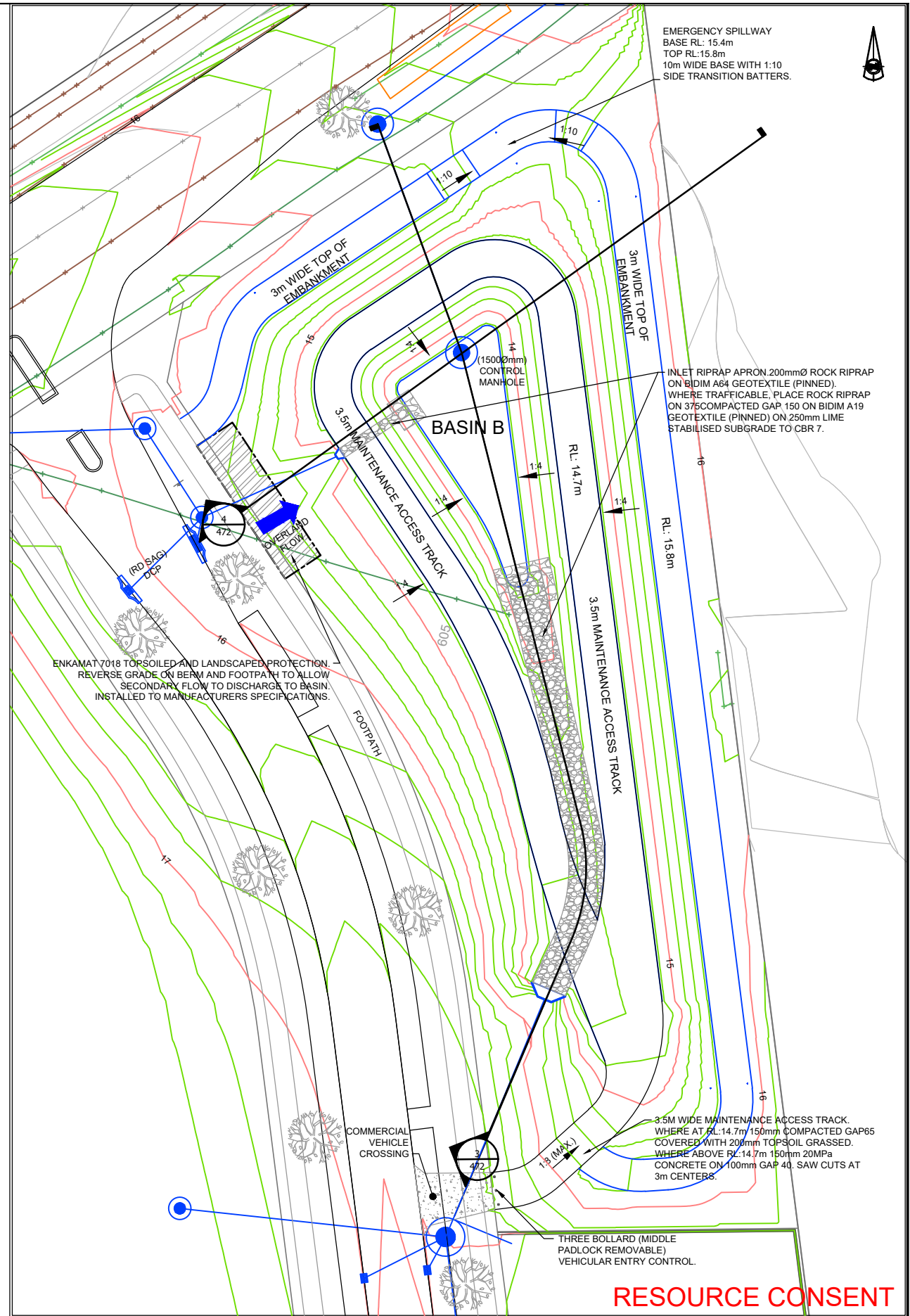
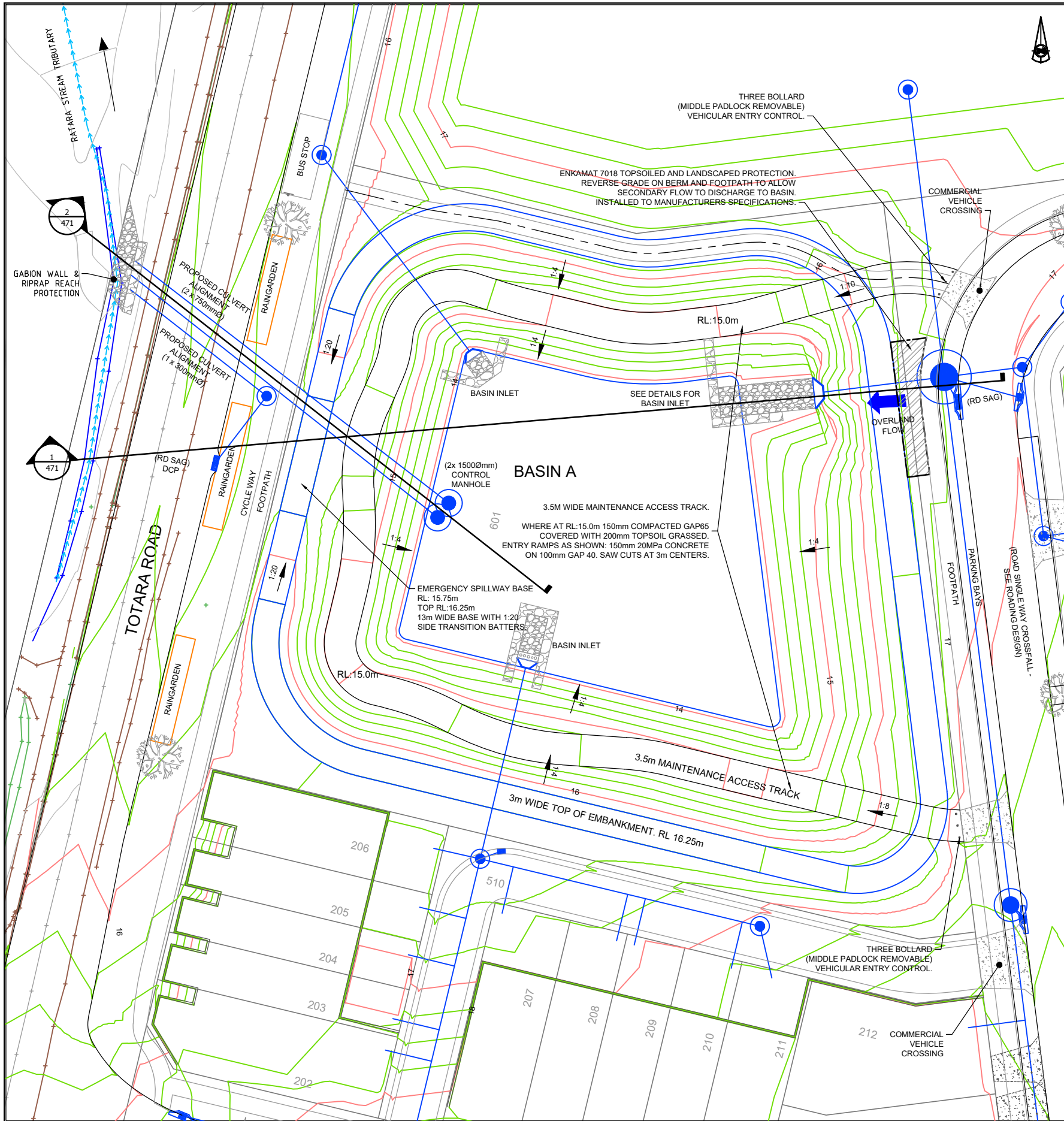
Drawing Title

STORMWATER MANAGEMENT

COAL's PRIVATE ON-SITE

STORMWATER DETENTION DEVICE

	By	Date	Scale	Job No.	Rev
Surveyed:	MS		1:1000@A3	Drawing No.	
Designed:	KLP			4520-01-SW-465	A
Drawn:	KLP	12/2022			
Approved:	BJ				



RESOURCE CONSENT

Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	BJ	16/12/2022

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF

THE NEIL GROUP

NEIL CONSTRUCTION LIMITED
LAND DEVELOPERS

THE NEIL GROUP LIMITED
LEVEL 3, BUILDING B
8 NUGENT STREET
GRAFTON

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND
TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

Job Title

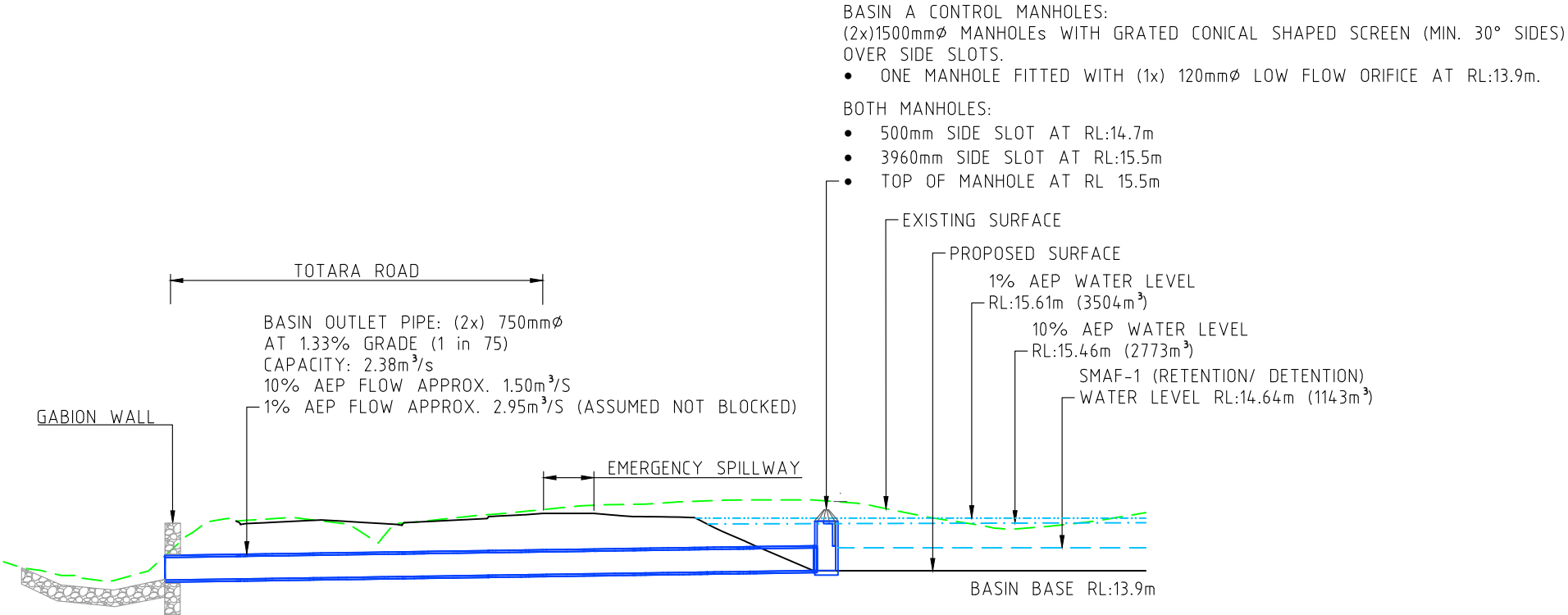
**WHENUAPAI GREEN
98-102 TOTARA ROAD
WHENUAPAI**

Drawing Title

**STORMWATER DRAINAGE
DRY BASINS
LAYOUT PLAN**

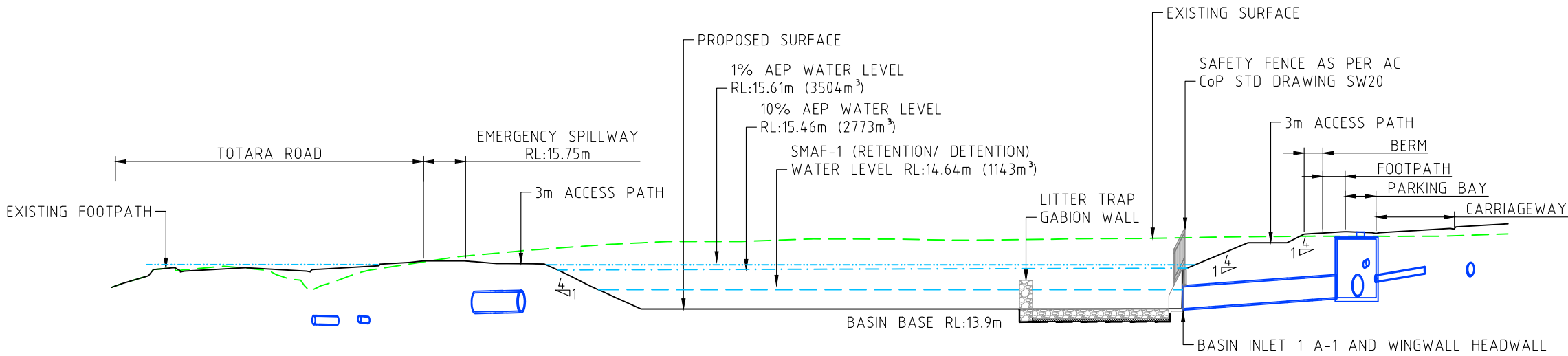
By	Date	Scale	Job No.	4520	Rev
Survised:	CP / MS	1:500@A3	Drawing No.	4520-01-SW-470	A
Designed:	KLP				
Drawn:	KLP	12/2022			
Approved:	BJ				

STORMWATER BASIN CONCEPT ONLY.
SUBJECT TO FINAL DETAILED DESIGN.



2 BASIN A CROSS SECTION (DATUM RL:11.0m)

Scale: 1:500@A3 (2.5 x VERTICAL EXAGGERATION)



1 BASIN A CROSS SECTION (DATUM RL:11.0m)

Scale: 1:500@A3 (2.5 x VERTICAL EXAGGERATION)

RESOURCE CONSENT

Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	BJ	16/12/2022



THE NEIL GROUP
LAND DEVELOPERS

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF
NEIL CONSTRUCTION LIMITED

THE NEIL GROUP LIMITED
LEVEL 3, BUILDING B
8 NUGENT STREET
GRAFTON

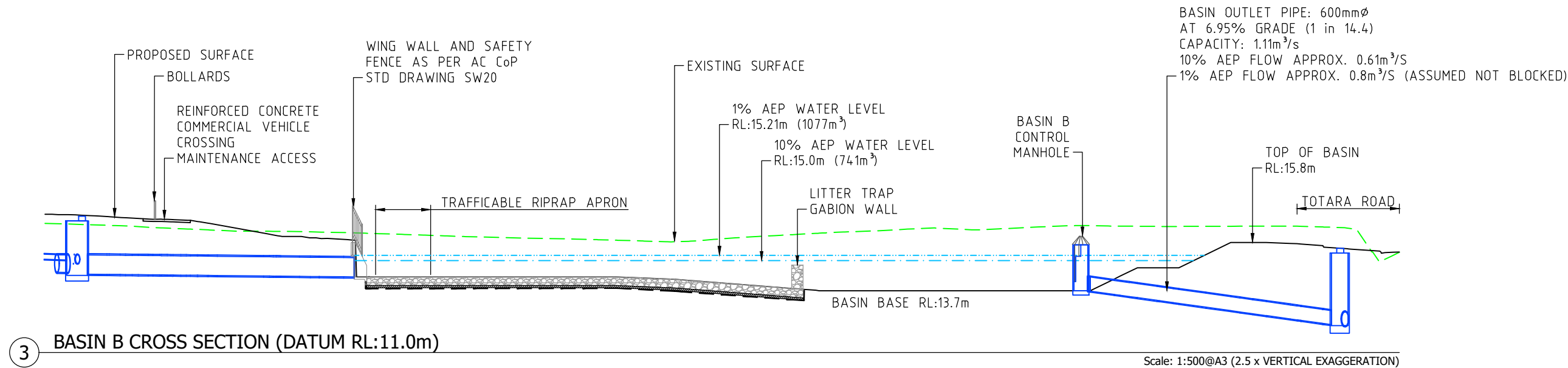
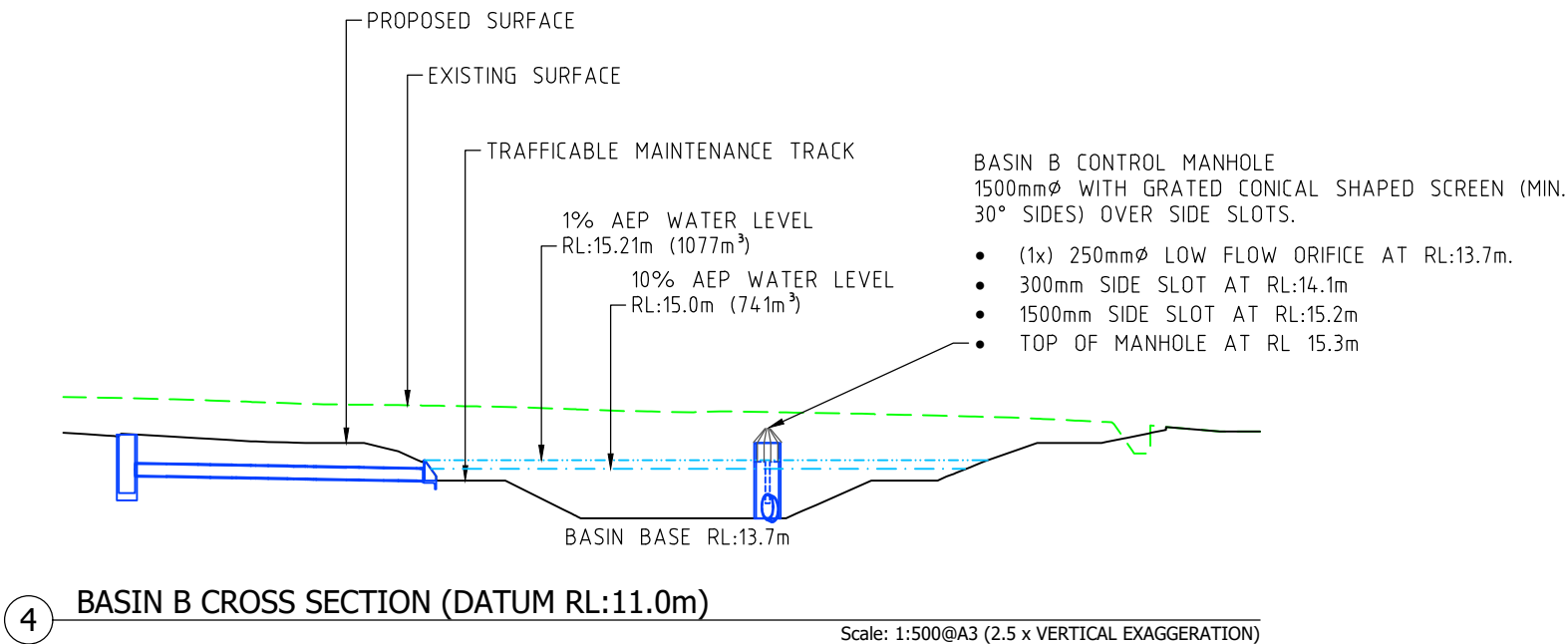
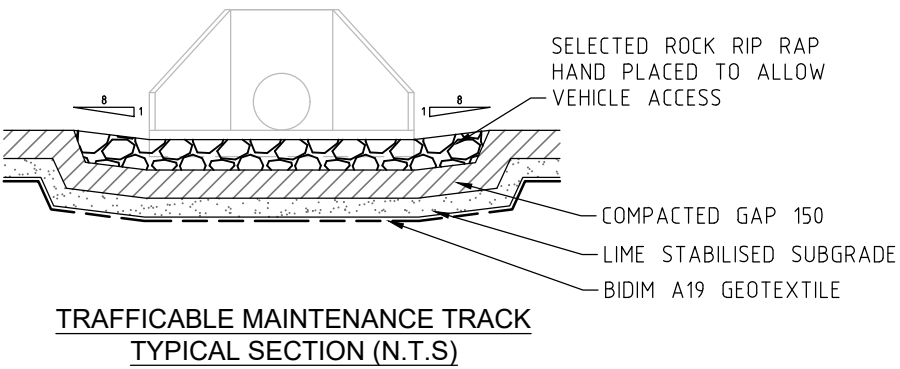
PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND
TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

Job Title	WHENUAPAI GREEN 98-102 TOTARA ROAD WHENUAPAI
-----------	--

Drawing Title	STORMWATER DRAINAGE DRY BASINS SECTIONS AND DETAILS
---------------	---

By	Date	Scale	Job No.	4520	Drawing No.	Rev
Surveyed:	CP / MS	AS SHOWN	4520-01-SW-471	A		
Designed:	KLP					
Drawn:	KLP					
Approved:	BJ					

STORMWATER BASIN CONCEPT ONLY.
SUBJECT TO FINAL DETAILED DESIGN.



RESOURCE CONSENT

Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	BJ	16/12/2022



THE NEIL GROUP

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF

NEIL CONSTRUCTION LIMITED
LAND DEVELOPERS

THE NEIL GROUP LIMITED
LEVEL 3, BUILDING B
8 NUGENT STREET
GRAFTON

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND
TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

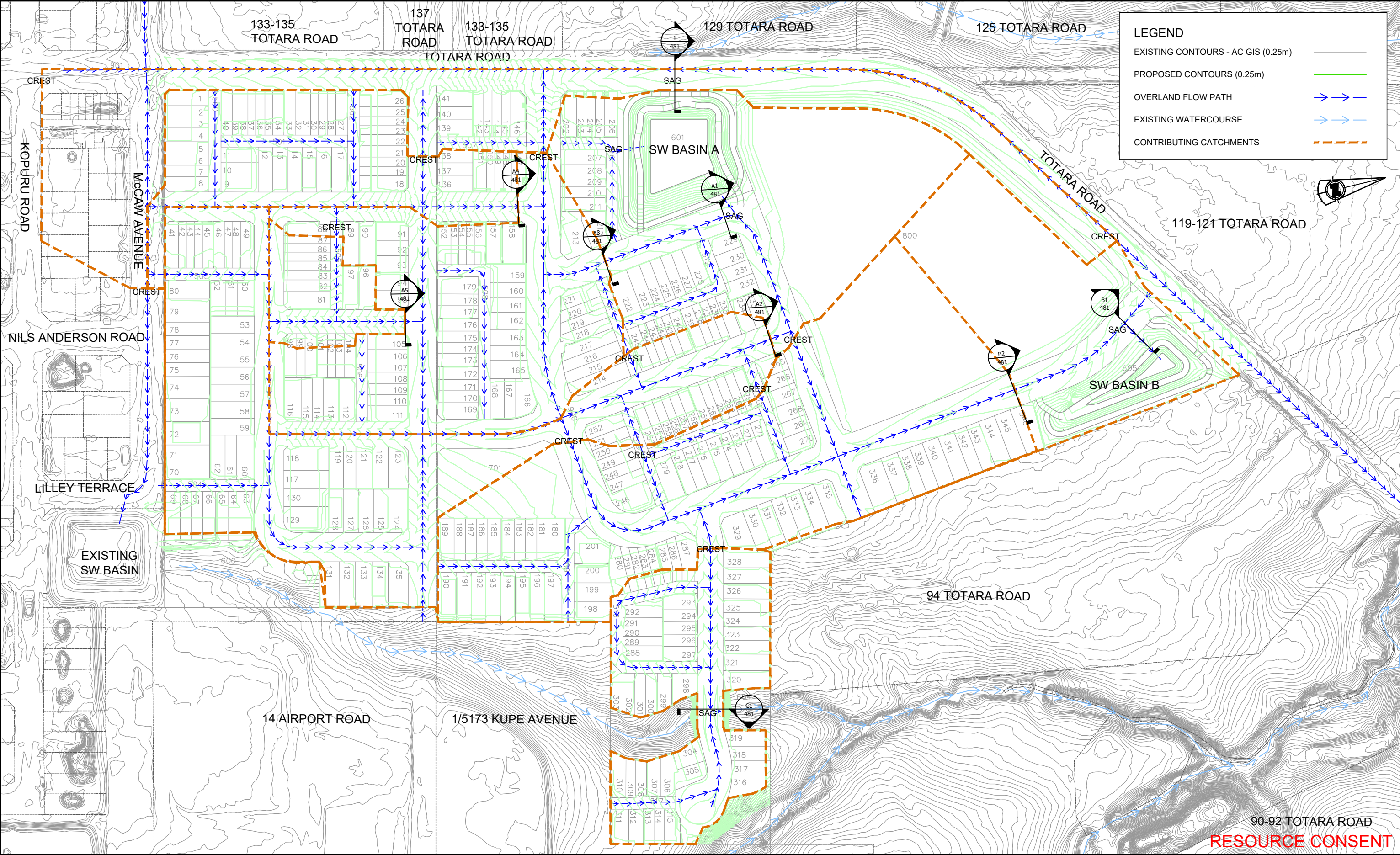
Job Title

**WHENUAPAI GREEN
98-102 TOTARA ROAD
WHENUAPAI**

Drawing Title

**STORMWATER DRAINAGE
DRY BASINS
SECTIONS AND DETAILS**

By	Date	Scale	Job No.	4520	Rev
Surveyed: CP / MS		AS SHOWN	Drawing No. 4520-01-SW-472		A
Designed: KLP					
Drawn: KLP	12/2022				
Approved: BJ					



Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	BJ	16/12/2022

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF

THE NEIL GROUP

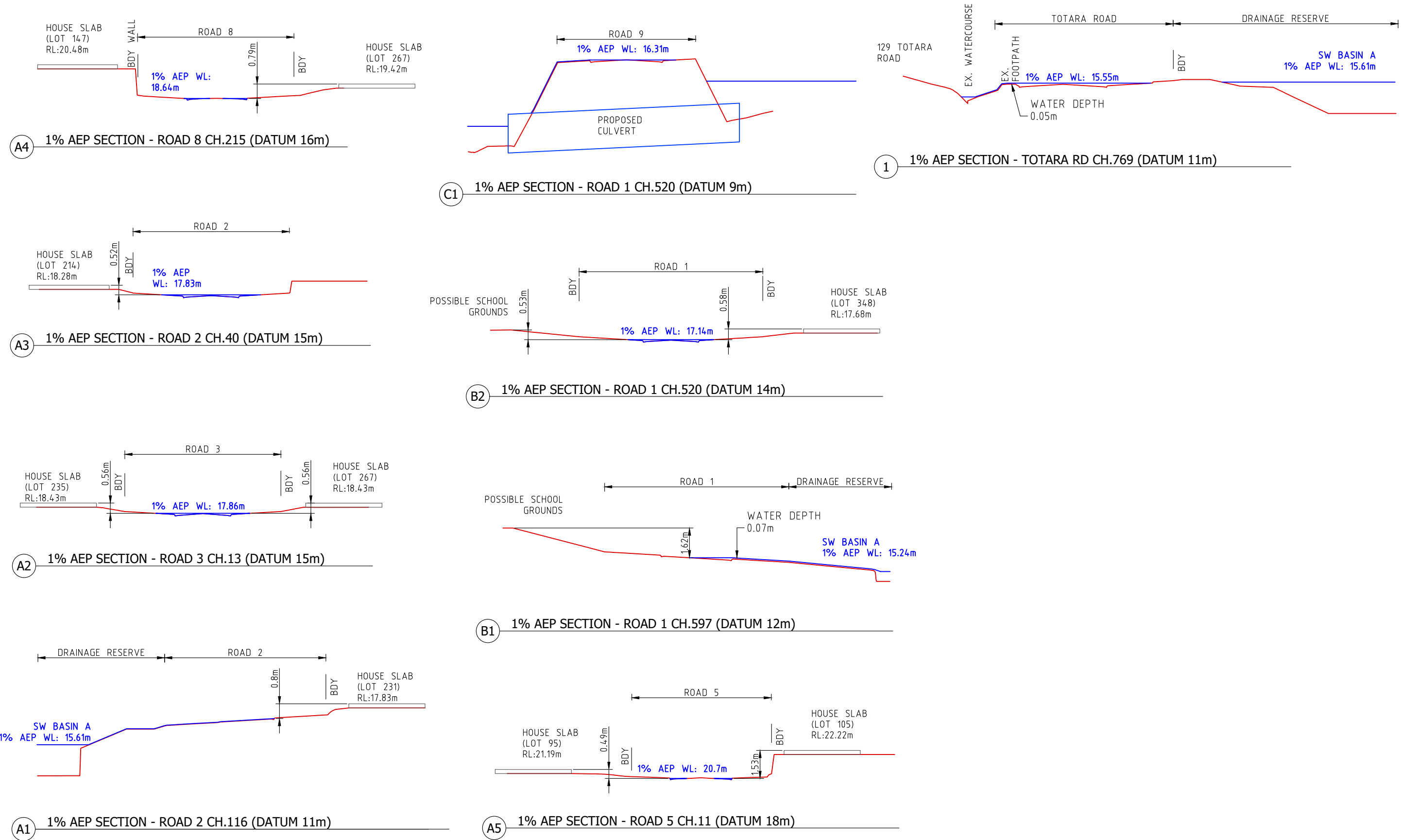
THE NEIL GROUP LIMITED
LEVEL 3, BUILDING B
8 NUGENT STREET
GRAFTON

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND
TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

Job Title
WHENUAPAI GREEN 98-102 TOTARA ROAD WHENUAPAI

Drawing Title
STORMWATER DRAINAGE 1% AEP OVERLAND FLOW PATH LOCATION PLAN

By	Date	Scale	Job No.	4520	Rev
Survised: MS/CP		1:2000@A3	Drawing No.	4520-01-SW-480	A
Designed: KLP	12/2022				
Drawn: KLP					
Approved: BJ					
CAD FILE					



RESOURCE CONSENT

Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	BJ	16/12/2022



THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF
THE NEIL GROUP
LAND DEVELOPERS

THE NEIL GROUP LIMITED
LEVEL 3, BUILDING B
8 NUGENT STREET
GRAFTON

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND
TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

Job Title
WHENUAPAI GREEN 98–102 TOTARA ROAD WHENUAPAI

Drawing Title
STORMWATER DRAINAGE 1% AEP OVERLAND FLOW PATH SECTIONS

	By	Date	Scale	Job No.	Drawing No.	Rev
Surveyed:	MS/CP		1:200@A3	4520		
Designed:	KLP		5 x VERT.			
Drawn:	KLP	12/2022				
Approved:	BJ					
CAD FILE						
					4520-01-SW-481	A

100 Year Flood Level Calculations

PROJECT DATA

PROJECT NO.:	4520 - 01 Whenuapai Green	TP108 rainfall data:	Intensity for 10min storm duration	CLIMATE CHANGE ALLOWANCE OF 2.1°C
DATE:	Oct-22	Return Period	Return Period	Return Period
BY:	KLP	Depth	Intensity	Intensity
SITE DESCRIPTION:	98-100 TOTARA ROAD, WHENUAPAI	24hr 10 year ARI =	10min 10 year ARI =	10min 10 year ARI =
		24hr 100 year ARI =	10min 100 year ARI =	10min 100 year ARI =
		135 mm	91.125 mm/hr	106.06 mm/hr
		195 mm	131.625 mm/hr	158.07 mm/hr

100YR FLOW CALCULATIONS - RATIONAL METHOD

100 Year flow calculations assuming full pipe network blockage.

Section ID. / Location:	ROAD 2 CH.116 (SAG)	ROAD 3 CH.13	ROAD 2 CH.40	ROAD 8 CH.215	ROAD 5 CH.11	ROAD 1 CH.597 (SAG)	ROAD 1 CH.520	ROAD 9 CH.110 (SAG)	TOTARA ROAD CH.769 (SAG)
	SECTION A1	SECTION A2	SECTION A3	SECTION A4	SECTION A5	SECTION B1	SECTION B2	SECTION C1	SECTION 1
Catchment Area (A) Ha:	10.5603	3.3179	3.7852	1.2603	0.3827	4.2956	2.8502	1.1980	2.0387
	Pervious	Impervious	Pervious	Impervious	Pervious	Impervious	Pervious	Impervious	Pervious
	3.4849	7.0754	1.0949	2.2230	1.2491	2.5361	0.4159	0.8444	0.1263
	0.2564	1.8471	2.4485	1.1401	1.7101	0.2982	0.8998	0.3058	1.7329
Imperviousness (%)	67%	67%	67%	67%	67%	57%	60%	75%	85%
Runoff Coefficient, C:	0.3	0.9	0.3	0.9	0.3	0.9	0.3	0.9	0.3
Weighted Runoff Coefficient (C):	0.70	0.70	0.70	0.70	0.70	0.64	0.66	0.75	0.81
Simulation event (AEP):	10%	1%	10%	1%	10%	1%	10%	1%	10%
Rainfall Intensity (I) mm/hr:	106.06	158.07	106.06	158.07	106.06	158.07	106.06	158.07	106.06
TP108 10min 10yr/100yr with climate change.									
Q _{AEP} :	10%	1%	10%	1%	10%	1%	10%	1%	10%
Catchment Runoff (m3/s):	2.184	3.255	0.686	1.023	0.783	1.167	0.261	0.388	0.079
	0.118	0.812	1.211	0.554	0.826	0.265	0.395	0.486	0.725
Q(I) = CIA/360									
Q _{10yr} , Network Blockage (%):	100%	100%	100%	100%	100%	100%	100%	100%	100%
As Per SWCOP 4.3.5.6									
Q _{100yr} , Secondary Flow (m3/s):	3.255	1.023	1.167	0.388	0.118	1.211	0.826	0.395	0.725

100YR ROAD FLOW CALCULATION - MANNINGS

Section ID. / Location:	ROAD 2 CH.116 (SAG)	ROAD 3 CH.13	ROAD 2 CH.40	ROAD 8 CH.215	ROAD 5 CH.11	ROAD 1 CH.597 (SAG)	ROAD 1 CH.520	ROAD 9 CH.110 (SAG)	TOTARA ROAD CH.769 (SAG)
	SECTION A1	SECTION A2	SECTION A3	SECTION A4	SECTION A5	SECTION B1	SECTION B2	SECTION C1	SECTION 1
Road Slope OR Basin entry slope(S):	3.0%	0.5%	0.5%	4.0%	4.3%	3.0%	0.5%	3.0%	3.0%
Depth of Flow above kerb top (m):	0.085	0.149	0.156	0.092	0.061	0.068	0.135	0.039	0.053
Flow Area (A) (m2):	2.0871	1.0810	1.1538	0.2417	0.1026	0.8922	0.9354	0.4219	0.9838
Wetted Perimeter (P) (m):	36.8322	10.3780	10.3780	5.1064	3.6688	19.6808	10.3780	16.2274	28.3792
Mannings n (n):	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
Flow Velocity (m/s):	1.597	0.978	1.022	1.635	1.194	1.376	0.888	0.950	1.151
*Flow Depth x Velocity (m ² /s):	0.136	0.146	0.159	0.150	0.073	0.094	0.120	0.037	0.061
	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
Channel Flow Q(a) (m3/s):	3.333	1.059	1.181	0.396	0.123	1.228	0.832	0.401	0.748
Qa = A(A/P) ^{2/3} *SQRT(S)/n									
* Maximum flow x depth of: 0.6m2/s no obvious danger and 0.4m2/s obvious danger. (Austroads 2013 Part 5A-table 5.1) & AC Stormwater CoP-4.3.5.6 (e)									

CAPACITY CHECK:

Catchment ID. / Location:	ROAD 2 CH.116 (SAG)	ROAD 3 CH.13	ROAD 2 CH.40	ROAD 8 CH.215	ROAD 5 CH.11	ROAD 1 CH.597 (SAG)	ROAD 1 CH.520	ROAD 9 CH.110 (SAG)	TOTARA ROAD CH.769 (SAG)
	SECTION A1	SECTION A2	SECTION A3	SECTION A4	SECTION A5	SECTION B1	SECTION B2	SECTION C1	SECTION 1
100yr Capacity > 100yr flow:	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE

RESOURCE CONSENT

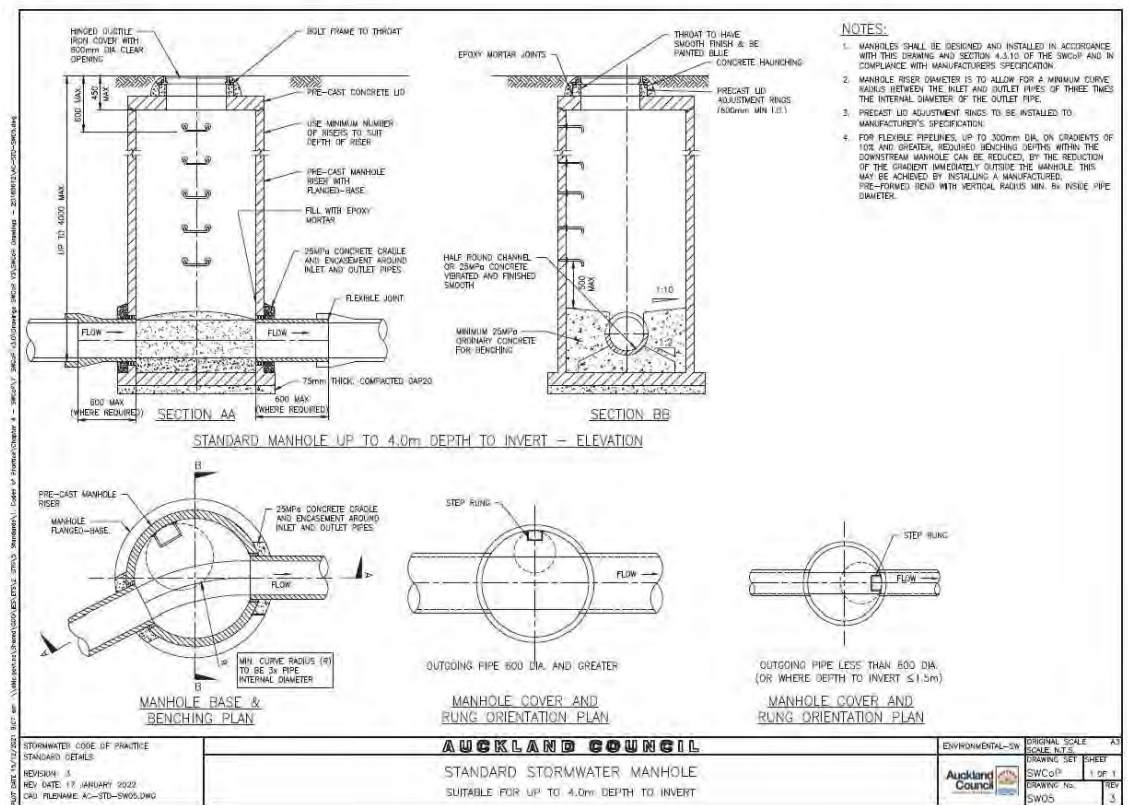
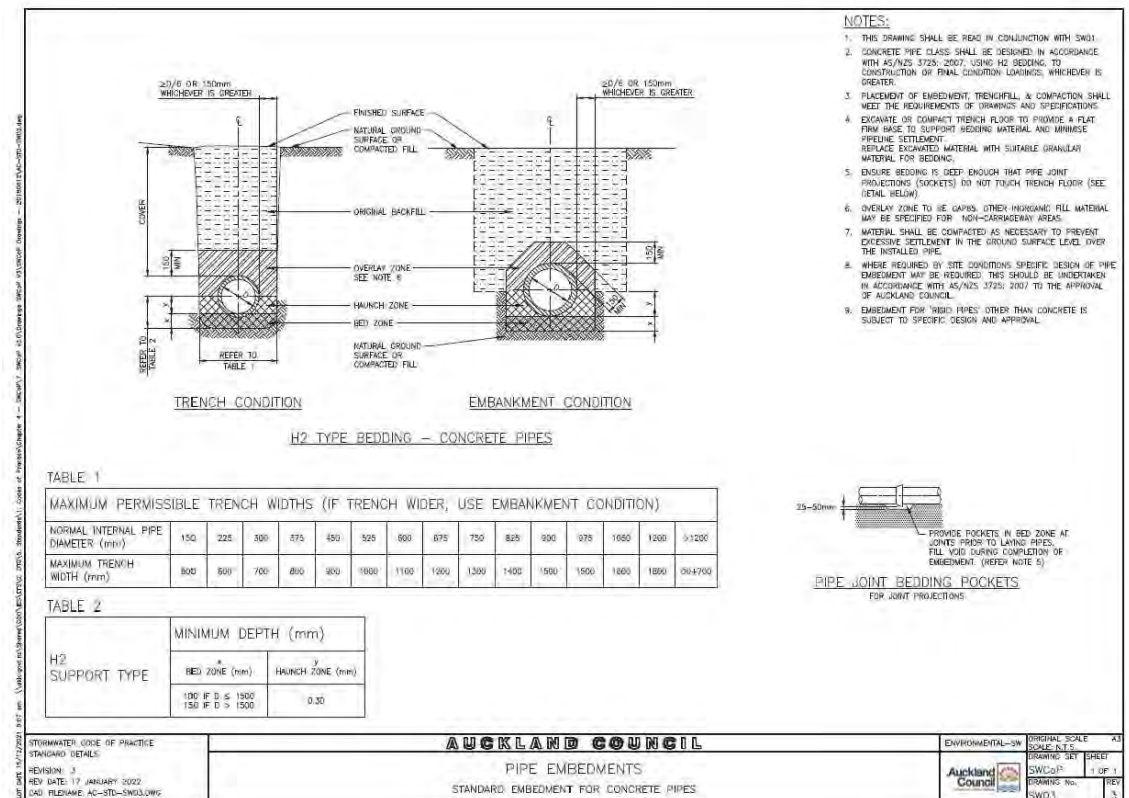
Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	BJ	16/12/2022

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF	
NEIL CONSTRUCTION LIMITED	
LAND DEVELOPERS	
	THE NEIL GROUP LIMITED
	LEVEL 3, BUILDING 5
	8 NUGENT STREET
	GRAFTON
PO BOX 8751, SYMONDS STREET	
AUCKLAND, NEW ZEALAND	
TELEPHONE: +64 9 918 6565	
FACSIMILE: +64 9 918 6567	
WEB: www.neilgroup.co.nz	

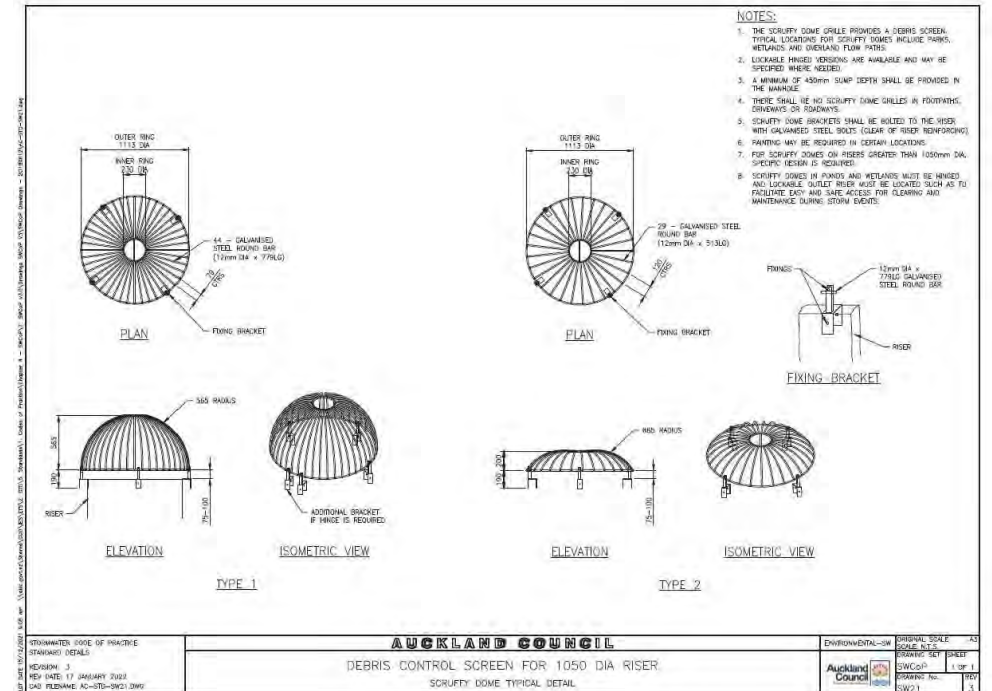
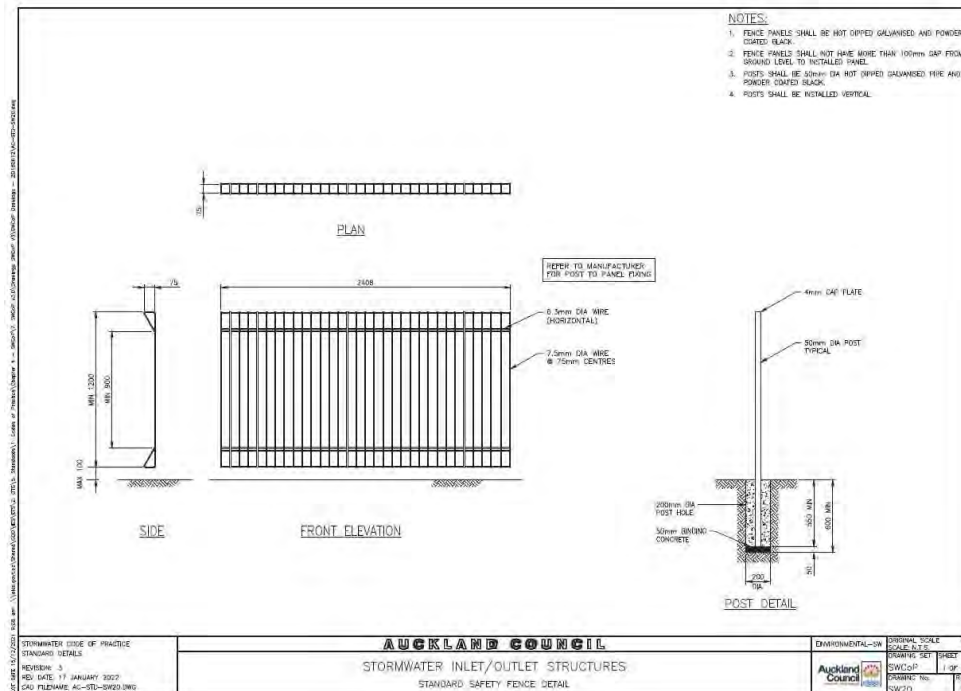
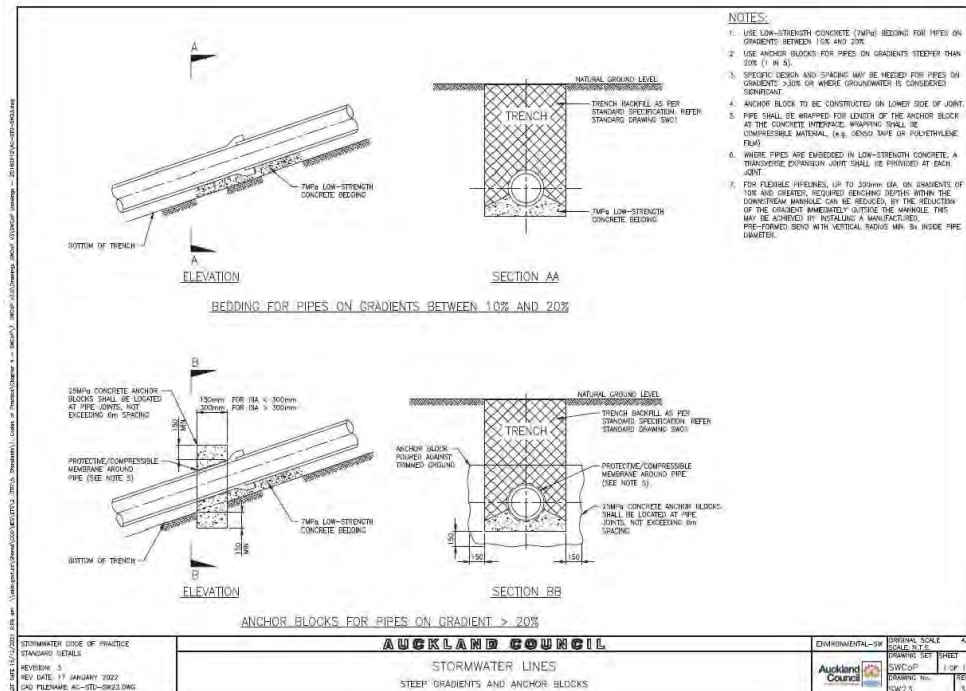
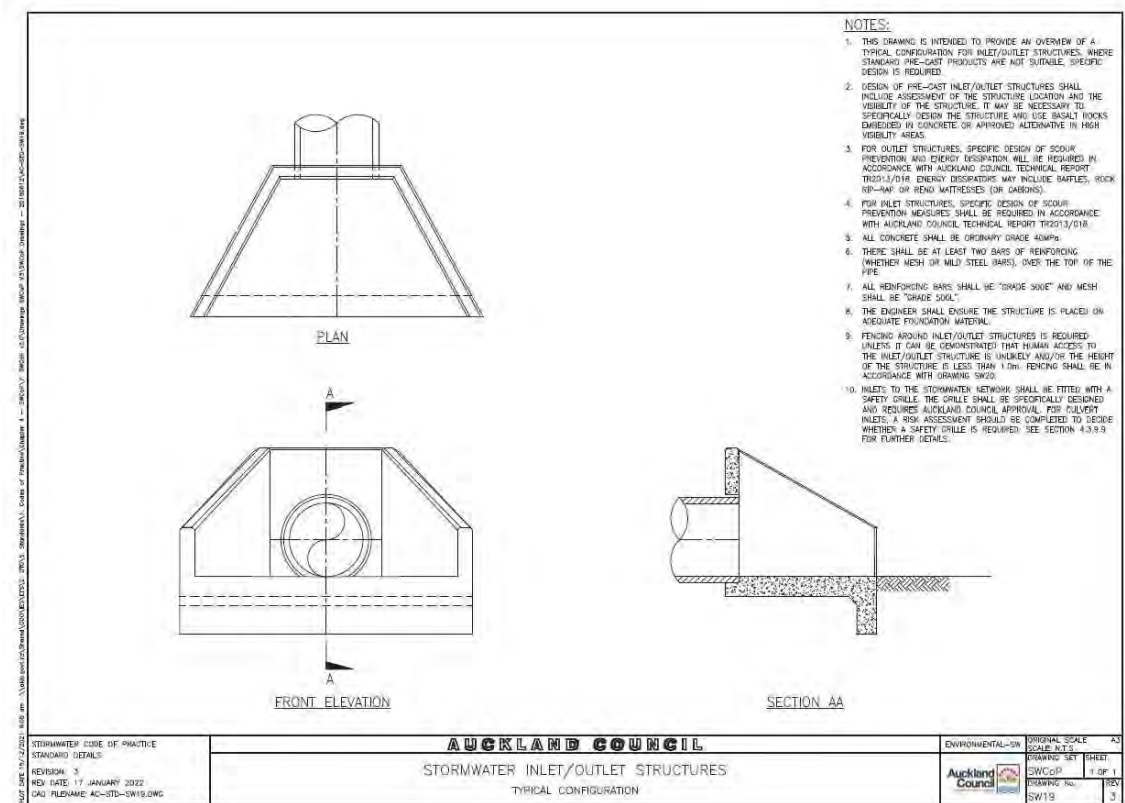
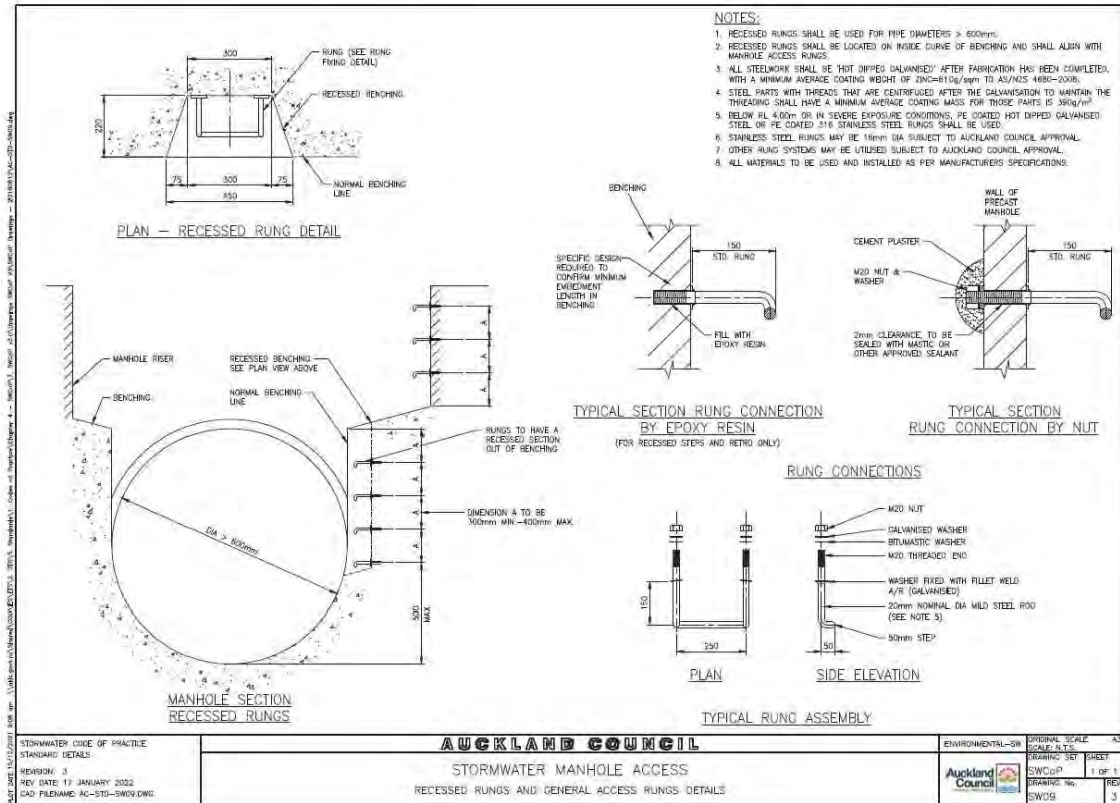
Job Title
WHENUAPAI GREEN
98–102 TOTARA ROAD
WHENUAPAI

Drawing Title
STORMWATER DRAINAGE
1% AEP OVERLAND FLOW PATH
CALCULATIONS

	By	Date	Scale	Job No. 4520	
Surveyed:	--		--	Drawing No.	Rev
Designed:	KLP			4520-01-SW-482	A
Drawn:	--	12/2022			
Approved:	BJ				
CAD FILE					



	By	Date	Scale	Job No. 4520-01	
Surveyed:	--		N.T.S.	Drawing No.	Rev
Designed:	--			4520-01-SW-490	A
Drawn:	--	12/2022			
Approved:	BJ				
CAD FILE					



RESOURCE CONSENT

Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	BJ	01/12/2022

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF

THE NEIL GROUP

NEIL CONSTRUCTION LIMITED
LAND DEVELOPERS

THE NEIL GROUP LIMITED
LEVEL 3 BUILDING B
8 NUGENT STREET
GRAFTON

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND

TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

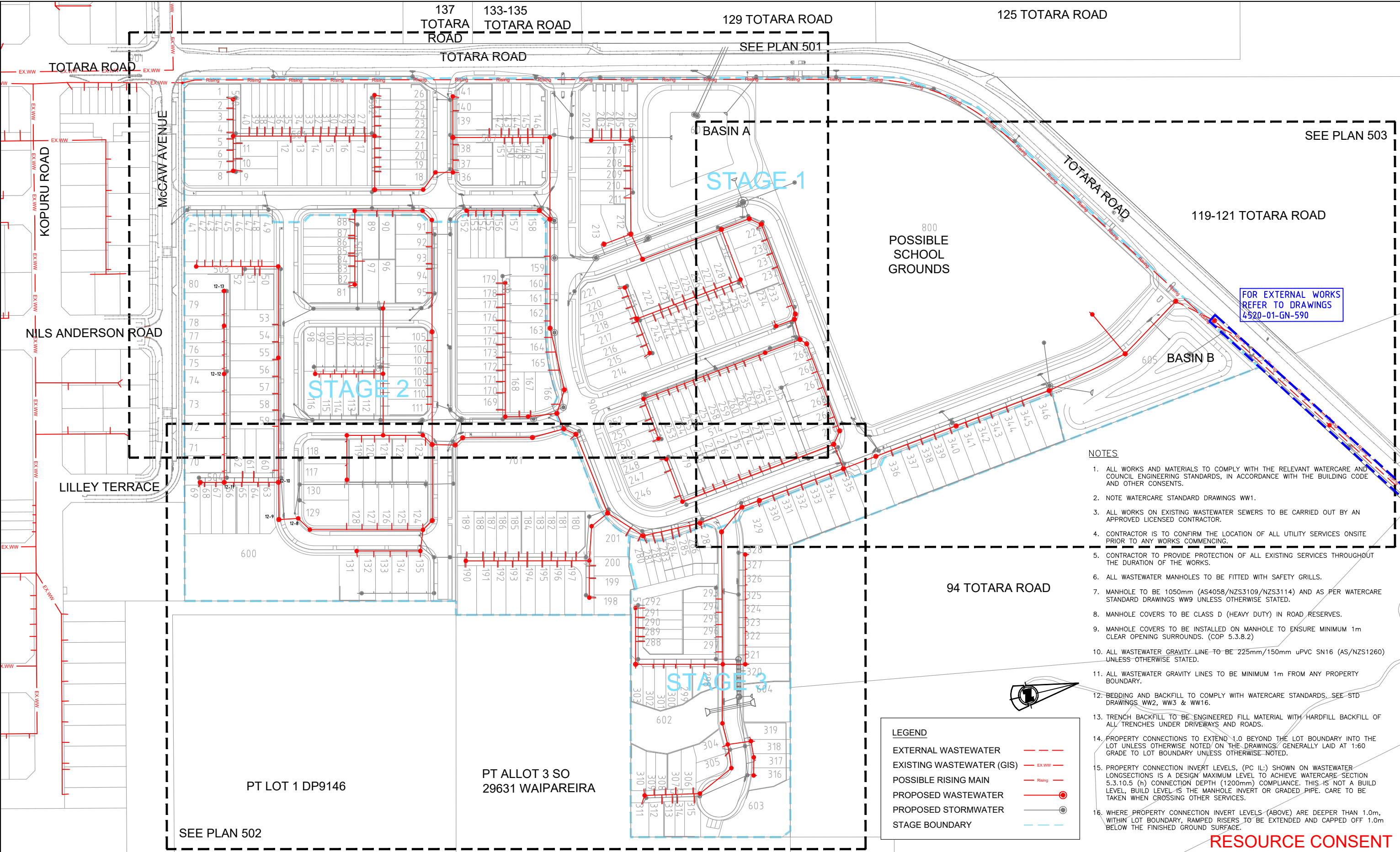
Job Title

98-102 TOTARA ROAD
WHENUAPAI GREEN
WHENUAPAI

Drawing Title

STORMWATER NETWORK
COUNCIL STD DRAWINGS

By	Date	Scale	Job No.	Drawing No.	Rev
Surveyed: --		N.T.S.	4520-01	4520-01-SW-491	A
Designed: --					
Drawn: --	12/2022				
Approved: BJ					
CAD FILE					



Rev	Description	By	Date
A	FOR RESOURCE CONSENT	CK	16/12/2022



THE NEIL GROUP

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF

NEIL CONSTRUCTION LIMITED

LAND DEVELOPERS

THE NEIL GROUP LIMITED
LEVEL 3, BUILDING B
8 NUGENT STREET
GRAFTON

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND
TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

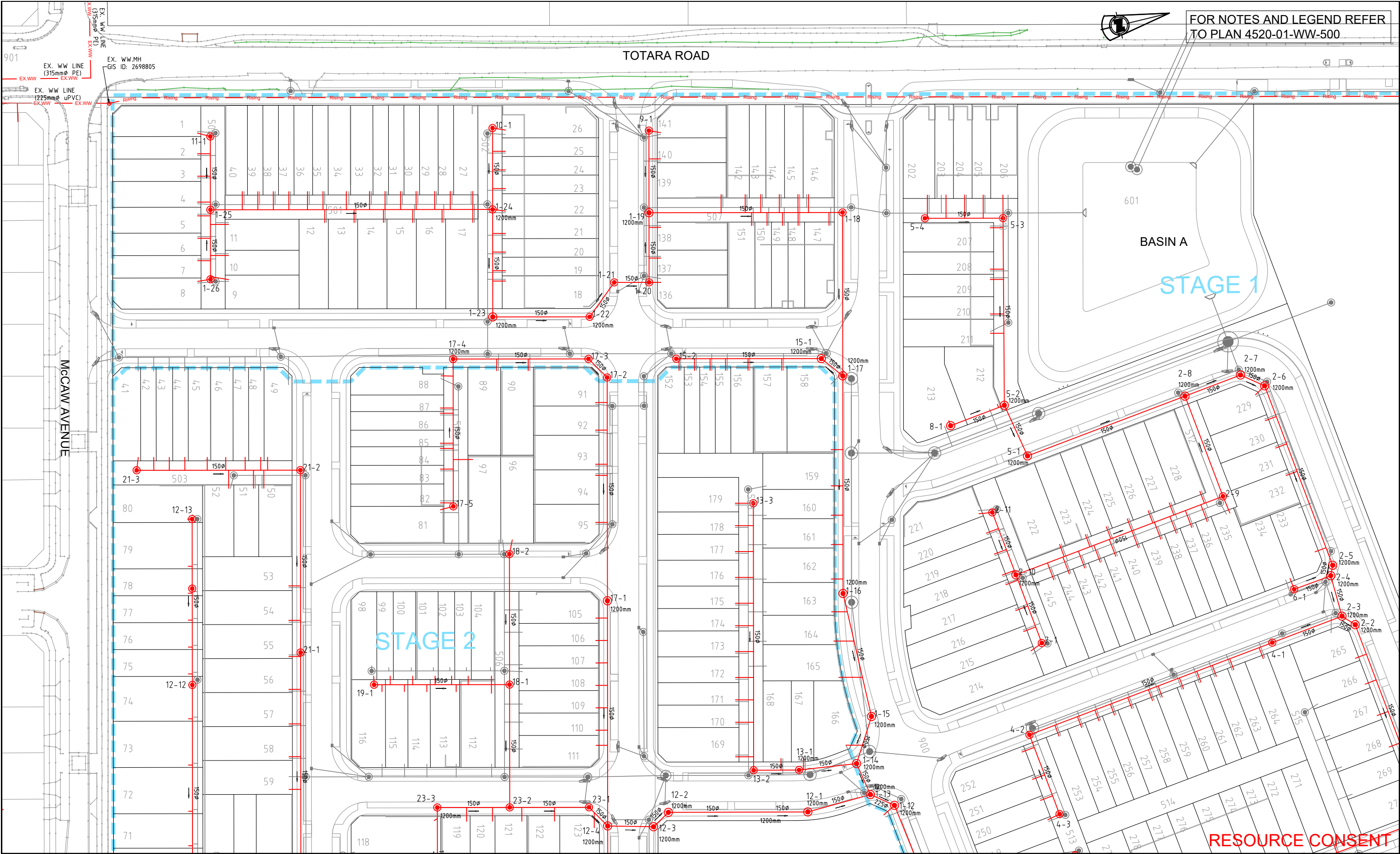
Job Title

WHENUAPAI GREEN
98-102 TOTARA ROAD
WHENUAPAI

Drawing Title

WASTEWATER NETWORK
LOCATION PLAN

By	Date	Scale	Job No.	Rev
Surveyed: MS		1:2000@A3	Drawing No.	
Designed: KLP			4520-01-WW-500	A
Drawn: KLP	11/2022			
Approved: BJ				



Rev	Description	By	Date
A	FOR RESOURCE CONSENT	CK	16/12/2022

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF

THE NEIL GROUP

NEIL CONSTRUCTION LIMITED
LAND DEVELOPERS

THE NEIL GROUP LIMITED
LEVEL 3, BUILDING B
8 NUGENT STREET
GRAFTON

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND

TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

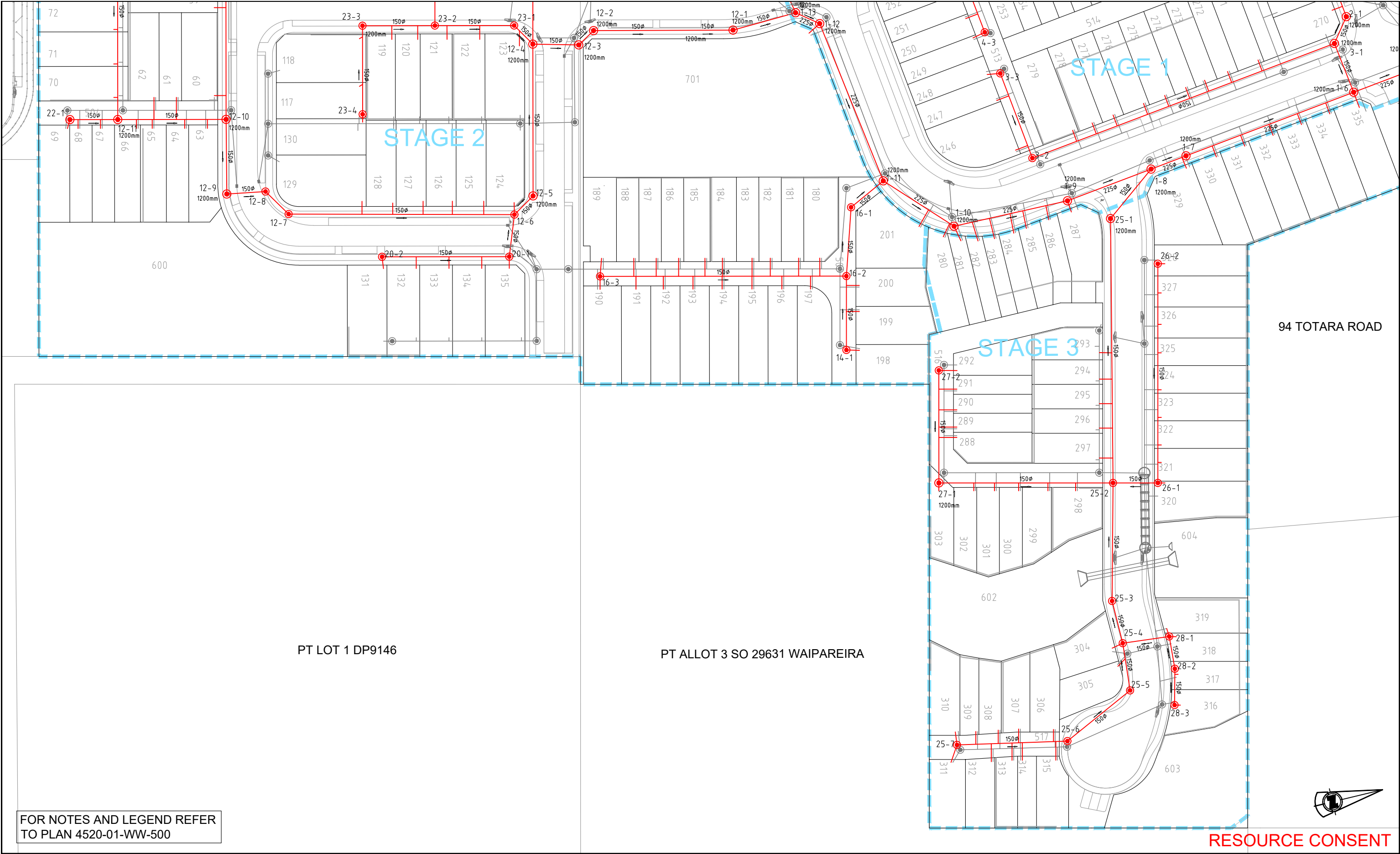
Job Title

**WHENUAPAI GREEN
98-102 TOTARA ROAD
WHENUAPAI**

Drawing Title

**WASTEWATER NETWORK
LOCATION PLAN**

By	Date	Scale	Job No.	Rev
Surveyed: MS		1:1000@A3	Drawing No.	
Designed: KLP	11/2022		4520-01-WW-501	A
Drawn: KLP				
Approved: BJ				



Rev	Description	By	Date
A	FOR RESOURCE CONSENT	CK	16/12/2022



THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF

NEIL CONSTRUCTION LIMITED

LAND DEVELOPERS

THE NEIL GROUP LIMITED
LEVEL 3, BUILDING B
8 NUGENT STREET
GRAFTON

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND
TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

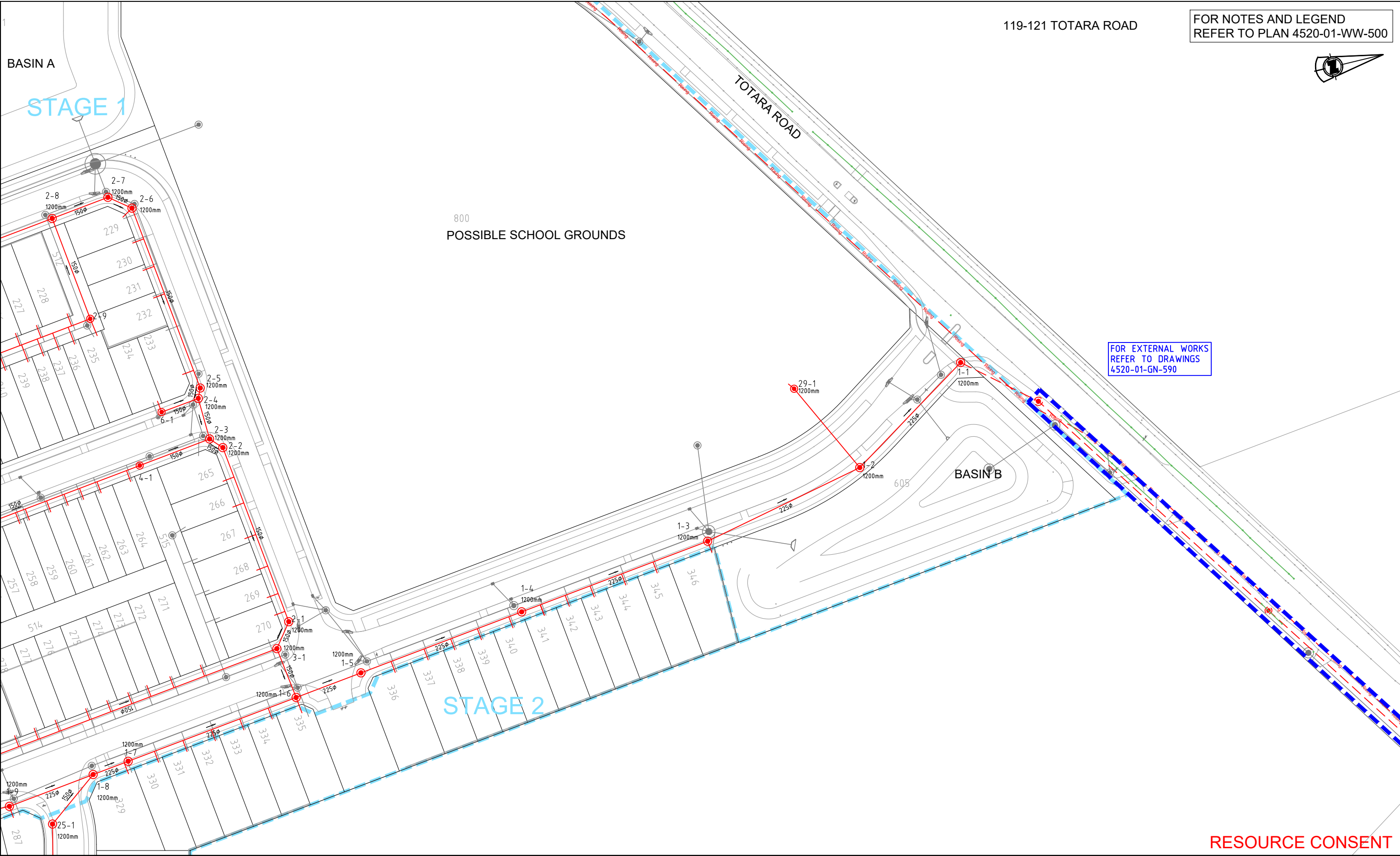
Job Title

WHENUAPAI GREEN
98–102 TOTARA ROAD
WHENUAPAI

Drawing Title

WASTEWATER NETWORK
LOCATION PLAN

By	Date	Scale	Job No.	Rev
Survised: MS		1:1000@A3	Drawing No. 4520–01–WW–502	A
Designed: KLP	11/2022			
Drawn: KLP				
Approved: BJ				



Rev	Description	By	Date
A	FOR RESOURCE CONSENT	CK	16/12/2022

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF

THE NEIL GROUP

NEIL CONSTRUCTION LIMITED
LAND DEVELOPERS

THE NEIL GROUP LIMITED
LEVEL 3, BUILDING B
8 NUGENT STREET
GRAFTON

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND

TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

Job Title

**WHENUAPAI GREEN
98-102 TOTARA ROAD
WHENUAPAI**

Drawing Title

**WASTEWATER NETWORK
LOCATION PLAN**

By	Date	Scale	Job No.	Rev
Surveyed: MS		1:1000@A3	Drawing No.	
Designed: KLP			4520-01-WW-503	A
Drawn: KLP	11/2022			
Approved: BJ				

STANDARDS RELATING TO WORKS

Works shall be completed to Watercare Construction Standards

MANUFACTURERS SPECIFICATIONS

WELDING & FIXINGS

Steelwork and fixings shall be hot-dip galvanised to AS/NZS 4680 unless otherwise stated.

A Nickel anti-seize free of copper, lead, sulphides, chlorides & carbons (graphite) shall be used on bolts.

REINFORCING STEEL

Reinforcing shall be centrally placed with the specified minimum cover.

Bends shall be cold formed.

JOINT SEALS

Flanges : Per WSL Material Standard.

Manhole joints : Concrete manhole with flexible joint seal such as rubber or butyl.
All joints must be externally wrapped with an accepted tape wrapped system.
Alternative materials to suppliers' specifications.



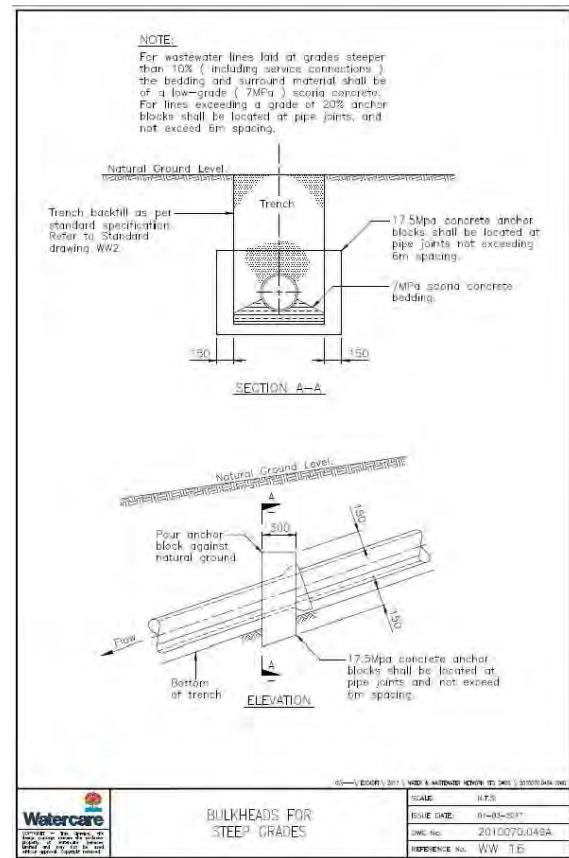
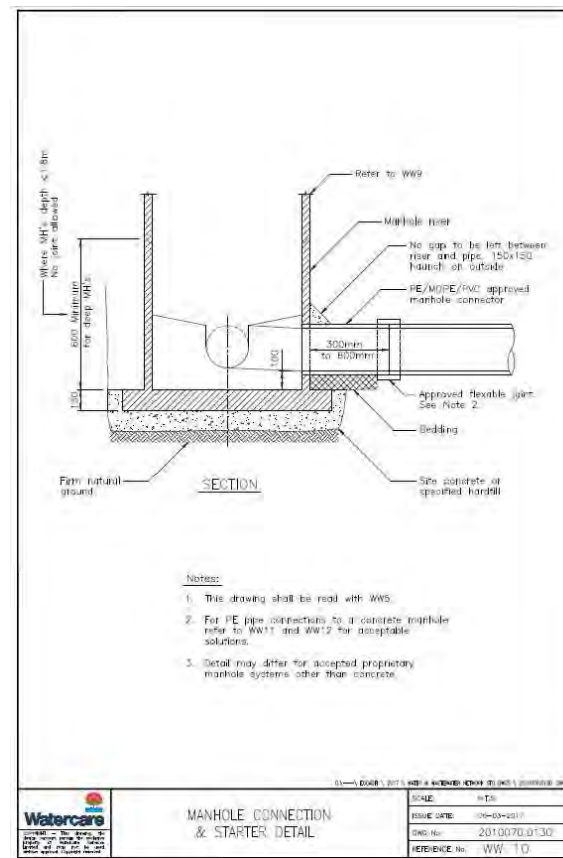
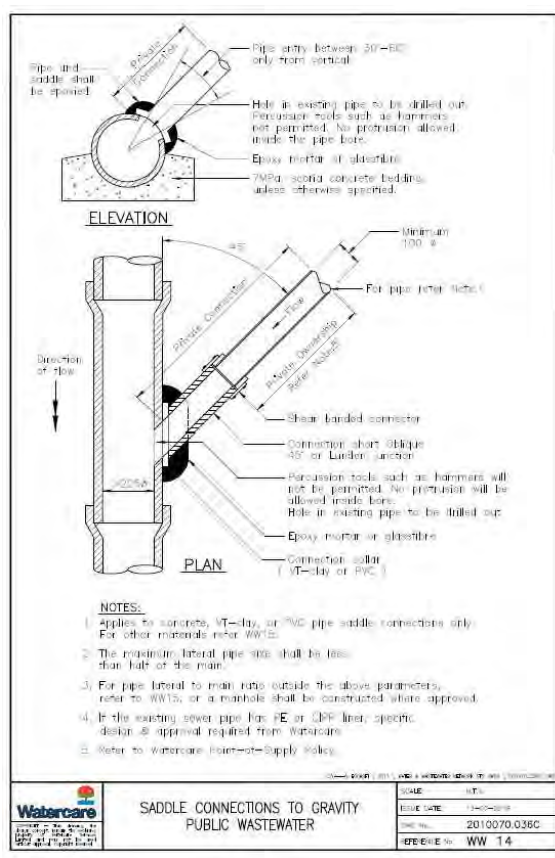
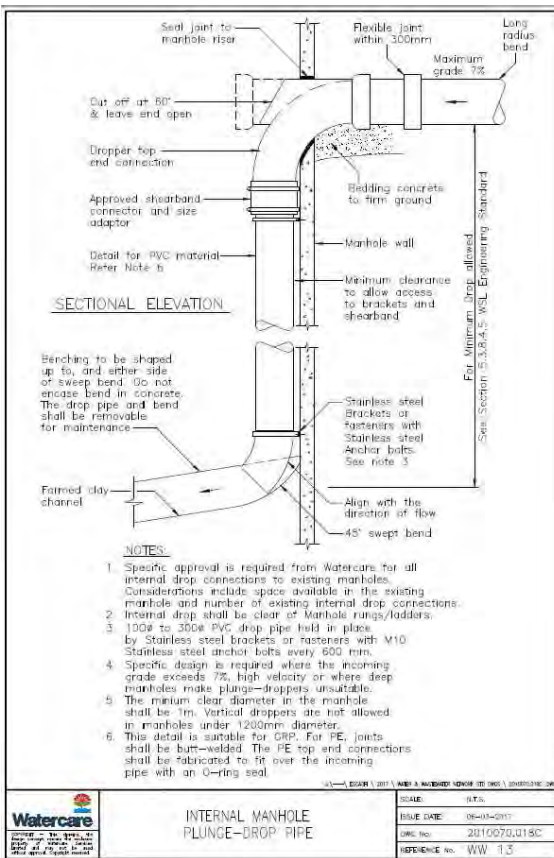
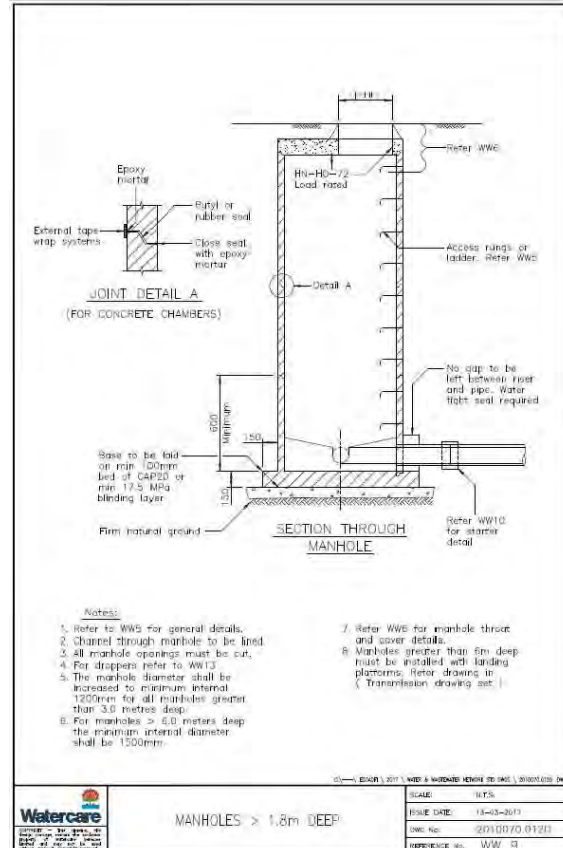
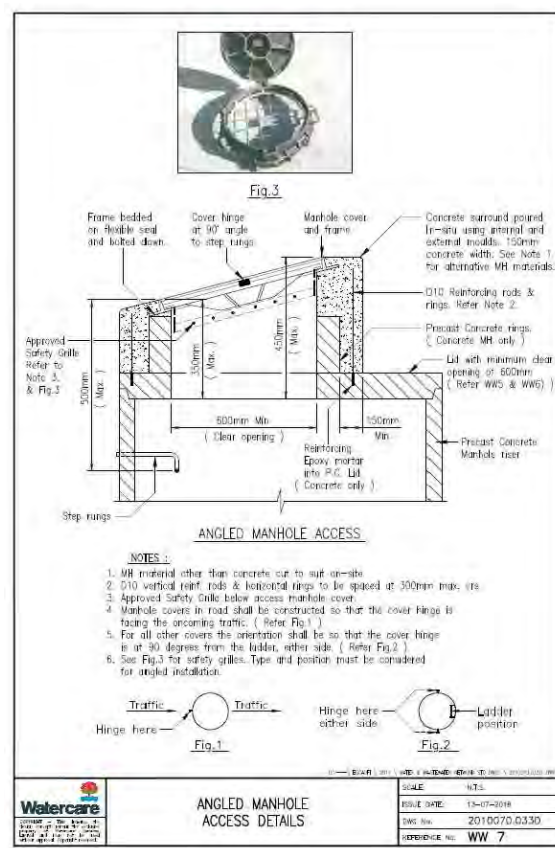
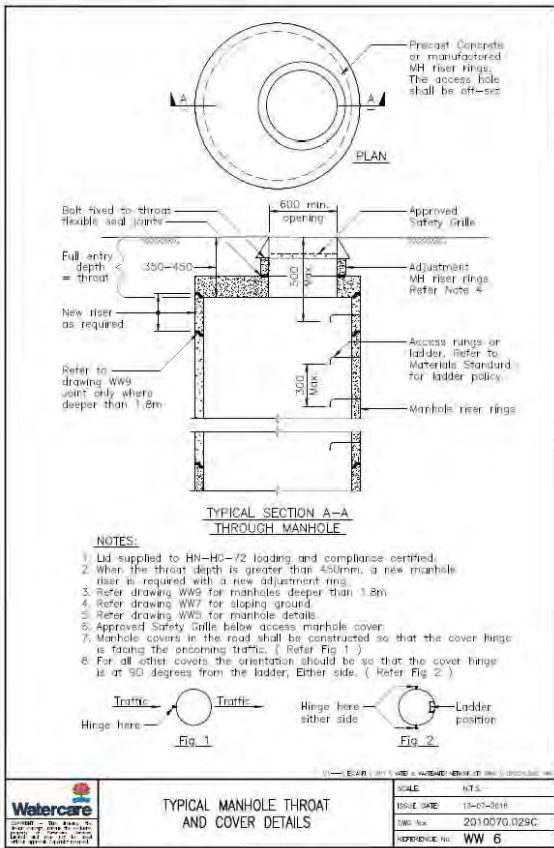
Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	CK	16/12/2022



Job Title
WHENUAPAI GREEN 98-102 TOTARA ROAD WHENUAPAI

Drawing Title
WASTEWATER DRAINAGE WATERCARE STD DRAWINGS

	By	Date	Scale	Job No. 4520	
Surveyed: --			N.T.S.	Drawing No.	Rev
Designed: --				4520-01-WW-540	A
Drawn: KLP	12/2022				
Approved: CK					
cap.sls					



RESOURCE CONSENT

Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	CK	16/12/2022

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF

THE NEIL GROUP

NEIL CONSTRUCTION LIMITED
 LAND DEVELOPERS

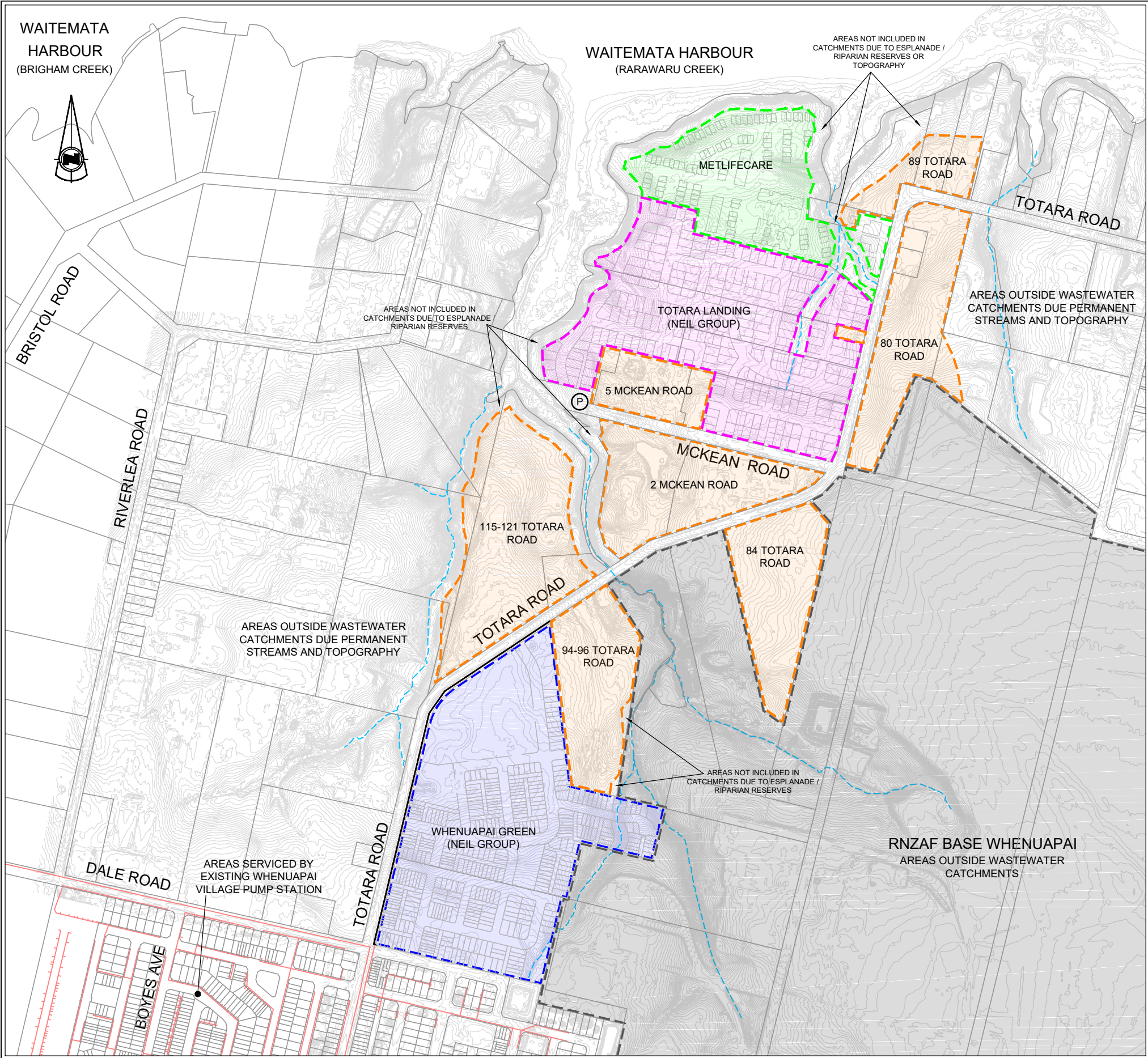
THE NEIL GROUP LIMITED
 LEVEL 3, BUILDING B
 8 NUGENT STREET
 GRAFTON

PO BOX 8751, SYMONDS STREET
 AUKLAND, NEW ZEALAND
 TELEPHONE: +64 9 918 6565
 FACSIMILE: +64 9 918 6567
 WEB: www.neilgroup.co.nz

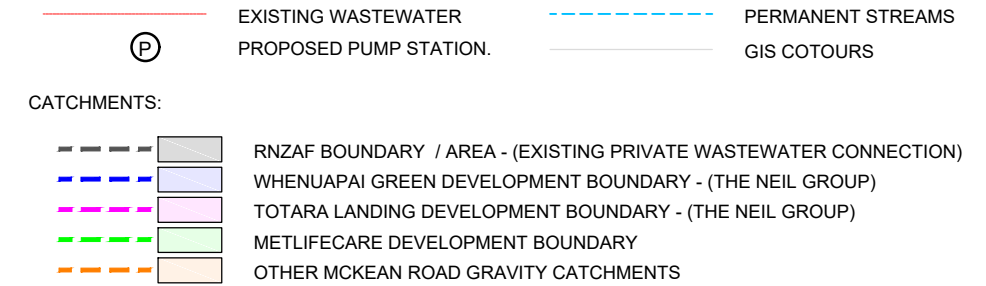
Job Title
WHENUAPAI GREEN 98-102 TOTARA ROAD WHENUAPAI

Drawing Title
WASTEWATER DRAINAGE WATERCARE STD DRAWINGS

By	Date	Scale	Job No.	Drawing No.	Rev
Surveyed: --		N.T.S.	4520	4520-01-WW-541	A
Designed: --					
Drawn: KLP	12/2022				
Approved: CK					
CAD FILE					



LEGEND:



WHENUAPAI GREEN - MCKEAN ROAD PUMP STATION WASTEWATER FLOWS

PROJECT DATA			
PROJECT NO.:	4520	DATE:	Oct-22
BY:	CMK	Rev	A
SITE DESCRIPTION: Whenuapai Green - Pump Station McKean Road Sewer Flows			

WASTEWATER FACTORS - (RESIDENTIAL)

Watercare WW COP Chapter 5 - Ver 2.2 (2019) - Section 5.3.5		Density Estimation Dwellings /Ha	
Design flow allowance (l/p/d)	180	Low Density / Coastal Living	5
Peaking factor: Self Cleansing (PDWF)	3	Low Density / Single House Zone	12
Peaking factor: Peak Design (PWWF)	6.7	Medium Density / Mixed Use Zone	18
People per Dwelling	3	High Density / Mixed Use Zone	24

WASTEWATER CATCHMENT FLOWS

Catchment:	Area Ha:	Dwelling/Ha:	Dwellings (Equivalent):	Population:	Design ADWF (l/s):	Design PDWF (l/s):	Design PWWF (l/s):
Whenuapai Green	16.15						
Residential Stage 1			134	402	0.838	2.513	5.611
School Site Stage 1			24	750	0.148	0.295	0.989
Residential Stage 2			145	435	0.906	2.719	6.072
Residential Stage 3			67	201	0.419	1.256	2.806
115-121 Totara Road	7.31	18	132	396	0.825	2.475	5.528
94-96 Totara Road	3.99	18	72	216	0.450	1.350	3.015
84 Totara Road	4.05	18	73	219	0.456	1.369	3.057
2 McKean Road	5.12	18	92	276	0.575	1.725	3.853
5 McKean Road	2.08	18	37	111	0.231	0.694	1.549
Totara Landing	13.81						
Residential Stage 1		18	125	374	0.778	2.334	5.213
Residential Stage 2		18	125	374	0.778	2.334	5.213
Metlifecare	6.94						
164 ILUs			82	246	0.794	2.381	5.318
80 Totara Road	4.95	12	59	177	0.369	1.106	2.471
89 Totara Road	1.85	5	9	27	0.056	0.169	0.377
TOTAL - FULL CATCHMENT	66.25		1175	4203	7.62	22.72	51.07
TOTAL - WHENUAPAI GREEN	16.15		370		2.31	6.78	15.48
TOTAL - TOTARA LANDING	13.81		249		1.56	4.67	10.43
TOTAL - NCL PROPERTIES	29.96		619		3.87	11.45	25.90
TOTAL - NCL PROPERTIES AND METLIFE CARE	36.90		701		4.66	13.83	31.22

- NOTES:
- School site assumes 700 students and 50 staff, Peaking factor: Self Cleansing (PDWF) of 2.0, Peaking factor: Peak Design (PWWF) of 6.7 and calculates to 24 dwelling equivalents.
 - Metlifecare site (Residential Retirement Village) uses design occupancy rates of 1.5 for population calculation and calculates to 82 dwelling equivalents.
 - Totara Landing assumed to be constructed in two equal sized stages
 - See Wastewater Catchment Plan (Wider Site) 4520-01-GN-533 for location and details.

FOR INFORMATION

Rev	Description	By	Date
A	FOR INFORMATOIN		08/22

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF

NEIL CONSTRUCTION LIMITED
LAND DEVELOPERS

THE NEIL GROUP

THE NEIL GROUP LIMITED
LEVEL 3, BUILDING B
8 NUGENT STREET
GRAFTON

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND

TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

Job Title

WHENUAPAI GREEN
98-108 TOTARA ROAD
WHENUAPAI

Drawing Title

WASTEWATER
CATCHMENT PLAN
(WIDER SITE)

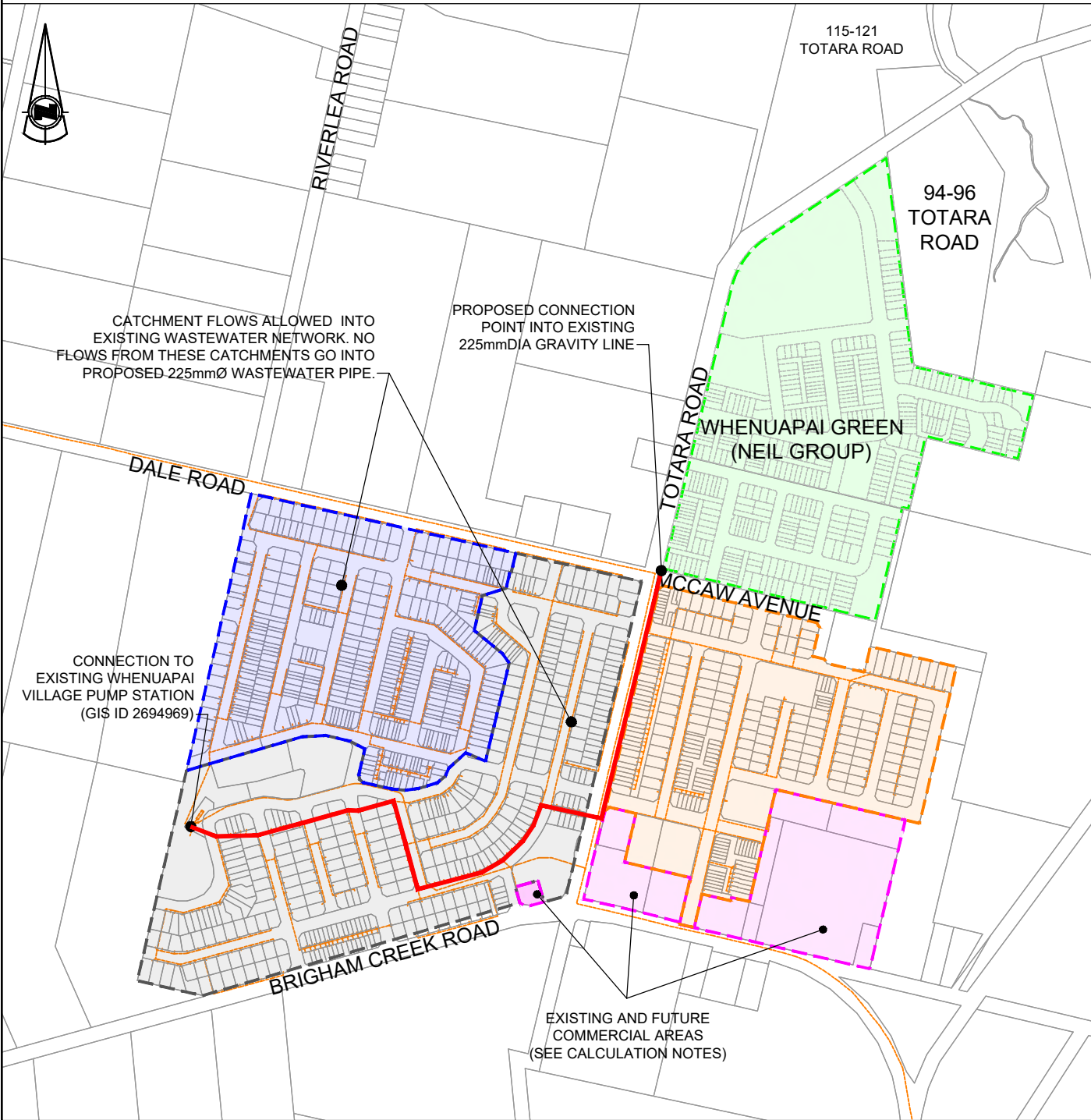
	By	Date	Scale	Job No.	Rev
Surveyed:	-		1: 7500@A3	Drawing No.	
Designed:	CK			4520-01-GN-553	A
Drawn:	CK	10/22			
Approved:	CK				
CAD FILE					

LEGEND:

EXISTING WASTEWATER
PROPOSED 225mmDIA WASTEWATER ALIGNMENT

CATCHMENTS:

WHENUAPAI VILLAGE DEVELOPMENT STAGE 1-4 (RESIDENTIAL)
WHENUAPAI VILLAGE DEVELOPMENT STAGE 5-8 (RESIDENTIAL)
WHENUAPAI 2 DEVELOPMENT (RESIDENTIAL)
WHENUAPAI 2 AND WHENUAPAI VILLAGE DEVELOPMENTS (COMMERCIAL)
WHENUAPAI GREEN DEVELOPMENT BOUNDARY - (THE NEIL GROUP)



WHENUAPAI 2 WASTEWATER FLOWS

CALCULATION PURPOSE: TO DETERMINE CURRENT/FUTURE FLOW FROM WHENUAPAI 2 DEVELOPMENT TO EXISTING 225mmDIA WW LINE

PROJECT DATA

PROJECT NO.:	4520
DATE:	Oct-22
BY:	KLP
SITE DESCRIPTION:	Whenuapai 2 wastewater flows

WASTEWATER FACTORS

Watercare WW COP Chapter 5 - Ver 2.2 (2019) - Section 5.3.5

Residential - Table 5.1.1

Design flow allowance (l/p/d)	180
Peaking factor: Self Cleansing (PDWF)	3
Peaking factor: Peak Design (PWWF)	6.7
People per Dwelling	3

Commercial - Table 5.1.3 (Office building / dry retail)

Peaking factor: Self Cleansing (PDWF)	2
Peaking factor: Peak Design (PWWF)	5
Net floor area (m2) per person	15
Daily flow per person (litres)	65

Other facility (Child day-care)

Children daily allowance (l/chld/d)	42
Staff daily allowance (l/employee/d)	45
Peaking factor: Self Cleansing (PDWF)	2
Peaking factor: Peak Design (PWWF)	6.7

Commercial (Wet retail / restaurant)

Litres per day per net m2 of floor area	15
Peaking factor: Self Cleansing (PDWF)	2
Peaking factor: Peak Design (PWWF)	6.7

WASTEWATER CATCHMENT FLOWS

Catchment:	Area Ha:	Dwellings (Equivalent):	Population (Equivalent)	Design ADWF (l/s):	Design PDWF (l/s):	Design PWWF (l/s):
Whenuapai 2	20.90					
Residential	--	313	939	1.956	5.869	13.107
ITM (Retail)	0.18	14	117	0.088	0.176	0.439
Petrol Station	0.04	3	23	0.018	0.035	0.088
Town Centre / Medical Centre	1.05	84	700	0.527	1.053	2.633
New Shoots day-care	0.07	13	160	0.079	0.158	0.528
TOTAL - COMMERCIAL ONLY				0.711	1.422	3.688
TOTAL - FULL CATCHMENT	20.90	427	1939	2.667	7.290	16.795
Whenuapai Village Stage 1-4	19.02					
Residential	--	361	1083	2.256	6.769	15.117
The Parkhouse Café	0.03	7	21	0.043	0.087	0.291
TOTAL - FULL CATCHMENT	19.02	368	1104	2.300	6.856	15.408

NOTES:

- Assumes flows from ITM retail shop (approx.1750m2) only. Business assumed to be 'dry retail' as defined in Table 5.1.3 of Watercare CoP v2.2.
- Assumes flows from petrol station retail building (approx.350m2) only. Business assumed to be 'dry retail' as defined in Table 5.1.3 of Watercare CoP v2.2.
- Assumes flows from future retail/commercial buildings (approx.3500m2 of footprint and 3 floors, total of 10500m2) only. Business assumed to be 'dry retail' as defined in Table 5.1.3 of Watercare CoP v2.2.
- Assumes approx. 130 children and 30 staff. Peaking factors and wastewater flow allowances as per Watercare CoP v2.2, Section 5.3.5.1 (F).
- Assumes Café to be 250m2 (Wet retail). Design wastewater peaking factors as defined in as defined in Table 5.1.3 of Watercare CoP v2.2.

WHENUAPAI GREEN - WATERCARE WASTEWATER CALCULATIONS - PRE / POST / UPGRADE FLOWS
(EXISTING 225mm NETWORK - MCCAW AVE TO PUMP STATION)

CALCULATION PURPOSE: TO SHOW EXISTING NETWORK DETAILS AND CAPACITIES WITH ADDITIONAL DEVELOPMENT FLOWS

PROJECT DATA

PROJECT NO.:	4520-EXT
DATE:	Nov-22
REV:	A
BY:	CK
SITE DESCRIPTION:	EXISTING WASTEWATER NETWORK CHECK FLOWS

NOTES: -> See plan 4520-1-GN-553 for Whenuapai Green Area Catchment details
-> Watercare WW COP Chapter 5 - Ver 2.2 (2019) used for calculation flows
-> Gradients from Cato Bolam assessment survey 2020
-> Existing dwellings updated 1.1.2022
-> Refer to '4520 EXTERNAL WW Catch Flows - Whenuapai 2 Development' for existing / future commercial flows
-> Whenuapai 2 commercial wastewater flows included to line 2634538 - 2634537

WASTEWATER FACTORS

Residential - Table 5.1.1

Design flow allowance (l/p/d)	180
Peaking factor: Self Cleansing (PDWF)	3
Peaking factor: Peak Design (PWWF)	6.7
People per Dwelling	3

EXISTING NETWORK FLOWS

Upstream Manhole	Downstream Manhole	Length (m)	Gradient (%)	Pipe Size (mm)	Capacity (l/s)	Existing Residential Properties No.	Existing Population	Proposed Residential Properties No.	Proposed Population	Design ADWF (l/s)	Design PDWF (l/s)	Design PWWF (l/s)	Capacity Status
2698803	2698802	66.95	0.56	225	35.95	10	30	370	1110	2.38	7.13	15.91	LIVE / OK
2698802	2698801	19.65	0.56	225	35.95	10	30	370	1110	2.38	7.13	15.91	LIVE / OK
2698801	2698799	62.79	0.36	225	28.83	142	426	370	1110	3.20	9.60	21.44	LIVE / OK
2698799	2698798	72.77	0.37	225	29.22	142	426	370	1110	3.20	9.60	21.44	LIVE / OK
2698798	2698796	66.93	0.38	225	29.62	142	426	370	1110	3.20	9.60	21.44	LIVE / OK
2698796	2698795	18.06	0.40	225	30.39	142	426	370	1110	3.20	9.60	21.44	LIVE / OK
2698795	2634538	32.28	0.80	225	42.97	313	939	370	1110	4.98	14.23	32.29	LIVE / OK
2634538	2634537	29.32	0.70	225	40.19	323	969	370	1110	5.04	14.42	32.71	LIVE / OK
2634537	2634515	37.97	0.74	225	41.33	361	1083	370	1110	5.28	15.13	34.30	LIVE / OK
2634515	2634516	13.46	1.10	225	50.38	377	1131	370	1110	5.38	15.43	34.97	LIVE / OK
2634516	2634522	29.99	0.76	225	41.88	379	1137	370	1110	5.39	15.47	35.05	LIVE / OK
2634522	2634523	25.58	0.70	225	40.19	381	1143	370	1110	5.40	15.50	35.14	LIVE / OK
2634523	2634524	37.48	0.74	225	41.33	385	1155	370	1110	5.43	15.58	35.30	LIVE / OK
2634524	2634526	15.40	0.80	225	42.97	387	1161	370	1110	5.49	15.70	35.68	LIVE / OK
2634526	2634527	17.61	0.90	225	45.57	388	1164	370	1110	5.49	15.72	35.72	LIVE / OK
2634527	2634528	89.56	1.40	225	56.84	395	1185	370	1110	5.54	15.85	36.01	LIVE / OK
2634528	2634602	62.87	1.30	225	54.77	420	1260	370	1110	5.69	16.32	37.06	LIVE / OK
2634602	2634636	61.50	3.70	225	92.39	510	1530	370	1110	6.25	18.01	40.83	LIVE / OK
2634636	2634638	49.43	2.40	225	74.41	522	1566	370	1110	6.33	18.23	41.33	LIVE / OK
2634638	2704665	12.95	1.20	225	52.62	524	1572	370	1110	6.34	18.27	41.41	LIVE / OK
2704665	2704695	63.02	0.79	225	42.70	542	1626	370	1110	6.45	18.61	42.17	LIVE / OK
2704695	2704728	64.48	0.83	225	43.77	565	1695	370	1110	6.60	19.04	43.13	LIVE / OK
2704728	2696094	56.63	3.20	225	85.92	618	1854	370	1110	6.93	20.03	45.35	LIVE / OK
2696094	2694969	36.61	3.40	225	88.56	674	2022	370	1110	7.28	21.08	47.70	LIVE / OK

FOR INFORMATION

Rev	Description	By	Date
A	FOR INFORMATOIN		11/22

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF

THE NEIL GROUP

NEIL CONSTRUCTION LIMITED
LAND DEVELOPERS

THE NEIL GROUP LIMITED
LEVEL 3, BUILDING B
8 NUGENT STREET
GRAFTON

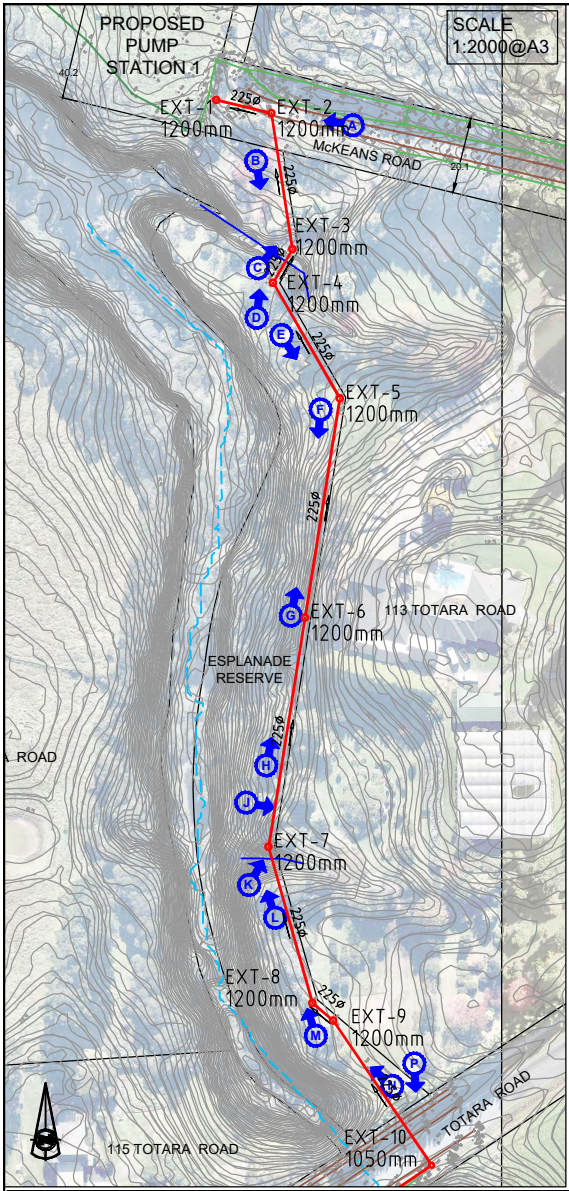
PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND

TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

Job Title
WHENUAPAI GREEN 98-102 TOTARA ROAD WHENUAPAI

Drawing Title
WASTEWATER PROPOSED GRAVITY ROUTE TO EXISTING PUMP STATION

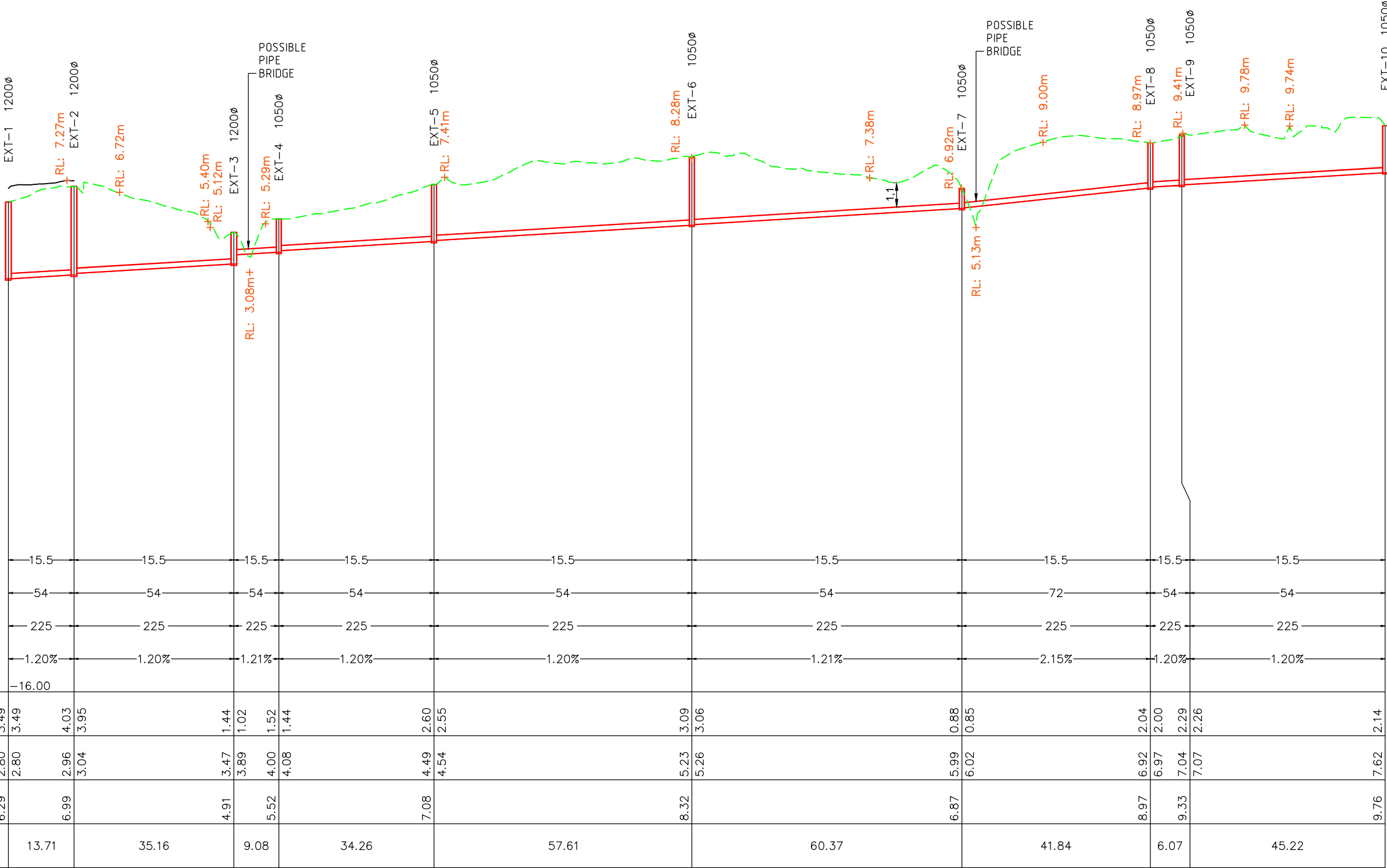
	By	Date	Scale	Job No.	Rev
Surveyed:	-		1:8000@A3	Drawing No.	
Designed:	CK/KLP			4520-01-GN-554	A
Drawn:	KLP	11/22			
Approved:	CK				
CAD FILE					



SCALE
1:2000@A3

ALIGNMENT
INVESTIGATION
SPOT HEIGHT
CHECKS MAY 2022

+ RL: X.XXm



EXTERNAL WASTEWATER LINE
SCALE: 1:1000 (5 x VERTICAL EXAGGERATION) @ A3

FOR INFORMATION

Rev	Description	By	Date
B	ISSUED FOR DISCUSSION	CK	20/12/2022
A	FOR INFORMATOIN	CK	05/22

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF

THE NEIL GROUP

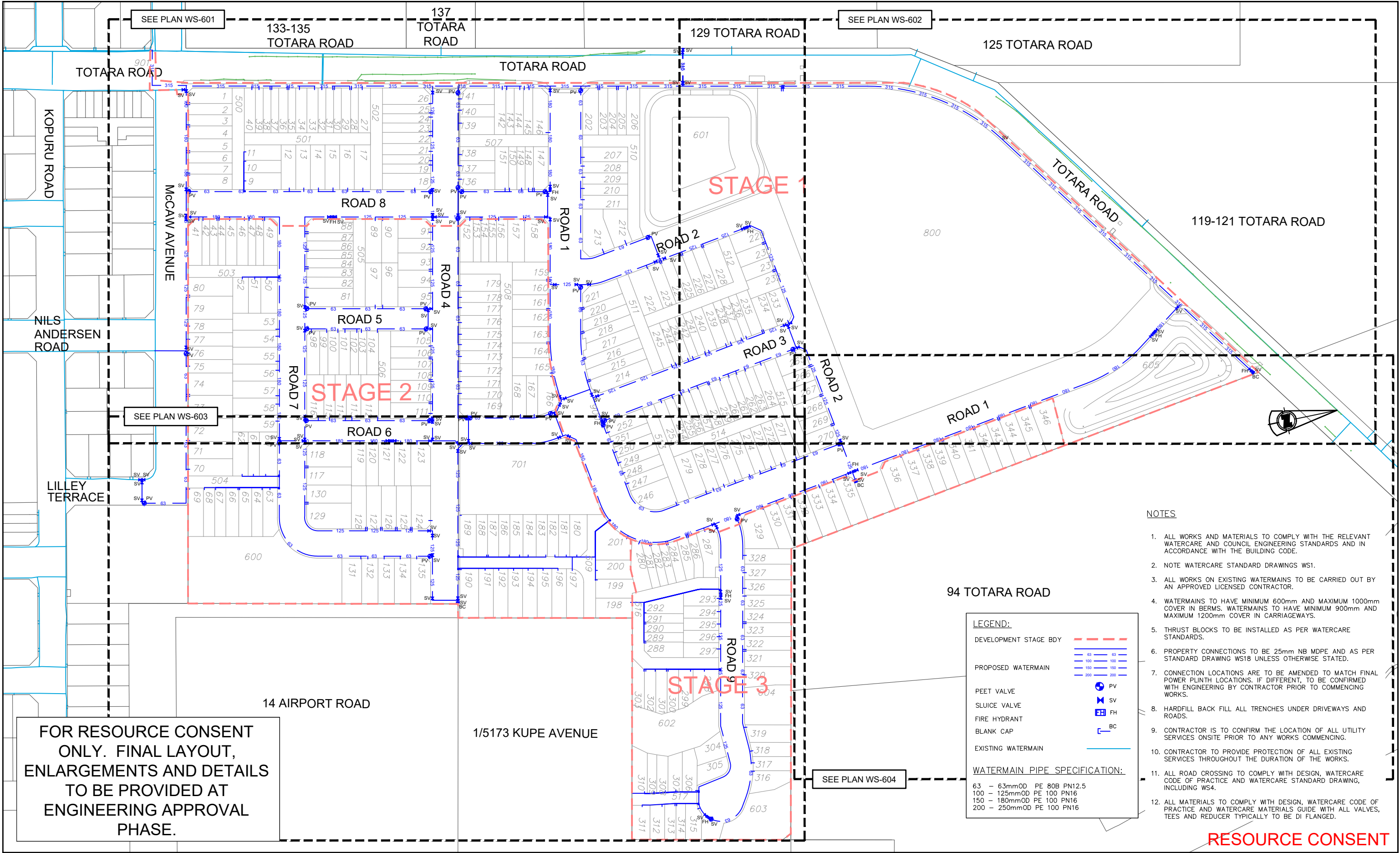
THE NEIL GROUP LIMITED
LEVEL 3, BUILDING 5
8 NUGENT STREET
GRAFTON

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND
TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

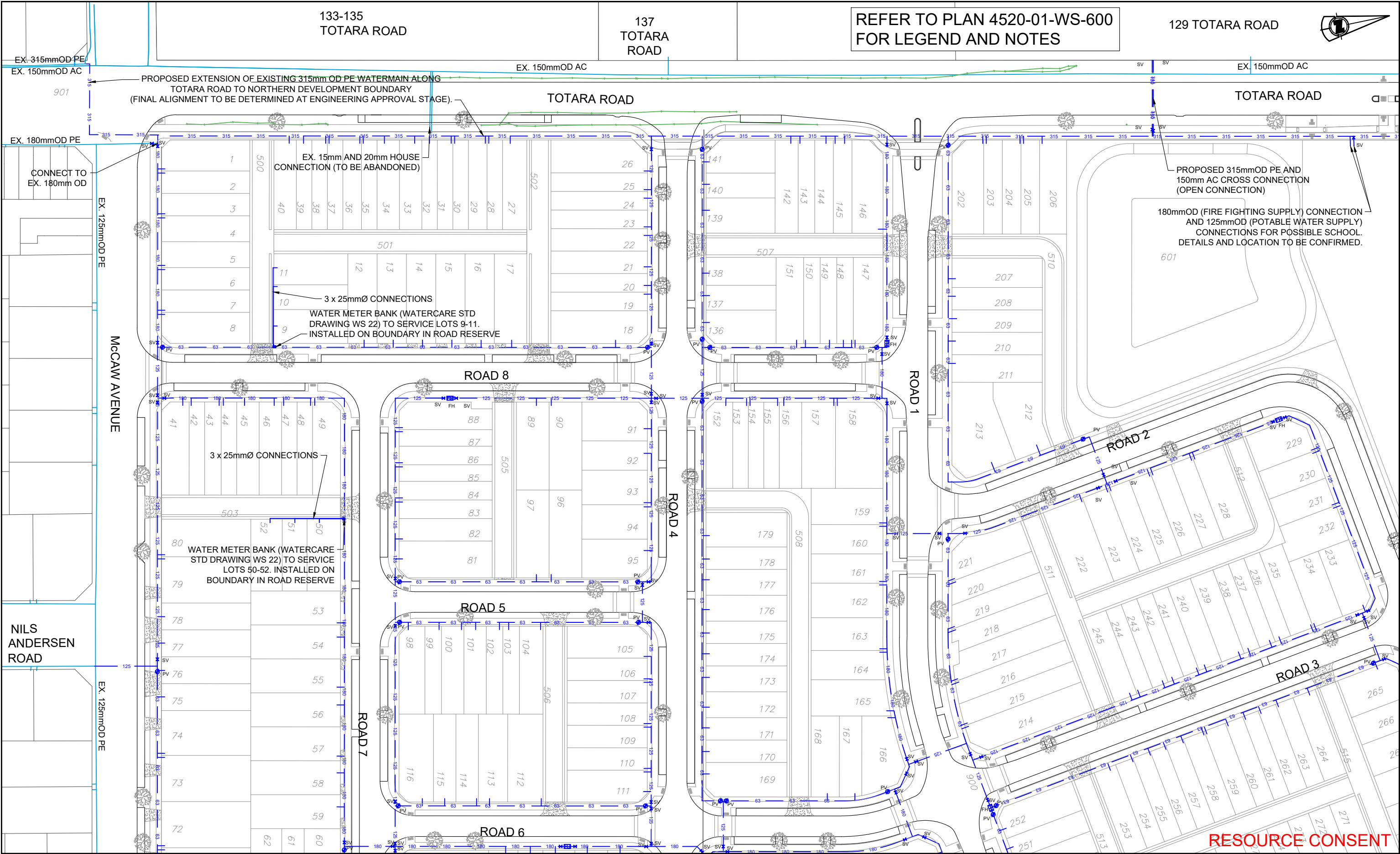
Job Title	WHENUAPAI GREEN CONCEPT PHASE
-----------	----------------------------------

Drawing Title	WASTEWATER ESPLANADE RESERVE OPTION – PIPE BRIDGE
---------------	---

By	Date	Scale	Job No.	Drawing No.	Rev
Surveyed: -		AS SHOWN	4520-01-GN-590		B
Designed: CK					
Drawn: CK	05/22				
Approved: CK					
CAD FILE					



Rev	Description	By	Date	Job Title	Drawing Title	By	Date	Scale	Job No.	Drawing No.	Rev
A	ISSUED FOR RESOURCE CONSENT	CK	16/12/2022	WHENUAPAI GREEN 98-102 TOTARA ROAD WHENUAPAI	WATER RETICULATION LAYOUT PLAN	MS / CP	12/2022	1:2000@A3	4520	4520-01-WS-600	A



Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	CK	16/12/2022



THE NEIL GROUP

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF

NEIL CONSTRUCTION LIMITED
LAND DEVELOPERS

THE NEIL GROUP LIMITED
LEVEL 3, BUILDING 5
8 NUGENT STREET
GRAFTON

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND
TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

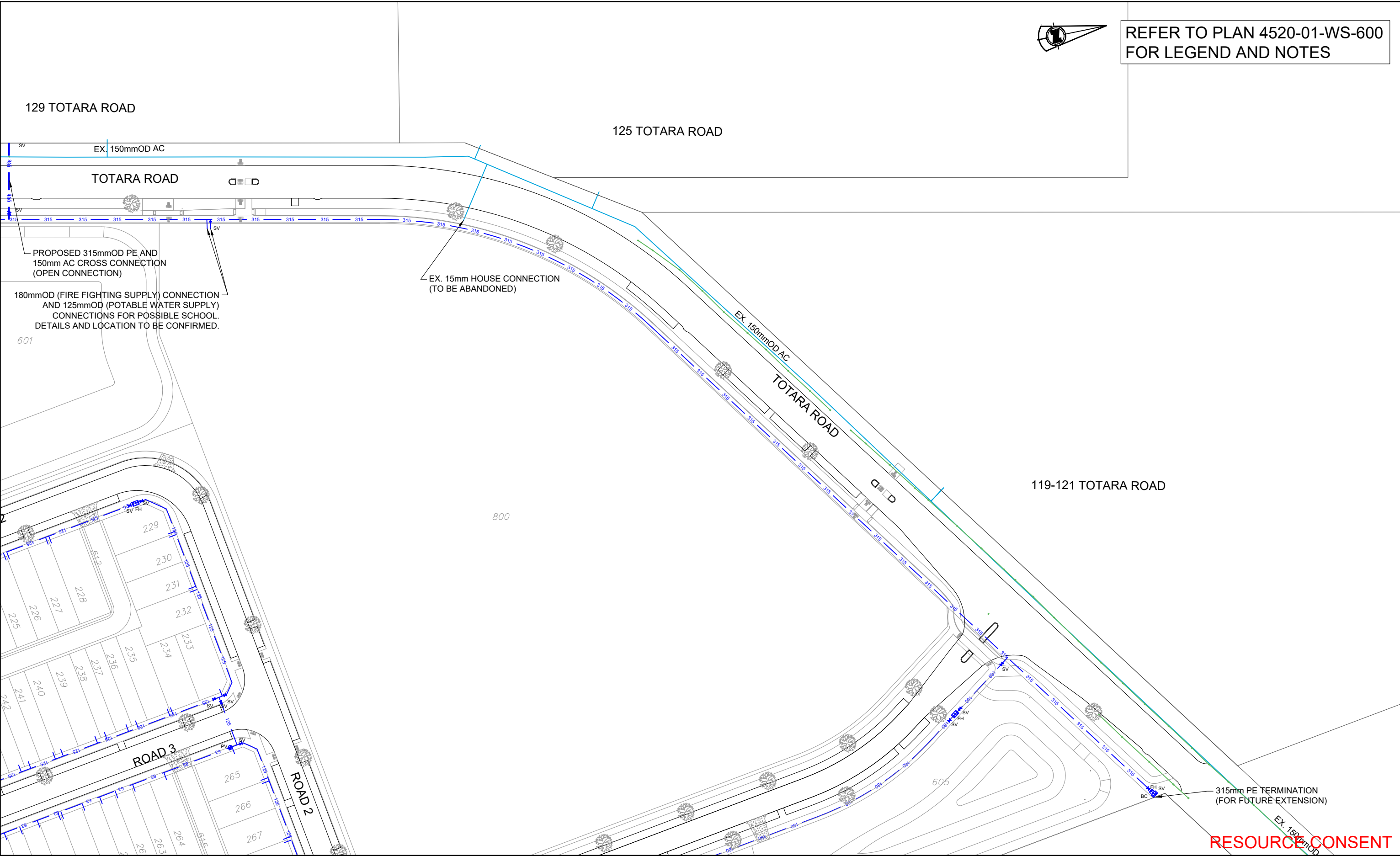
Job Title

WHENUAPAI GREEN
98-102 TOTARA ROAD
WHENUAPAI

Drawing Title

WATER RETICULATION
LOCATION PLAN

By	Date	Scale	Job No.	4520	Rev
Surveyed: MS / CP		1:1000@A3	Drawing No.	4520-01-WS-601	A
Designed: KLP	12/2022				
Drawn: KLP					
Approved: BJ					
CAD FILE					



Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	CK	16/12/2022



THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF
THE NEIL GROUP

NEIL CONSTRUCTION LIMITED
LAND DEVELOPERS

THE NEIL GROUP LIMITED
LEVEL 3, BUILDING B
8 NUGENT STREET
GRAFTON

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND
TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

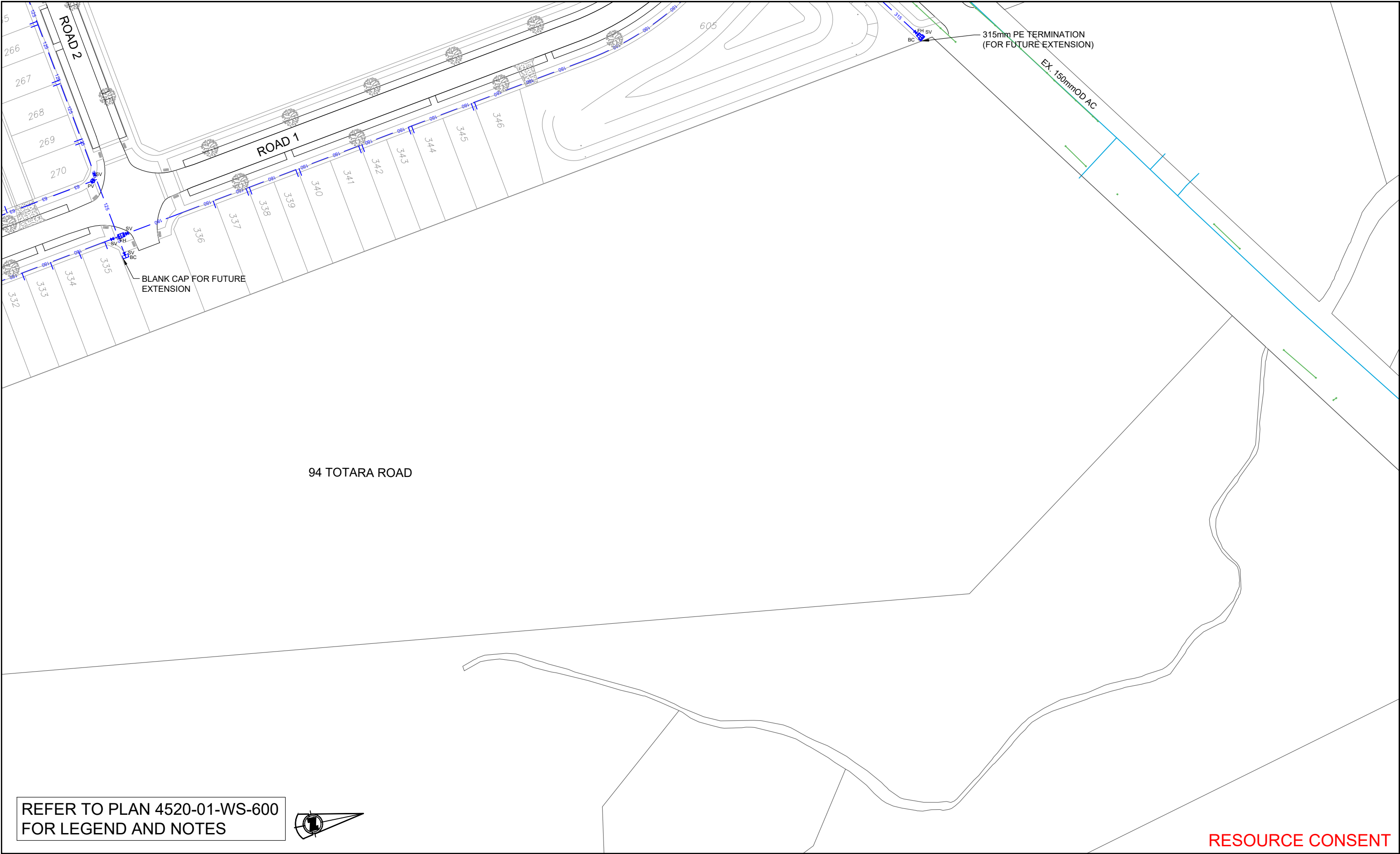
Job Title

**WHENUAPAI GREEN
98-102 TOTARA ROAD
WHENUAPAI**

Drawing Title

**WATER RETICULATION
LOCATION PLAN**

By	Date	Scale	Job No.	Drawing No.	Rev
MS / CP		1:1000@A3	4520	4520-01-WS-602	A
Designed: KLP					
Drawn: KLP	12/2022				
Approved: BJ					
CAD FILE					



REFER TO PLAN 4520-01-WS-600
FOR LEGEND AND NOTES



RESOURCE CONSENT

Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	CK	16/12/2022



THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF

NEIL CONSTRUCTION LIMITED
LAND DEVELOPERS

THE NEIL GROUP LIMITED
LEVEL 3, BUILDING B
8 NUGENT STREET
GRAFTON

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND
TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

Job Title

**WHENUAPAI GREEN
98–102 TOTARA ROAD
WHENUAPAI**

Drawing Title

**WATER RETICULATION
LOCATION PLAN**

	By	Date	Scale	Job No.	4520
Surveyed:	MS / CP		1:1000@A3	Drawing No.	Rev
Designed:	KLP			4520-01-WS-604	A
Drawn:	KLP	12/2022			
Approved:	BJ				
CAD FILE					

GENERAL CONSTRUCTION NOTES

STANDARDS RELATING TO WORKS

Works shall be carried out to the requirements of the Health & Safety at work in Employment Act 2015

Works shall be completed to Watercare Construction Standards.

MANUFACTURERS SPECIFICATIONS

Materials shall be installed to the Manufacturers requirements unless otherwise specified.

WELDING & FIXINGS

All steelwork shall be workshop fabricated.

Steelwork and fixings shall be hot-dip galvanised to AS/NZS 4680 unless otherwise stated.

A Nickel anti-seize free of copper, lead, sulphides, chlorides & carbons (graphite) shall be used on bolts.

REINFORCING STEEL

Reinforcing shall be centrally placed with the specified minimum cover.

Bends shall be cold formed.

JOINT SEALS

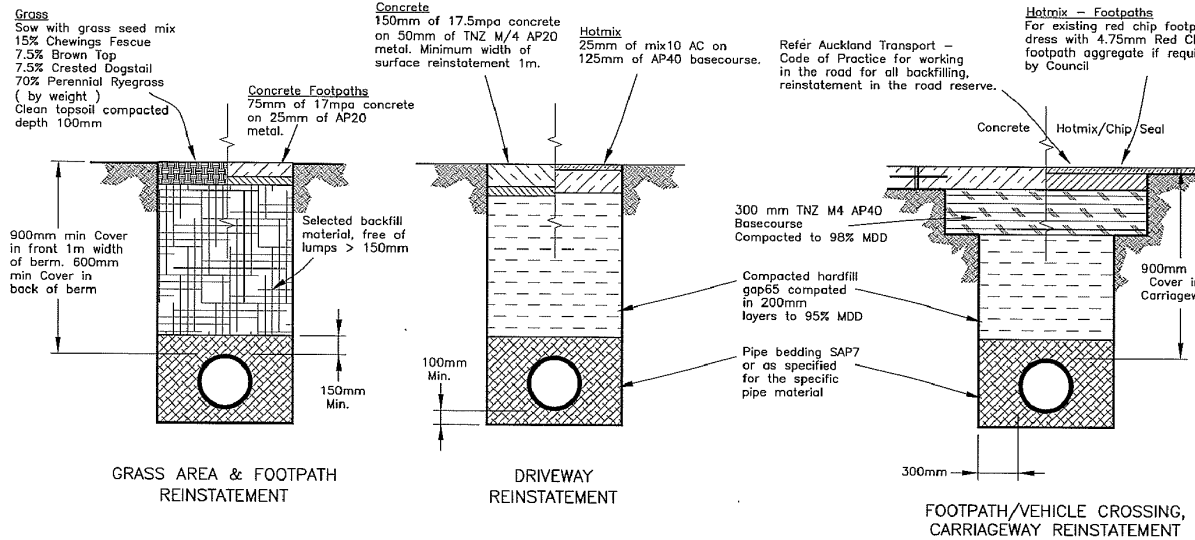
Couplings & Flanges : Per WSL Material Standard.

Concrete joints around pipe penetrations through chambers shall be made with a suitable hydrophilic sealant to the manufacturer's requirements. Concrete repair shall be reinforced and box-cast to prevent cracking from sealant forces.



GENERAL CONSTRUCTION NOTES

SCALE: N.T.S.
ISSUE DATE: 13-07-2018
DWG No. 2010069.002D
REFERENCE No. WS 1



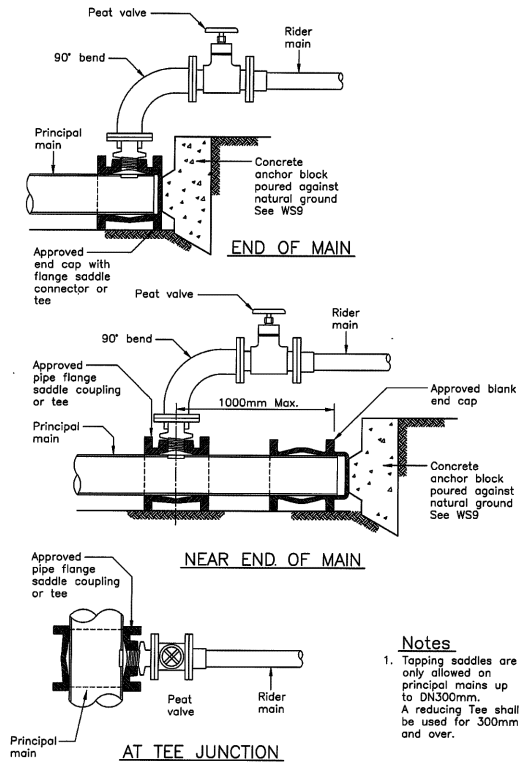
NOTES

- Trench reinstatement within the road reserve shall comply with the Auckland Transport requirements.
- Backfill is to be compacted in 200mm layers to obtain maximum density, as per standard specifications.
- Where concrete or other stabilized layers exist in the roadway, the trench shall be reinstated with similar material or as directed by the roading engineer.
- Minimum cover in carriageway for watermain 900mm. 900mm cover in front 1m of berm and Minimum 600mm in the back of berm.
- Fill shall be clean, Non-contaminated material. Recycled material is not acceptable.
- Pipe bedding shall be compacted to AS/NZS 2566.2 clause 5.6.3 for compaction control.
- Alternative embedment details by specific design for pipe at steep grades, inadequate trench foundation and erosion is not covered by this drawing.



TYPICAL TRENCH REINSTATEMENT AND BEDDING DETAILS

SCALE: N.T.S.
ISSUE DATE: 28-09-2017
DWG No. 2010069.001D



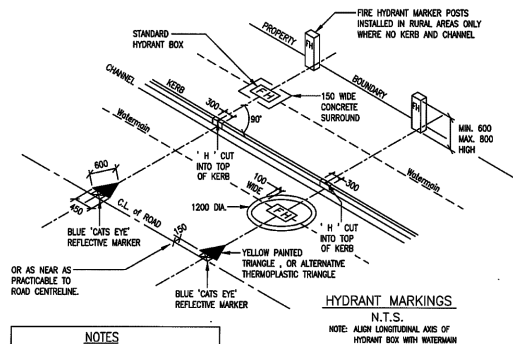
Notes

- Tapping saddles are only allowed on principal mains up to DN300mm. A reducing Tee shall be used for 300mm and over.



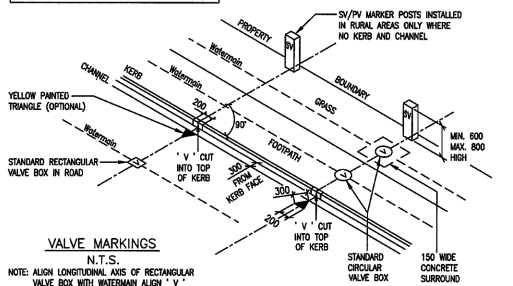
RIDER MAIN ALTERNATIVE CONNECTION

SCALE: N.T.S.
ISSUE DATE: 13-07-2018
DWG No. 2010069.036C
REFERENCE No. WS 5



NOTES

- PAINT USED FOR ALL MARKINGS AND C/D/L LIDS SHALL BE THINST 'ROAD MARKING PAINT' AS FOLLOWS:
- HYDRANTS - YELLOW PROTECTIVE PAINTS LTD. - LANY CODE: 880-403
 - OR - RESCUE KIT-H-1 (ALTERNATIVE OPTION THERMOPLASTIC TRIANGLE)
 - VALVES (P, S, A, V) - WHITE
 - SPECIAL CONTROL VALVES (SHUT) - RED
 - RESIDUE RED CODE - VINYL ETCH ADHESION PRIMER
- NOTE: ALIGN LONGITUDINAL AXIS OF HYDRANT BOX WITH WATERMAIN



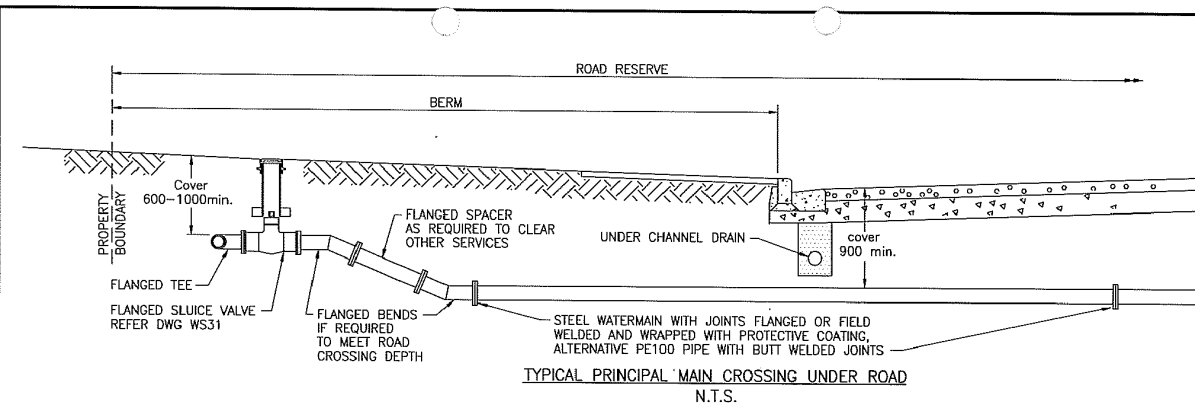
VALVE MARKINGS

NOTE: ALIGN LONGITUDINAL AXIS OF RECTANGULAR VALVE BOX WITH WATERMAIN ALIGN 'V' WITH WATERMAIN AS SHOWN



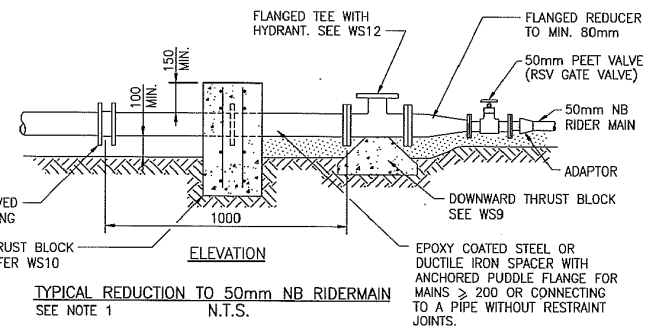
VALVE AND HYDRANT MARKINGS

SCALE: N.T.S.
ISSUE DATE: 10-02-2017
DWG No. 2010069.006B
REFERENCE No. WS 7



TYPICAL PRINCIPAL MAIN CROSSING UNDER ROAD

N.T.S.



TYPICAL REDUCTION TO 50mm NB RIDER MAIN

N.T.S.

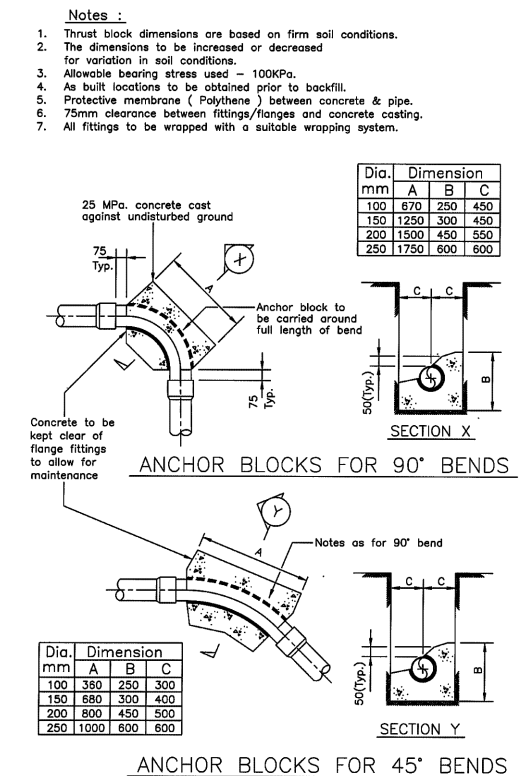
NOTES

- FOR AN ALTERNATIVE RIDER MAIN CONNECTION SEE WS5.
- PIPE AND BENDS TO BE SUPPORTED AN CORROSION PROTECTED.
- ALL SPECIAL FITTINGS INCLUDING TEES AND BENDS TO BE FLANGED DUCTILE IRON OR AN ACCEPTED PROPRIETARY ALTERNATIVE.



ROAD CROSSING DETAILS AND PRINCIPAL MAIN TO RIDER MAIN CONNECTIONS

SCALE: N.T.S.
ISSUE DATE: 13-07-2018
DWG No. 2010069.004C
REFERENCE No. WS 4



ANCHOR BLOCKS FOR 90° BENDS

SECTION X

Notes as for 90° bend

ANCHOR BLOCKS FOR 45° BENDS

SECTION Y



ANCHOR BLOCK DETAILS FOR 90° & 45° BENDS

SCALE: N.T.S.
ISSUE DATE: 10-02-2017
DWG No. 2010069.013B
REFERENCE No. WS 8

Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	CK	16/12/2022

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF

NEIL CONSTRUCTION LIMITED
LAND DEVELOPERS

THE NEIL GROUP LIMITED
LEVEL 3, BUILDING B
8 NUGENT STREET
GRAFTON

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND
TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

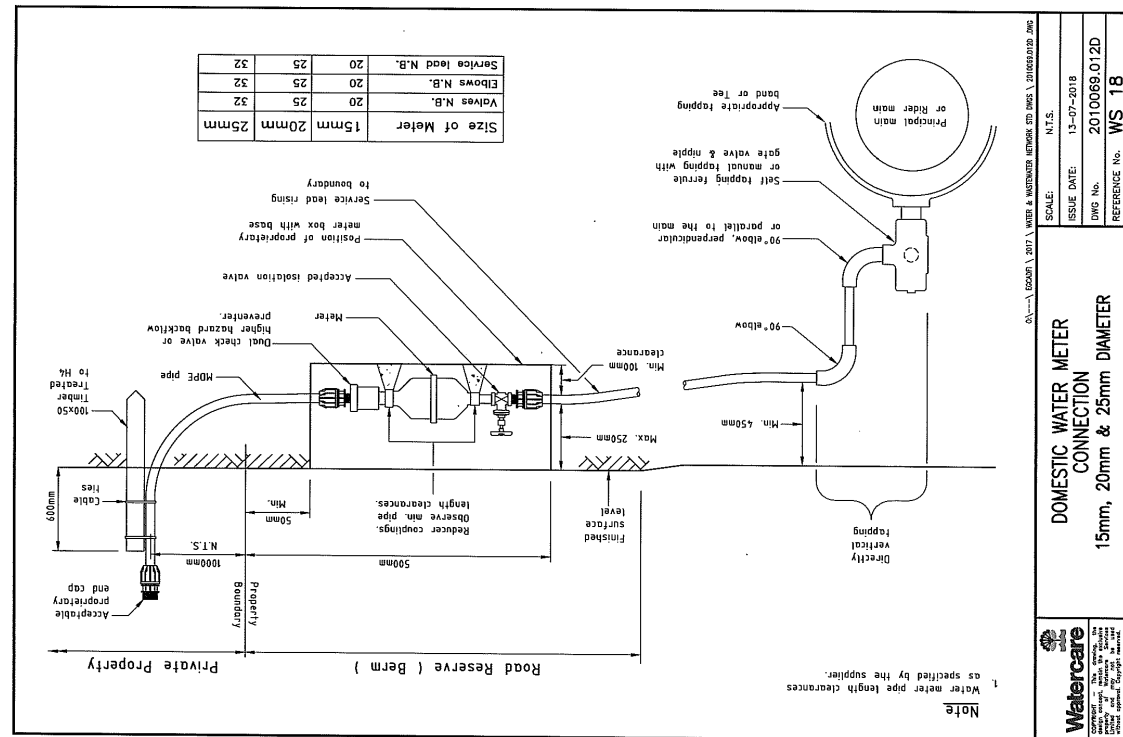
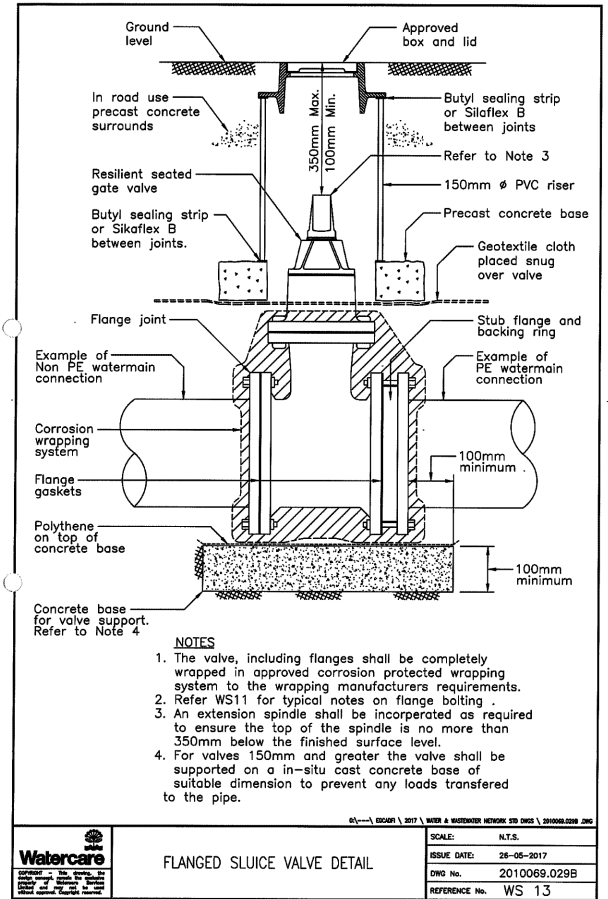
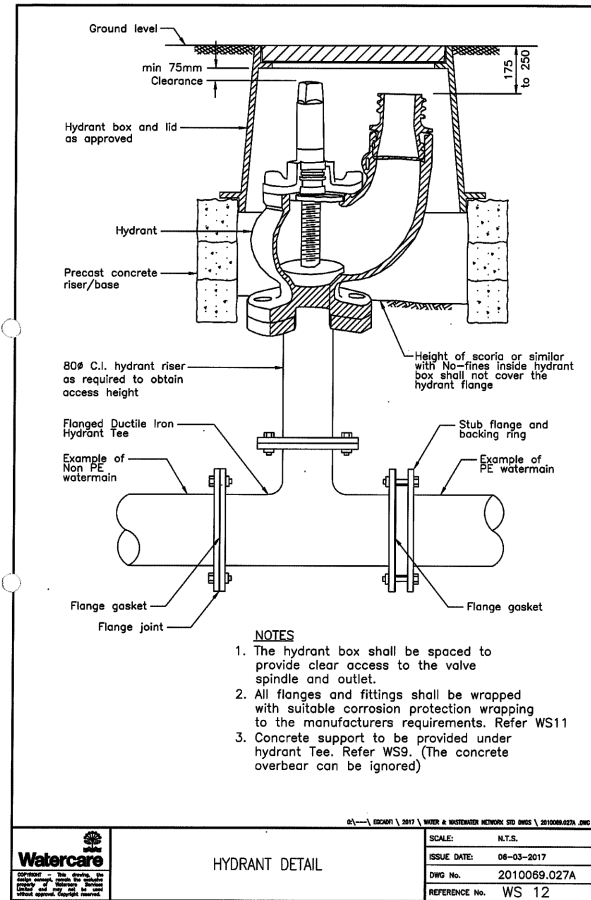
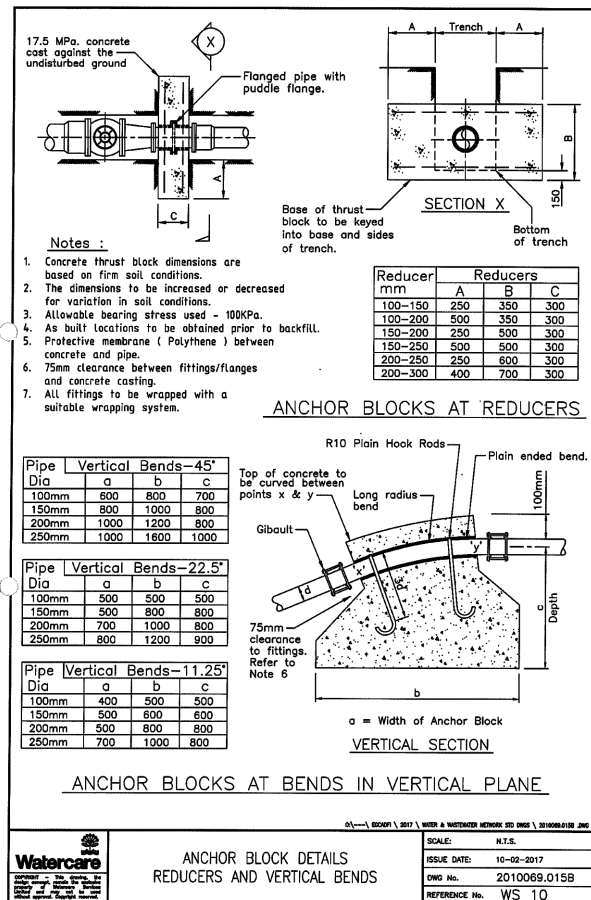
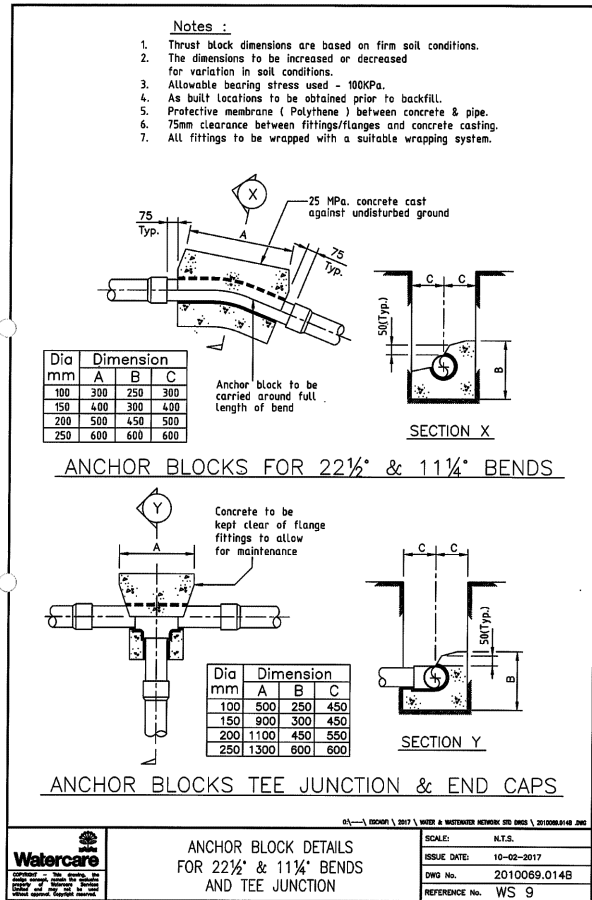
Job Title

WHENUAPAI GREEN
98-102 TOTARA ROAD
WHENUAPAI

Drawing Title

WATER RETICULATION
WATERCARE STD DRAWINGS

By	Date	Scale	Job No.	Rev
Survised: --		N.T.S.	4520	
Designed: --			Drawing No.	
Drawn: KLP	12/2022		4520-01-WS-620	A
Approved: CK				
CAD FILE				



RESOURCE CONSENT

Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	CK	16/12/2022

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF

THE NEIL GROUP

NEIL CONSTRUCTION LIMITED
 LAND DEVELOPERS

THE NEIL GROUP LIMITED
 LEVEL 3, BUILDING B
 8 NUGENT STREET
 GRAFTON

PO BOX 8751, SYMONDS STREET
 AUCKLAND, NEW ZEALAND

TELEPHONE: +64 9 816 5565
 FACSIMILE: +64 9 816 5567
 WEB: www.neilgroup.co.nz

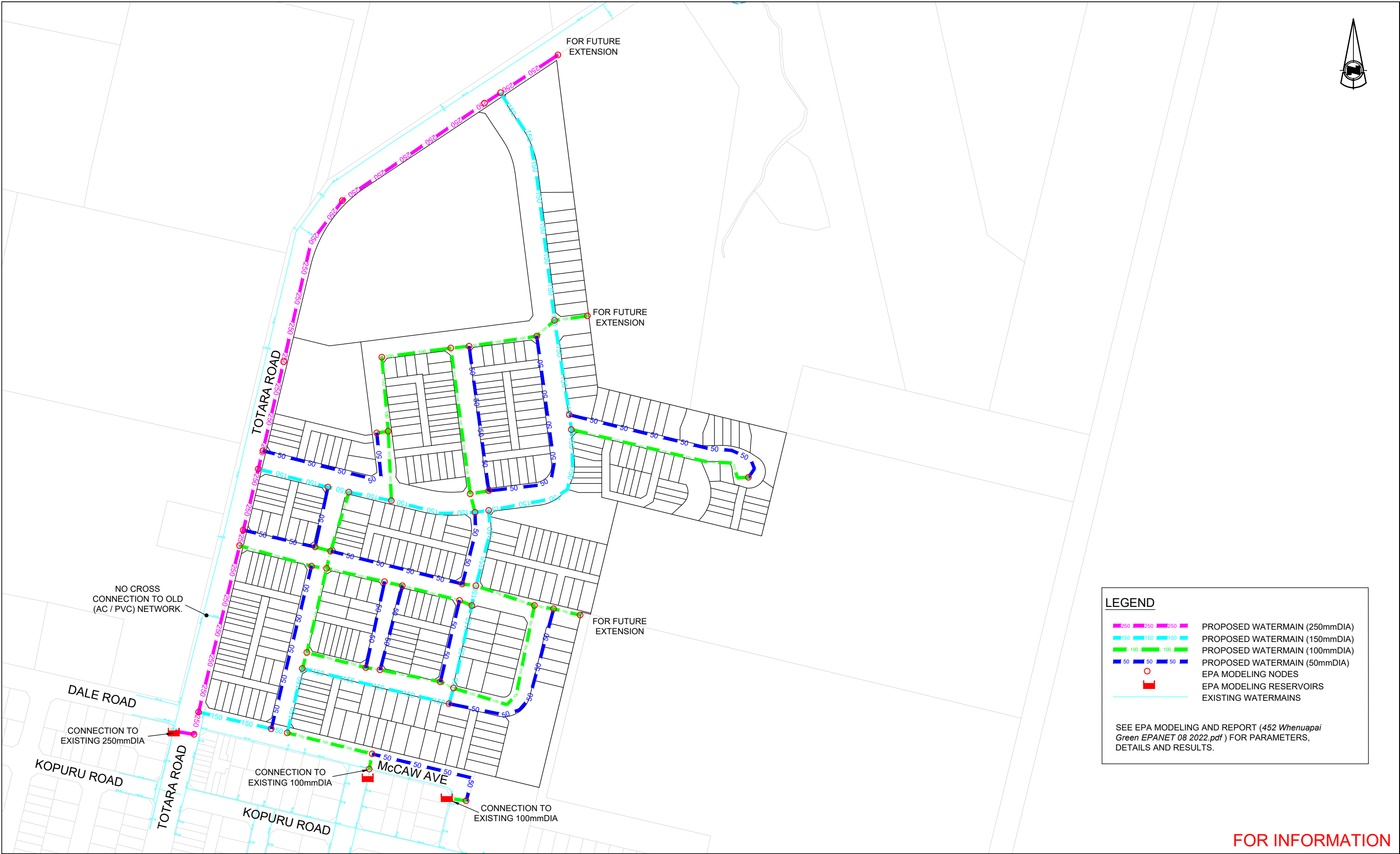
Job Title

**WHENUAPAI GREEN
 98-102 TOTARA ROAD
 WHENUAPAI**

Drawing Title

**WATER RETICULATION
 WATERCARE STD DRAWINGS**

By	Date	Scale	Job No.	Drawing No.	Rev
Surveyed: --		N.T.S.	4520	4520-01-WS-621	A
Designed: --					
Drawn: KLP	12/2022				
Approved: CK					
CAD FILE					



LEGEND

250

250

250

150

150

150

100

100

100

50

50

50

PROPOSED WATERMAIN (250mmDIA)

PROPOSED WATERMAIN (150mmDIA)

PROPOSED WATERMAIN (100mmDIA)

PROPOSED WATERMAIN (50mmDIA)

EPA MODELING NODES

EPA MODELING RESERVOIRS

EXISTING WATERMAINS

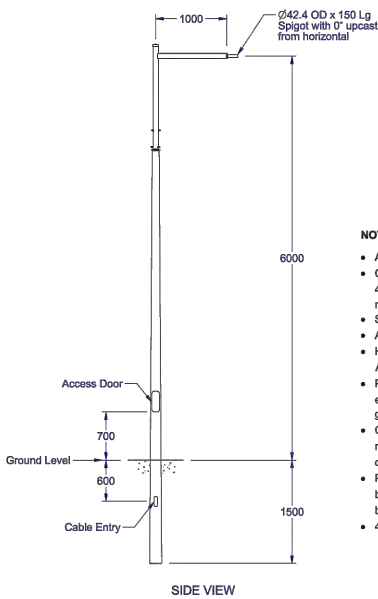
SEE EPA MODELING AND REPORT (452 Whenuapai Green EPANET 08 2022.pdf) FOR PARAMETERS, DETAILS AND RESULTS.

FOR INFORMATION

Rev		Description	By	Date	THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF				Job Title	Drawing Title		By		Date	Scale	Job No.		Rev
					 NEIL CONSTRUCTION LIMITED LAND DEVELOPERS THE NEIL GROUP LIMITED LEVEL 3, BUILDING B 8 NUGENT STREET GRAFTON PO BOX 8751, SYMONDS STREET AUCKLAND, NEW ZEALAND TELEPHONE: +64 9 918 6565 FACSIMILE: +64 9 918 6567 WEB: www.neilgroup.co.nz				WHENUAPAI GREEN		WATERSUPPLY				Drawing No.			
									CONCEPT PHASE		EPANET WATER MODELING							
A		FOR INFORMATIION		07/22													1:3000@A3	
																A		

Advanced Lighting Technologies

1.0m Sgl Madison Outreach (6.0m Mounting Height)



- NOTES:**
- All dimensions shown are in mm.
 - Column design complies with AS/NZS 4676 - AS 1170 & AS 1798 to a minimum 50 year design life.
 - Steel grade 235MPA.
 - All Welding complies to AS/NZS 1554.
 - Hot dip galvanizing conforms to AS/NZS 4680 after fabrication.
 - Paint system (when specified) 2 pot epoxy (DULUX Acrathane IF) marine grade protection ~10 year warranty.
 - Only approved luminaires may be used, no additional attachments can be placed on pole without ADLT NZ approval.
 - Pole mounting types available : Ground base (as shown), Flange base, Shear base.
 - 4 styles of outreaches available.

Manufactured by:
VICPOLE
LIGHTING SOLUTIONS

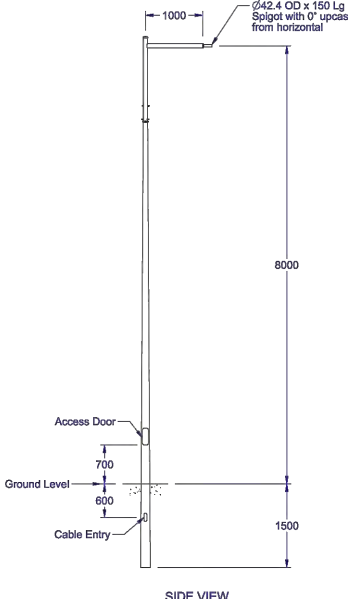
62 Jersey Road
Beyerswater 3153
Australia
Tel: + 61 03 9738 0808
Web: www.vicpole.com.au
Email: sales@vicpole.com.au

For further information:
Advanced
LIGHTING SOLUTIONS

8 Boeing Place
Mount Maunganui
New Zealand
Tel: + 64 07 579 0163
Web: www.adlt.co.nz
Email: light@adlt.co.nz

Advanced Lighting Technologies

1.0m Sgl Madison Outreach (8.0m Mounting Height)



- NOTES:**
- All dimensions shown are in mm.
 - Column design complies with AS/NZS 4676 - AS 1170 & AS 1798 to a minimum 50 year design life.
 - Steel grade 235MPA.
 - All Welding complies to AS/NZS 1554.
 - Hot dip galvanizing conforms to AS/NZS 4680 after fabrication.
 - Paint system (when specified) 2 pot epoxy (DULUX Acrathane IF) marine grade protection ~10 year warranty.
 - Only approved luminaires may be used, no additional attachments can be placed on pole without ADLT NZ approval.
 - Pole mounting types available : Ground base (as shown), Flange base, Shear base.
 - 4 styles of outreaches available.

Manufactured by:
VICPOLE
LIGHTING SOLUTIONS

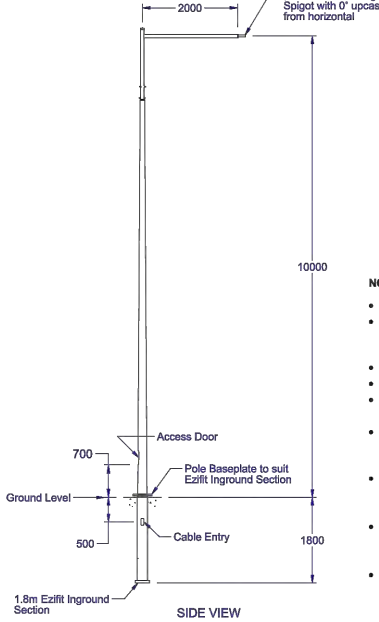
62 Jersey Road
Beyerswater 3153
Australia
Tel: + 61 03 9738 0808
Web: www.vicpole.com.au
Email: sales@vicpole.com.au

For further information:
Advanced
LIGHTING SOLUTIONS

8 Boeing Place
Mount Maunganui
New Zealand
Tel: + 64 07 579 0163
Web: www.adlt.co.nz
Email: light@adlt.co.nz

Advanced Lighting Technologies

2.0m Sgl Madison Outreach (10.0m Mounting Height)



- NOTES:**
- All dimensions shown are in mm.
 - Column design complies with AS/NZS 4676 - AS 1170 & AS 1798 to a minimum 50 year design life.
 - Steel grade 235MPA.
 - All Welding complies to AS/NZS 1554.
 - Hot dip galvanizing conforms to AS/NZS 4680 after fabrication.
 - Paint system (when specified) 2 pot epoxy (DULUX Acrathane IF) marine grade protection ~10 year warranty.
 - Only approved luminaires may be used, no additional attachments can be placed on pole without ADLT NZ approval.
 - Pole mounting types available : Ground base (as shown), Flange base, Shear base.
 - 4 styles of outreaches available.

Manufactured by:
VICPOLE
LIGHTING SOLUTIONS

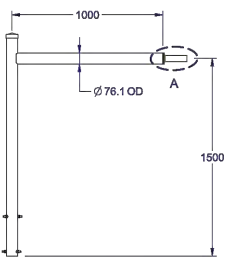
62 Jersey Road
Beyerswater 3153
Australia
Tel: + 61 03 9738 0808
Web: www.vicpole.com.au
Email: sales@vicpole.com.au

For further information:
Advanced
LIGHTING SOLUTIONS

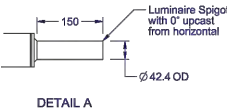
8 Boeing Place
Mount Maunganui
New Zealand
Tel: + 64 07 579 0163
Web: www.adlt.co.nz
Email: light@adlt.co.nz

Advanced Lighting Technologies

1.0m Sgl Madison Outreach



- NOTES:**
- All dimensions shown are in mm.
 - Column design complies with AS/NZS 4676 - AS 1170 & AS 1798.
 - Steel grade 235MPA.
 - All Welding complies to AS/NZS 1554.
 - Hot dip galvanizing conforms to AS/NZS 4680 after fabrication.
 - Paint system (when specified) 2 pot epoxy (DULUX Acrathane IF) marine grade protection ~10 year warranty.
 - Only approved luminaires may be used, no additional attachments can be placed on pole without ADLT NZ approval.



Manufactured by:
VICPOLE
LIGHTING SOLUTIONS

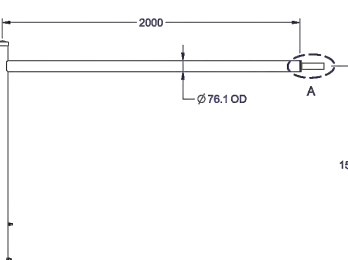
62 Jersey Road
Beyerswater 3153
Australia
Tel: + 61 03 9738 0808
Web: www.vicpole.com.au
Email: sales@vicpole.com.au

For further information:
Advanced
LIGHTING SOLUTIONS

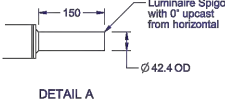
8 Boeing Place
Mount Maunganui
New Zealand
Tel: + 64 07 579 0163
Web: www.adlt.co.nz
Email: light@adlt.co.nz

Advanced Lighting Technologies

2.0m Sgl Madison Outreach



- NOTES:**
- All dimensions shown are in mm.
 - Column design complies with AS/NZS 4676 - AS 1170 & AS 1798.
 - Steel grade 235MPA.
 - All Welding complies to AS/NZS 1554.
 - Hot dip galvanizing conforms to AS/NZS 4680 after fabrication.
 - Paint system (when specified) 2 pot epoxy (DULUX Acrathane IF) marine grade protection ~10 year warranty.
 - Only approved luminaires may be used, no additional attachments can be placed on pole without ADLT NZ approval.



Manufactured by:
VICPOLE
LIGHTING SOLUTIONS

62 Jersey Road
Beyerswater 3153
Australia
Tel: + 61 03 9738 0808
Web: www.vicpole.com.au
Email: sales@vicpole.com.au

For further information:
Advanced
LIGHTING SOLUTIONS

8 Boeing Place
Mount Maunganui
New Zealand
Tel: + 64 07 579 0163
Web: www.adlt.co.nz
Email: light@adlt.co.nz

STREET LIGHT POLES, LUMINAIRES,
LOCATION AND DETAILS TO BE CONFIRMED
WITH FINAL LIGHTING DESIGN PRIOR TO
INSTALLATION.

COLOUR - BLACK

RESOURCE CONSENT

Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	CK	12/22

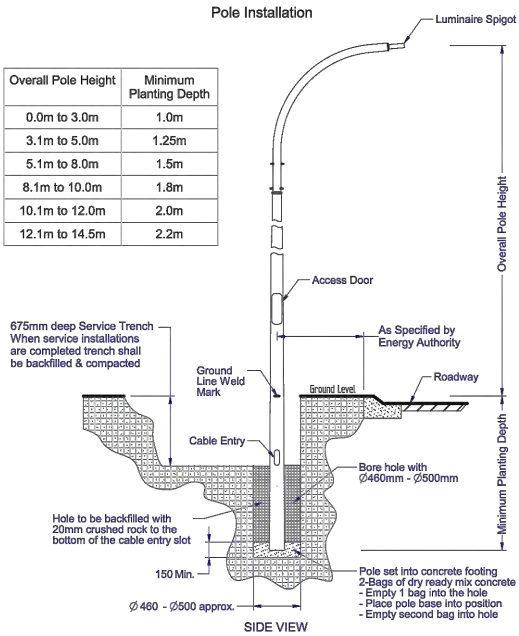
THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF	
THE NEIL GROUP	
NEIL CONSTRUCTION LIMITED LAND DEVELOPERS	
THE NEIL GROUP LIMITED LEVEL 3, BUILDING B 8 NUGENT STREET GRAFTON	PO BOX 8751, SYMONDS STREET AUCKLAND, NEW ZEALAND TELEPHONE: +64 9 918 6565 FACSIMILE: +64 9 918 6567 WEB: www.neilgroup.co.nz

Job Title
WHENUAPAI GREEN 98-102 TOTARA ROAD WHENUAPAI

Drawing Title
LANDSCAPING STREET LIGHT DETAILS

	By	Date	Scale	Job No.	4520	Rev
Surveyed:	-			Drawing No.		
Designed:	CK			4520-01-LS-720		A
Drawn:	CK	05/22				
Approved:	CK					
CAD FILE						

Advanced Lighting Technologies



Manufactured by:

82 Jersey Road
Bayswater 3153
Australia
Tel: + 61 03 9738 0808
Web: www.vicpole.com.au
Email: sales@vicpole.com.au

For further information:

8 Boeing Place
Mount Maunganui
New Zealand
Tel: + 64 07 579 0163
Web: www.adlt.co.nz
Email: lgr@adlt.co.nz



Handling & Storage of Poles

For Steel / Aluminum Poles

Handling:

The purchaser / installer must ensure the proper handling of the product at the construction site to ensure a damage-free product when installation is complete. Care needs to be taken to ensure the integrity of the product finish. Damage to the finish such as scratches, gouges and marred areas will reduce or eliminate the corrosive resistance of protective coatings. Direct metal to metal contact, such as choking a galvanized or painted pole with metal chains, will cause damage to the finish. Protective materials such as nylon slings or cloth sleeves for chains should be utilized during handling to prevent damage to the finish. Do not utilize any bolt hole opening in either a base plate or simplex plate for lifting or handling any products, as this will cause damage to the finish. The proper repair of any damage or deterioration to the product finish during handling and installation at the construction site shall be the installer's responsibility.

Storage:

The product should be stored in a clean, dry and well ventilated area. Wrapping material should be removed, particularly if poles are to be stored for extended periods of time prior to installation. The product must be stacked in an orderly manner on spacers that raise the product off the ground and above any vegetation. Spacers should also be used while stacking the product to keep individual pieces separated from each other so that air can freely access all surfaces of the product. Stacked product should be inclined so that moisture can drain out. See Figure 1 for an illustration of incorrect and correct stacking of product. Resinous wood must NOT be used for spacers or packing, since the resin itself can damage any finish. Use wood material that is dry and untreated (NO CHEMICALS) when transporting and storing all products.

Incorrect & Correct Stacking of Product

1

Advanced Lighting Technologies Australia Inc
Advanced Lighting Technologies New Zealand Ltd
Advanced Lighting Technologies Asia Pte Ltd

110 Lewis Road, Wertheim South, VIC 3052
8 Boeing Place, Mount Maunganui
Block 4006, Ang Mo Kio Avenue 10, #04-06, Techplace 1

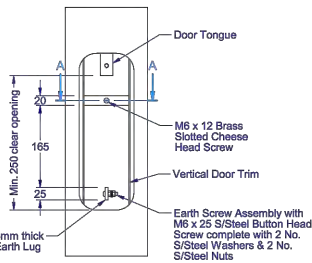
Australia
New Zealand
Singapore

61 03 9800 5800
64 07 579 0283
65 6844 2338

www.adlt.com.au
www.adlt.co.nz
www.adlt.com.sg

Advanced Lighting Technologies

Typical Door Detail



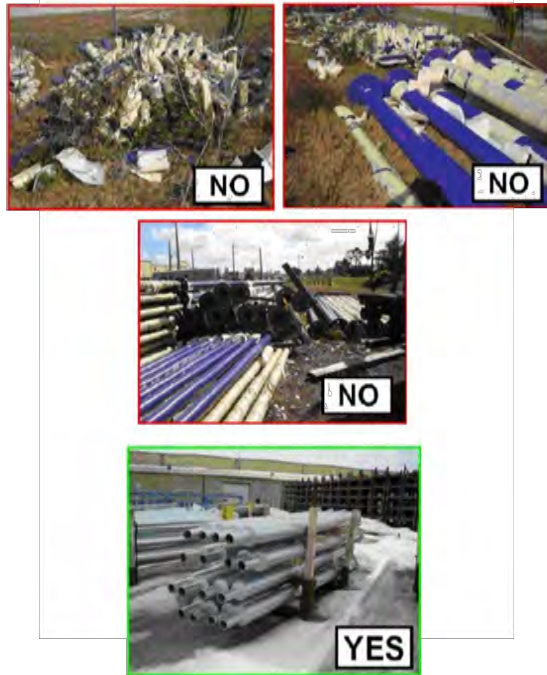
Column Type	Clear Door Opening	Max. Gear Width	Max. Gear Depth
4.5m Tapered Round Igm (6.0m Mounting Height)	85	75	80
6.5m Tapered Round Igm (8.0m Mounting Height)	85	75	80
8.5m Tapered Round Igm (10.0m Mounting Height)	100	90	100
10.5m Tapered Round Ezifit (12.0m Mounting Height)	100	90	120

Manufactured by:

82 Jersey Road
Bayswater 3153
Australia
Tel: + 61 03 9738 0808
Web: www.vicpole.com.au
Email: sales@vicpole.com.au

For further information:

8 Boeing Place
Mount Maunganui
New Zealand
Tel: + 64 07 579 0163
Web: www.adlt.co.nz
Email: lgr@adlt.co.nz



2

Advanced Lighting Technologies Australia Inc
Advanced Lighting Technologies New Zealand Ltd
Advanced Lighting Technologies Asia Pte Ltd

110 Lewis Road, Wertheim South, VIC 3052
8 Boeing Place, Mount Maunganui
Block 4006, Ang Mo Kio Avenue 10, #04-06, Techplace 1

Australia
New Zealand
Singapore

61 03 9800 5800
64 07 579 0283
65 6844 2338

www.adlt.com.au
www.adlt.co.nz
www.adlt.com.sg

RESOURCE CONSENT

Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	CK	12/22

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF

NEIL CONSTRUCTION LIMITED
LAND DEVELOPERS

THE NEIL GROUP LIMITED
LEVEL 3, BUILDING B
8 NUGENT STREET
GRAFTON

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND

TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

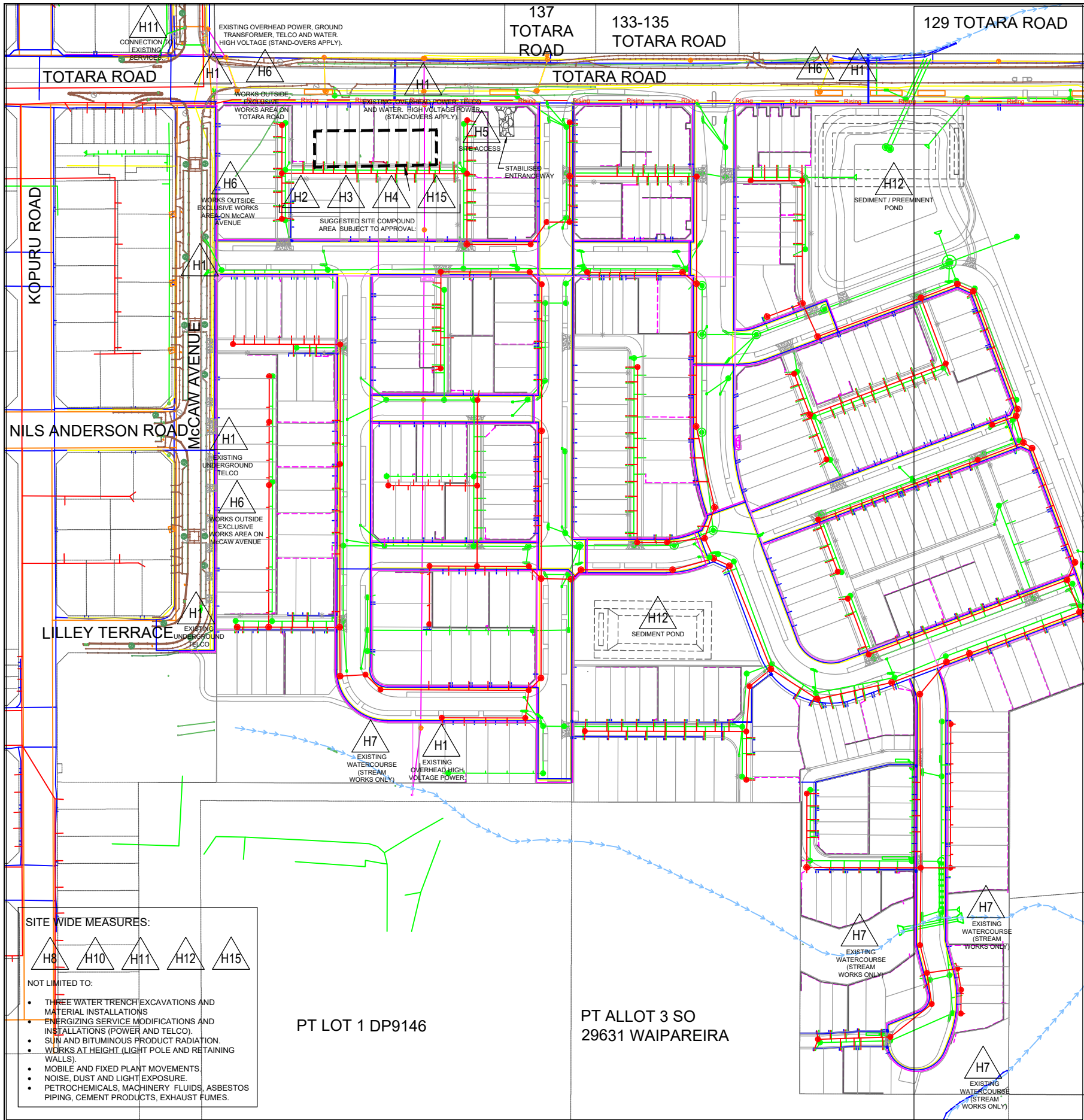
Job Title

WHENUAPAI GREEN
98-102 TOTARA ROAD
WHENUAPAI

Drawing Title

LANDSCAPING
STREET LIGHT DETAILS

	By	Date	Scale	Job No.	Drawing No.	Rev
Surveyed:	-		-	4520	4520-01-LS-721	A
Designed:	CK					
Drawn:	CK	05/22				
Approved:	CK					
CAD FILE						



HEALTH AND SAFETY NOTES:

Before commencing work or allowing works to be undertaken onsite, the Contractor must have and provide:

- A Site Specific Health and Safety Plan which includes consideration of the hazards identified on this plan and any other potential hazards.
- Contractors Company Health & Safety policies, procedures and record form.
- Read, understood and signed the Neil Group Ltd's Contractor Health and Safety Handbook.
- Read, completed and signed the Neil Group Ltd Health & Safety Questionnaire (form 024)
- Read and understood Authority Consents, Contract Documents, Contract drawings and Specifications.
- Certificate of Currency of the following insurances: Public Liability, Professional Indemnity, Motor Vehicle Liability, Contractors Plant, at the sums specified in the contract documents.
- Induct Separate Sub-Contractors to the site and provide confirmation in writing of induction.
- All required contractor initiated consents. (Not limited to: Workspace Confined space approval, Approval CAR, Approved Watercare Entry Permits)

The design and specification of works has been carried out to minimise health and safety risks during construction activities. Should the Contractor consider that the design introduces unnecessary risks during construction, they shall notify the Engineer or Principal of their concerns.

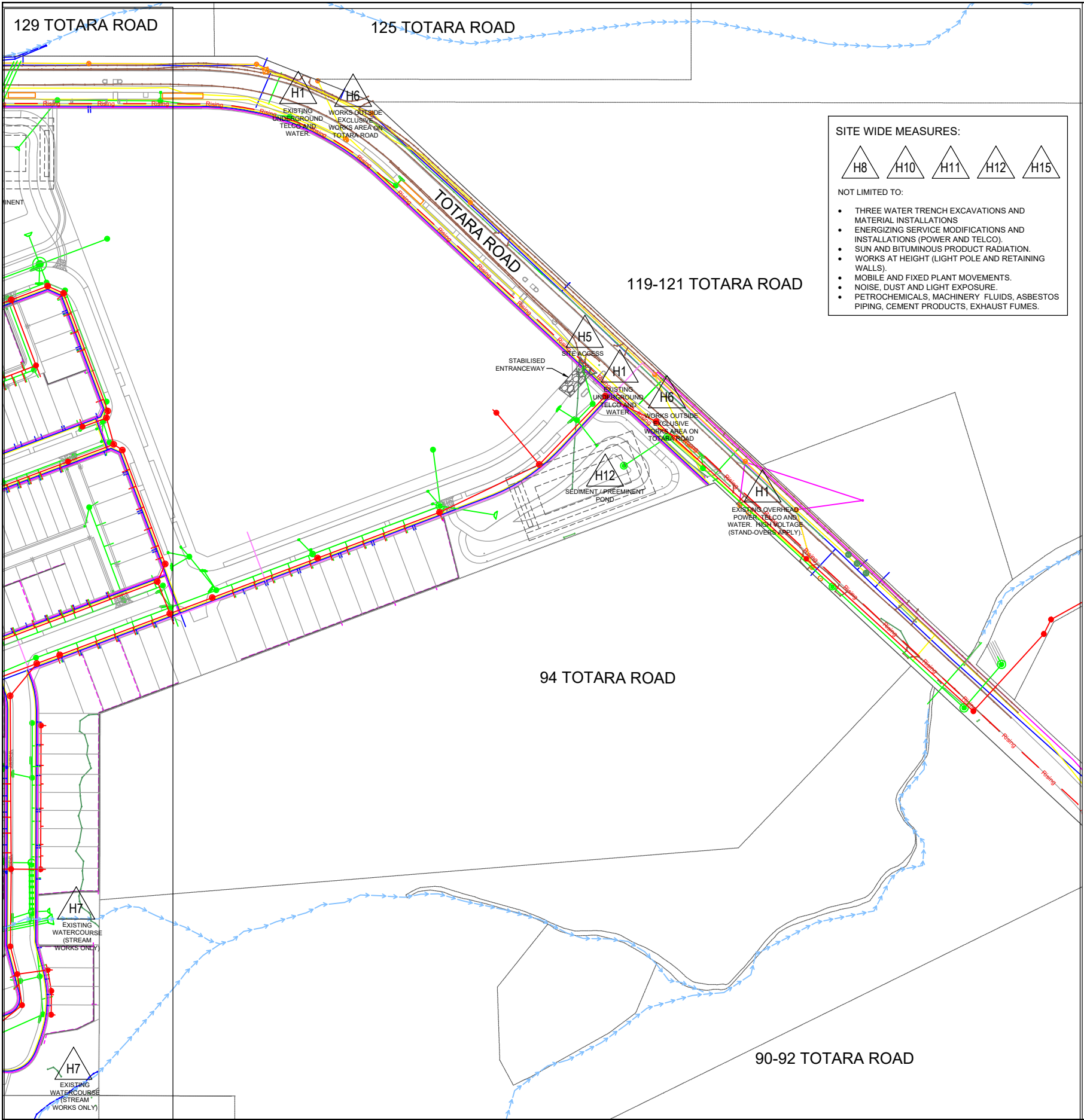
The Contractor should also suggest alternatives or alterations to the design which would result in safer work practices

HEALTH AND SAFETY PROTECTION

H1 EXISTING UNDERGROUND / OVERHEAD SERVICES SHOWN ON PLAN ✓ CONTRACTOR TO CONDUCT 'BYD' INQUIRY AND NOTIFY ALL AUTHORITIES TO LOCATE EXISTING SERVICES.	H2 SITE INDUCTIONS EMPLOYEES / SUBCONTRACTORS & VISITORS SHOWN ON PLAN ✓ CONTRACTOR TO PROVIDE COMPLYING UP TO DATE HAZARD BOARD AND UNDERTAKE INDUCTIONS.
H3 EMERGENCY PROCEDURES SHOWN ON PLAN ✓ CONTRACTOR TO RETAIN COMPLYING EMERGENCY PROCEDURES ONSITE.	H4 ACCIDENT REPORTING SHOWN ON PLAN ✓ CONTRACTOR TO PROVIDE AND RETAIN ONSITE ACCIDENT REPORTING PROCEDURES AND RECORDS
H5 TRAFFIC MANAGEMENT SHOWN ON PLAN ✓ CONTRACTOR TO OBTAIN, PROVIDE AND MAINTAIN TRAFFIC MANAGEMENT AS PER CONSENTS AND BEST PRACTICES	H6 PUBLIC INTERFACE SHOWN ON PLAN ✓ CONTRACTOR TO MANAGE PUBLIC INTERFACE AND ENSURE NO UNAUTHORISED PUBLIC ACCESS TO SITE.
H7 RESTRICTED AREAS SHOWN ON PLAN ✓ NO ACCESS WITHOUT PRIOR APPROVAL	H8 DUST & NOISE CONTROL SHOWN ON PLAN ✓ CONTROLS AS PER CONSENTS AND BEST PRACTICES.
H9 MANAGEMENT OF CONTAMINATED MATERIALS SHOWN ON PLAN ✗ CONTROLS AS PER CONSENTS AND BEST PRACTICES.	H10 OPERATING PLANT / MACHINERY SHOWN ON PLAN ✓ CONTROLS AS PER CONSENTS AND BEST PRACTICES.
H11 EXCAVATIONS, CONFINED SPACES & VOIDS SHOWN ON PLAN ✓ CONTROLS AS PER CONSENTS AND BEST PRACTICES.	H12 PONDS / WATER HAZARDS SHOWN ON PLAN ✓ CONTROLS AS PER CONSENTS AND BEST PRACTICES.
H14 OTHER HAZARDS SHOWN ON PLAN ✗ IDENTIFIED ON PLANS IF APPLICABLE	H15 HAZARDOUS CHEMICAL STORAGE AND HANDLING SHOWN ON PLAN ✓ CONTROLS AS PER CONSENTS AND BEST PRACTICES.

FOR RESOURCES, GUIDES AND NEWS VISIT:
www.worksafe.govt.nz
www.construction.worksafe.govt.nz
WORKSAFE: PH 0800 030 040

Rev	Description	By	Date	THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF				Job Title	Drawing Title	By	Date	Scale	Job No.	Drawing No.	Rev	
				 THE NEIL GROUP LIMITED LEVEL 3, BUILDING B 8 NUGENT STREET GRAFTON PO BOX 8751, SYMONDS STREET AUCKLAND, NEW ZEALAND TELEPHONE: +64 9 918 6565 FACSIMILE: +64 9 918 6567 WEB: www.neilgroup.co.nz				WHENUAPAI GREEN 98-102 TOTARA ROAD WHENUAPAI	HEALTH AND SAFETY MANAGEMENT PLAN (CONTRACT PRINCIPAL PROVIDED)	GP	KLP	11/2022	1:2000@A3	4520	4520-01-HS-1000	A
A	ISSUED FOR RESOURCE CONSENT	CK	12/2022													



SITE WIDE MEASURES:

H8 H10 H11 H12 H15

NOT LIMITED TO:

- THREE WATER TRENCH EXCAVATIONS AND MATERIAL INSTALLATIONS
- ENERGIZING SERVICE MODIFICATIONS AND INSTALLATIONS (POWER AND TELCO).
- SUN AND BITUMINOUS PRODUCT RADIATION.
- WORKS AT HEIGHT (LIGHT POLE AND RETAINING WALLS).
- MOBILE AND FIXED PLANT MOVEMENTS.
- NOISE, DUST AND LIGHT EXPOSURE.
- PETROCHEMICALS, MACHINERY FLUIDS, ASBESTOS PIPING, CEMENT PRODUCTS, EXHAUST FUMES.

HEALTH AND SAFETY NOTES:

Before commencing work or allowing works to be undertaken onsite, the Contractor must have and provide:

- A Site Specific Health and Safety Plan which includes consideration of the hazards identified on this plan and any other potential hazards.
- Contractors Company Health & Safety policies, procedures and record form.
- Read, understood and signed the Neil Group Ltd's Contractor Health and Safety Handbook.
- Read, completed and signed the Neil Group Ltd Health & Safety Questionnaire (form 024)
- Read and understood Authority Consents, Contract Documents, Contract drawings and Specifications.
- Certificate of Currency of the following insurances: Public Liability, Professional Indemnity, Motor Vehicle Liability, Contractors Plant, at the sums specified in the contract documents.
- Induct Separate Sub-Contractors to the site and provide confirmation in writing of induction.
- All required contractor initiated consents. (Not limited to: Workspace Confined space approval, Approval CAR, Approved Watercare Entry Permits)

The design and specification of works has been carried out to minimise health and safety risks during construction activities. Should the Contractor consider that the design introduces unnecessary risks during construction, they shall notify the Engineer or Principal of their concerns.

The Contractor should also suggest alternatives or alterations to the design which would result in safer work practices

LEGEND:

STORMWATER
WASTEWATER
POSSIBLE RISING MAIN
WATER SUPPLY
TELCO
POWER
EXISTING WATERCOURSE

SEE DESIGN PLANS FOR OTHER SERVICE / ITEM SYMBOL DESCRIPTIONS AND LEGENDS

HEALTH AND SAFETY PROTECTION

H1 EXISTING UNDERGROUND / OVERHEAD SERVICES SHOWN ON PLAN ✓ CONTRACTOR TO CONDUCT 'BYD' INQUIRY AND NOTIFY ALL AUTHORITIES TO LOCATE EXISTING SERVICES.	H2 SITE INDUCTIONS EMPLOYEES / SUBCONTRACTORS & VISITORS SHOWN ON PLAN ✓ CONTRACTOR TO PROVIDE COMPLYING UP TO DATE HAZARD BOARD AND UNDERTAKE INDUCTIONS.
H3 EMERGENCY PROCEDURES SHOWN ON PLAN ✓ CONTRACTOR TO RETAIN COMPLYING EMERGENCY PROCEDURES ONSITE.	H4 ACCIDENT REPORTING SHOWN ON PLAN ✓ CONTRACTOR TO PROVIDE AND RETAIN ONSITE ACCIDENT REPORTING PROCEDURES AND RECORDS
H5 TRAFFIC MANAGEMENT SHOWN ON PLAN ✓ CONTRACTOR TO OBTAIN, PROVIDE AND MAINTAIN TRAFFIC MANAGEMENT AS PER CONSENTS AND BEST PRACTICES	H6 PUBLIC INTERFACE SHOWN ON PLAN ✓ CONTRACTOR TO MANAGE PUBLIC INTERFACE AND ENSURE NO UNAUTHORISED PUBLIC ACCESS TO SITE.
H7 RESTRICTED AREAS SHOWN ON PLAN ✓ NO ACCESS WITHOUT PRIOR APPROVAL	H8 DUST & NOISE CONTROL SHOWN ON PLAN ✓ CONTROLS AS PER CONSENTS AND BEST PRACTICES.
H9 MANAGEMENT OF CONTAMINATED MATERIALS SHOWN ON PLAN ✗ CONTROLS AS PER CONSENTS AND BEST PRACTICES.	H10 OPERATING PLANT / MACHINERY SHOWN ON PLAN ✓ CONTROLS AS PER CONSENTS AND BEST PRACTICES.
H11 EXCAVATIONS, CONFINED SPACES & VOIDS SHOWN ON PLAN ✓ CONTROLS AS PER CONSENTS AND BEST PRACTICES.	H12 PONDS / WATER HAZARDS SHOWN ON PLAN ✓ CONTROLS AS PER CONSENTS AND BEST PRACTICES.
H14 OTHER HAZARDS SHOWN ON PLAN ✗ IDENTIFIED ON PLANS IF APPLICABLE	H15 HAZARDOUS CHEMICAL STORAGE AND HANDLING SHOWN ON PLAN ✓ CONTROLS AS PER CONSENTS AND BEST PRACTICES.



FOR RESOURCES, GUIDES AND NEWS VISIT:
www.worksafe.govt.nz
www.construction.worksafe.govt.nz
WORKSAFE: PH 0800 030 040

RESOURCE CONSENT

Rev	Description	By	Date
A	ISSUED FOR RESOURCE CONSENT	CK	12/2022

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF

THE NEIL GROUP

NEIL CONSTRUCTION LIMITED
LAND DEVELOPERS

THE NEIL GROUP LIMITED
LEVEL 3, BUILDING B
8 NUGENT STREET
GRAFTON

PO BOX 8751, SYMONDS STREET
AUCKLAND, NEW ZEALAND

TELEPHONE: +64 9 918 6565
FACSIMILE: +64 9 918 6567
WEB: www.neilgroup.co.nz

Job Title

WHENUAPAI GREEN
98-102 TOTARA ROAD
WHENUAPAI

Drawing Title

HEALTH AND SAFETY
MANAGEMENT PLAN
(CONTRACT PRINCIPAL PROVIDED)

	By	Date	Scale	Job No.	Drawing No.	Rev
Surveyed:	GP		1:2000@A3	4520	4520-01-HS-1001	A
Designed:	KLP					
Drawn:	KLP	11/2022				
Approved:	CK					
CAD FILE						