

From: "Liam" <liam@bsk.co.nz>
Sent: Wed, 26 Jul 2023 10:04:18 +1200
To: "RLC Building Services" <buildingadmin@rotorualc.nz>
Subject: RE: Permitted Boundary Application - 170 Kawaha Point Road
Attachments: 24493 - Building Consent.pdf
Categories: TRIM save docs and RFS (RDC-1007013)

Hi there,

Building consent application for this same job is attached.

Thanks,
Liam Kelly
Geotechnical Engineer
BE Civil (Hons), MEngNZ

Telephone 07 348 5394
314 Malfroy Road
PO Box 23 Rotorua 3040
www.bsk.co.nz



Consulting Engineers

From: [Liam](#)
Sent: Tuesday, 18 July 2023 10:50 am
To: [Building Admin](#)
Subject: Permitted Boundary Application - 170 Kawaha Point Road

Hi there,

We are submitting a permitted boundary application for the above address. Documentation is attached.
Building consent application to follow.

Thank you,
Liam Kelly
Geotechnical Engineer
BE Civil (Hons), MEngNZ

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PO Box 23 Rotorua 3040
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Consulting Engineers

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Nick Tompkins
Retaining Wall Replacement
170 Kawaha Point Road
Geotechnical Statement for Retaining Wall Design



Statement Prepared by:
Liam Kelly
BE (Hons)

Reviewed by:
Ash Bowtell
MSc, BSc, CPEng, CMEngNZ

BSK REF: 24493
22 September 2022

Contact Details

Name Liam Kelly
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 Westbrook
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Document Details

Reference 24493
Status Issue
Date 22 September 2022

Document History

Revision	Date	Author	Detail

EXECUTIVE SUMMARY

Nick Tompkins is proposing to replace an existing retaining wall at 170 Kawaha Point Road. The existing wall is of block construction and has failed. It is proposed to replace it with a timber pole retaining wall, 2.0m in height. The wall is surcharged by a driveway on the upper level.

Our scope of works includes:

Ground Investigation	2x hand augers with associated scala penetrometer tests
Assessment and design	Deflection based retaining wall design
Report	Geotechnical Statement
Drawings	Site Location Plan Cross Sections

1 GROUND INVESTIGATIONS

Site investigations were undertaken on the 01st of September 2022 by BSK. These investigations consisted of the following:

- Two hand augers with associated Scala penetrometers,

The test locations are presented on the test location plan in Appendix A, with the test results presented in Appendix B.

2 RETAINING WALL DESIGN

2.1 Design Philosophy

Our design philosophy for the design of the timber wall is based on the following:

- Limiting deflection at the top of the wall;
- Allowing the wall to undergo limited permanent deformation during an ultimate limit state (ULS) seismic event;
- All aspects to remain sufficiently robust and ductile to accommodate the calculated permanent displacements.
- Pole centre to centre spacing based on three times the diameter of the bored hole filled with concrete. This is because soil arching between the posts will enable the posts to act as a near continuous structure both for passive resisting loads in front of the wall and active loads applied behind the wall.

2.2 Design Standards & Guidelines

We have utilized the following standards and design guidelines during the detailed design of the timber wall remediation option:

- NZ Transport Agency Bridge Manual SP/M/022, Third Edition, October 2018.
- NZS 1170.0:2002. Australia/New Zealand Standard, Structural Design Actions, Part 0: General Principals. Standards New Zealand, Wellington, New Zealand.
- NZS 1170.5:2002. Australia/New Zealand Standard, Structural Design Actions, Part 5: Earthquake Actions - New Zealand. Standards New Zealand, Wellington, New Zealand.
- MBIE / NZGS (2021). Earthquake geotechnical engineering practice. Module 1: Overview of the guidelines. NZ Geotechnical Society Inc., Wellington, New Zealand. (Module 1)
- MBIE / NZGS (2021). Earthquake Engineering Geotechnical Practice. Module 6: Earthquake resistant retaining wall design. NZ Geotechnical Society Inc., Wellington, New Zealand. (Module 6)

- Eurocode EN1997-1. Eurocode 7: Geotechnical design - Part 1: General rules. EUROPEAN COMMITTEE FOR STANDARDIZATION COMITE EUROPEEN DE NORMALISATION.

2.3 WALLAP Software Design

The design of the timber wall has been undertaken using the 2D retaining wall modelling software WALLAP. The subgrade reaction models for the static and seismic analyses respectively were used to calculate the maximum bending moments, shear forces, displacements of the proposed timber wall. The WALLAP results and calculations are presented within Appendix C. Other design assumptions that have been incorporated into our design are as follows:

- Maximum exposed retained height = 2.0m;
- Angle of toe slope = 0°
- Angle of upslope = 0°
- Design calculations assume effective conditions behind the wall;
- Wall friction of $2/3\phi$ is assumed to develop on the active soil-wall interface;
- A 5kPa traffic load is applied directly behind the wall in the static case.
- Traffic load below the wall has not been applied;
- Wall modelled with a 3 degree lean back into the slope which is beyond the capability of the software, however the raking adds greater capacity to the overall design, therefore the design may be slightly more conservative.
- We have adopted the ULS design load cases as per Module 6 as we consider this recent approach is more relevant to the design of retaining structures and in some respects is considered conservative. This includes the live load of the traffic. This live load has been reduced by $2/3$ for the seismic case.
- The pole centre to centre spacing is based on keeping the post holes at or within three times the hole diameter. This is to ensure the wall acts as a single structural member using principals of soil arching between the posts to generate a continuous passive resistance, as per the New Zealand Building Code, B1/VM4 for lateral pile loads and spacing.

2.3.1 Analysis Staging

The following sequence in Table 3 has been used to assess the various actions on the wall.

Stage	Action
1	Fill to 2.0m behind wall
2	Apply traffic load of 5kPa and analyse
3	Remove 5kPa traffic load
4	Reset displacements
5	Apply 1/3 of 5kPa traffic load to apply during seismic loading
6	Apply seismic acceleration as pseudo-dynamic loading

Table 1: Sequence of Construction and Loading

The results of our design calculations are summarised below in Table 4. This is for the greatest retained height. Checks on the bending and shear capacity are provided in Appendix C1.

Stage	Displacement (mm)	FoS on Embedment	Largest Bending Moments kN.m/m	Largest Shear Forces (kN/m)
3	77	1.665	13.4	9.4
6	18	1.385	16.0	14.5

Table 2: WALLAP Analyses Output Summary (unfactored)

2.3.2 Design Summary

The design summary for the proposed timber wall is presented within Table 5 below. The products listed have a 50-year design life as long as correct construction tolerances are adhered to.

Wall Details	Wall Summary
Approximate wall length	Approximately 20m
Pole spacing c/c	1.2m
Max designed retained height	2.0m
Timber pole small end diameter (SED)	250mm
Minimum pole length	5.5m

Pole auger hole diameter	450mm
Moment of Inertia per unit Length	$1.598 \times 10^{-4} \text{ m}^4 \text{ per linear m}$
Timber Young's Modulus	$7.852 \times 10^6 \text{ kN/m}^2$
Hole Concrete	20MPa
Timber Lagging (Lagging to span at least 3 poles)	50mm thick from top of wall down to 1.3m below the top of wall. 100mm thick from 1.3m below the top of wall down to the ground level.
Backfill	40/20 Drainage Metal
Drainage (Consider drainage outlet to access road or stormwater system)	Bidim A19, Duraforce AS410 or equivalent with 100mm perforated PVC pipe with filter sock.

Table 3: Timber Wall Design Summary

A value of a 1/10 lean into the slope is proposed to provide further stability and conservatism to the wall construction.

2.4 Safety from Falling

A fence is required at the top of the wall to comply with the New Zealand Building Code to prevent falling from height. Each end of the wall must be inaccessible. We have provided a design for both a fence and a barrier for this site. Either of these two designs or an off the shelf product may be used, provided it has the required documentation and is designed for the correct load.

3 REFERENCES

- Henderson, D. (2013). The performance of House Foundations in the Canterbury Earthquakes. Department of Civil and Natural Resources Engineering, University of Canterbury, Christchurch, New Zealand.
- Ishihara, K. (1985). Stability of natural soil deposits during earthquakes. International Conference on Soil Mechanics and Foundation Engineering, 321-376.
- MBIE (2012). Ministry of Business, Innovation & Development (MBIE). Repairing and rebuilding houses affected by the Canterbury earthquakes, Part A Technical Guidance. ISBN: 978-0-478-39908-0 (online).
- MBIE (2016). Ministry of Business, Innovation & Development (MBIE) & New Zealand Geotechnical Society (NZGS), Earthquake Geotechnical Engineering Practice, Module 3: Identification, assessment, and mitigation of liquefaction hazards. ISBN: 978-0-947497-50-7 (online).
- MBIE (2016). Ministry of Business, Innovation & Development (MBIE), New Zealand Geotechnical Society (NZGS). Earthquake Geotechnical Engineering Practice, Module 1: Overview of the guidelines. ISBN: 978-0-947497-51-4 (online).
- MBIE (2017). Ministry of Business, Innovation & Development (MBIE) & Ministry for the Environment (MfE). Planning and engineering guidance for potentially liquefaction-prone land. ISBN: 978-1-98851770-4 (online).
- MBIE AS/VM B1 (2019). Ministry of Business, Innovation & Employment (MBIE). Acceptable Solutions and Verification Methods for New Zealand Building Code Clause B1 Structure. Amendment 18.
- NZS 3604:2011. Timber Framed buildings. Standards New Zealand.
- Youd, T. L. 2018, Application of MLR Procedure for Prediction of Liquefaction-Induced Lateral Spread Displacement, Journal of Geotechnical and Environmental Engineering 144(6), ASCE.

APPENDIX A – SITE PLAN



LEGEND

HA Hand Auger and Scala Penetrometer

ISSUE:	DATE:	DESCRIPTION:
<div><div>BSK</div><div>Consulting Engineers</div></div> <div><div><div>P.O. BOX 23, 314 Malfroy Rd, Rotorua, New Zealand Phone: (07) 348 5394 Email: admin@bsk.co.nz Web: www.bsk.co.nz</div><div></div></div></div>		
PROJECT: 170 Kawaha Point Road Rotorua		
CONTENTS: Site Investigation Location Plan		
SCALES: N/A	DATE: 29/07/2022	
DESIGNED: A George	JOB REF No:	24493
DRAWN: A George	SHEET No:	1 OF 1
APPROVED: N/A		
CHECKED: L K		

APPENDIX B – GEOTECHNICAL INVESTIGATION DATA

Test Location ID: HA01



BSK
Consulting Engineers

Undrained shear strengths are reported in general accordance with NZGS Guideline for hand held shear vane test, 2001.

Additional Notes	
* based on diagnostic properties undertaken in the field	

Hand Auger Log

Test Location ID: HA02

Project Reference:24493

Testing Date:29/07/2022

Project Name:Retaining Wall

Shear Vane ID:N/A

Client Name:Blick Tompkins

Shear Vane Correction:N/A

Site Location:170 Kawaha Point Road

Logged By:A.G/L.K

Level (mRL):307mRL

Checked By:L.K

BSK

Consulting Engineers

Soils have been described in general accordance with NZGS Guideline for the Field Classification and Description of Soil and Rock for Engineering Purposes, 2005.

Undrained shear strengths are reported in general accordance with NZGS Guideline for hand held shear vane test, 2001.

Auger Diameter	Depth BGL (meters)	Soil Description (NZGS 2005 Soil and Rock Description)	Geological Unit	In-Situ Test Data						Groundwater Depth BGL (meters)		
				Vane Shear Strength (kPa) Peak / Residual	Scala Penetrometer				Groundwater Depth BGL (meters)			
					Blows per 100mm	Very loose	Loose	Medium Dense			Dense	
50mm diameter	0.0	Soil Description Starts Below...	T/S Rotorua-Kapenga		0	0	2	3	7	>17	Groundwater not encountered	
	0.1	Silty SAND; black; very loose; moist.			0	0						
	0.2				1	1						
	0.3	Silty SAND; light brown; very loose to loose; moist. sand,fine.			0	0						
	0.4				1	1						
	0.5				1	1						
	0.6				2	2						
	0.7	Sandy SILT; dark brown; firm to stiff*; moist. sand, fine.			2	2						
	0.8				2	2						
	0.9				2	2						
1.0		2	2									
1.1		3	3	3								
1.2		3	3	3								
1.3	Silty SAND; light brown; loose to medium dense; moist. sand,fine.	4	4	4	4							
1.4		4	4	4	4							
1.5		4	4	4	4							
1.6		4	4	4	4							
1.7	Fine to medium SAND; light whitish brown; medium dense; moist. Pumiceous.	4	4	4	4							
1.8		4	4	4	4							
2.0	END OF AUGER- TARGET ACHIEVED											
2.5												
3.0												
3.5												
4.0												
4.5												
5.0												
5.5												
6.0												

Additional Notes

* based on diagnostic properties undertaken in the field

APPENDIX C – WALLAP DESIGN OUTPUT

BSK CONSULTING ENGINEERS LTD	Sheet No.
Program: WALLAP Version 6.07 Revision A55.B74.R58	Job No. 24493
Licensed from GEOSOLVE	Made by : LK
Data filename/Run ID: surchargedwallABLK	
170 Kawaha Point Road	Date:19-09-2022
Retaining Wall for Driveway	Checked :

Units: kN,m

INPUT DATA

SOIL PROFILE

Stratum no.	Elevation of top of stratum	Soil types	
		Left side	Right side
1	0.00	1 Silty Sand	1 Silty Sand
2	-1.50	2 Sandy Silt	2 Sandy Silt

SOIL PROPERTIES

	Bulk density	Young's Modulus	At rest coeff.	Consol state.	Active limit	Passive limit	Cohesion
No. Description	kN/m3	Eh, kN/m2	Ko	NC/OC	Ka	Kp	kN/m2
(Datum elev.)		(dEh/dy)	(dKo/dy)	(Nu)	(Kac)	(Kpc)	(dc/dy)
1 Silty Sand	18.00	8000	0.531	OC	0.309	4.132	
				(0.200)	(0.000)	(0.000)	
2 Sandy Silt	18.00	10000	0.500	OC	0.283	4.701	2.000d
				(0.200)	(1.241)	(6.411)	

Additional soil parameters associated with Ka and Kp

	--- parameters for Ka ---			--- parameters for Kp ---		
	Soil friction	Wall adhesion	Back-fill	Soil friction	Wall adhesion	Back-fill
No. Description	angle	coeff.	angle	angle	coeff.	angle
1 Silty Sand	28.00	0.670	0.00	28.00	0.670	0.00
2 Sandy Silt	30.00	0.670	0.00	30.00	0.670	0.00

GROUND WATER CONDITIONS

Density of water = 10.00 kN/m3

	Left side	Right side
Initial water table elevation	-10.00	-10.00

Automatic water pressure balancing at toe of wall : No

WALL PROPERTIES

Type of structure = Fully Embedded Wall
Elevation of toe of wall = -3.00
Maximum finite element length = 0.30 m
Youngs modulus of wall E = 8.7000E+06 kN/m2
Moment of inertia of wall I = 1.6000E-04 m4/m run
E.I = 1392.0 kN.m2/m run
Yield Moment of wall = Not defined

HORIZONTAL and MOMENT LOADS/RESTRAINTS

Load no.	Elevation	Horizontal load	Moment load	Moment restraint	Partial factor
		kN/m run	kN.m/m run	kN.m/m/rad	(Category)
1	2.00	0	0.7500	0	N/A

SURCHARGE LOADS

Surch- arge no.	Distance from wall	Length parallel to wall	Width perpend. to wall	Surcharge		Equiv. soil type	Partial factor/ Category
	Elev.			Near edge	Far edge		
1	2.00	0.00 (L)	20.00	7.00	5.00	=	1 N/A
2	2.00	0.00 (L)	20.00	7.00	1.67	=	1 N/A

Note: L = Left side, R = Right side

CONSTRUCTION STAGES

Construction stage no.	Stage description
1	Fill to elevation 2.00 on LEFT side with soil type 1
2	Apply surcharge no.1 at elevation 2.00
3	Remove surcharge no.1 at elevation 2.00
4	Change EI of wall to 1392 kN.m2/m run Reset wall displacements to zero at this stage
5	Apply surcharge no.2 at elevation 2.00
6	Apply seismic loading: 0.108g horizontal Line of action of quasi-static seismic force = 0.333 Seismic loading model: Quasi-static loading

FACTORS OF SAFETY and ANALYSIS OPTIONS

Stability analysis:

Method of analysis - Strength Factor method
Factor on soil strength for calculating wall depth = 1.25
Active limit pressures calculated by Wedge Stability
Passive limit pressures calculated by Wedge Stability

Parameters for undrained strata:

Minimum equivalent fluid density = 5.00 kN/m3
Maximum depth of water filled tension crack = 0.00 m

Bending moment and displacement calculation:

Method - Subgrade reaction model using Influence Coefficients
Open Tension Crack analysis? - No
Non-linear Modulus Parameter (L) = 0 m

Boundary conditions:

Length of wall (normal to plane of analysis) = 1000.00 m

Width of excavation on Left side of wall = 20.00 m

Width of excavation on Right side of wall = 20.00 m

Distance to rigid boundary on Left side = 20.00 m

Distance to rigid boundary on Right side = 20.00 m

OUTPUT OPTIONS

Stage no.	Stage description	Displacement Bending mom. Shear force	Active, Passive pressures	Graph. output
1	Fill to elev. 2.00 on LEFT side	Yes	Yes	Yes
2	Apply surcharge no.1 at elev. 2.00	Yes	Yes	Yes
3	Remove surcharge no.1 at elev. 2.00	No	No	No
4	Change EI of wall to 1392kN.m2/m run	Yes	Yes	Yes
5	Apply surcharge no.2 at elev. 2.00	Yes	Yes	Yes
6	Quasi-static Seismic load: 0.108g(H)	Yes	Yes	Yes
*	Summary output	Yes	-	Yes

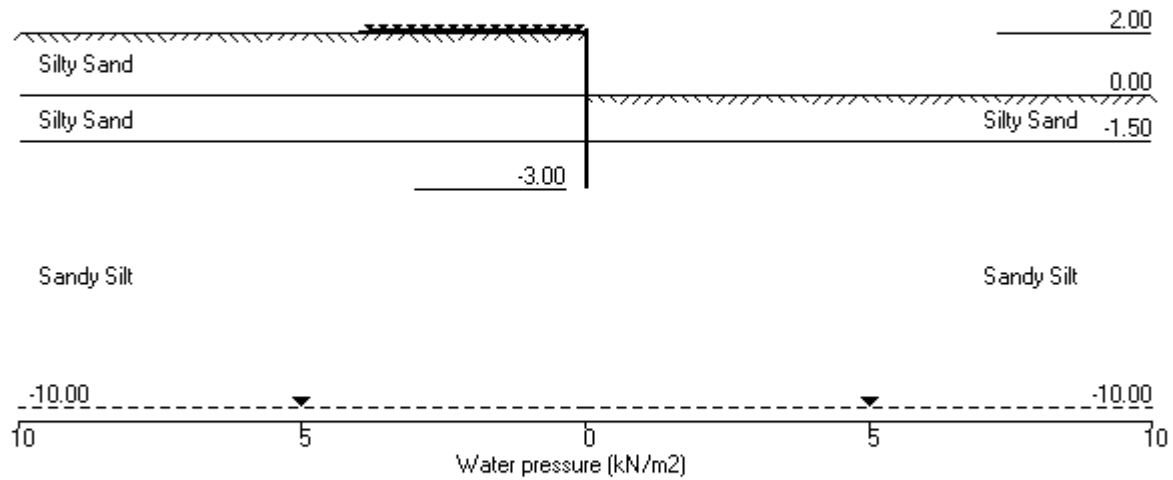
Program WALLAP - Copyright (C) 2020 by DL Borin, distributed by GEOSOLVE
150 St. Alphonsus Road, London SW4 7BW, UK www.geosolve.co.uk

BSK CONSULTING ENGINEERS LTD
Program: WALLAP Version 6.07 Revision A55.B74.R58
Licensed from GEOSOLVE
Data filename/Run ID: surchargedwallABLK
170 Kawaha Point Road
Retaining Wall for Driveway

| Sheet No.
| Job No. 24493
| Made by : LK
|
| Date:19-09-2022
Checked :

Units: kN,m

Stage No.6 Quasi-static Seismic load: 0.108g(H)



BSK CONSULTING ENGINEERS LTD	Sheet No.
Program: WALLAP Version 6.07 Revision A55.B74.R58	Job No. 24493
Licensed from GEOSOLVE	Made by : LK
Data filename/Run ID: surchargedwallABLK	
170 Kawaha Point Road	Date:19-09-2022
Retaining Wall for Driveway	Checked :

Units: kN,m

Stage No. 1 Fill to elevation 2.00 on LEFT side with soil type 1

STABILITY ANALYSIS of Fully Embedded Wall according to Strength Factor method

Factor of safety on soil strength

Active limit pressures calculated by Wedge Stability

Passive limit pressures calculated by Wedge Stability

				FoS for toe		Toe elev. for		
				elev. = -3.00		FoS = 1.250		
<u>Stage</u>	<u>Ground level</u>	<u>Prop</u>	<u>Factor</u>	<u>Moment</u>	<u>Toe</u>	<u>Wall</u>	<u>Direction</u>	
<u>No.</u>	<u>Act.</u>	<u>Pass.</u>	<u>of</u>	<u>equilib.</u>	<u>elev.</u>	<u>Penetr</u>	<u>of</u>	
			<u>Safety</u>	<u>at elev.</u>		<u>-ation</u>	<u>failure</u>	
1	2.00	0.00	Cant.	1.665	-2.63	-2.10	2.10	L to R

BENDING MOMENT and DISPLACEMENT ANALYSIS of Fully Embedded Wall

Analysis options

Length of wall perpendicular to section = 1000.00m

Subgrade reaction model - Boussinesq Influence coefficients

Soil deformations are elastic until the active or passive limit is reached

Active limit pressures calculated by Wedge Stability

Passive limit pressures calculated by Wedge Stability

Open Tension Crack analysis - No

Rigid boundaries: Left side 20.00 from wall

Right side 20.00 from wall

<u>Node</u>	<u>Y</u>	<u>Nett</u>	<u>Wall</u>	<u>Wall</u>	<u>Shear</u>	<u>Bending</u>	<u>Prop</u>
<u>no.</u>	<u>coord</u>	<u>pressure</u>	<u>disp.</u>	<u>rotation</u>	<u>force</u>	<u>moment</u>	<u>forces</u>
		kN/m2	m	rad.	kN/m	kN.m/m	kN/m
1	2.00	0.00	0.054	1.89E-02	0.0	0.0	
2	1.75	1.36	0.049	1.89E-02	0.2	0.0	
3	1.50	2.71	0.044	1.88E-02	0.7	0.1	
4	1.20	4.34	0.038	1.88E-02	1.7	0.5	
5	0.90	5.96	0.033	1.86E-02	3.3	1.2	
6	0.60	7.59	0.027	1.82E-02	5.3	2.5	
7	0.30	9.22	0.022	1.75E-02	7.8	4.4	
8	0.00	10.85	0.017	1.62E-02	10.8	7.2	
9	-0.30	-11.10	0.012	1.43E-02	10.8	10.6	
10	-0.60	-31.71	0.008	1.17E-02	4.4	13.7	
11	-0.90	-18.14	0.005	8.77E-03	-3.1	13.5	
12	-1.20	-8.70	0.003	6.04E-03	-7.1	11.8	
13	-1.50	-2.42	0.002	3.77E-03	-8.8	9.3	
		-5.28	0.002	3.77E-03	-8.8	9.3	
14	-1.80	2.59	0.001	2.07E-03	-9.2	6.4	
15	-2.10	6.64	0.000	9.78E-04	-7.8	3.8	
16	-2.40	8.40	0.000	3.81E-04	-5.6	1.7	
17	-2.70	9.19	-0.000	1.43E-04	-2.9	0.5	
18	-3.00	10.23	-0.000	9.43E-05	0.0	-0.0	

LEFT side

<u>Node</u>	<u>Y</u>	<u>Water</u>	<u>Effective stresses</u>				<u>Total</u>	<u>Coeff. of</u>
			<u>Vertic</u>	<u>Active</u>	<u>Passive</u>	<u>Earth</u>		
<u>no.</u>	<u>coord</u>	<u>press.</u>	<u>-al</u>	<u>limit</u>	<u>limit</u>	<u>pressure</u>	<u>earth</u>	<u>subgrade</u>
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m3
1	2.00	0.00	0.00	0.00	0.00	0.00	0.00	2472
2	1.75	0.00	4.50	1.36	19.52	1.36	1.36a	2472
3	1.50	0.00	9.00	2.71	39.04	2.71	2.71a	2472
4	1.20	0.00	14.40	4.34	62.46	4.34	4.34a	2472

(continued)

Stage No.1 Fill to elevation 2.00 on LEFT side with soil type 1

LEFT side								
Node no.	Y coord	Water press.	Effective stresses			Earth pressure	Total earth pressure	Coeff. of subgrade reaction
			Vertic -al	Active limit	Passive limit			
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m3
5	0.90	0.00	19.80	5.96	85.88	5.96	5.96a	2472
6	0.60	0.00	25.20	7.59	109.31	7.59	7.59a	2472
7	0.30	0.00	30.60	9.22	132.73	9.22	9.22a	2472
8	0.00	0.00	36.00	10.85	156.15	10.85	10.85a	2472
9	-0.30	0.00	41.40	12.47	179.57	12.47	12.47a	2472
10	-0.60	0.00	46.80	14.10	203.00	14.10	14.10a	2472
11	-0.90	0.00	52.20	15.73	226.42	15.73	15.73a	2472
12	-1.20	0.00	57.60	17.35	249.84	17.35	17.35a	2472
13	-1.50	0.00	63.00	18.98	273.26	19.47	19.47	2472
		0.00	63.00	15.29	332.04	17.66	17.66	3089
14	-1.80	0.00	68.40	16.82	359.32	23.03	23.03	3089
15	-2.10	0.00	73.80	18.34	386.60	27.10	27.10	3089
16	-2.40	0.00	79.20	19.86	413.88	30.40	30.40	3089
17	-2.70	0.00	84.60	21.39	441.16	33.39	33.39	15627
18	-3.00	0.00	90.00	22.91	468.44	36.61	36.61	15627

RIGHT side								
Node no.	Y coord	Water press.	Effective stresses			Earth pressure	Total earth pressure	Coeff. of subgrade reaction
			Vertic -al	Active limit	Passive limit			
		kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m2	kN/m3
1	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	1.75	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	1.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	0.00	0.00	0.00	4820
9	-0.30	0.00	5.40	1.62	23.58	23.58	23.58p	4820
10	-0.60	0.00	10.80	3.24	47.15	45.81	45.81	4820
11	-0.90	0.00	16.20	4.85	70.73	33.86	33.86	4820
12	-1.20	0.00	21.60	6.47	94.30	26.06	26.06	4820
13	-1.50	0.00	27.00	8.09	117.88	21.89	21.89	4820
		0.00	27.00	5.21	146.62	22.94	22.94	6025
14	-1.80	0.00	32.40	6.76	173.25	20.44	20.44	6025
15	-2.10	0.00	37.80	8.30	199.88	20.46	20.46	6025
16	-2.40	0.00	43.20	9.84	226.52	22.00	22.00	6025
17	-2.70	0.00	48.60	11.39	253.15	24.21	24.21	15627
18	-3.00	0.00	54.00	12.93	279.79	26.39	26.39	15627

Note: 17.35 a Soil pressure at active limit
 23.58 p Soil pressure at passive limit

Units: kN,m

Stage No. 6 Apply seismic loading:
0.108g horizontal
Line of action of quasi-static seismic force = 0.333
Seismic loading model: Quasi-static loading

STABILITY ANALYSIS of Fully Embedded Wall according to Strength Factor method

Factor of safety on soil strength
Active limit pressures calculated by Wedge Stability
Passive limit pressures calculated by Wedge Stability

<u>Stage</u> <u>No.</u>	<u>Ground level</u> <u>Act.</u> <u>Pass.</u>	<u>Prop</u> <u>Elev.</u>	<u>FoS for toe</u> <u>elev. = -3.00</u>		<u>Toe elev. for</u> <u>FoS = 1.250</u>		<u>Direction</u> <u>of</u> <u>failure</u>
			<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Moment</u> <u>equilib.</u> <u>at elev.</u>	<u>Toe</u> <u>elev.</u>	<u>Wall</u> <u>Penetr</u> <u>-ation</u>	
6	2.00 0.00	Cant.	1.385	-2.70	-2.58	2.58	L to R

BENDING MOMENT and DISPLACEMENT ANALYSIS of Fully Embedded Wall

Analysis options

Length of wall perpendicular to section = 1000.00m
Subgrade reaction model - Boussinesq Influence coefficients
Soil deformations are elastic until the active or passive limit is reached
Active limit pressures calculated by Wedge Stability
Passive limit pressures calculated by Wedge Stability
Open Tension Crack analysis - No

Rigid boundaries: Left side 20.00 from wall
Right side 20.00 from wall

*** Wall displacements reset to zero at stage 4

<u>Node</u> <u>no.</u>	<u>Y</u> <u>coord</u>	<u>Nett</u> <u>pressure</u> kN/m2	<u>Wall</u> <u>disp.</u> m	<u>Wall</u> <u>rotation</u> rad.	<u>Shear</u> <u>force</u> kN/m	<u>Bending</u> <u>moment</u> kN.m/m	<u>Prop</u> <u>forces</u> kN/m
1	2.00	0.02	0.018	5.10E-03	0.0	0.0	
2	1.75	1.21	0.017	5.10E-03	0.2	0.0	
3	1.50	4.06	0.016	5.10E-03	0.8	0.1	
4	1.20	6.11	0.014	5.12E-03	2.3	0.6	
5	0.90	8.17	0.013	5.13E-03	4.5	1.6	
6	0.60	10.22	0.011	5.16E-03	7.2	3.3	
7	0.30	12.27	0.010	5.16E-03	10.6	6.0	
8	0.00	14.33	0.008	5.12E-03	14.6	9.7	
9	-0.30	-5.00	0.007	5.00E-03	16.0	14.5	
10	-0.60	-24.33	0.005	4.74E-03	11.6	19.4	
11	-0.90	-40.49	0.004	4.23E-03	1.9	21.7	
12	-1.20	-21.05	0.003	3.53E-03	-7.4	20.4	
13	-1.50	-7.47	0.002	2.79E-03	-11.6	17.3	
		-15.51	0.002	2.79E-03	-11.6	17.3	
14	-1.80	-4.46	0.001	2.08E-03	-14.6	13.1	
15	-2.10	4.63	0.000	1.49E-03	-14.6	8.5	
16	-2.40	12.00	0.000	1.08E-03	-12.1	4.4	
17	-2.70	20.35	-0.000	8.74E-04	-7.3	1.3	
18	-3.00	27.99	-0.000	8.24E-04	0.0	-0.0	

(continued)

Stage No.6 Apply seismic loading:
0.108g horizontal
Line of action of quasi-static seismic force = 0.333
Seismic loading model: Quasi-static loading

LEFT side								
Node no.	Y coord	Water press. kN/m2	Effective stresses				Total earth pressure kN/m2	Coeff. of subgrade reaction kN/m3
			Vertic -al kN/m2	Active limit kN/m2	Passive limit kN/m2	Earth pressure kN/m2		
1	2.00	0.00	1.67	0.02	6.90	0.02	0.02a	2099
2	1.75	0.00	6.17	1.21	27.27	1.21	1.21a	2099
3	1.50	0.00	10.67	4.06	50.23	4.06	4.06a	2099
4	1.20	0.00	16.07	6.11	75.65	6.11	6.11a	2099
5	0.90	0.00	21.47	8.17	101.06	8.17	8.17a	2099
6	0.60	0.00	26.86	10.22	126.47	10.22	10.22a	2099
7	0.30	0.00	32.26	12.27	151.87	12.27	12.27a	2099
8	0.00	0.00	37.65	14.33	177.26	14.33	14.33a	2099
9	-0.30	0.00	43.04	16.38	202.64	16.38	16.38a	2099
10	-0.60	0.00	48.43	18.43	228.01	18.43	18.43a	2099
11	-0.90	0.00	53.82	20.48	253.37	20.48	20.48a	2099
12	-1.20	0.00	59.20	22.53	278.72	22.53	22.53a	2099
13	-1.50	0.00	64.59	24.57	304.07	24.57	24.57a	2099
		0.00	64.59	20.13	367.76	20.13	20.13a	2624
14	-1.80	0.00	69.97	22.07	397.16	22.07	22.07a	2624
15	-2.10	0.00	75.35	24.01	426.55	26.70	26.70	2624
16	-2.40	0.00	80.72	25.94	455.93	32.37	32.37	2624
17	-2.70	0.00	86.10	27.58	471.36	39.14	39.14	9977
18	-3.00	0.00	91.47	29.18	485.10	45.66	45.66	9977

RIGHT side								
Node no.	Y coord	Water press. kN/m2	Effective stresses				Total earth pressure kN/m2	Coeff. of subgrade reaction kN/m3
			Vertic -al kN/m2	Active limit kN/m2	Passive limit kN/m2	Earth pressure kN/m2		
1	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
2	1.75	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	1.20	0.00	0.00	0.00	0.00	0.00	0.00	0.0
5	0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.0
6	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.0
7	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
		0.00	0.00	0.00	0.00	0.00	0.00	3689
9	-0.30	0.00	5.40	1.30	21.38	21.38	21.38p	3689
10	-0.60	0.00	10.80	2.61	42.76	42.76	42.76p	3689
11	-0.90	0.00	16.20	3.91	64.13	60.97	60.97	3689
12	-1.20	0.00	21.60	5.22	85.51	43.58	43.58	3689
13	-1.50	0.00	27.00	6.52	106.89	32.05	32.05	3689
		0.00	27.00	3.95	134.84	35.64	35.64	4612
14	-1.80	0.00	32.40	5.12	159.33	26.52	26.52	4612
15	-2.10	0.00	37.80	6.29	183.83	22.07	22.07	4612
16	-2.40	0.00	43.20	7.46	208.32	20.37	20.37	4612
17	-2.70	0.00	48.60	8.63	232.81	18.79	18.79	9977
18	-3.00	0.00	54.00	9.80	257.31	17.67	17.67	9977

Note: 22.07 a Soil pressure at active limit
 42.76 p Soil pressure at passive limit

BSK CONSULTING ENGINEERS LTD	Sheet No.
Program: WALLAP Version 6.07 Revision A55.B74.R58	Job No. 24493
Licensed from GEOSOLVE	Made by : LK
Data filename/Run ID: surchargedwallABLK	
170 Kawaha Point Road	Date:19-09-2022
Retaining Wall for Driveway	Checked :

Units: kN,m

Summary of results

STABILITY ANALYSIS of Fully Embedded Wall according to Strength Factor method

Factor of safety on soil strength

Active limit pressures calculated by Wedge Stability

Passive limit pressures calculated by Wedge Stability

<u>Stage</u> <u>No.</u>	<u>Ground level</u>		<u>Prop</u> <u>Elev.</u>	<u>FoS for toe</u> <u>elev. = -3.00</u>		<u>Toe elev. for</u> <u>FoS = 1.250</u>		<u>Direction</u> <u>of</u> <u>failure</u>
	<u>Act.</u>	<u>Pass.</u>		<u>Factor</u> <u>of</u> <u>Safety</u>	<u>Moment</u> <u>equilib.</u> <u>at elev.</u>	<u>Toe</u> <u>elev.</u>	<u>Wall</u> <u>Penetr</u> <u>-ation</u>	
1	2.00	0.00	Cant.	1.665	-2.63	-2.10	2.10	L to R
2	2.00	0.00	Cant.	1.519	-2.62	-2.35	2.35	L to R
3	2.00	0.00	Cant.	1.665	-2.63	-2.10	2.10	L to R
4	2.00	0.00	No analysis at this stage					
5	2.00	0.00	Cant.	1.614	-2.63	-2.17	2.17	L to R
6	2.00	0.00	Cant.	1.385	-2.70	-2.58	2.58	L to R

Units: kN,m

Summary of results

BENDING MOMENT and DISPLACEMENT ANALYSIS of Fully Embedded Wall

Analysis options

Length of wall perpendicular to section = 1000.00m
 Subgrade reaction model - Boussinesq Influence coefficients
 Soil deformations are elastic until the active or passive limit is reached
 Active limit pressures calculated by Wedge Stability
 Passive limit pressures calculated by Wedge Stability
 Open Tension Crack analysis - No

Rigid boundaries: Left side 20.00 from wall
 Right side 20.00 from wall

Bending moment, shear force and displacement envelopes

Node no.	Y coord	Displacement		Bending moment		Shear force	
		maximum	minimum	maximum	minimum	maximum	minimum
		m	m	kN.m/m	kN.m/m	kN/m	kN/m
1	2.00	0.018	0.000	0.0	0.0	0.0	0.0
2	1.75	0.017	0.000	0.0	0.0	0.2	0.0
3	1.50	0.016	0.000	0.1	0.0	1.0	0.0
4	1.20	0.014	0.000	0.6	0.0	2.5	0.0
5	0.90	0.013	0.000	1.7	0.0	4.5	0.0
6	0.60	0.011	0.000	3.4	0.0	7.2	0.0
7	0.30	0.010	0.000	6.0	0.0	10.6	0.0
8	0.00	0.008	0.000	9.7	0.0	14.6	0.0
9	-0.30	0.007	0.000	14.5	0.0	16.0	0.0
10	-0.60	0.005	0.000	19.4	0.0	11.6	0.0
11	-0.90	0.004	0.000	21.7	0.0	1.9	-3.1
12	-1.20	0.003	0.000	20.4	0.0	0.0	-8.1
13	-1.50	0.002	0.000	17.3	0.0	0.0	-11.6
14	-1.80	0.001	0.000	13.1	0.0	0.0	-14.6
15	-2.10	0.000	0.000	8.5	0.0	0.0	-14.6
16	-2.40	0.000	0.000	4.4	0.0	0.0	-12.1
17	-2.70	0.000	-0.000	1.3	0.0	0.0	-7.3
18	-3.00	0.000	-0.000	0.0	-0.0	0.0	0.0

Maximum and minimum bending moment and shear force at each stage

Stage no.	Bending moment				Shear force			
	maximum kN.m/m	elev.	minimum kN.m/m	elev.	maximum kN/m	elev.	minimum kN/m	elev.
1	13.7	-0.60	-0.0	-3.00	10.8	0.00	-9.2	-1.80
2	18.8	-0.90	-0.0	-3.00	14.0	-0.30	-13.0	-1.80
3	18.7	-0.90	-0.0	-3.00	13.9	-0.30	-13.0	-1.80
4	No calculation at this stage							
5	18.7	-0.90	-0.0	-3.00	13.9	-0.30	-13.0	-1.80
6	21.7	-0.90	-0.0	-3.00	16.0	-0.30	-14.6	-1.80

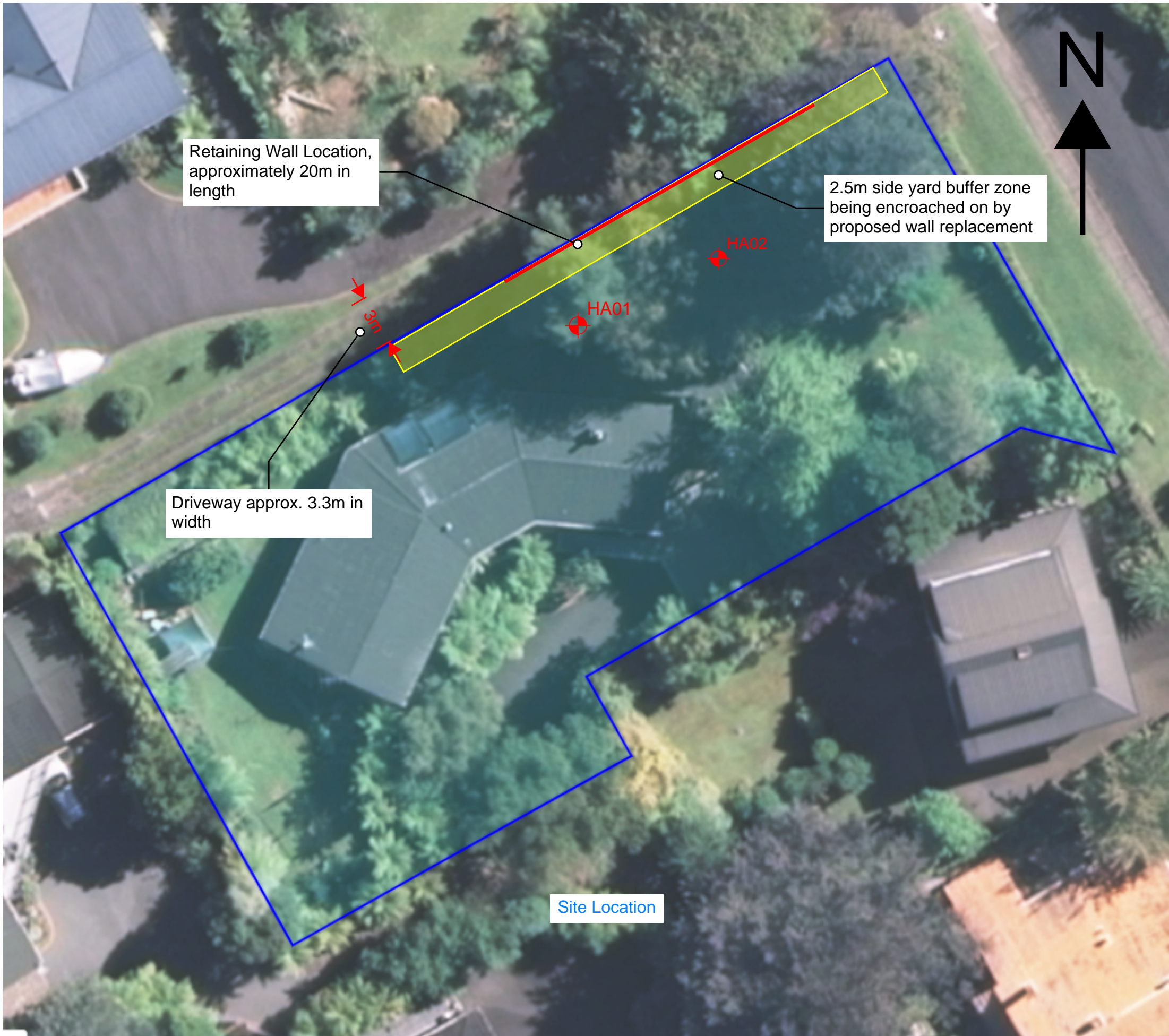
Maximum and minimum displacement at each stage

Stage no.	Displacement				Stage description
	maximum m	elev.	minimum m	elev.	
1	0.054	2.00	-0.000	-3.00	Fill to elev. 2.00 on LEFT side
2	0.078	2.00	-0.001	-3.00	Apply surcharge no.1 at elev. 2.00
3	0.077	2.00	-0.001	-3.00	Remove surcharge no.1 at elev. 2.00
4	Wall displacements reset to zero				
5	0.000	2.00	0.000	2.00	Apply surcharge no.2 at elev. 2.00
6	0.018	2.00	-0.000	-3.00	Quasi-static Seismic load: 0.108g(H)

Run ID. surchargedwallABLK
170 Kawaha Point Road
Retaining Wall for Driveway

| Sheet No.
| Date:19-09-2022
| Checked :

Summary of results (continued)



Retaining Wall Location,
approximately 20m in
length

2.5m side yard buffer zone
being encroached on by
proposed wall replacement

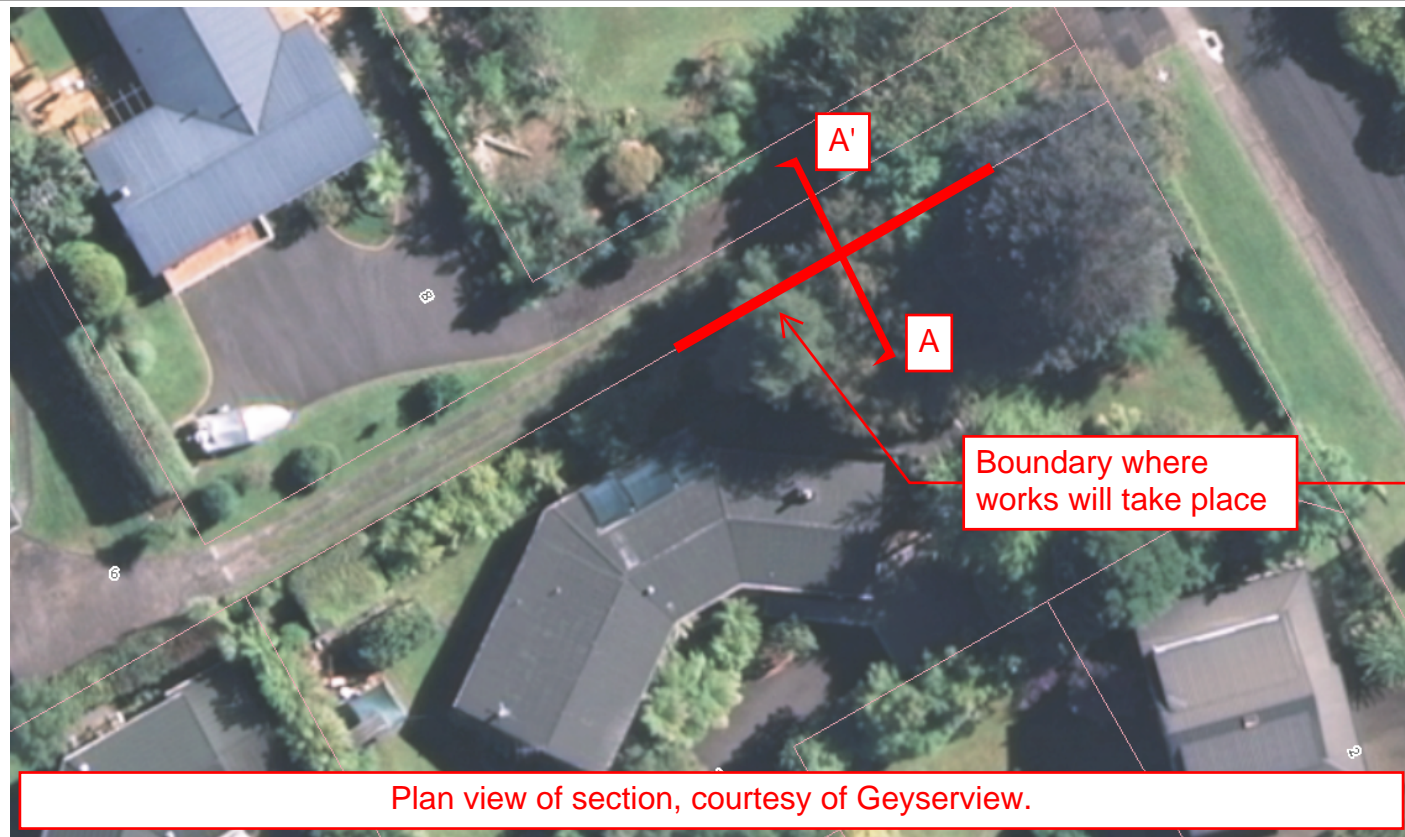
Driveway approx. 3.3m in
width

Site Location

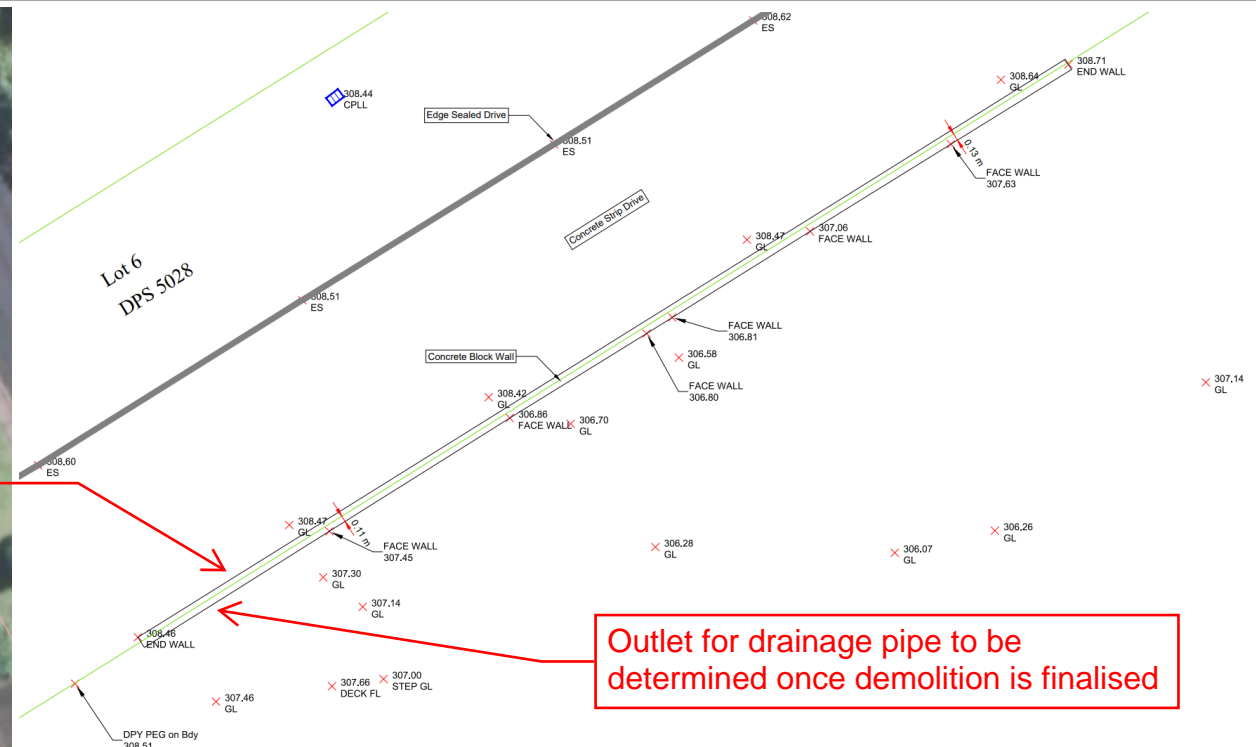
LEGEND

HA Hand Auger and Scala Penetrometer

Rev A	19/05/23	Revised as per discussions
ISSUE:	DATE:	DESCRIPTION:
<div><div>BSK</div><div>Consulting Engineers</div></div> <div><div><div>P.O. BOX 23, 314 Malfroy Rd, Rotorua, New Zealand Phone: (07) 348 5394 Email: admin@bsk.co.nz Web: www.bsk.co.nz</div><div></div></div></div>		
PROJECT: 170 Kawaha Point Road Rotorua		
CONTENTS: Site Investigation Location Plan		
SCALES: N/A		DATE: 29/07/2022
DESIGNED:	LK	JOB REF No: 24493
DRAWN:	LK	SHEET No: SK1 OF 5
APPROVED:	AB	
CHECKED:	LK	



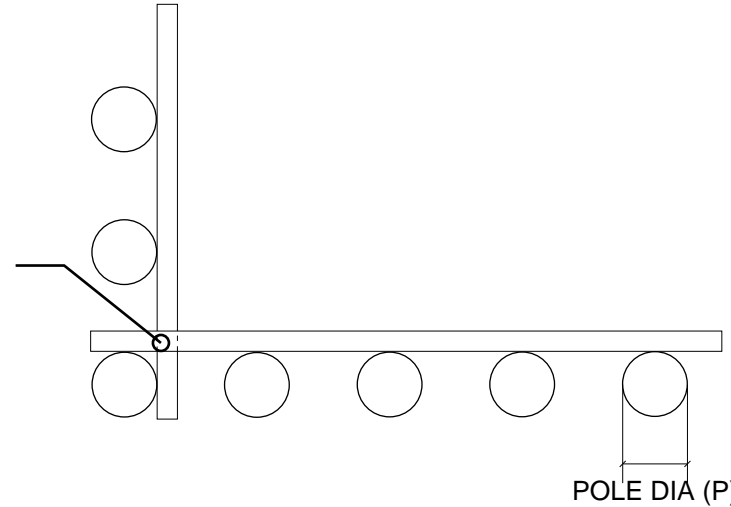
Plan view of section, courtesy of Geyserview.



Survey of boundary in question, courtesy of Landhelp Ltd.

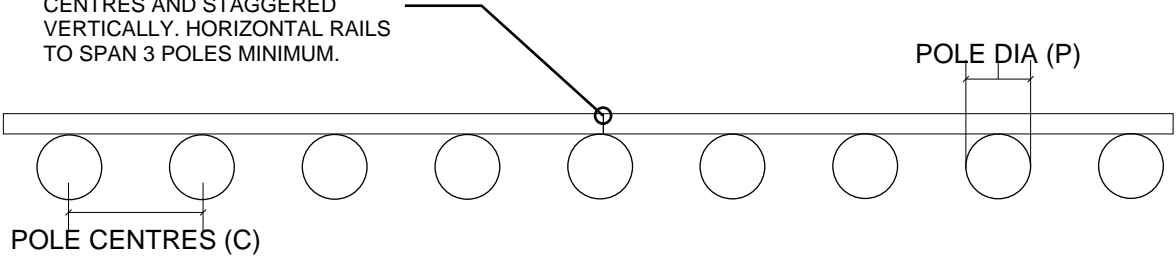


CORNER JOINTS IN HORIZONTAL
RAILS TO BE LOCATED AT POLE
CENTRES. OVERLAPS TO BE
STAGGERED VERTICALLY.



TYPICAL PLAN
DETAIL - CORNER
NOT TO SCALE

BUTT JOINTS IN HORIZONTAL
RAILS TO BE LOCATED AT POLE
CENTRES AND STAGGERED
VERTICALLY. HORIZONTAL RAILS
TO SPAN 3 POLES MINIMUM.



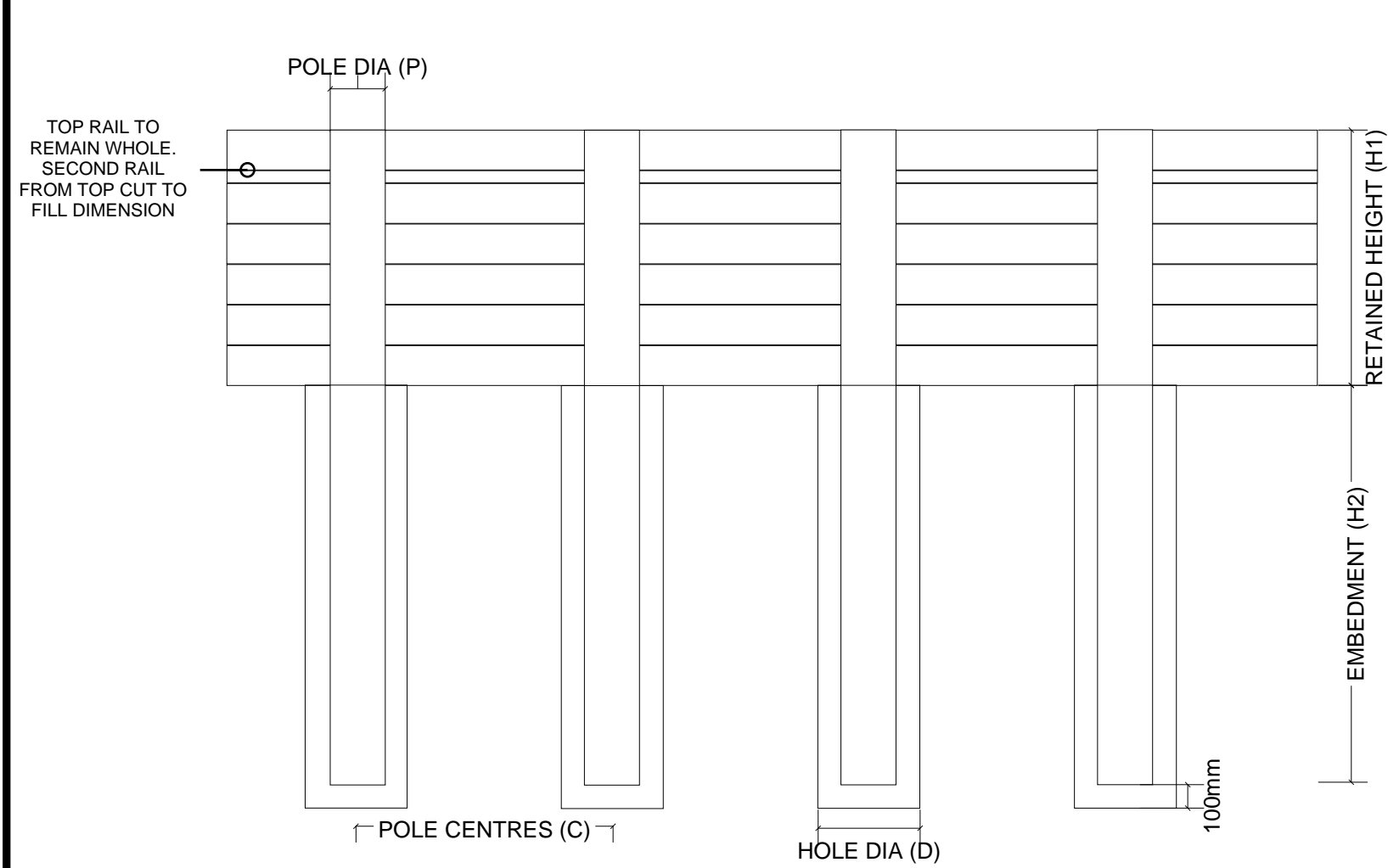
POLE CENTRES (C)

TYPICAL PLAN
DETAIL - LINEAR
NOT TO SCALE

NOTES

- THE WALL HAS BEEN DESIGNED FOR NO SLOPES ABOVE OR BELOW ACTING TO SURCHARGE THE WALL.
- THE WALLS HAS BEEN DESIGNED FOR A VEHICULAR SURCHARGE OF 5kPa.
- IF THE EXPECTED SURCHARGE OR SLOPE CHANGES, BSK MUST BE NOTIFIED SO THE WALL CAN BE RE-DESIGNED TO INCLUDE THIS.
- POLES TO BE INSTALLED WITH THEIR SMALL END DIAMETERS AT THE TOP OF THE WALL.
- USE 200x50 ROUGH SAWN H4 RAILS BEHIND THE POLES. STAGGER THE JOINTS IN THE RAILS AND USE LENGTHS TO SPAN A MINIMUM OF 3x POLE SPACING .
- RAILS FIXED TO POLES WITH 2x3.75MM FH GALVANISED NAILS. DOUBLE RAILS PROGRESSIVELY NAILED.
- ANY CUTTING OF POLES OR RAILS IS TO BE GENEROUSLY COATED WITH A CONCENTRATED SOLUTION OF COPPER NAPHTHALENE ENEAL OR EQUIVALENT CONCENTRATED PRESERVATIVE.
- IT IS RECOMMENDED THAT A FILTER FABRIC (E.G. BIDIM A14 OR EQUIVALENT) IS USED AS A SEPARATION LAYER BETWEEN THE DRAINAGE MATERIAL AND THE BACKFILLING. WRAP OVER THE TOP OF THE DRAINAGE MATERIAL AT THE TOP BEFORE PLACING TOPSOIL OR PAVEMENTS. PLACE 100MM TOPSOIL OVER BACKFILLING.
- SLOTTED PIPE TO BE FILTER FABRIC WRAPPED AND PLACED AT BASE OF WALL CONNECTED AND DRAINING INTO STORMWATER SOAKAGE.
- DRAINAGE MATERIAL TO BE CLEAN 5-40MM GRAVEL OR PUMICE WITH LOW FINES. MATERIAL TO BE COMPACTED AS PER ENGINEERS SPECIFICATION.
- TIMBER RAILS TO HAVE A 45 DEGREE CHAMFER (10MM IN LENGTH) ON VISIBLE SIDE.

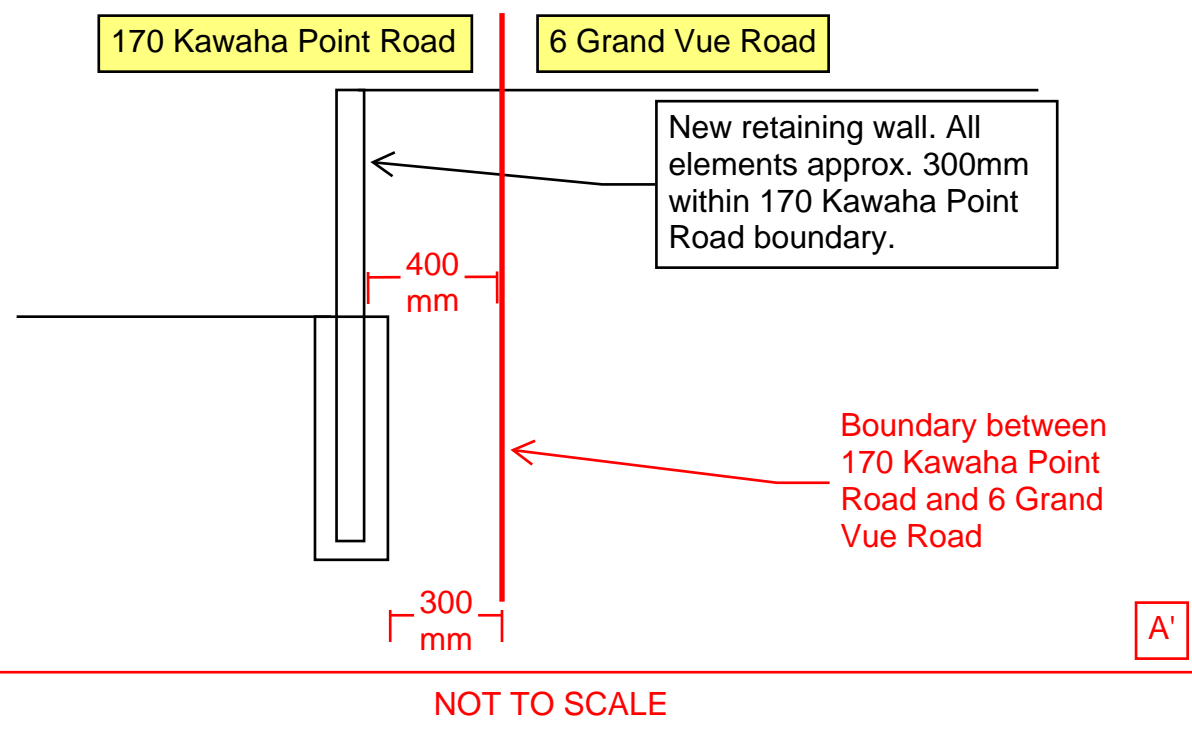
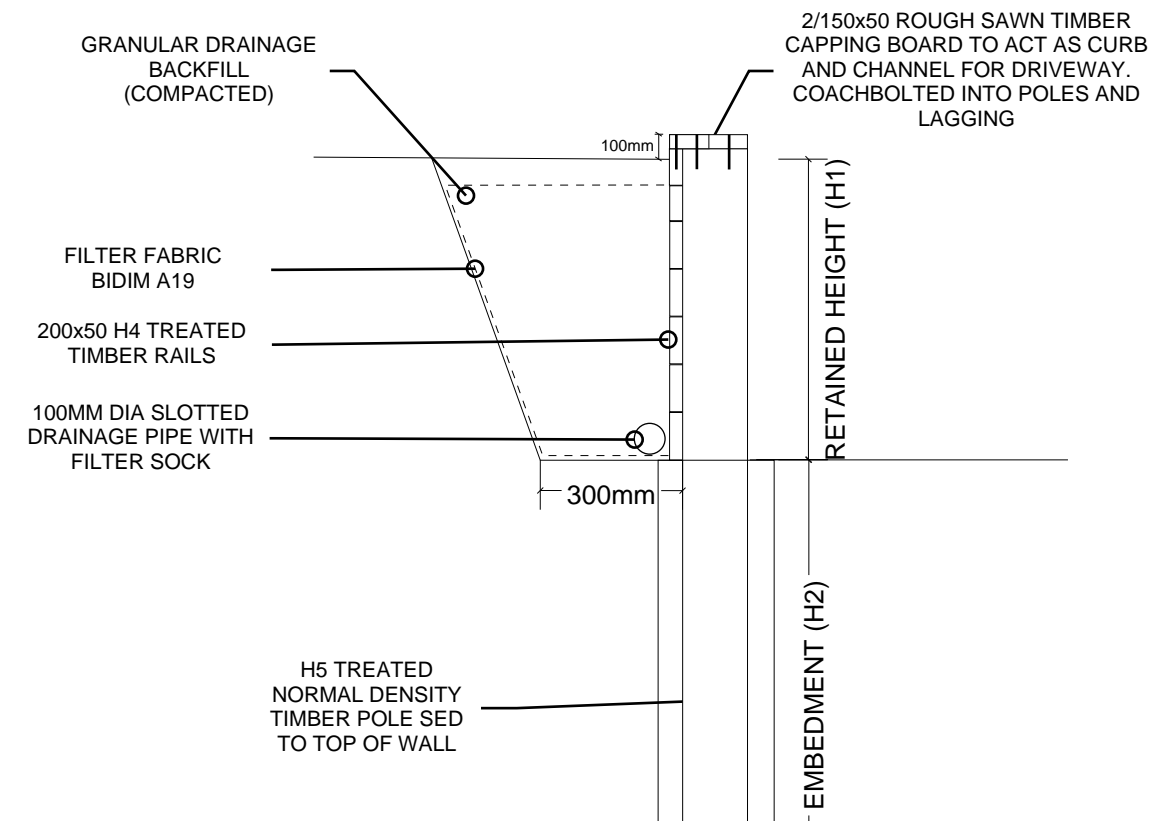
Rev A	19/05/23	Revised as per discussions
ISSUE:	DATE:	DESCRIPTION:
 <div>P.O. BOX 23, 314 MALFROY RD, ROTORUA, NEW ZEALAND PHONE: (07) 348 5394 EMAIL: admin@bsk.co.nz WEB: www.bsk.co.nz</div> 		
PROJECT: 170 Kawaha Point Road Rotorua		
CONTENTS: Site Investigation Location Plan		
SCALES: N/A		DATE: 29/07/2022
DESIGNED: LK	JOB REF No: 24493	
DRAWN: LK	SHEET No: SK2 OF: 5	
APPROVED: AB		
CHECKED: LK		



TYPICAL ELEVATION
NOT TO SCALE

H1	H2	P	D	C
Maximum Retained Height	Required Embedment Depth	Pole Diameter	Hole Diameter (20MPa Concrete)	Hole Centres
2.0m	3.0m	250mm	450mm	1.2m

WALL SIZING



INSPECTION SCEDULE

The following hold points shall be observed prior to or during construction. No further work shall proceed until the Engineer is satisfied that each hold point has been fulfilled.

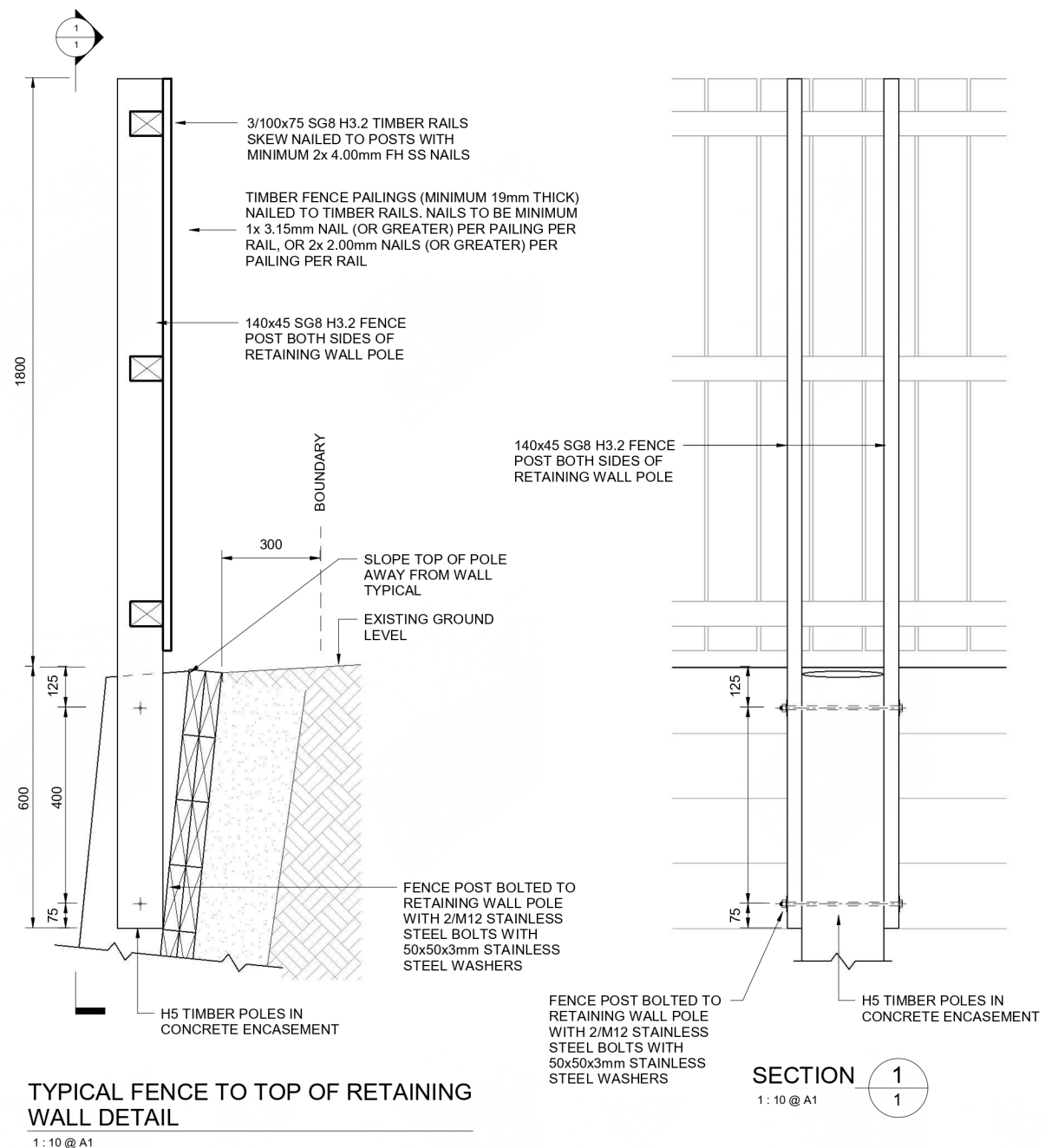
- Set-out detail
- Certification of timber pole and timber lagging
- Pole hole depths and pole installation
- Subsoil drain pipe location, lagging, filter cloth

Rev A	19/05/23	Revised as per discussions
ISSUE:	DATE:	DESCRIPTION:
BSK Consulting Engineers P.O. BOX 23, 314 MALFROY RD, ROTORUA, NEW ZEALAND PHONE: (07) 348 5394 EMAIL: admin@bsk.co.nz WEB: www.bsk.co.nz ACENZ		
PROJECT: 170 Kawaha Point Road Rotorua		
CONTENTS: Site Investigation Location Plan		
SCALES: N/A	DATE:	29/07/2022
DESIGNED: LK	JOB REF No:	24493
DRAWN: LK	SHEET No:	SK3 OF 5
APPROVED: AB		
CHECKED: L K		



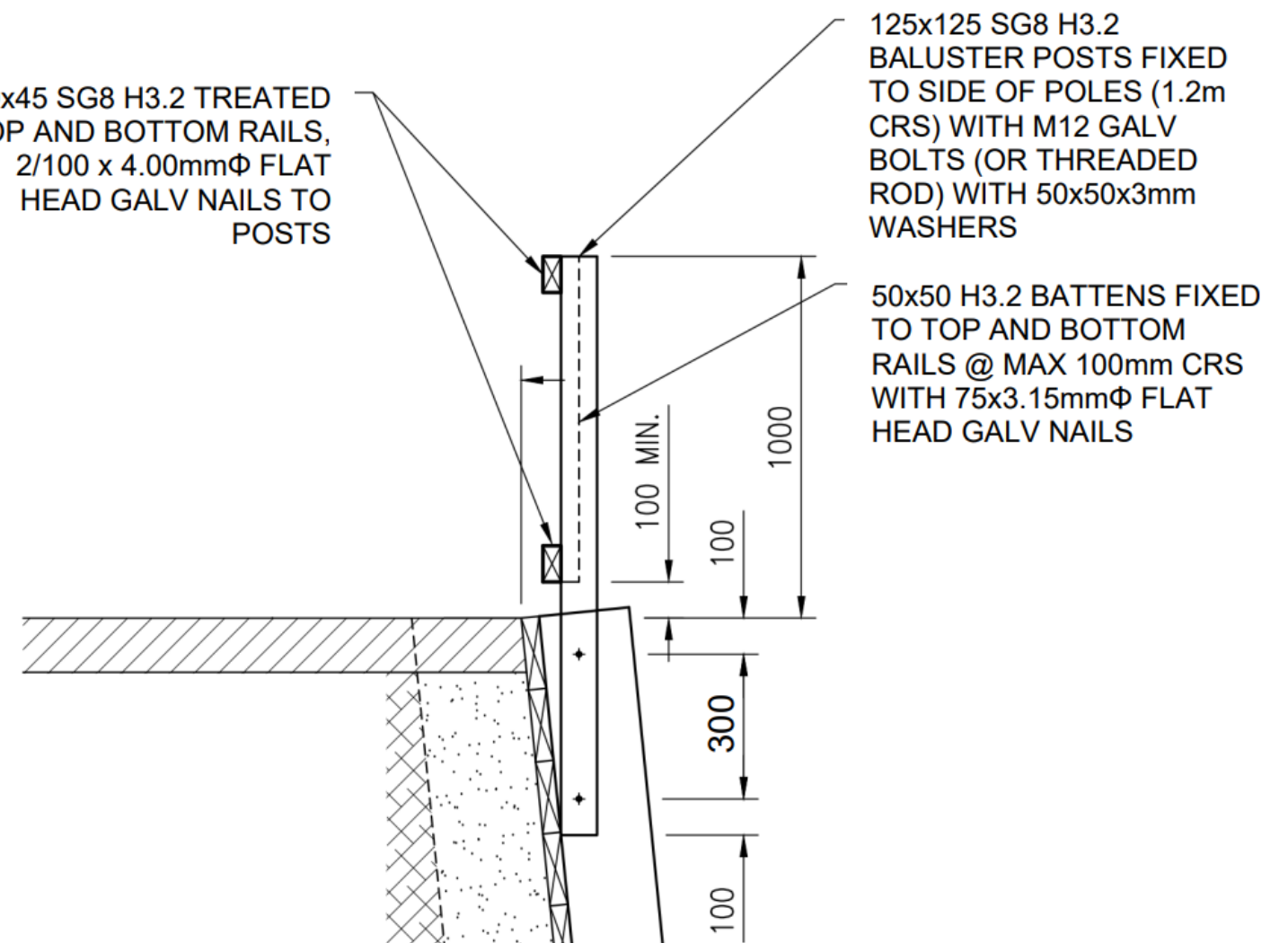
- Type A Barrier - Fence
- Type B Barrier - Handrail

Rev A	19/05/23	Revised as per discussions
ISSUE:	DATE:	DESCRIPTION:
<div><div>BSK</div><div>Consulting Engineers</div></div> <div><div><div>P.O. BOX 23, 314 MALFROY RD, Rotorua, New Zealand</div><div>PHONE: (07) 348 5394</div><div>EMAIL: admin@bsk.co.nz</div><div>WEB: www.bsk.co.nz</div></div><div><div>ACENZ</div></div></div>		
PROJECT: 170 Kawaha Point Road Rotorua		
CONTENTS: Type of fall from height barrier		
SCALES: N/A		DATE: 29/07/2022
DESIGNED:	LK	JOB REF No: 24493
DRAWN:	LK	SHEET No: SK1 OF: 5
APPROVED:	AB	
CHECKED:	LK	



Type A Barrier - Fence

90x45 SG8 H3.2 TREATED
TOP AND BOTTOM RAILS,
2/100 x 4.00mmΦ FLAT
HEAD GALV NAILS TO
POSTS



Type B Barrier - Handrail

Rev A	19/05/23	Revised as per discussions
ISSUE:	DATE:	DESCRIPTION:
BSK Consulting Engineers P.O. BOX 23, 314 Malfroy Rd, Rotorua, New Zealand PHONE: (07) 348 5394 EMAIL: admin@bsk.co.nz WEB: www.bsk.co.nz ACENZ		
PROJECT:		
170 Kawaha Point Road Rotorua		
CONTENTS:		
Protection from fall		
SCALES:	DATE: 29/07/2022	
N/A	JOB REF No: 24493	
DESIGNED: LK	SHEET No: SK4 OF: 5	
DRAWN: LK		
APPROVED: AB		
CHECKED: L K		

Memorandum from licensed building practitioner: Certificate of design work

Section 45 and Section 30C, Building Act 2004

Please fill in the form as fully and correctly as possible.

If there is insufficient room on the form for requested details, please continue on another sheet and attach the additional sheet(s) to this form.

THE BUILDING

Street address: 170 Kawaha Point Road

Suburb: Kawaha Point

Town/City: Rotorua

Postcode: 3010

THE OWNER

Name(s): Laura Tompkins

Mailing address:

Suburb:

PO Box/Private Bag:

Town/City:

Postcode:

Phone number:

Email address: nicnlolo@gmail.com

BASIS FOR PROVIDING THIS MEMORANDUM

I am providing this memorandum in my role as the: Please tick the option that applies (✓)	
()	sole designer of all of the RBW design outlined in this memorandum – I carried out all of the RBW design myself – no other person will be providing any additional memoranda for the project
()	lead designer who carried out some of the RBW design myself but also supervised other designers – this memorandum covers their RBW design work as well as mine, and no other person will be providing any additional memoranda for the project
<input checked="" type="checkbox"/>	lead designer for all but specific elements of RBW – this memorandum only covers the RBW design work that I carried out or supervised and the other designers will provide their own memoranda relating to their specific RBW design
()	specialist designer who carried out specific elements of RBW design work as outlined in this memorandum – other designers will be providing a memorandum covering the remaining RBW design work

IDENTIFICATION OF DESIGN WORK THAT IS RESTRICTED BUILDING WORK (RBW)

I Ashley John Bowtell supervised the following design work that is restricted building work

PRIMARY STRUCTURE: B1

Design work that is restricted building work	Description	Carried out/supervised	Reference to plans and specifications
Tick (✓) if included Cross (X) if excluded	[If appropriate, provide details of the restricted building work]	[Specify whether you carried out this design work or supervised]	[If appropriate, specify references]

	<i>someone else carrying out this design work]</i>	
--	--	--

Primary structure

All RBW Design work relating to B1 ()		() Carried out () Supervised	
Foundations and subfloor framing ()		() Carried out () Supervised	
Walls ()		() Carried out () Supervised	
Roof ()		() Carried out () Supervised	
Columns and beams ()		() Carried out () Supervised	
Bracing ()		() Carried out () Supervised	
Other ()	- Structural timber retaining wall (2.0m max retained height, 450mm diameter holes, 250mm max SED timber poles).	() Carried out <input checked="" type="checkbox"/> Supervised	BSK Details, job number 24493

EXTERNAL MOISTURE MANAGEMENT SYSTEMS: E2

All RBW design work relating to E2 ()		() Carried out () Supervised	
Damp proofing ()		() Carried out () Supervised	
Roof cladding or roof cladding system ()		() Carried out () Supervised	
Ventilation system (for example, subfloor or cavity) ()		() Carried out () Supervised	
Wall cladding or wall cladding system ()		() Carried out () Supervised	
Waterproofing ()		() Carried out () Supervised	
Other ()		() Carried out () Supervised	

FIRE SAFETY SYSTEMS: C1 – C6

Emergency ()		() Carried out	
---------------	--	-----------------	--

warning systems, evacuation and fire service operation systems, suppression or control systems, or other		() Supervised	
--	--	----------------	--

Note: The design of fire safety systems is only restricted building work when it involves small-to-medium apartment buildings as defined by the Building (Definition of Restricted Building Work) Order 2011.

Note: continue on another page if necessary.

WAIVERS AND MODIFICATIONS

Waivers or modifications of the building code are required () Yes () No

If Yes, provide details of the waivers or modifications below:

Clause	Waiver/modification required
<i>[List relevant clause numbers of building code]</i>	<i>[Specify nature of waiver or modification of building code]</i>

Note: continue on another page if necessary.

ISSUED BY

Name: Ashley John Bowtell		LBP or Registration number: 1018456	
The practitioner is a:	() Design LBP () Registered architect <input checked="" type="checkbox"/> Chartered professional engineer		
Design Entity or Company (optional): BSK Consulting Engineers Ltd			
Mailing address (if different from below):			
Street address / Registered office: 314 Malfroy Road			
Suburb:		Town/City: Rotorua	
PO Box/Private Bag: 23		Postcode: 3040	
Phone number: 07 3485394		Mobile:	
After Hours:		Fax:	
Email address: ash@bsk.co.nz		Website:	

DECLARATION

I Ashley John Bowtell *[name of practitioner]*, LBP,

state that I have applied the skill and care reasonably required of a competent design professional in carrying out or supervising the Restricted Building Work (RBW) described in this form, and that based on this, I also state that the RBW:

- Complies with the building code; or
- Complies with the building code subject to any waiver or modification of the building code recorded on this form.

Signature:



Date: 21/09/22

21 September 2022

Rotorua Lakes Council
Private Bag 3029
Rotorua Mail Centre
ROTORUA 3046

Telephone 07 348 5394
Email admin@bsk.co.nz
314 Malfroy Road
PO Box 23 Rotorua 3040
www.bsk.co.nz

Attention: Building Consents Department

**RE: PROPOSED DWELLING AT 170 KAWAHA POINT ROAD, ROTORUA –
DURABILITY COMPLIANCE**

OUR REF: 24493

The purpose of this letter is to discuss structural performance with regards to Clause B2 of the Building Code – Structural Durability

We are not able to provide a design Producer Statement – PS1 for clause B2 as there is no effective verification method for B2 contained within the Building Code.

However, we can confirm the following for the structural elements shown in our documentation.

Timber

Timber treatment has been selected in accordance with Table 1A of B2/AS1.

Concrete

Concrete covers have been selected in accordance with NZS3101, Part 1, Section 3.

We trust this provides the information required.

Please contact the undersigned if you wish to discuss this matter further.

Yours faithfully,



L Kelly
BE Civil (Hons), CEngNZ
BSK CONSULTING ENGINEERS LTD

21 September 2022

Telephone 07 348 5394
 Email admin@bsk.co.nz
 314 Malfroy Road
 PO Box 23 Rotorua 3040
www.bsk.co.nz

170 KAWAHA POINT ROAD, PROPOSED RETAINING WALL – INSPECTION REGIME

The following table outlines the proposed inspections to be carried out by BSK Consulting Engineers Ltd (BSK). Note that additional inspections will be required by the local Building Consent Authority.

INSPECTION	STAGE OF INSPECTION	TYPE OF INSPECTION	INSPECTED BY
Retaining Wall Holes (depth and diameter)	Once all piles holes are dug or bored	Visual	BSK
Retaining Wall Timber	Once installed	Visual	BSK
Retaining Wall Filter Cloth and Backfill	Once installed	Visual	BSK
Handrail Structural Elements and Connections	Once installed	Visual	BSK

Please provide a minimum of 48 hours notice for all inspections.



association of
consulting and
engineering



PRODUCER STATEMENT – PS1 DESIGN

BUILDING CODE CLAUSE(S): B1/F4

JOB NUMBER: 24493

ISSUED BY: BSK CONSULTING ENGINEERS LTD
(Engineering Design Firm)

TO: LAURA TOMPKINS
(Owner/Developer)

TO BE SUPPLIED TO: ROTORUA LAKES COUNCIL
(Building Consent Authority)

IN RESPECT OF: TIMBER POLE RETAINING WALL
(Description of Building Work)

AT: 170 KAWAHA POINT ROAD, ROTORUA
(Address, Town/City)

LEGAL DESCRIPTION: LOT 2 DP47200

N/A ☐

We have been engaged by the owner/developer referred to above to provide (Extent of Engagement):

STRUCTURAL DESIGN OF TIMBER POLE RETAINING WALL AND HANDRAIL

in respect of the requirements of the Clause(s) of the Building Code specified above for Part only, as specified in the Schedule, of the proposed building work.

The design carried out by us has been prepared in accordance with:

- ☒ Compliance documents issued by the Ministry of Business, Innovation & Employment (Verification method/acceptable solution) B1/F4 and/or;
- ☒ Alternative solution as per the attached Schedule.

The proposed building work covered by this producer statement is described on the drawings specified in the Schedule, together with the specification, and other documents set out in the Schedule.

On behalf of the Engineering Design Firm, and subject to:

- Site verification of the following design assumptions: As per drawings and design report
- All proprietary products meeting their performance specification requirements;

I believe on reasonable grounds that:

- the building, if constructed in accordance with the drawings, specifications, and other documents provided or listed in the Schedule, will comply with the relevant provisions of the Building Code and that;
- the persons who have undertaken the design have the necessary competency to do so.

I recommend the CM 2 level of **construction monitoring**.

I, (Name of Engineering Design Professional) ASHLEY JOHN BOWTELL, am:

- ☒ CPEng number 1018456

and hold the following qualifications MSc Engineering Geology, CPEng

The Engineering Design Firm holds a current policy of Professional Indemnity Insurance no less than \$200,000

The Engineering Design Firm is ☒ a member of ACE New Zealand.

SIGNED BY (Name of Engineering Design Professional): ASHLEY JOHN BOWTELL

(Signature below):

Ashley John Bowtell

Digitally signed by Ashley John Bowtell
DN: C=NZ, E=Ash@bsk.co.nz, O=BSK Consulting
Engineers Limited, OU=Geotechnical, CN=Ashley John
Bowtell
Location: Tauranga
Reason: I am the author of this document
Contact Info: 0279390003
Date: 2022.09.21 16:49:00+12'00'

ON BEHALF OF (Engineering Design Firm): BSK CONSULTING ENGINEERS LTD

Date: 21/09/22

Note: This statement has been prepared solely for the Building Consent Authority named above and shall not be relied upon by any other person or entity. Any liability in relation to this statement accrues to the Engineering Design Firm only. As a condition of reliance on this statement, the Building Consent Authority accepts that the total maximum amount of liability of any kind arising from this statement and all other statements provided to the Building Consent Authority in relation to this building work, whether in tort or otherwise, is limited to the sum of \$200,000.

This form is to accompany **Form 2 of the Building (Forms) Regulations 2004** for the application of a Building Consent.

SCHEDULE to PS1

Please include an itemised list of all referenced documents, drawings, or other supporting materials in relation to this producer statement below:

BSK Structural Calculations and Site Plan (ref: 24493)

MBIE Module 1 and 6 used for methods, limits and design approach
Alternative method is the use of WALLAP software for wall design.

GUIDANCE ON USE OF PRODUCER STATEMENTS

Information on the use of Producer Statements and Construction Monitoring Guidelines can be found on the Engineering New Zealand website

<https://www.engineeringnz.org/engineer-tools/engineering-documents/producer-statements/>

Producer statements were first introduced with the Building Act 1991. The producer statements were developed by a combined task committee consisting of members of the New Zealand Institute of Architects (NZIA), Institution of Professional Engineers New Zealand (now Engineering New Zealand), Association of Consulting and Engineering New Zealand (ACE NZ) in consultation with the Building Officials Institute of New Zealand (BOINZ). The original suite of producer statements has been revised at the date of this form to ensure standard use within the industry.

The producer statement system is intended to provide Building Consent Authorities (BCAs) with part of the reasonable grounds necessary for the issue of a Building Consent or a Code Compliance Certificate, without necessarily having to duplicate review of design or construction monitoring undertaken by others.

PS1 DESIGN Intended for use by a suitably qualified independent engineering design professional in circumstances where the BCA accepts a producer statement for establishing reasonable grounds to issue a Building Consent;

PS2 DESIGN REVIEW Intended for use by a suitably qualified independent engineering design review professional where the BCA accepts an independent design professional's review as the basis for establishing reasonable grounds to issue a Building Consent;

PS3 CONSTRUCTION Forms commonly used as a certificate of completion of building work are Schedule 6 of NZS 3910:2013 or Schedules E1/E2 of NZIA's SCC 2011²

PS4 CONSTRUCTION REVIEW Intended for use by a suitably qualified independent engineering construction monitoring professional who either undertakes or supervises construction monitoring of the building works where the BCA requests a producer statement prior to issuing a Code Compliance Certificate.

This must be accompanied by a statement of completion of building work (Schedule 6).

The following guidelines are provided by ACE New Zealand and Engineering New Zealand to interpret the Producer Statement.

Competence of Engineering Professional

This statement is made by an engineering firm that has undertaken a contract of services for the services named, and is signed by a person authorised by that firm to verify the processes within the firm and competence of its personnel.

The person signing the Producer Statement on behalf of the engineering firm will have a professional qualification and proven current competence through registration on a national competence-based register such as a Chartered Professional Engineer (CPEng).

Membership of a professional body, such as Engineering New Zealand provides additional assurance of the designer's standing within the profession. If the engineering firm is a member of ACE New Zealand, this provides additional assurance about the standing of the firm.

Persons or firms meeting these criteria satisfy the term "suitably qualified independent engineering professional".

Professional Indemnity Insurance

As part of membership requirements, ACE New Zealand requires all member firms to hold Professional Indemnity Insurance to a minimum level.

The PI Insurance minimum stated on the front of this form reflects standard practice for the relationship between the BCA and the engineering firm.

Professional Services during Construction Phase

There are several levels of service that an engineering firm may provide during the construction phase of a project (CM1-CM5 for engineers³). The building Consent Authority is encouraged to require that the service to be provided by the engineering firm is appropriate for the project concerned.

Requirement to provide Producer Statement PS4

Building Consent Authorities should ensure that the applicant is aware of any requirement for producer statements for the construction phase of building work at the time the building consent is issued as no design professional should be expected to provide a producer statement unless such a requirement forms part of the Design Firm's engagement.

Refer Also:

- 1 Conditions of Contract for Building & Civil Engineering Construction NZS 3910: 2013
- 2 NZIA Standard Conditions of Contract SCC 2011
- 3 Guideline on the Briefing & Engagement for Consulting Engineering Services (ACE New Zealand/Engineering New Zealand 2004)
- 4 PN01 Guidelines on Producer Statements

www.acenz.org.nz

www.engineeringnz.org



Consulting Engineers

Structural - Engineering - Solutions

Telephone 07 348 5394

Email admin@bsk.co.nz

314 Malfroy Road

PO Box 23 Rotorua 3040

www.bsk.co.nz

26 July 2023

N & L Tompkins
nicnlolo@gmail.com

Dear Nick and Laura,

RE: LETTER OF AUTHORISATION TO ACT AS AGENT FOR BUILDING CONSENT

OUR REF: 24493

This letter is to confirm that Nick Tompkins and Laura Forlong, as the owners of the property at 170 Kawaha Point Road, Rotorua, give authorisation for BSK Consulting Engineers Ltd to act as the agent for the Building Consent application relating to the proposed retaining wall.

Please sign and date below confirming that you agree to the above.

Name NICK TOMPKINS

Signed 

Date 26/07/23

Regards,

Liam Kelly

Providing the services of
Chartered Professional Engineers





Form 2

Application No/BC: _____
Property ID #: _____

SIMPLE

APPLICATION FOR PROJECT INFORMATION MEMORANDUM AND/OR BUILDING CONSENT Section 33 or 45, Building Act 2004

Garage/Carport ☐ Decks ☐ Retaining ☐ Farm Buildings ☐ Temp Structure ☐

1. THE BUILDING [if item is not applicable put N/A in the space]

Street address of building: _____

[If no street address – details of nearest intersection] _____

Legal description of land where building is located: Lot _____ DP _____ Site area: _____ m²
Sec _____ Block _____

Building name: _____ Valuation No: _____

Location of building within site/block number: [Include nearest street access] _____

Number of levels: [Above & below ground] _____

Level/Unit No: _____ Floor area: _____ (sq m) [Indicate area affected by the building work] Current, lawfully
established, use: _____ Year First Constructed: _____ [Add no. of occupants per
level and per use if more than 1] _____

2. OWNER

Name of Owner: _____

Contact person: _____

Mailing address: _____

Street address/registered office: _____

Phone No: _____ Landline: _____

Mobile: _____ Daytime: _____

After hours: _____ Facsimile: _____

Email: _____

Website _____

THE FOLLOWING EVIDENCE OF OWNERSHIP IS ATTACHED:

- ☐ Certificate of Title ☐ Lease Agreement
☐ Agreement for Sale and Purchase ☐ Other document

3. AGENT [Only required if application is being made on behalf of the owner]

Name of Agent: _____

Contact person: _____

Mailing address: _____

Street address/registered office: _____

Phone No: _____ Landline: _____

Mobile: _____ Daytime: _____

After hours: _____ Facsimile: _____

Email: _____

Website _____

Relationship to owner: [State details of the authorisation from the
owner to make the application on the owner's behalf] _____

FIRST POINT OF CONTACT [Mark boxes as appropriate]

Further information ☐ Agent ☐ Owner

Correspondence ☐ Agent ☐ Owner

Invoicing: ☐ Agent ☐ Owner

Additional copy of Code Compliance Certificate ☐

4. APPLICATION [Tick if applicable]

I, [name] request that you issue one of the following *[for the building work described in this application]*:

Signature: _____

Signature: _____ Date: _____

The signature is that of the ☐ Owner OR the ☐ Agent on behalf of and with the approval of the Owner.

☐ Building Consent

☐ Project Information Memorandum (PIM)

☐ Staged Consent

Existing PIM No [if applicable] is: _____

Restricted Building Work applicable? ☐ Yes ☐ No

Cultural or Heritage Significance? ☐ Yes ☐ No

Financial assistance package [FAP] re-clad application -
or claim under FAP scheme? ☐ Yes ☐ No If yes, FAP claim number: _____

National Multiple Use Approval? ☐ Yes ☐ No If yes, NUA number: _____

To be completed in lieu of Authorisation Letter:

I, _____ as the owner of the property, authorise _____ to act as my agent.

Signature: _____

Signature: _____ Date: _____

5. PRIVACY INFORMATION

The information you have provided on this form is required so that your building consent application can be processed under the Building Act 2004. The Council collates statistics relating to issued building consents and has a statutory obligation to forward these regularly to Statistics New Zealand. The Council stores the information on a public register, which must be supplied (as previously determined by the Ombudsman) to whoever requests the information. Under the Privacy Act 2020 you have the right to see and correct personal information the Council holds about you.

6. THE PROJECT

Description of Building Work: *[Provide sufficient information below to enable scope of work to be fully understood]*

Will the building work result in a change of use of the building? ☐ Yes ☐ No If Yes, provide details of the new use of the building: _____

Intended life of the building if less than 50 years: _____ *[Years]*

List Building Consents previously issued for this project (if any): _____

Estimated value of the building work on which the building levy will be calculated *[including goods and services tax]*:

\$ _____ *[State estimated value as defined in section 7 of the Building Act 2004]*

7. RESTRICTED BUILDING WORK

Will the building work include any restricted building work? ☐ Yes ☐ No If Yes, please provide the following details of all licensed building practitioners who will be involved in carrying out or supervising the restricted building work *[If these details are unknown at the time of the application, they must be supplied before the building work begins]*.

Complete in contacts section below

8. CONTACTS [Provide all details where relevant]

Please provide the following details of all practitioners who will be involved in carrying out or supervising the building work regardless of whether it is restricted building work.

DESIGNER:

Name: _____

Address: _____

Email: _____

Telephone: _____ LBP No: _____

License Class: DESIGN

ENGINEER:

Name: _____

Address: _____

Email: _____

Telephone: _____ Reg No: _____

License Class: DESIGN

BUILDER:

Name: _____

Address: _____

Email: _____

Telephone: _____ LBP No: _____

License Class: CARPENTRY

BRICK / BLOCK LAYER:

Name: _____

Address: _____

Email: _____

Telephone: _____ Reg No: _____

License Class: BLOCKLAYING

ROOFER:

Name: _____

Address: _____

Email: _____

Telephone: _____ Reg No: _____

License Class: ROOFING or CARPENTRY (delete one)

EXTERNAL PLASTERER:

Name: _____

Address: _____

Email: _____

Telephone: _____ Reg No: _____

License Class: EXTERNAL PLASTERING

FOUNDATIONS / FLOORS:

Name: _____

Address: _____

Email: _____

Telephone: _____ Reg No: _____

License Class: FOUNDATIONS or CARPENTRY (delete one)

GAS FITTER:

Name: _____

Address: _____

Email: _____

Telephone: _____ Reg No: _____

PLUMBER:

Name: _____

Address: _____

Email: _____

Telephone: _____ Reg No: _____

DRAIN LAYER:

Name: _____

Address: _____

Email: _____

Telephone: _____ Reg No: _____

LICENSED BUILDING PRACTITIONER:

Name: _____

Address: _____

Email: _____

Telephone: _____ Reg No: _____

License Class: _____

OTHER KEY PERSONNEL:

Name: _____

Address: _____

Email: _____

Telephone: _____ Reg No: _____

License Class: _____

9. PROJECT INFORMATION MEMORANDUM [Do not fill in this section if the application is for a building consent only]

The following matters are involved in the project: *[Tick the matters relevant to the project]*

- ☐ Subdivision
- ☐ Alterations to land contours *[e.g. digging out the site for a building platform]*
- ☐ New or altered connections to public utilities *[e.g. Council sewer, storm water or water mains]*
- ☐ New or altered locations and/or external dimensions of buildings
- ☐ New or altered access for vehicles
- ☐ Building work over or adjacent to any road or public place
- ☐ Disposal of storm water and wastewater
- ☐ Building work over any existing drains or sewers or in close proximity to wells or water mains
- ☐ Other matters known to the applicant that may require authorisations from the Territorial Authority: *[Specify]*

The following plans and specifications are attached to this application:

10. COMPLIANCE METHODS:

Building Code Clause <i>Tick relevant clauses</i>	Acceptable Solution & NZS 4121 Accessible Design	Verification Method	Alternative Solution [Supporting documents listed below]	Waiver/ Modification [Supporting documents listed below]	Proposed Inspections
<input type="checkbox"/> B1 Structure	<input type="checkbox"/> AS/NZS1170 <input type="checkbox"/> B1/AS1 <input type="checkbox"/> B1/AS2 <input type="checkbox"/> B1/AS3 <input type="checkbox"/> NZS4229 <input type="checkbox"/> Other	<input type="checkbox"/> B1/VM1 <input type="checkbox"/> B1/VM2 <input type="checkbox"/> B1/VM3 <input type="checkbox"/> B1/VM4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Council <input type="checkbox"/> Engineer <input type="checkbox"/> Other <i>(Specify)</i> : _____
<input type="checkbox"/> B2 Durability	<input type="checkbox"/> B2/AS1	<input type="checkbox"/> B2/VM1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Council <input type="checkbox"/> Engineer <input type="checkbox"/> Other <i>(Specify)</i> : _____
<input type="checkbox"/> C1-6 Protection from Fire	<input type="checkbox"/> C/AS1 <input type="checkbox"/> C/AS2	<input type="checkbox"/> C/VM1 <input type="checkbox"/> C/VM2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Council <input type="checkbox"/> Engineer <input type="checkbox"/> Other <i>(Specify)</i> : _____
<input type="checkbox"/> D1 Access routes	<input type="checkbox"/> D1/AS1 <input type="checkbox"/> NZS 4121	<input type="checkbox"/> D1/VM1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Council <input type="checkbox"/> Engineer <input type="checkbox"/> Other <i>(Specify)</i> : _____
<input type="checkbox"/> E1 Surface water	<input type="checkbox"/> E1/AS1 <input type="checkbox"/> E1/AS2	<input type="checkbox"/> E1/VM1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Council <input type="checkbox"/> Other <i>(Specify)</i> : _____
<input type="checkbox"/> E2 External moisture	<input type="checkbox"/> E2/AS1 <input type="checkbox"/> E2/AS2 <input type="checkbox"/> E2/AS3 <input type="checkbox"/> E2/AS4 <input type="checkbox"/> SED	<input type="checkbox"/> E2/VM1 <input type="checkbox"/> E2/VM2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Council <input type="checkbox"/> Other <i>(Specify)</i> : _____
<input type="checkbox"/> E3 Internal moisture	<input type="checkbox"/> E3/AS1 <input type="checkbox"/> E3/AS2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Council <input type="checkbox"/> Other <i>(Specify)</i> : _____
<input type="checkbox"/> F1 Hazardous agents on site	<input type="checkbox"/> F1/AS1	<input type="checkbox"/> F1/VM1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Council <input type="checkbox"/> Other <i>(Specify)</i> : _____
<input type="checkbox"/> F2 Hazardous building materials	<input type="checkbox"/> F2/AS1	<input type="checkbox"/> F2/VM1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Council <input type="checkbox"/> Other <i>(Specify)</i> : _____

<input type="checkbox"/> F4 Safety from falling	<input type="checkbox"/> F4/AS1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Council <input type="checkbox"/> Other (<i>Specify</i>): _____
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Building Code Clause <i>Tick relevant clauses</i>	Acceptable Solution & NZS 4121 Accessible Design	Verification Method	Alternative Solution [Supporting documents listed below]	Waiver/Modification [Supporting documents listed below]	Proposed Inspections
<input type="checkbox"/> F5 Construction and demolition hazards	<input type="checkbox"/> F5/AS1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Council <input type="checkbox"/> Other (<i>Specify</i>): _____
<input type="checkbox"/> F6 Visibility in escape routes	<input type="checkbox"/> F6/AS1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Council <input type="checkbox"/> Other (<i>Specify</i>): _____
<input type="checkbox"/> F7 Warning systems	<input type="checkbox"/> F7/AS1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Council <input type="checkbox"/> Engineer <input type="checkbox"/> Other (<i>Specify</i>): _____
<input type="checkbox"/> F8 Signs	<input type="checkbox"/> F8/AS1 <input type="checkbox"/> NZS 4121		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Council <input type="checkbox"/> Other (<i>Specify</i>): _____
<input type="checkbox"/> G4 Ventilation	<input type="checkbox"/> G4/AS1 <input type="checkbox"/> G4/AS2	<input type="checkbox"/> G4/VM1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Council <input type="checkbox"/> Other (<i>Specify</i>): _____
<input type="checkbox"/> G7 Natural light	<input type="checkbox"/> G7/AS1 <input type="checkbox"/> G7/AS2	<input type="checkbox"/> G7/VM1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Council <input type="checkbox"/> Other (<i>Specify</i>): _____
<input type="checkbox"/> G9 Electricity	<input type="checkbox"/> G9/AS1	<input type="checkbox"/> G9/VM1	<input type="checkbox"/>	<input type="checkbox"/>	By certification only
<input type="checkbox"/> G12 Water supplies	<input type="checkbox"/> G12/AS1 <input type="checkbox"/> G12/AS2	<input type="checkbox"/> G12/VM1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Council <input type="checkbox"/> Other (<i>Specify</i>): _____
<input type="checkbox"/> G13 Foul water	<input type="checkbox"/> G13/AS1 <input type="checkbox"/> G13/AS2 <input type="checkbox"/> G13/AS3	<input type="checkbox"/> G13/VM1 <input type="checkbox"/> G13/VM4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Council <input type="checkbox"/> Other (<i>Specify</i>): _____

11. WAIVER/MODIFICATION TO NZ BUILDING CODE REQUIRED FOR FOLLOWING PARTS OF CODE:

Supporting documentation attached as follows [please list]:

12. COMPLIANCE SCHEDULE:

The specified systems for the building are as follows: [specified systems are defined in regulations]

There are no specified systems in the building <input type="checkbox"/>		Applicant to complete								
Any system installed from below to be accompanied by procedures for inspection and routine maintenance. [Council to vet and verify in first column.]	COUNCIL	Existing	New	Altered	Added	Removed	Inspection performance standards	Maintenance performance standards	Reporting frequency	
Specified Systems Prescribed by Building Act 2004 Compliance Schedule Handbook 25 May 2007 (List Systems)										
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

13. ATTACHMENTS

The following documents are attached to this application: [Tick as applicable]

- ☐ Plans and specifications (list) _____

- ☐ Memoranda from licensed building practitioner(s) who carried out or supervised any design work that is restricted building work
- ☐ Project Information Memorandum
- ☐ Development contribution notice
- ☐ Certificate attached to Project Information Memorandum
- ☐ National Environmental Standard Checklist
- ☐ Other information relevant to this application: [Please specify]: _____

COUNCIL USE ONLY

ESTIMATED TOTAL VALUE OF WORK

\$ _____ GST inclusive Project floor area _____ m²

FEE PAYABLE

Project Information Memorandum	\$ _____
Building Admin / Circulation	\$ _____
Technical Processing fee	\$ _____
Inspection fee	\$ _____
Land Development fee	\$ _____
<u>LODGEMENT FEE</u>	\$ _____
Technical Processing fee	\$ _____
Inspection fee	\$ _____
Industry Levy (MBIE)	\$ _____
Industry Levy (BRANZ)	\$ _____
External Review (Geotechnical)	\$ _____
External Review (Structural)	\$ _____
Land Development	\$ _____
Compliance Schedule	\$ _____
Vehicle Crossing	\$ _____
Street Damage	\$ _____
Water Connection	\$ _____
Sewer Connection	\$ _____
Development Contribution	\$ _____
_____	\$ _____
_____	\$ _____

TOTAL BALANCE PAYABLE

\$ _____

Lodgement deposit	\$ _____
Date paid	_____
Receipt No.	_____
Consent fee balance	\$ _____
Date paid	_____
Receipt No.	_____

Granted by _____

Signature _____

Date _____

Issued by _____

Signature _____

Date _____

Please complete

Forward any refunds or further invoices to:



Building Consent Application Checklist

SIMPLE BUILDING CONSENTS

<input type="checkbox"/> Garage/Carport	<input type="checkbox"/> Decks	<input type="checkbox"/> Retaining	<input type="checkbox"/> Farm Buildings	<input type="checkbox"/> Temp Structure
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Address: _____ **Date Vetted:** _____

How to use this checklist

Use this checklist when finalising your building drawings plans to assist you to lodge a complete application and to avoid delays in processing. Your application will be accepted based on this checklist to ensure that it has sufficient information to commence processing. All items on this checklist must be circled to show that they are either provided or are not applicable to your project (N/A).

Later additional information may be requested during the processing of your building consent to confirm compliance with the Building Act, Building Code, District/City Plan and any other relevant legislation. Processing time will be suspended until information is received.

Your application will only be accepted if the information in this checklist is provided and the checklist completed.

Customer Use Circle as appropriate		Doc ref./ page #	General Documentation Required (All)	Council Use		
Yes	N/A		Application form completed in full and signed	Yes	No	N/A
Yes	N/A		Lodgment fee (refer to Schedule of Fees and Charges for amount)	Yes	No	N/A
Yes	N/A		Two (2) complete sets of drawings/report/specification/plans and other relevant documents are required	Yes	No	N/A
Yes	N/A		All drawings must meet the minimum requirements of the technical drawings standard AS/NZS1100. Index provided for plans and specifications	Yes	No	N/A
Yes	N/A		All documents including photocopies must be legible	Yes	No	N/A
Yes	N/A		All plans are to be titled and dated (or version number)	Yes	No	N/A
			Legal Documentation Required (All)			
Yes	N/A		Full, current (less than three months old) Certificate of Title	Yes	No	N/A
Yes	N/A		Sale and purchase agreement with settlement date provided and confidential information hidden (if applicable)	Yes	No	N/A

Comments – Council Use Only

Customer Use Circle as appropriate		Doc ref./ page #	Specifications and other Documentation	Council Use		
<input type="checkbox"/> Section NA				<input type="checkbox"/> Section Accepted		
Yes	N/A		Technical specifications for proprietary systems/products e.g. foundation/structural design	Yes	No	N/A
Yes	N/A		Natural hazard assessment report where applicable (erosion, falling debris, subsidence, inundation, slippage)	Yes	No	N/A
<input type="checkbox"/> Section NA			Specific Design Engineering (Complete for all types of applications)	<input type="checkbox"/> Section Accepted		
Yes	N/A		Engineering calculations and scope of works	Yes	No	N/A
Yes	N/A		Producer statements fully completed, signed and dated	Yes	No	N/A
Yes	N/A		Engineered plans or Architectural plans with engineer's details to be signed, dated and stamped	Yes	No	N/A
Yes	N/A		Proposed inspections regime	Yes	No	N/A
<input type="checkbox"/> Section NA			Site/Location Plan (Complete for all types of applications)	<input type="checkbox"/> Section Accepted		
Yes	N/A		North Point	Yes	No	N/A
Yes	N/A		Road frontage indicated and street named	Yes	No	N/A
Yes	N/A		Location of all existing and proposed buildings	Yes	No	N/A
Yes	N/A		Distance of buildings to boundaries and distance between existing and proposed buildings including eaves and gutters	Yes	No	N/A
Yes	N/A		Site levels and finished floor levels relative to Moturiki Datum survey point (if applicable)	Yes	No	N/A
Yes	N/A		Existing contours (proposed cut or fill also to be shown)	Yes	No	N/A
Yes	N/A		Building line restrictions and easements	Yes	No	N/A
Yes	N/A		Site boundaries/exclusive area boundaries for cross lease properties and common areas clearly shown	Yes	No	N/A
Yes	N/A		Show calculations and percentage of net site coverage	Yes	No	N/A
Yes	N/A		Labelled points on boundaries where overshadowing is taken from	Yes	No	N/A
Yes	N/A		Existing and proposed crossings/driveways also showing berms and footpaths. Crossings are to be clear of Council storm water sumps <i>(Note: normally one crossing per site)</i>	Yes	No	N/A
Yes	N/A		Sediment control plan	Yes	No	N/A
Yes	N/A		If building under or near transmission and or power lines, please show transmission plan area or location of power lines	Yes	No	N/A
<input type="checkbox"/> Section NA			Drainage/ Services (Complete for all types of applications)	<input type="checkbox"/> Section Accepted		
Yes	N/A		All existing SEWERS, sewer connections and sewer drain locations and depth shown including Territorial Authority services	Yes	No	N/A
Yes	N/A		Storm Water – soak holes (sizes and depths), Council drains (if applicable) disposal	Yes	No	N/A
Yes	N/A		Design for any proposed drainage including that installed behind retaining walls	Yes	No	N/A
Comments – Council Use Only						

Customer Use Circle as appropriate		Doc ref./ page #	Garages / Farm Sheds / Decks	Council Use		
<input type="checkbox"/> Section NA				<input type="checkbox"/> Section Accepted		
<input type="checkbox"/> Section NA			Floor Plan	<input type="checkbox"/> Section Accepted		
Yes	N/A		Plan of all floors describing the function of each room	Yes	No	N/A
Yes	N/A		Dimensions of proposed building work	Yes	No	N/A
Yes	N/A		Construction joints to control concrete shrinkage	Yes	No	N/A
Yes	N/A		Finished floor levels/datum, daylight angles	Yes	No	N/A
<input type="checkbox"/> Section NA			Foundation Plan	<input type="checkbox"/> Section Accepted		
Yes	N/A		Foundation details and concrete strength, post foundations (must provide resistance to uplift)	Yes	No	N/A
<input type="checkbox"/> Section NA			Structure	<input type="checkbox"/> Section Accepted		
Yes	N/A		Framing, connections, bracing layout, details and calculations	Yes	No	N/A
Yes	N/A		Fixing details including wind fixings and structure to floor/foundation	Yes	No	N/A
<input type="checkbox"/> Section NA			Elevations	<input type="checkbox"/> Section Accepted		
Yes	N/A		Claddings, openings, clearly indicated and their locations	Yes	No	N/A
Yes	N/A		Daylighting (relevant to nearest boundary, if applicable)	Yes	No	N/A
<input type="checkbox"/> Section NA			Cross Section	<input type="checkbox"/> Section Accepted		
Yes	N/A		Drawings showing constructional details of foundations, floor systems, wall, ceiling, stud heights and stud sizes, roof construction, balustrades and barriers.	Yes	No	N/A
<input type="checkbox"/> Section NA			Details	<input type="checkbox"/> Section Accepted		
Yes	N/A		Flashing details for openings, change of cladding, internal/external corners	Yes	No	N/A
Yes	N/A		Roof barge, ridge, apron, valley flashing details	Yes	No	N/A
<input type="checkbox"/> Section NA			Fire Wall (consider distance from boundary)	<input type="checkbox"/> Section Accepted		
Yes	N/A		Details provided for fire walls	Yes	No	N/A
<input type="checkbox"/> Section NA			Plumbing Fixtures (laundry or toilets in non-habitable buildings)	<input type="checkbox"/> Section Accepted		
Yes	N/A		Impervious finishes to linings and floors	Yes	No	N/A
Yes	N/A		Specifications for hot and cold water heating system (consider seismic restraints)	Yes	No	N/A
Yes	N/A		Wastes pipe size, gradient and ventilation	Yes	No	N/A

<input type="checkbox"/> Section NA		Relocatable Buildings	<input type="checkbox"/> Section Accepted		
Yes	N/A	Is the structure being relocated in more than one part? If so, please provide detail of how the building will be reconnected showing compliance with NZBC including B1 & E2.	Yes	No	N/A

Comments – Council Use Only

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Customer Use Circle as appropriate		Doc ref./ page #	Retaining Wall	Council Use		
<input type="checkbox"/> Section NA				<input type="checkbox"/> Section Accepted		
Yes	N/A		Site Plan indicating position and height of retaining walls, other buildings and drainage points to an approved outfall	Yes	No	N/A
Yes	N/A		Elevations showing original ground level, cut and fill	Yes	No	N/A
Yes	N/A		Engineering design information where required	Yes	No	N/A
Yes	N/A		Has safety from falling and loadings from barrier been considered?	Yes	No	N/A
Yes	N/A		Cross sections/details (cut, fill, height of retained ground, waterproof membrane and drainage) and height of wall indicated	Yes	No	N/A
Yes	N/A		Show cuts battered to a safe angle	Yes	No	N/A

<input type="checkbox"/> Section NA		Marquee (complete supplementary form to identify specific requirements) / Temporary Structures	<input type="checkbox"/> Section Accepted			
Yes	N/A		Floor plan, size of marquee, and proposed fixture layout	Yes	No	N/A
Yes	N/A		Supplementary "Marquee Fire Safety and Hygiene Requirement" form completed	Yes	No	N/A
Yes	N/A		Specific engineering design for temporary structures provided	Yes	No	N/A
Yes	N/A		Number and location of exits including signage	Yes	No	N/A
Yes	N/A		Specific design and flammability testing documentation provided.	Yes	No	N/A
Yes	N/A		Fire safety systems identified including emergency lighting for night time use	Yes	No	N/A
Yes	N/A		Personal hygiene provisions	Yes	No	N/A
Yes	N/A		Accessibility provisions for those with a disability	Yes	No	N/A
Yes	-		Certificate for Public Use and Code Compliance Certificate application form completed	Yes	No	N/A

Comments – Council Use Only

Council Specific Requirements – Please complete for your related Council						
<input type="checkbox"/> Section NA		Tauranga City Council			<input type="checkbox"/> Section Accepted	
Yes	N/A		Land undergoing subdivision – If the title has not yet been issued, the council may or may not accept your application. Refer to the Land Undergoing Subdivision Checklist form AC-6	Yes	No	N/A
Yes	N/A		50m ² continuous outdoor living area incorporating a 4x3m outdoor living court minimum dimension	Yes	No	N/A
<input type="checkbox"/> Section NA		Rotorua Lakes Council			<input type="checkbox"/> Section Accepted	
Yes	N/A		Soil investigation that has a conclusion readily identifiable in accordance with chapter 3 RCEIS	Yes	No	N/A
Yes	N/A		Buildings built prior to 2000 undergoing alt. or add. – Asbestos Declaration	Yes	No	N/A

Yes	N/A		Any geothermal activity on or near site, distances to proposed building work (SED where <50m to a bore or geothermal feature)	Yes	No	N/A
Yes	N/A		Relocatable Buildings – Please provide re-site report	Yes	No	N/A
<input type="checkbox"/> Section NA			Whakatane District Council	<input type="checkbox"/> Section Accepted		
Yes	N/A		Peer review required Structural <input type="checkbox"/> Geotech <input type="checkbox"/>	Yes	No	N/A
Yes	N/A		Comments required by Council 3 Water Engineers	Yes	No	N/A

<input type="checkbox"/> Section NA			Opotiki District Council	<input type="checkbox"/> Section Accepted		
<input type="checkbox"/> Section NA			South Waikato District Council	<input type="checkbox"/> Section Accepted		
Yes	N/A		Geotechnical report for new and relocatable buildings	Yes	No	N/A
Yes	N/A		Relocatable/transportable Buildings – Please provide re-site report	Yes	No	N/A
<input type="checkbox"/> Section NA			Kawerau District Council	<input type="checkbox"/> Section Accepted		
<input type="checkbox"/> Section NA			Western Bay of Plenty District Council	<input type="checkbox"/> Section Accepted		
<input type="checkbox"/> Section NA			Taupo District Council	<input type="checkbox"/> Section Accepted		
Yes	N/A		Any geothermal activity on or near site, distances to proposed building work	Yes	No	N/A
Yes	N/A		Electronic plans/documentation provided	Yes	No	N/A
Yes	N/A		Any geothermal activity on or near site, distances to proposed building work	Yes	No	N/A
Yes	N/A		Relocatable Buildings: - Please provide current photos for all elevations	Yes	No	N/A
			Please specify how you would like to receive your approved documents: (select one option) <input type="checkbox"/> USB (\$10.00) <input type="checkbox"/> Paper copy - Plans only printed to a maximum size of A3 . Due to this the scale of plans may be affected. (\$35.00 minimum fee)			

ADDITIONAL FEES

Please be aware that additional fees may be applied after lodgment deposit is paid, for inspections, processing, certificates, government levies and the like.

Person completing checklist

Name of person signing: _____	Date: _____
Signature: _____ <input type="checkbox"/> Agent <input type="checkbox"/> Owner <input type="checkbox"/> Other: _____	
Name to be on invoice: _____	
Payment Details: _____	

COUNCIL USE ONLY

Outcome of decisions – Council Use Only	Officer	Date	Time
<input checked="" type="radio"/> This application was not accepted for lodgement because documentation was incomplete			
<input checked="" type="radio"/> This application needs to be re-vetted			

<input checked="" type="radio"/> Documentation is now complete and the application is accepted for lodgement			
<input checked="" type="radio"/> Application will now proceed for compliance checking			

Project Type									
RBW	Yes <input type="checkbox"/> No <input type="checkbox"/>	Type	PIM <input type="checkbox"/> PIM/BC <input type="checkbox"/> BC <input type="checkbox"/>	Category	R1 <input type="checkbox"/> R2 <input type="checkbox"/> R3 <input type="checkbox"/> C1 <input type="checkbox"/> C2 <input type="checkbox"/> C3 <input type="checkbox"/>				
Comments – Council Use Only									