



GEOTECHNICAL REPORT – BUILDING FOUNDATION SOILS

116 Richard Street
OPOTIKI



CLIENT: Graham Brown

Project Ref. 2630-1
20 September 2024

Contact Details

Manktelow Consulting Engineers
1st Floor, 240 The Strand
P. O. Box 474
Whakatane 3158, NZ

Telephone 07 3072002

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Craig Manktelow
Chartered Geotechnical and Structural Engineer
BE(Hons) CPEng(131529) CMEngNZ IntPE(NZ) / APEC Engineer

1.0 Executive Summary

Manktelow Consulting Engineers have been engaged by the client to complete a geotechnical investigation for a new building platform at the subject site. It is proposed to construct or relocate a circa 7.8 m wide x 14.3 m long single storey light timber framed building onto the subject building platform. Claddings are expected to be light weight. Testing was done around the perimeter of the house that was pegged out by the client. This report is intended to support a building consent application to the Opotiki District Council and provides the foundation designer with the soil parameters to design building foundations.

Site investigation has included a review of on-line and background resources, drone imagery and soil testing that includes 4 No. hand tool scala penetrometer (DCP) and hand auger borelogs.

The following geohazards and potential geohazards have been identified at this site.

- Loose/soft compressible soils
- Potential liquefiable soil
- Flood water inundation

A summary of the geotechnical hazards, or geohazards, for this site, are presented in the following Table.

Table 1: Geotechnical Hazard Summary		
Geohazard	Applicable to site	Mitigation (if required)
Flood water inundation	Possible	Establish a suitable minimum building platform level based on supplied flood levels. The Regional Council state that the 2% AEP level for this site is 3.6m RL (Moturiki Datum 1953). Application of additional 0.5m freeboard reveals a minimum building platform level (BPL) for the project of 4.1m RL (Moturiki Datum 1953). Top of bearer should be at or above 4.1m RL. Confirm that this is at or above the ODC minimum building platform level.
Liquefaction	Y	The site is at risk of liquefaction, modelling under ULS conditions shows the site is classified as L2 moderate performance level, with moderate settlements likely. The site is classed as suitable for TC2 type foundations. The following is recommended for IL2 buildings on this site. • Timber floors shallow bearing conventional piled foundations are appropriate provided there is an acceptance that releveling of foundation will be required following a moderate earthquake. The Canterbury Guidance Documents provide solutions for TC2 performance level timber floors if required. • Concrete floors designed to meet TC2 performance criteria. In terms of liquefaction mitigation measures there are no requirements for IL1 buildings on this site provided there is an acceptance that the building may be damaged beyond repair following a moderate earthquake.
Expansive soils	N	The silt found during the survey are unlikely to be expansive. No mitigation measures are required.
Slope instability	N	Slope instability is not considered an issue at this site.
Loose and soft compressible soil and topsoil	Y	• Specific design of building foundations is required on this site. • Loose soils may require boxing during construction and exposed sand may be vulnerable to wind erosion. Refer Section 5.8 for mitigation measures.
Elevated ground water	N	During periods of prolonged wet weather, the watertable level will rise however is unlikely to influence foundations or construction.
Soils of limited soakage characteristics	Y	The silty soils found appear to have poor drainage properties. Stormwater design parameters should be completed per Section 5.12
Stormwater sensitive	Y	
Overland flows	Y	
Seismic shaking	Y	The effect to buildings from seismic shaking can be influenced by sound construction methods and materials composition (lightweight and ductile roofing and cladding). Shaking hazards are enhanced using construction products such as masonry cladding and concrete tile roofing.

Investigations reveal that the soils underlying this site do not comply with the minimum requirements of *NZS 3604:2011 Light Timber Framed Buildings Standard*. As such, specific engineering design was required for building foundations on this property.

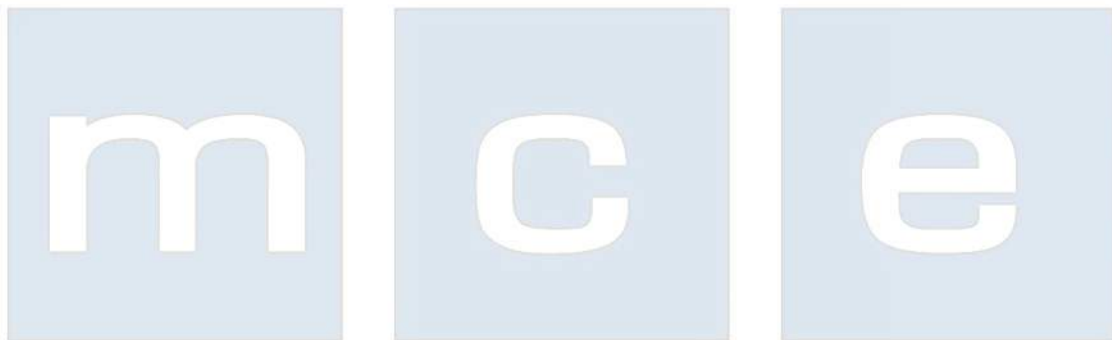
A raised vegetable garden and existing landscaping features are located within the building area. These should be removed. The excavation must be cut level and exposed natural organic free soil and be backfilled per New Zealand Standard *NZS 4431:2022: Engineered fill construction for lightweight structures*. Any filling greater than 0.6m depth or that will support a building foundation must be performed under supervision of a Chartered Engineer who is familiar with this report.

In accordance with NZS 1170.5, Clause 3.1.3 the results of our investigation suggest that the site subsoil would be Class D – Deep or Soft Soil.

Underground services were cleared below each test site however a detailed services locate was not completed as part of this investigation. This is not a guarantee that there are no services within the building platform area. It is assumed that this will be completed by others to ensure no influences at the proposed site.

Construction of a dwelling on the proposed building platform is geotechnically feasible. Geotechnical considerations will influence design. Refer to the report for more detailed requirements.

Manktelow Consulting Engineers would be happy to assist with foundation design, if required.



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Appendices

- A Bay of Plenty Regional Council Flood Level Assessment Correspondence
- B MCE Site investigation data
- C CPT liquefaction outputs

2.0 References

The following are referenced documents within this report.

1. GNS active faults and geology website, www.gns.cri.nz
2. New Zealand Standard, *Timber Framed Buildings Standard NZS 3604:2011*
3. New Zealand Standard, *NZS 1170.0-5 Structural design actions*.
4. NZ Geotechnical Society Inc's *Soil – Field Guide Sheet*, attached.
5. Ministry of Environment document titled, *Planning for Development of Land on or Close to Active Faults*, by Kerr, J et al. 2003. A guideline to assist resource management planners in New Zealand.
6. Ministry of Environment and MBIE document titled, *Planning and Engineering Guidance for Potentially Liquefaction-Prone Land*, dated September 2017.
7. *Earthquake Geotechnical Engineering Practice, Module 1: Overview of the Guidelines*, by MBIE and NZ Geotechnical Society Inc.
8. *Earthquake Geotechnical Engineering Practice, Module 3: Overview of the Guidelines*, by MBIE and NZ Geotechnical Society Inc.
9. MBIE, *Canterbury Technical Guidance A- Repairing and Rebuilding Houses Affected by the Canterbury Earthquakes*
10. Bay of Plenty Regional Council authored document titled, *Erosion and Sediment Control Guidelines for Land Disturbing Activities, Guideline 2010/1*.
11. New Zealand Standard *NZS 4431:2022: Engineered fill construction for lightweight structures*
12. Bay of Plenty Regional Council authored letter titled, *116 Richard Street, Opotiki*, dated 18 July 2024, attached.
13. Manktelow Consulting Engineers (MCE), *Soil test data sheets (x4), ref. 2630-1, dated 28/8/2024*, attached.
14. Manktelow Consulting Engineers (MCE), *Geotechnical Report- Foundation Soils, Proposed Residence, 72A King Street, Opotiki, ref. 2429-1 dated 10 June 2022*.

Definitions

The following are abbreviations used in this report.

- MCE = Manktelow Consulting Engineers
SLS= Serviceability limit state, per ref. 3
ULS= Ultimate limit state, per ref. 3
SED= Specific engineering design
CPT = Cone Penetrometer Test, mechanical rig test.
DCP = Dynamic Cone Penetrometer or scala penetrometer, hand test
RL = Reduced Level
IL = Importance Level per NZS 1170

3.0 Background

3.1 Introduction

The client, Graham Brown, intends to build or relocate a circa 7.8m wide x 14.3m long single storey light timber framed house onto the proposed building platform. A suspended timber floor and light weight claddings are proposed. This geotechnical investigation will review the foundation soils beneath the proposed building platform, assess foundation design requirements and support a building consent application to the District Council.

3.2 Desk-Top Geological Review

3.2.1 Site Location

The site is in the Opotiki township. Existing dwellings surround the site which is at the rear of an existing house.



Figure 2: Site Location (courtesy Topomap NZ)

3.2.2 Topography and Council Services

According to ODC GIS information the surrounding land is predominantly flat at approximately 4m RL (Moturiki Datum 1953) and there are piped services available to the site.



Figure 3: Site Topography (courtesy BOPRC GIS)

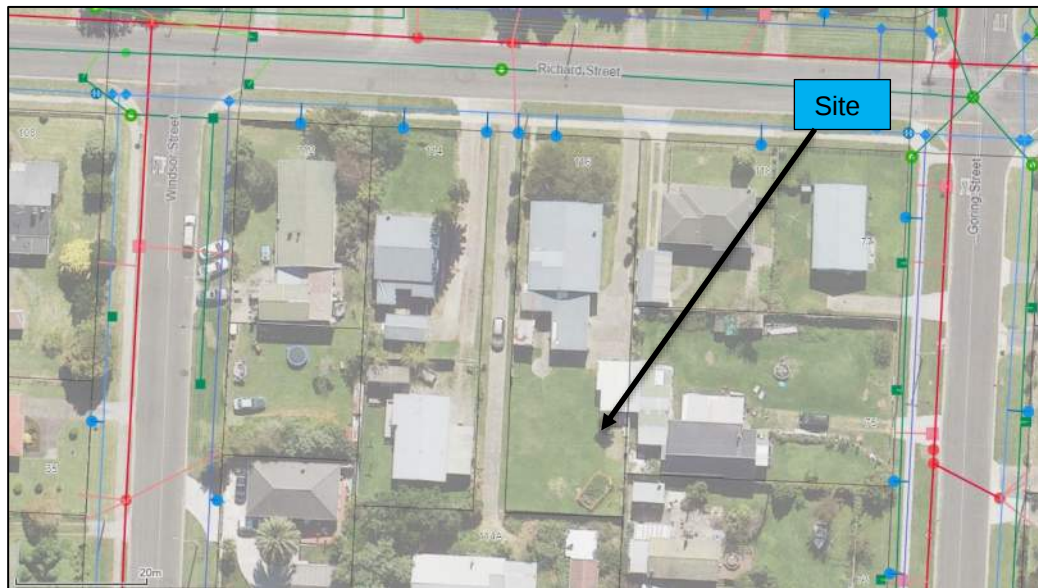


Figure 4: ODC site services (stormwater: green, sewer: red, drinking water: blue)

3.2.3 Historical Land Usage (Retrolens)

The earliest image was from 1940 which showed the front house. The 1962 image shows the site surrounded by houses. There is no evidence of bulk earthworks ever being performed or ground instability at the investigation site.



Figure 5: Aerial views by date (courtesy Retrolens)

Also, no signs of large trees or vegetation. May have been a small garage or shed in the general area that has been removed.

3.2.4 Published Geology

The NZ 1:250k GNS geological map (ref. 1) identifies the underlying geology as (QIS1) Holocene River deposits. Deposits consisting of alluvial gravel, sand, silt, mud and clay with local peat, includes modern riverbeds, aged 0.000 to 0.014 My.

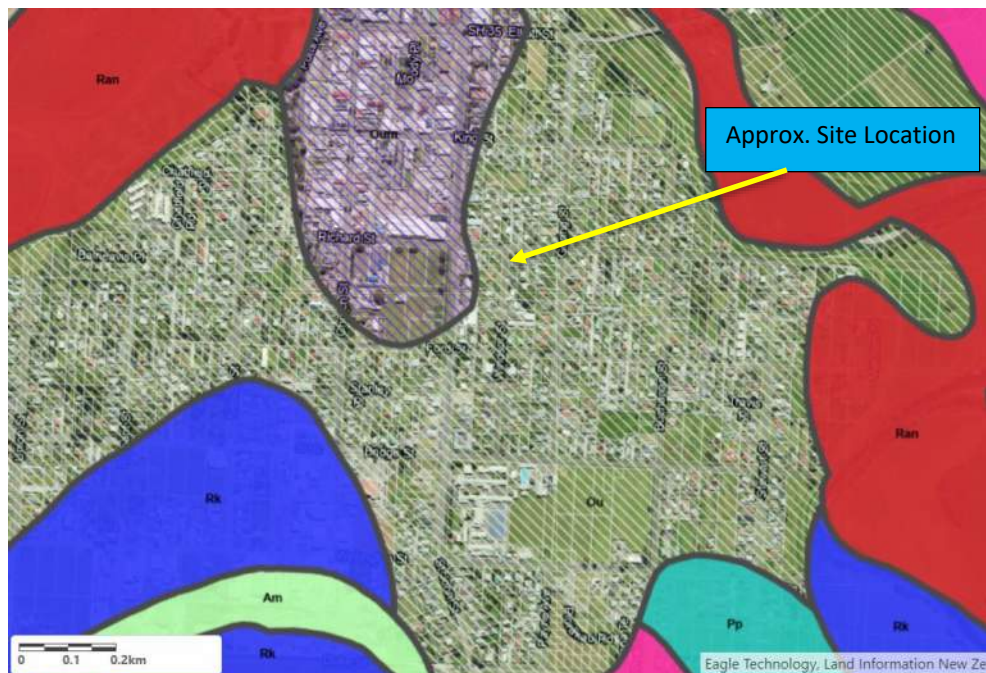


Figure 6: Regional Council BOP Soils Map

The BOP Regional Council Soil Map (<https://gis.boprc.govt.nz>) names the site soils as Opouriao fine sandy loam.

3.2.5 Seismicity – Tirohanga Fault (#30051)

With reference to the GNS active fault database website (ref.1), the closest known active fault is the Tirohanga Fault (#30051) which is located approximately ~5.8km to the east of the site. Viewed at 1:250K scale, there is a discernible gap between the site and this fault.

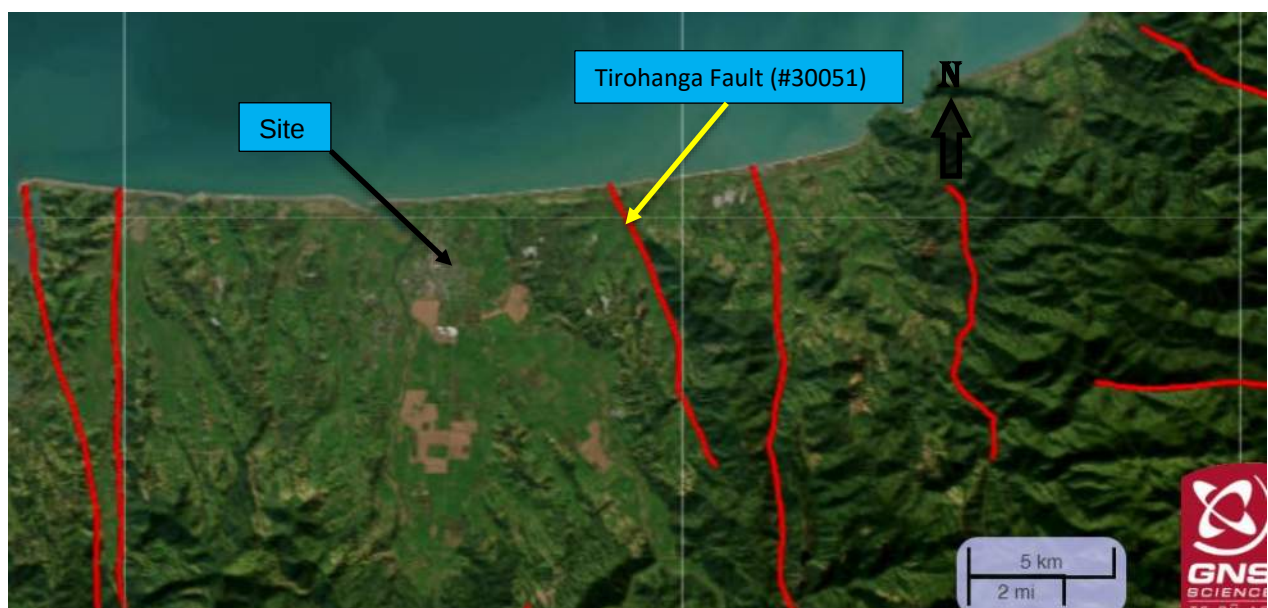


Figure 7: Active Faults (courtesy GNS Active Faults database)

3.2.6 Previous Geotechnical Investigations

The NZG database shows previously registered geotechnical investigations in the area. The green triangles show the CPT test sites that are in the same geology unit, per 6.2.4, and within 50m of the site.



Figure 8: Registered investigations 50m from site (courtesy NZG database)

The CPT data will be used to complete a CPT based liquefaction assessment. See this in a later section. The water table was viewed at 1.5m depth (dated 23/3/2023). The probe was pushed to 12m depth.

MCE have performed soil investigations at 72a King Street (ref. 14) that included CPT, which is around 250m to the northeast of the site. Some of the conclusions from this report include the following.

- For the IL2 building TC2 type foundations were suitable. At ULS levels of ground shaking circa 90mm of vertical settlement is expected.
- $LSN_{ULS} = 8-19$ with little to minor surface expression.
- Loose and soft compressible soils were encountered. Soils are interbedded sands, silty sands, silts and clays.
- Ground bearing was suitable at 0.4m depth. UBC of 75kPa was assumed at this depth.
- RL4.0m ground levels with watertable at 1.57m depth.
- Given the high watertable ground soakage is not recommended and refer to Opotiki District Council Code of Practice- Subdivision and Development Clause 5.4.5.3. for allotments with poor draining soils.

4.0 Geotechnical Site Investigation

4.1 Geomorphology

The site and surrounding ground are relatively level. Slopes will not influence the building platform.

A raised garden is in the southeastern corner of the site. This will be within the building platform.



Figure 9: view looking south at site (drone)

4.2 Soil testing

4.2.1 Hand testing

Our fieldwork included 4 No. hand-augured borelogs and scala penetrometer (DCP) probes.

DCP testing has generally been undertaken per the procedure as outlined in NZS 4402 Test 6.5.2 with results expressed as penetration mm/blow and number of blows per 100 mm and a 50-mm diameter hand auger used to reveal soil types. The NZ Geotechnical Society guidelines for *Field Description of Soil and Rock* has been used in depiction of the soils encountered and recordings taken. A copy of this guideline is attached. Borelogs and scala penetrometer (DCP) probing was extended down to depths of ~3.0 m.

The attached *plan* locates the testing locations and *Soil Test Results Sheets* summarise observations and recordings.

Description	Depth (m)	Soil moisture content	DCP range (blows/0.1m)	Shear Vane Strength (kPa)		Sensitivity Ratio
				Peak	Residual	
(FILL) only a test site C'. moderately sensitive clayey SILT, stiff	+0.60 - 0	Dry	0.5 – 1.0	58- 124	18 - 35	3.2- 3.5
(TOPSOIL organics 0.1m) clayey SILT stiff moderately sensitive	0.0 – 0.5	Dry	0.8 – 1.0	68- 92	49- 34	2.4
clayey SILT with trace fg sand, stiff to very stiff, moderately sensitive	0.5 – 2.6 (DCP to 3.1m)	Moist to saturated at 2.2m	1.0 – 8.0	78- 142	18-49	2.7- 5.9

Other than the observed fills, results were consistent across the four test sites.

4.3 Groundwater Conditions

At the time of testing the water table was not encountered down to a depth of 3.0m. Antecedent soil moisture was dry, with wintertime conditions and a small amount of rain in the preceding week.

4.4 Soakage test

We have not completed percolation testing on this site. By observation, the clayey soils are considered to have poor permeability with limited soakage.

5.0 Engineering Conditions

5.1 Introduction

The dwelling will be single storey light timber framed construction founded on timber piles. Lightweight claddings are proposed.

Based on our walkover, desktop study and site investigations, the key geotechnical aspects for this development include:

- Loose/soft compressible soils.
- Potential liquefiable soil.
- Flood water inundation.

5.2 Seismic Setting

In accordance with NZS 1170.5, Clause 3.1.3 the results of our investigation suggest that the site subsoil would be Class D – Deep or Soft Soil, given that the near surface soils are loose sands with SPT-N values of less than 6.

5.3 Faulting

The Ministry of the Environment document (ref. 6) defines a Fault Avoidance Zone for Buildings. This zone is a distance of 20m on either side of the fault rupture zone.

The fault rupture risk for this development is considered to be low and the closest known faults is the Tirohanga Fault (#30051) which is located approximately ~5.8km to the east of the site.

Whilst acknowledging the scarcity of surface outcrops on which to undertake detailed geological mapping no evidence of any surficial features or lineaments were identified during the site appraisal that would suggest active fault movement closer than that implied by the database maps, and therefore no specific investigations or design is considered to be necessary for the proposed development.

5.4 Stratigraphy

A geological model has been developed for the site based on the investigation findings. It depicts the alluvial deposits and manmade fills that mantle the proposed building platform.

The interpolated soil layering is summarised as follows.

- Shallow fills from the garden area are summed to be removed back to the underlying topsoil.
- Table 2 summarises the soil data.
- Underlying (>0.5m depth) clayey silt strength based on $78 \times 0.5 = 39\text{kPa}$ or remoulded value 20kPa undrained shear strength. Use 20kPa.

Table 3: Geotechnical Soil Properties							
Layer ID	Depth (m)	Dominant Soil Type	Suitable as vertical support for building platform	Effective Cohesion c' or S_u (kPa)	Effective friction angle ϕ' ($^\circ$)	Bulk Density γ (kN/m ³)	Stiffness Vertical (kN/m ³)
1	+0.6 – 0.0	FILL	NO	-	-	-	-
2	0.0 – 0.5	stiff SILT TOPSOIL	NO	$S_u = 17$ $c' = 1$	20	15	6000
3	0.50 – 2.6	Stiff to very stiff clayey silt	Yes	$S_u = 20$ $c' = 3$	25	17	12100
Notes: 1. Soil properties have been interpreted from specific test data. Any variation in location or soils will alter properties. 2. Lateral stiffness can be assumed to be 1/5 of vertical value. 3. No vertical bearing is permissible in Layers 1 and 2. 4. Estimates based on shear strength equation $\tau = c' + \sigma_v \tan \phi'$. In a couple of cases ϕ' has been conservatively reduced. S_u based on $0.5 \times S_{u\text{peak}}$ or remoulded value.							

5.5 Liquefaction

MBIE & the Ministry for the Environment published document “*Planning and engineering guidance for potentially liquefaction-prone land (2017)*” notes that liquefaction requires three preconditions in addition to an applied seismic load:

1. Loose non-plastic soils (typically sands and low plasticity silts)
2. Shallow saturated soils; (<4-8m depth to groundwater table, dependent on subsoil age)
3. Young (~Holocene) aged soils.

Per adjacent CPT test data, the soils are dominated by Holocene aged soils, with the saturated soils found at 2.2m depth the site would be considered at some risk of liquefaction. A CPT based risk review of seismic induced settlement was completed using Geologismiki software CLiq v.3.5.3.10 to quantify this risk.

5.5.1 Assumptions and Ground Motion Parameters

The analysis provides an insight into the susceptibility of the site. As with any settlement analysis, results should be treated as estimates of soil response to applied loads. Actual settlements may vary from that estimated.

The analysis was conducted using the ‘simplified procedure’ as summarised by Idriss and Boulanger (2014) and recommended by the New Zealand Geotechnical Society Guidelines. The soil index (I_c) values have been estimated based on the Robertson and Wride (1998) method. The Zang et al. (2004) method was used to calculate liquefaction induced reconsolidation settlements. Based on the soil types encountered soils have been assumed to be non-liquefiable when the I_c value is greater than 2.6.

Assumptions included in the analysis include the following.

- Groundwater depth of 2.2m during an earthquake.
- The building has been assigned a Building Importance Level of IL2 and a design life of at least 50 years.
- Per geotechnical module 1 (2022) peak ground accelerations used:
 - 0.44g (ULS) for 1 in 500 year-return period
 - 0.11g (SLS1) for 1 in 25 year-return period.
- Earthquake magnitude 6.1.

- Weighting factor e_v is applied and weights the volumetric strain with depth (Cetin et al (2009)).

5.5.2 Analysis and Results

The following table summarises outputs with more detailed results attached in the Appendices.

Table 4: Liquefaction analysis summary						
Case	Thickness of liquefiable layers (m)	Land Vertical Settlements (mm)	LPI	LSN	Thickness of non-liquifiable crust (m)	Surface Expression and Damage Risk
SLS	0.0	5	0	<1	>20m	None
ULS	~6.0	130	24	24	2.9	Moderate

Lateral spread is not considered a significant risk given the relatively flat nature of the land.

5.5.3 Discussion and Conclusions

Work from Ishihara (1985) and observations after the Canterbury earthquakes from Bowen (2013) and Henderson (2013) consider the benefits of a non-liquefiable crust of 3.5 to 4.0m has major benefits to foundation performance and is sufficient to prevent liquefaction induced damage even with significant thickness of liquefied soil below. Also, once the non-liquefiable crust is greater than 2.5m, sand boils or differential settlements still may be expected in this situation, however adequate bearing capacity for timber framed houses is likely to be maintained. Some of the outputs are provided in the attached appendices.

Experience from Christchurch has shown timber floors supported on piles are viable to relevel for settlements up to 100mm.

Per MBIE *Earthquake geotechnical engineering practice – Module 3* (ref. 8) the soils below this site are considered:

- L3 high performance level.

In terms of building performance criteria in terms of New Zealand Building Code Clause B1 Structure, table 11 summarises normal interpretation of B1.

The very low risk of surface expression from liquification at SLS levels of ground shaking indicates a very low risk of loss of amenity per B1.3.2.

Accurate prediction of the magnitude of earthquake induced settlements is questionable. It is possible that the building may be an economic loss following a moderate earthquake, however, there appears to be an acceptably low risk of structural collapse up to ULS levels of ground shaking for a single storey light timber framed building with a piled foundation. It is likely that in-ground services will suffer damage and require repair at ULS levels of ground shaking.

This satisfies the current building code Clause B1 requirements in terms of earthquake induced ground settlements.

Table 5.1: General performance levels for liquefied deposits

PERFORMANCE LEVEL	EFFECTS FROM EXCESS PORE WATER PRESSURE AND LIQUEFACTION	CHARACTERISTICS OF LIQUEFACTION AND ITS CONSEQUENCES	CHARACTERISTIC F_L , LPI
L0	Insignificant	No significant excess pore water pressures (no liquefaction).	$F_L > 1.4$ LPI = 0 LSN < 10
L1	Mild	Limited excess pore water pressures; negligible deformation of the ground and small settlements.	$F_L > 1.2$ LPI = 0 LSN = 5 – 15
L2	Moderate	Liquefaction occurs in layers of limited thickness (small proportion of the deposit, say 10 percent or less) and lateral extent; ground deformation results relatively small in differential settlements.	$F_L = 1.0$ LPI < 5 LSN 10 – 25
L3	High	Liquefaction occurs in significant portion of the deposit (say 30 percent to 50 percent) resulting in transient lateral displacements, moderate differential movements, and settlement of the ground in the order of 100mm to 200mm.	$F_L < 1.0$ LPI = 5 – 15 LSN = 15 – 35
L4	Severe	Complete liquefaction develops in most of the deposit resulting in large lateral displacements of the ground, excessive differential settlements and total settlement of over 200mm.	$F_L < 1.0$ LPI > 15 LSN > 30
L5	Very severe	Liquefaction resulting in lateral spreading (flow), large permanent lateral ground displacements and/or significant ground distortion (lateral strains/stretch, vertical offsets and angular distortion).	

Notes

- 1 Liquefaction of relatively thin layers of near-surface soils could be very damaging, and may produce effects equivalent to Performance Levels L3 and L4.
- 2 A relatively thin liquefied layer with low residual strength could be responsible for lateral spreading and consequent very severe effects (Performance Level L5).
- 3 LPI (Iwasaki et al., 1978) and LSN (van Ballegooy et al., 2014) are damage indices that quantify liquefaction-induced damage by combining the effects of the severity of liquefaction (value of F_L or F_S), thickness of liquefied soils and their location within the soil profile. The threshold values for these indices shown in relation to the performance levels are only indicative values. These thresholds may vary and do not cover all liquefaction cases (scenarios and ground conditions). These indices are typically applied for area-based screening, and in such applications have reasonable predictive capacity, but may mispredict damage/performance for about 20 percent to 30 percent of the cases. Maurer et al. (2014) and van Ballegooy et al. (2014) provide significant insights on liquefaction-induced land damage and its interpretation through land damage indices LPI and LSN.
- 4 All being equal (ie F_L , thickness and location of liquefied layer), liquefaction consequences and magnitude of liquefaction-induced ground deformation strongly depend on the density of the soil. LSN quantifies this effect in a simplified manner. Severity of liquefaction effects decreases with increasing density of the soils, and importantly the mechanism of ground deformation also changes as the density of the soil increases (eg flow liquefaction, zero-effective stress liquefaction, and nearly zero-effective stress transient liquefaction with cyclic mobility are characteristic types of behaviour associated with very loose, loose to medium dense, and dense sands respectively).
- 5 The LPI and LSN should be considered in the context of particular ground conditions and structure of interest. The ranges provided in the table are based on triggering calculations using Boulanger and Idriss (2014) method, and analyses and interpretation of liquefaction effects in the 2010–2011 Canterbury earthquakes.

Figure 10: Extract from MBIE Guidelines (ref. 8)

The following table summarises the normal interpretation of B1:

Table B.1: Building Code Performance Requirements of Clause B1 (Structure)

CLAUSE B1 REFERENCE	PERFORMANCE CRITERIA	
	SERVICEABILITY / AMENITY	STABILITY
B1.3.1 – low probability of instability. Relates to ULS events	NA	Gross deformation of foundations that could lead to collapse to be avoided eg bearing failure, sliding.
B1.3.2 – low probability of loss of amenity. Relates to SLS events	Avoid undue deformation of foundations and structure. Building must be readily usable after the event.	NA
B1.3.3 – lists physical conditions likely to affect building stability	NA	Includes earthquake, differential movement and adverse effects on buildings such as temporary loss of geotechnical bearing capacity due to liquefaction

Figure 11: Extract from MBIE Guideline

The following is recommended for IL2 buildings on this site.

- Timber floors shallow bearing conventional piled foundations are appropriate provided there is an acceptance that releveling of foundation will be required following a moderate earthquake.
- Concrete floors designed to meet TC2 performance criteria.

In terms of liquefaction mitigation measures there are no requirements for IL1 buildings on this site provided there is an acceptance that the building may be damaged beyond repair following a moderate earthquake.

5.6 Slope Stability

Slope instability is not considered a meaningful risk at this site. Other than footing diggings no site excavations are proposed which may require boxing to avoid sand collapse.

5.7 Static Settlement Potential - Building Gravity

Fill and thick topsoil layer was seen below the building platform. Some variations in scala penetrometer recordings were also seen which increases the risk of differential settlement. Footings that bear at least below 0.9m depth and applied bearing pressures of less than specified in Section 5.8 are recommended.

5.8 Bearing Capacity of Soil

For the site to have 'Good Ground' in accordance with NZS 3604:2011 (ref. 2) with a Geotechnical Ultimate Bearing Capacity (GUBC) of > 300kPa the Scala (DCP) readings shall not be less than 5 blows per 100mm penetration at the footing/soil interface to a depth of twice the widest footing below the underside of the proposed footing and 3 blows per 100mm penetration below this.

Soil consistently exceeding 5 blows per 100mm is not found until 2.3m depth at this location. NZS3604 foundations are not suitable for this site, specific engineering design is required.

5.8.1 Vertical Bearing Capacity

Refer to Table 4 for soil properties.

5.8.1.1 Isolated Piles and Footings

Piles should bear at least 0.9m below ground level.

Vertical pile/footing capacities should be calculated from B1/VM4 assuming the following:

1. End bearing pile (no skin friction) at 0.9m depth minimum.
2. For pile capacity design purposes only, the watertable level $D_w = 0.6\text{m}$ should be assumed.

Table 5: Geotechnical Bearing Capacity v Depth	
Depth (m)	Ultimate Geotechnical Bearing Capacity (kPa)
0.9	189
1.2	200
Notes 1. A strength reduction factor of 0.45 should be applied to these values or 0.8 for combinations including earthquake to obtain dependable structural bearing capacities for design.	

5.8.1.2 Concrete Floor

Proposed building is expected not to have a concrete floor. Consult Manktelow Consulting Engineers for bearing capacities for a concrete floor.

5.8.2 Lateral Pile Capacity

As mentioned previously, soils looser than required in NZS 3604 underlay the site. Subfloor bracing will require specific engineering design (SED) including review of pile and footings.

The New Building Code *Clause B1 – Structure Verification Method VM4* provides a procedure to determine lateral pile capacity.

Lateral pile capacity should be calculated using soil properties from Table 4 assuming a cohesionless soil. Passive resistance should also account for final ground profiles.

Long term pile capacities (for example retaining walls) should ignore contributions from the upper 0.5m depth of soil.

5.9 Expansive Soils

Expansive soils are common in the residual Auckland clays. Very few areas of expansive soils have been found within the Bay of Plenty Region. At this site the near surface silts are unlikely to be expansive.

The soils showed no signs of plasticity subsoils will not be expansive. Therefore, no mitigation measures need to be implemented.

5.10 Earthworks Guidance

At this stage there has been limited development works for the building site. No earthworks plan for the development has been proposed. Any land movements will need to consider the building platform and overland water flow paths.

Requirements from a geotechnical perspective are as follows.

- Any earthworks should be compliant with the Bay of Plenty Regional Council *Erosion and Sediment Control Guidelines for Land Disturbing Activities* (ref. 9).
- Exposed sand surfaces are vulnerable to erosion and should be protected during and post construction. Concentrated stormwater discharges should be avoided as this will cause erosion. Protection measures include grass seeded topsoil protected with mulch and rigid pavements or paths. Roof downpipes should be fitted immediately following roofing installation and piped away from the building with an erosion resistant outfall.
- If any site excavation is proposed, temporary cut faces should be located at least 1.5 x cut height away from any property boundary and covered with polythene to prevent rainwater erosion.

Any cut faces above 0.6m height should be supported by a retaining wall or battered back to 1 vertical to 2 horizontal maximum and protected from erosion.

Retaining walls supporting the neighbouring boundary or surcharge (driveway or building) or are above 1.5m height will require specific engineering design including stability review of temporary cut face.

- Locate and protect any existing underground or overhead services. Earth fills for building platforms should be per *NZS 4431:2022 - Engineered fill construction for light weight structures* (ref. 10). Earthworks should be completed under Chartered Engineer supervision and approval and should suit the individual house drawings and design. A statement of suitability provided by the supervising engineer is required.
- Topsoil, organic and compressible soil depths vary across the site which is up to 0.7m in places. This will require removal below any roadways.

- Silt and subgrade below topsoil tested with CBR 2%. As general guidance for the roadways. engineering design of the pavement cross-section including sub-base and basecourse is recommended per Austroads Pavement Design Guide. The topsoil should be removed prior to placement of sub-base. Generally, construction of roadway should be in accordance with Opotiki District Council *Engineering Code of Practice*.
- Locate and protect any existing underground or overhead services.

5.11 Flood Water Inundation

A detailed review of the risks associated with flood water has not been completed as part of this report. Comments herein are based on supplied information from the Bay of Plenty Regional Council (ref. 12).

The Regional Council state that the 2% AEP level for this site is 3.6m RL (Moturiki Datum 1953). Application of additional 0.5m freeboard reveals a minimum building platform level (BPL) for the project of 4.1m RL (Moturiki Datum 1953).

- Top of bearer should be at or above 4.1m RL. Confirm that this is at or above the ODC minimum building platform level.
- Required building platform levels should be confirmed by the District Council and a Registered Surveyor.

5.12 Stormwater Disposal

Stormwater disposal design and investigation is beyond the scope of this report.

The silt that mantles the area are susceptible to erosion if left exposed. The overall stability of the site will be subject to prudent practices in terms of vegetation and surface water control. No uncontrolled discharges of water are permitted onto the building platform. All stormwater from hard surfaces such as house roof, decks, driveways and paths should be collected and piped into the ground soakage system then overflow into the roadside kerb.

The site is considered acceptable for ground soakage of stormwater.

The following is also recommended.

- Soakhole depth should be limited to 0.9m depth.
- Soakholes should be located at least 4m away from building foundations.
- A conservative estimate of acceptance rate is 200 mm/hr.
- Ground and driveway level should direct overland water flow towards the road.

The New Zealand Building Code Approved Documents Clause E1 provides a verification method for stormwater control and disposal.

5.13 Effluent Disposal

Effluent should be piped into the town piped system. Detailed design is not part of this report.

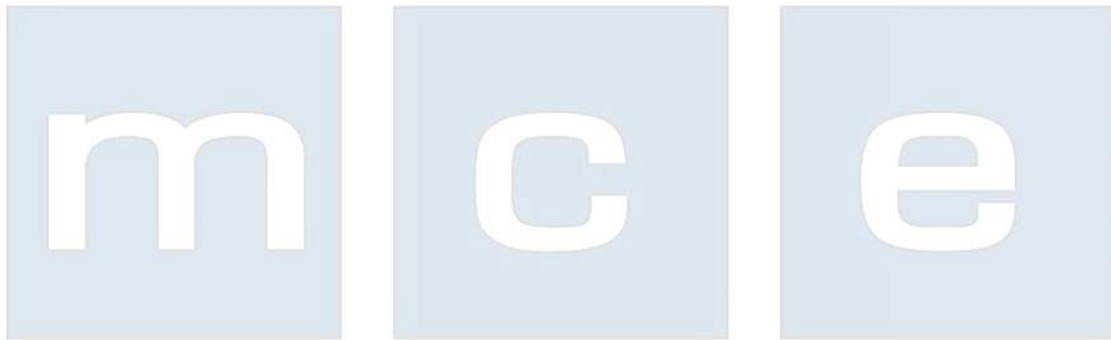
6.0 House Foundation Options

Read this section in conjunction with the previous sections of this report.

In summary for a single storey light timber framed residence on a timber floor:

- A conventional shallow bearing foundation system subject to specific engineering design (SED), site parameters are specified herein, is feasible for this site. This may require releveling after a moderate earthquake.
- The raised gardens and fill should be removed from the southeastern corner of the house.
- Foundations should bear at least 0.9m below ground level. Applied bearing pressures should be less than those values specified herein.
- Subfloor bracing pile capacities should be assessed as part of the SED review.

Manktelow Consulting Engineers would be happy to complete the specific engineering design of building foundations and/or earthworks once house drawings and final ground contours have been determined.



7.0 Report Limitations and Scope

This report reviews the foundation soils at the proposed building site and foundation design guidance in terms of geotechnical considerations and comments about stormwater disposal. This report is part of the overall project and has been prepared at the specific instruction from the client and supports a building consent application to the Opotiki District Council and should not be used for any other purpose. It may not be used or relied on (in whole or part) by anyone else, or for any other purpose or in any other contexts, without our prior written agreement.

Factual evidence has been obtained from visual inspections, 4 No. dynamic cone (scala penetrometer or DPC) and borelog test sites at the subject building site, which by their nature only provide information about a relatively small volume of subsoil, there may be special conditions pertaining to the building site which have not been disclosed and which have not been considered in the report.

No attempt has been made to locate underground services. Soil conditions in terms of Hazardous Activities and Industries List (HAIL) is specifically excluded from this report.

USE OF THIS REPORT

Site subsurface conditions cause more construction problems than any other factor and therefore are generally the largest technical risk to a project. These notes have been prepared to help you understand the limitations of your geotechnical report.

Your geotechnical report is based on project specific criteria

Your geotechnical report has been developed on the basis of our understanding of your project specific requirements and applies only to the site area investigated. Project requirements could include the general nature of the project; its size and configuration; the location of any structures on or around the site; and the presence of underground utilities. If there are any subsequent changes to your project, you should seek geotechnical advice as to how such changes affect your report's recommendations. Your geotechnical report should not be applied to a different project given the inherent differences between projects and sites.

Subsurface conditions can change

Subsurface conditions are created by natural processes and the activity of man. For example, water levels can vary with time, fill may be placed on a site and pollutants may migrate with time. Because a report is based on conditions which existed at the time of subsurface investigation, the conditions may have changed, particularly when large periods of time have elapsed since the investigations were performed.

Interpretation of factual data

Site investigations identify actual subsurface conditions at points where samples are taken. Additional geotechnical information (e.g. literature and external data source review, laboratory testing on samples, etc) are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact on the proposed development and recommended actions. Actual conditions may differ from those inferred to exist, because no professional, no matter how qualified, can exactly predict what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions.

Interpretation by other design professionals

Costly problems can occur when other design professionals develop their plans based on misinterpretations of a geotechnical report. Read all geotechnical documents closely and do not hesitate to ask any questions you may have. To help avoid misinterpretations, retain the assistance of geotechnical professionals familiar with the contents of the geotechnical report to work with other project design professionals who need to take account of the contents of the report. Have the report implications explained to design professionals who need to take account of them, and then have the design plans and specifications produced reviewed by a competent Geotechnical Engineer.

Appendix A

Regional Council Flood letter

18th July 2024

Graham Brown
116 Richard Street
Ōpōtiki
graham.brown107@gmail.com



Dear Graham,

Re: 116 Richard Street, Ōpōtiki

I have reviewed the information we have available for 116 Richard Street, Ōpōtiki. The location of the area investigated by the desktop study is outlined in the attached maps. The elevation of the land within the property boundary ranges between 3.0 and 3.6 m RL (New Zealand Vertical Datum (NZVD2016) (3.3 and 3.9 m RL Moturiki Datum 1953). The map shows the elevation of the land (from the Digital Elevation Model); with the lower elevation represented by the yellow colour.

The property is protected from the Waioeka and Otara Rivers by stopbanks that are designed and maintained to contain a 1% AEP event. While this does offer protection from the design storm event it must be kept in mind that risks associated with stopbank failure and events that exceed the design capacity still exist.

Flood level

The Ōpōtiki Operative District Plan has the following:

2.6.6 FLOOR LEVELS

2.6.6.1 Floor levels

*Floor levels shall be sufficient to ensure that water does not enter **buildings** in a 1% AEP (Annual Exceedance Probability) event within the **Coastal Environment** or 2% AEP event for areas outside the **Coastal Environment**. **Council** will determine the appropriate freeboard that needs to be added to the flood level to set the required minimum floor level (Sub 17.28).*

The stopbank design levels for the Waioeka River Urban Right bank and the Otara Urban Left bank that protect the Ōpōtiki township are 1% Annual Exceedance Probability (100 year) + freeboard of 450mm. The 3.6m floor level however does give additional protection in the event of a stopbank breach or a larger than design flood. (For more information refer to *Measure II-1: minimum floor level 3.6m for new buildings in the township* in the Waioeka Otara Floodplain Management Strategy). The Waioeka Otara Floodplain Management Strategy September 2001 was adopted following a major investigation and consultation into mitigating flood risks in Ōpōtiki. The strategy gave the commitment of both Ōpōtiki District Council and Bay of Plenty Regional Council to managing the risks. The strategy was formally adopted by both Councils and signed by both the Ōpōtiki District Council Mayor Don Reisterer Mayor and Bay of Plenty Regional Council Chairman J E Keaney. The strategy was reviewed in 2007 with no changes to Measure II-1.

Ōpōtiki District Council (ODC) may have more detailed information on flood levels from local stormwater.

BOPRC ID: A4723966

For 2% AEP flood levels BOPRC recommends to use either the 2% AEP local stormwater flood level identified by ODC or the level of 3.6m (Moturiki Datum), whichever is higher.

Additionally, if an identified house site is located within an overland flow path, the design 2% AEP flood level should be set a minimum of 0.5 m above general ground level and the building should not obstruct any existing flow paths. This level includes freeboard components for estimate imprecision and phenomena not explicitly included in the calculations. This requirement is not applicable to those house sites located on ridges.

This is not a guarantee that any new dwelling will not be affected by flooding. It is also possible that in the future, the flood levels may be superseded by more up-to-date information. The information in this letter is valid for one year from the letter date.

In determining the required minimum building floor level WDC need to consider what additional freeboard components (if any) need to be added for construction tolerances and potential bow waves generated by vehicles traversing water.

Minimum Floor Level

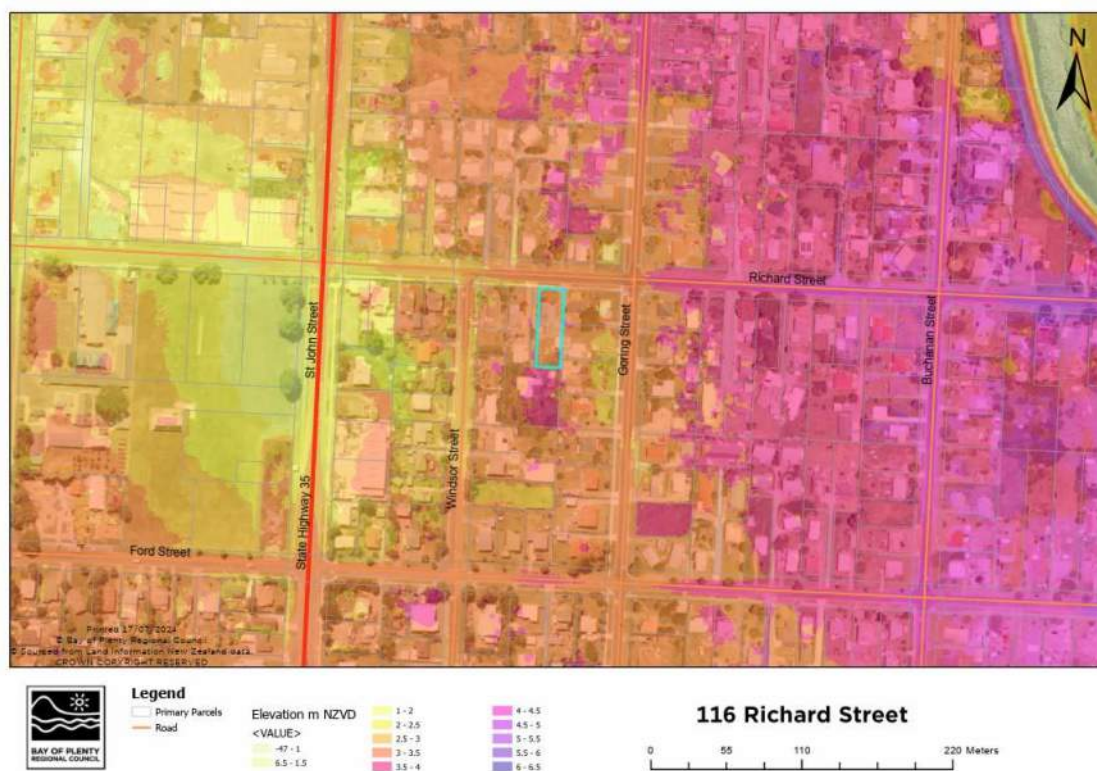
Minimum Floor Levels are set by Territorial Authorities with consideration to the New Zealand Building Code, the Resource Management Act, the applicable District Plan and the latest information available. Please contact Ōpōtiki District Council for the Minimum Floor Level for this property.

Please contact me if you have any further questions.

Yours sincerely



Rachael Medwin
Engineering Hydrologist

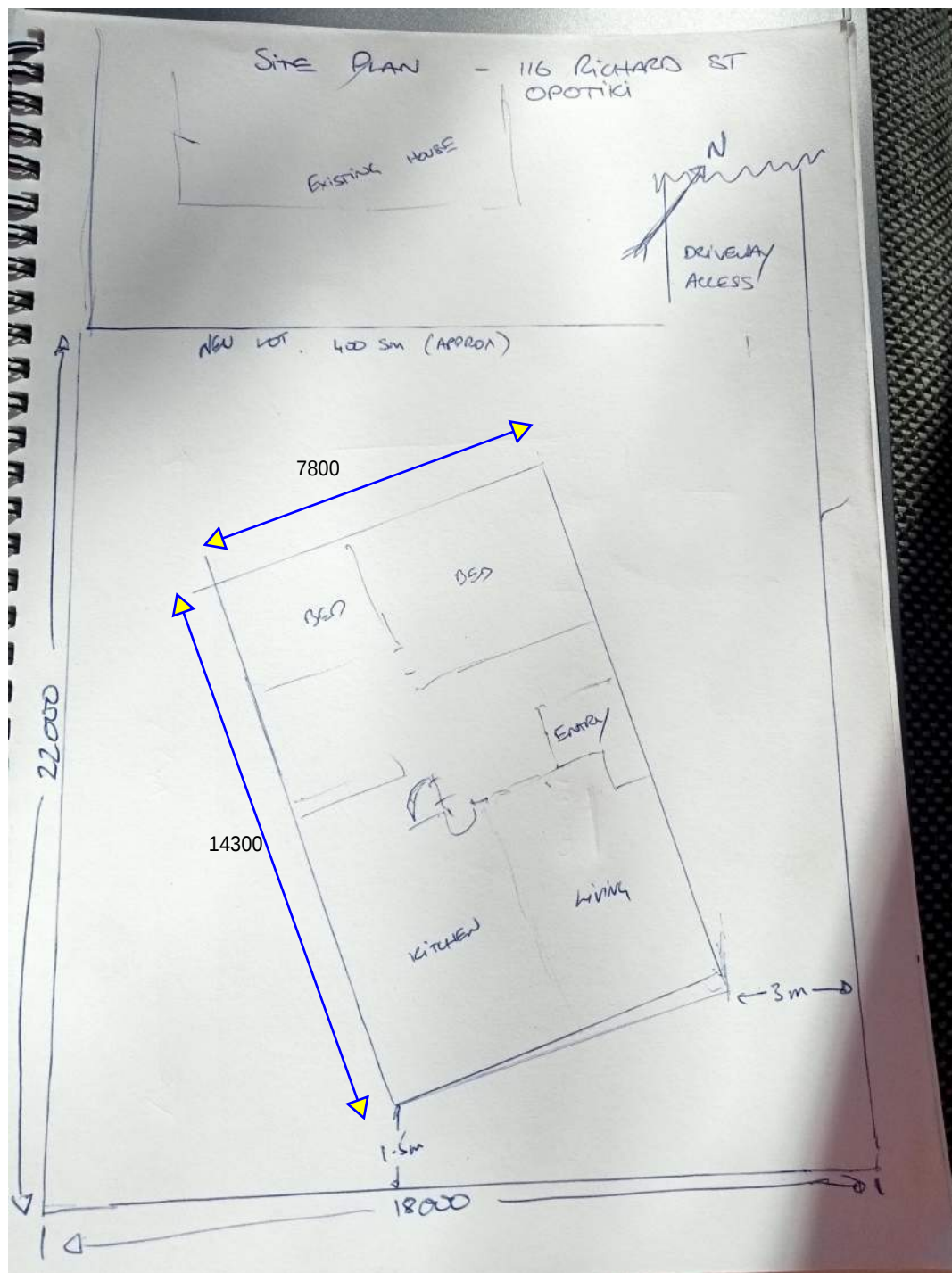


Appendix B

Client Site Plan

MCE Soil Test data

Bearing capacity calcs





SOIL

> field guide sheet

FIELD DESCRIPTION OF SOIL

SEQUENCE OF TERMS – fraction – colour – structure – strength – moisture – bedding – plasticity – sensitivity – additional

GRAIN SIZE CRITERIA

TYPE	COARSE								FINE		ORGANIC
	Boulders	Cobbles	Gravel			Sand			Silt	Clay	Organic Soil
Size Range (mm)	200	60	20	6	2	0.6	0.2	0.06	0.002		
Graphic Symbol											

PROPORTIONAL TERMS DEFINITION (COARSE SOILS)

Fraction	Term	% of Soil Mass	Example
Major	(...) [UPPER CASE]	≥ 50 [major constituent]	GRAVEL
Subordinate	(...) y [lower case]	20 – 50	Sandy
Minor	with some ... with minor ...	12 – 20 5 – 12	with some sand with minor sand
	with trace of (or slightly)...	< 5	with trace of sand (slightly sandy)

DENSITY INDEX (RELATIVE DENSITY) TERMS

Descriptive Term	Density Index (I _D)	SPT "N" value (blows / 300 mm)	Dynamic Cone (blows / 100 mm)
Very dense	> 85	> 50	> 17
Dense	65 – 85	30 – 50	7 – 17
Medium dense	35 – 65	10 – 30	3 – 7
Loose	15 – 35	4 – 10	1 – 3
Very loose	< 15	< 4	0 – 2

Note: • No correlation is implied between Standard Penetration Test (SPT) and Dynamic Cone Test values.
• SPT "N" values are uncorrected. • Dynamic Cone Penetrometer (Scala)

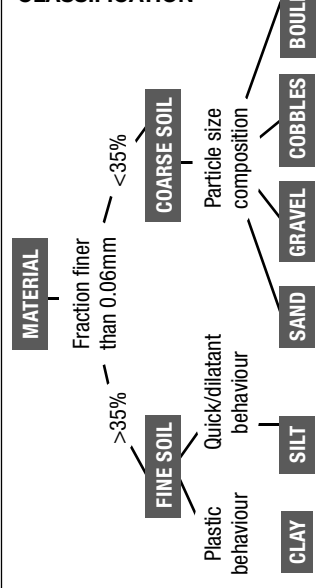
ORGANIC SOILS/ DESCRIPTORS

Term	Description
Topsoil	Surficial organic soil layer that may contain living matter. However topsoil may occur at greater depth, having been buried by geological processes or man-made fill, and should then be termed a buried topsoil.
Organic clay, silt or sand	Contains finely divided organic matter; may have distinctive smell; may stain; may oxidise rapidly. Describe as for inorganic soils.
Peat	Consists predominantly of plant remains. Firm: Fibres already compressed together Spongy: Very compressible and open structure Plastic: Can be moulded in hand and smears in fingers Fibrous: Plant remains recognisable and retain some strength Amorphous: No recognisable plant remains
Roolets	Fine, partly decomposed roots, normally found in the upper part of a soil profile or in a redeposited soil (e.g. colluvium or fill)
Carbonaceous	Discrete particles of hardened (carbonised) plant material.

PLASTICITY (CLAYS & SILTS)

Term	Description
High plasticity	Can be moulded or deformed over a wide range of moisture contents without cracking or showing any tendency to volume change
Low plasticity	When moulded can be crumbled in the fingers; may show quick or dilatant behaviour

SOIL CLASSIFICATION



CONSISTENCY TERMS FOR COHESIVE SOILS

Descriptive Term	Undrained Shear Strength (kPa)	Diagnostic Features
Very soft	< 12	Easily exudes between fingers when squeezed
Soft	12 – 25	Easily indented by fingers
Firm	25 – 50	Indented by strong finger pressure and can be indented by thumb pressure
Stiff	50 – 100	Cannot be indented by thumb pressure
Very stiff	100 – 200	Can be indented by thumb nail
Hard	200 – 500	Difficult to indent by thumb nail

MOISTURE CONDITION

Condition	Description	Granular Soils	Cohesive Soils
Dry	Looks and feels dry	Run freely through hands	Hard, powdery or friable
Moist	Feels cool, darkened in colour	Tend to cohere	Weakened by moisture, but no free water on hands when remoulding
Wet			Weakened by moisture, free water forms on hands when handling
Saturated	Feels cool, darkened in colour and free water is present on the sample		

GRADING (GRAVELS & SANDS)

Term	Description	
Well graded	Good representation of all particle sizes from largest to smallest	
Poorly graded	Limited representation of grain sizes - further divided into:	
	Uniformly graded	Most particles about the same size
	Gap graded	Absence of one or more intermediate sizes

NZ GEOTECHNICAL SOCIETY INC

This field sheet has been taken from and should be used and read with reference to the document FIELD DESCRIPTION OF SOIL AND ROCK. Guideline For the Field Classification and Description of Soil and Rock for Engineering Purposes. NZ Geotechnical Society Inc, December 2005. www.nzgeotechsoc.org.nz

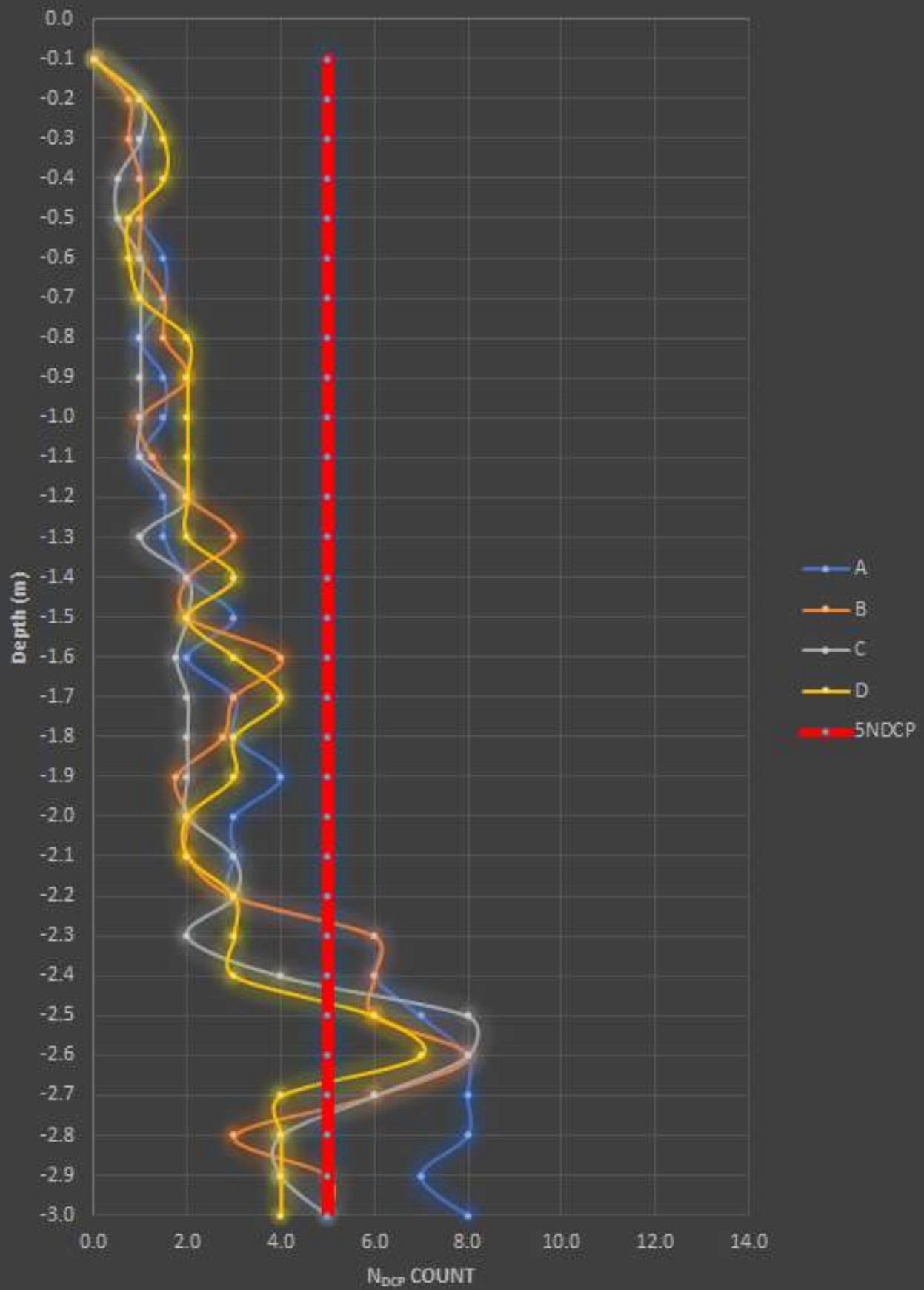
SOIL INVESTIGATION LOG										
mce manktelow consulting engineers		Client: Graham Brown Project: New dwelling Location: 116 Richard St, Opotiki GPS: Elevation:			Job No.: 2630-1 Test No.: Date: 28/08/2024 Logged by: R.L.P. Checked by: C.M.					
GEOLOGY	GEOTECHNICAL INTERPRETATION	Depth	Water table	Graphic Log	DCP N-Value	Density / Consistency	N-DCP Plot (Blows per 100/mm)	Shear Vane PEAK (kPa)	Shear Vane Remoulded (kPa)	Sensitivity
Holocene river deposits	(topsoil) dark brown, SILT, clayey, trace fg sand	-0.1		TS	0.0			79	17	4.6
		-0.2		TS	1.0	Stiff				
		-0.3		TS	1.0					
		-0.4		TS	1.0					
	at 0.4m- SILT, clayey, slightly plastic, light brown	-0.5			1.0	Stiff				
		-0.6			1.5					
		-0.7			1.5					
		-0.8			1.0					
		-0.9			1.5	Stiff				
		-1.0			1.5					
		-1.1			1.0					
		-1.2			1.5					
		-1.3			1.5					
		-1.4			2.0	V Stiff				
		-1.5			3.0					
		-1.6			2.0					
	moist SILT, clayey, slightly plastic, light brown	-1.7			3.0	Stiff				
		-1.8			3.0					
		-1.9			4.0					
		-2.0			3.0					
	saturated SILT, clayey, slightly plastic, light brown	-2.1			3.0					
		-2.2			3.0					
		-2.3			6.0	Stiff				
		-2.4			6.0					
	difficult to recover sample (possible sand)	-2.5			7.0					
	At 2.6m End of bore (unable to recover sample)	-2.6			8.0					
		-2.7			8.0					
		-2.8			8.0					
	-2.9			7.0						
	-3.0			8.0						
	-3.1									
	-3.2									
	-3.3									
	-3.4									
	-3.5									
	-3.6									
	-3.7									
	-3.8									
	-3.9									
	-4.0									
	-4.1									
	-4.2									
	-4.3									
	-4.4									
	-4.5				Firm					
	-4.6									
	-4.7									
	-4.8									
	-4.9									
PHOTOGRAPHS					NOTES					
Top → Deeper → Bottom Deeper					Notes:				KEY GRAVEL SAND silty-SAND sandy-SILT SILT CLAY FILL	

SOIL INVESTIGATION LOG										
mce manktelow consulting engineers		Client: Graham Brown			Job No.: 2630-1		Test No.: Loc B			
		Project: New dwelling			Test No.:		Date: 28/08/2024			
		Location: 116 Richard St, Opotiki			Date:		Logged by: R.L.P.			
		GPS:			Logged by:		Checked by: C.M.			
		Elevation:			Checked by:					
GEOLOGY	GEOTECHNICAL INTERPRETATION	Depth	Water table	Graphic Log	DCP N-Value	Density / Consistency	N-DCP Plot (Blows per 100/mm)	Shear Vane PEAK (kPa)	Shear Vane Remoulded (kPa)	Sensitivity
Holocene river deposits	(topsoil) dark brown, SILT, clayey, trace fg sand	-0.1		TS	0.0					
		-0.2		TS	0.8	Stiff		71	28	2.5
		-0.3		TS	0.8					
		-0.4		TS	1.0					
		-0.5		TS	1.0	Stiff		73	28	2.6
	at 0.5m- light yellowy/brown, clayey SILT	-0.6			1.0					
		-0.7			1.5					
		-0.8			1.5					
		-0.9			2.0	V Stiff		110	31	3.5
		-1.0			1.0					
		-1.1			1.3					
		-1.2			2.0	V Stiff		120	45	2.7
	moist, light yellowy/brown, clayey SILT	-1.3			3.0					
		-1.4			2.0					
		-1.5			2.0					
		-1.6			4.0	Vstiff		142	49	2.9
		-1.7			3.0					
		-1.8			2.8					
		-1.9			1.8					
		-2.0			2.0					
		-2.1			2.0					
		-2.2			3.0					
		-2.3			6.0					
		-2.4			6.0					
		-2.5			6.0					
		-2.6			8.0					
		-2.7			6.0					
		-2.8			3.0					
	-2.9			5.0						
	-3.0			5.0						
	-3.1									
	-3.2									
	-3.3									
	-3.4									
	-3.5									
	-3.6									
	-3.7									
	-3.8									
	-3.9									
	-4.0									
	-4.1									
	-4.2									
	-4.3									
	-4.4									
	-4.5									
	-4.6									
	-4.7									
	-4.8									
	-4.9									
PHOTOGRAPHS					NOTES					
Top → Deeper → Bottom					Notes:					
					KEY GRAVEL SAND silty-SAND sandy-SILT SILT CLAY FILL					

SOIL INVESTIGATION LOG												
mce manktelow consulting engineers		Client: Graham Brown Project: New dwelling Location: 116 Richard St, Opotiki GPS: Elevation: around 0.6m above surrounding GL			Job No.: 2630-1 Test No.: Date: 28/08/2024 Logged by: R.L.P. Checked by: C.M.							
GEOLOGY	GEOTECHNICAL INTERPRETATION	Depth	Water table	Graphic Log	DCP N-Value	Density / Consistency	N-DCP Plot (Blows per 100/mm)			Shear Vane PEAK (kPa)	Shear Vane Remoulded (kPa)	Sensitivity
fills	(mixture - fill), yellowy brown, clayey SILT and dark brown, garden filling	-0.1			0.0	V Stiff	1	5	10	124	35	
		-0.2			1.0							
		-0.3			1.0							
		-0.4			0.5							
		-0.5			0.5							
		-0.6			1.0							
Holocene river deposits	at 0.6m- dark brown, clayey SILT at 0.7m - yellow/brown clayey SILT, trace fg sand	-0.7	TS	1.0	Stiff	1	5	10	82	20		
		-0.8	TS	1.0								
		-0.9		1.0	Stiff							
		-1.0		1.0								
		-1.1		1.0								
		-1.2		2.0								
		-1.3		1.0								
		-1.4		2.0								
		-1.5		2.0								
		-1.6		1.8								
		-1.7		2.0								
		-1.8		2.0								
		-1.9		2.0								
		-2.0		2.0								
		-2.1		3.0								
		-2.2		3.0								
		-2.3		2.0								
		-2.4		4.0								
		-2.5		8.0								
		-2.6		8.0								
	At 2.6m End of bore	-2.7		6.0	Soft	1	5	10				
		-2.8		4.0								
		-2.9		4.0								
		-3.0		5.0								
		-3.1										
		-3.2										
		-3.3										
		-3.4										
		-3.5										
		-3.6										
		-3.7										
		-3.8										
		-3.9										
		-4.0										
		-4.1										
-4.2												
-4.3												
-4.4												
-4.5												
-4.6												
-4.7												
-4.8												
-4.9												
PHOTOGRAPHS					NOTES							
Top → Deeper → Bottom					Notes:							
					KEY GRAVEL SAND silty-SAND sandy-SILT SILT CLAY FILL							

SOIL INVESTIGATION LOG														
mce manktelow consulting engineers		Client: Graham Brown			Job No.: 2630-1		2630-1							
		Project: New dwelling			Test No.:		Loc D							
		Location: 116 Richard St, Opotiki			Date:		28/08/2024							
		GPS:			Logged by:		R.L.P.							
		Elevation:			Checked by:		C.M.							
GEOLGY	GEOTECHNICAL INTERPRETATION	Depth	Water table	Graphic Log	DCP N-Value	Density / Consistency	N-DCP Plot (Blows per 100/mm)	Shear Vane PEAK (kPa)	Shear Vane Remoulded (kPa)	Sensitivity				
Holocene river deposits	dark brown, clayey SILT (TOPSOIL)	-0.1		TS	0.0	V Stiff	1510 1005 500 100 50 10	113 92	42 17					
		-0.2		TS	1.0									
		-0.3		TS	1.5									
		-0.4		TS	1.5									
		-0.5		TS	0.8									
		at 0.5m- yellow/brown clayey SILT, trace fg sand	-0.6			0.8					Stiff			
		-0.7			1.0									
		-0.8			2.0									
		-0.9			2.0									
		-1.0			2.0									
		-1.1			2.0									
		-1.2			2.0									
		-1.3			2.0									
		-1.4			3.0									
		-1.5			2.0									
		-1.6			3.0									
		-1.7			3.0									
		-1.8			4.0									
		-1.9			3.0									
		-2.0			2.0									
	At 2.0m End of bore	-2.1			2.0									
		-2.2			3.0									
		-2.3			3.0									
		-2.4			3.0									
		-2.5			6.0									
		-2.6			7.0									
		-2.7			4.0									
		-2.8			4.0									
		-2.9			4.0									
		-3.0			4.0									
		-3.1			4.0									
		-3.2												
		-3.3												
		-3.4												
		-3.5												
		-3.6												
		-3.7												
		-3.8												
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		-4.2												
		-4.3												
		-4.4												
		-4.5												
		-4.6												
		-4.7												
		-4.8												
		-4.9												
PHOTOGRAPHS					NOTES									
Top Deeper Bottom					Notes:					KEY GRAVEL SAND silty-SAND sandy-SILT SILT CLAY FILL				

Combined N_{DCP} Values vs Depth



SESOC | SOILS

Version: 3.3.2.2156, Published: 25 Apr 2024

Soils design to N.Z. Building Code document B1/VM4

DESIGNER: CM

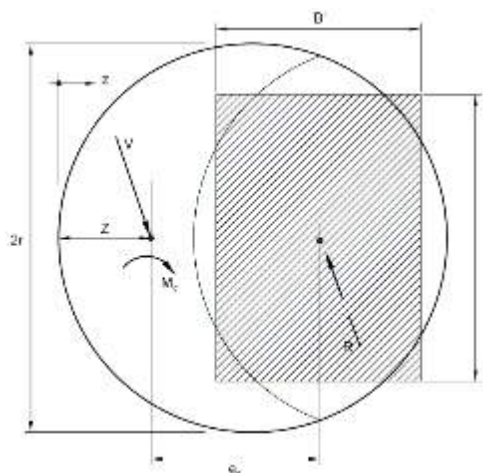
PROJECT: 116 Richard Street, Opotiki

DESCRIPTION: 600 dia x 0.9m depth

ANALYSIS ID:

DATE: 25/09/2024 TIME: 5:09 pm

PAD FOOTING - CIRCULAR



THE LOADING CONDITION CHOSEN IS SHORT TERM AND EARTHQUAKE

Size in metres:-

Diameter: 0.60

Load position:-

$Z = 0.30$ m.

Vertical Load :-

$V = 20.0$ kN.

SHORT TERM LOAD CHOSEN

Moment towards Centre :-

$M_c = 0.0$ kNm.

Eccentricity towards centre :-

$e_c = 0.00$ m.

Horizontal Force :-

$H = 0.0$ kN.

eRatio = 0.000

Equivalent Area :-

$A = 0.283$ m².

Equivalent Length :-

$L' = 0.532$ m.

Equivalent Width :-

$B' = 0.532$ m.

Design Bearing Pressure :-

$q_d = 70.74$ kPa.

Sliding Resistance :- $S = 5.7 \text{ kN}$.
 Angle of friction with soil:- $\delta = 0.00 \text{ deg}$.
 Sliding Resistance Capacity Ratio :- $CRs = 0.000$
 The footing is cast in place and poured on the ground, friction factor = 1.000
 The Applied Loads are the factored loads of the Loading Standard.

SITE DETAILS

Site Type 0.
 Minimum Depth of footing:- $D_f = 0.90 \text{ m}$.
 Depth from surface to water table:- $D_w = 0.60 \text{ m}$.

SOIL AND CAPACITY ANALYSIS

THE SOIL TYPE IS 0
 Undrained shear strength:- $s_u = 20.00 \text{ kPa}$.
 Eff.Angle of Shearing Resistance:- $\phi' = 0.000 \text{ deg}$.
 Actual Adjacent pressure:- $q = 15.300 \text{ kPa}$.
 Soil Density:- $\gamma = 17.00 \text{ kN/m}^3$
 Under water Soil Density:- $\gamma' = 7.19 \text{ kN/m}^3$
 Bearing Strength Reduction Factor $\phi_{bc} = 0.45$
 Passive Strength Reduction Factor $\phi_{pp} = 0.45$
 Sliding Strength Reduction Factor $\phi_{sl} = 0.80$
 Earthquake Str. Reduction Factor $\phi_{eq} = 0.60$
 Effective Adjacent pressure:- $q' = 6.5 \text{ kPa}$.
 Pore water pressure at depth D_f :- $u_f = 2.94$

ANALYSIS RESULTS:

Bearing Strength Factor:- $N_c = 5.14$
 Bearing Strength Factor:- $N_q = 1.00$
 Bearing Strength Factor:- $N_\gamma = 0.00$

Explanation of Soil Capacity Modification Factors:

- λ** Values are dimensionless factors relating to Φ and the following:
- c** relates to: Cohesion.
- d** relates to: Footing depth.
- g** relates to: Site slope.
- i** relates to: Applied Load inclination i.e. H/V.
- q** relates to: Surcharge effects.

s relates to: The shape of the footing i.e. L/B

λ_{cs} :-	= 1.195
λ_{cd} :-	= 1.415
λ_{ci} :-	= 1.000
λ_{cg} :-	= 1.000
λ_{qs} :-	= 1.000
λ_{qd} :-	= 1.000
λ_{qi} :-	= 1.000
λ_{qg} :-	= 1.000
λ_{gs} :-	= 0.600
λ_{gd} :-	= 1.000
λ_{gi} :-	= 1.000
λ_{gg} :-	= 1.000

ULTIMATE BEARING CAPACITY = 189kPa
AVAILABLE BEARING CAP: = 85.1 kPa.
AVAILABLE LOAD CAPACITY: = 24.1 kN.

BEARING CAPACITY RATIO: = 0.83
SLIDING CAPACITY RATIO: = 0.00

SESOC | SOILS

Version: 3.3.2.2156, Published: 25 Apr 2024

Soils design to N.Z. Building Code document B1/VM4

DESIGNER: CM

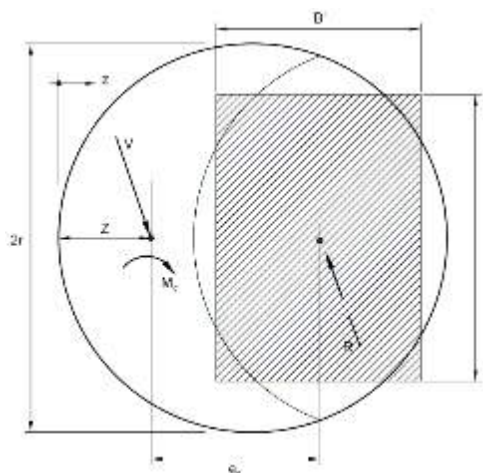
PROJECT: 116 Richard Street, Opotiki

DESCRIPTION: 600 dia x 1.2m depth

ANALYSIS ID:

DATE: 25/09/2024 TIME: 5:12 pm

PAD FOOTING - CIRCULAR



THE LOADING CONDITION CHOSEN IS SHORT TERM AND EARTHQUAKE

Size in metres:-

Diameter: 0.60

Load position:-

 $Z = 0.30 \text{ m.}$

Vertical Load :-

 $V = 20.0 \text{ kN.}$
SHORT TERM LOAD CHOSEN

Moment towards Centre :-

 $M_c = 0.0 \text{ kNm.}$

Eccentricity towards centre :-

 $e_c = 0.00 \text{ m.}$

Horizontal Force :-

 $H = 0.0 \text{ kN.}$

eRatio = 0.000

Equivalent Area :-

 $A = 0.283 \text{ m}^2.$

Equivalent Length :-

 $L' = 0.532 \text{ m.}$

Equivalent Width :-

 $B' = 0.532 \text{ m.}$

Design Bearing Pressure :-

 $q_d = 70.74 \text{ kPa.}$

Sliding Resistance :- $S = 5.7 \text{ kN}$.
 Angle of friction with soil:- $\delta = 0.00 \text{ deg}$.
 Sliding Resistance Capacity Ratio :- $CRs = 0.000$
 The footing is cast in place and poured on the ground, friction factor = 1.000
 The Applied Loads are the factored loads of the Loading Standard.

SITE DETAILS

Site Type 0.
 Minimum Depth of footing:- $D_f = 1.20 \text{ m}$.
 Depth from surface to water table:- $D_w = 0.60 \text{ m}$.

SOIL AND CAPACITY ANALYSIS

THE SOIL TYPE IS 0
 Undrained shear strength:- $s_u = 20.00 \text{ kPa}$.
 Eff.Angle of Shearing Resistance:- $\phi' = 0.000 \text{ deg}$.
 Actual Adjacent pressure:- $q = 20.400 \text{ kPa}$.
 Soil Density:- $\gamma = 17.00 \text{ kN/m}^3$
 Under water Soil Density:- $\gamma' = 7.19 \text{ kN/m}^3$
 Bearing Strength Reduction Factor $\phi_{bc} = 0.45$
 Passive Strength Reduction Factor $\phi_{pp} = 0.45$
 Sliding Strength Reduction Factor $\phi_{sl} = 0.80$
 Earthquake Str. Reduction Factor $\phi_{eq} = 0.60$
 Effective Adjacent pressure:- $q' = 8.6 \text{ kPa}$.
 Pore water pressure at depth D_f :- $u_f = 5.89$

ANALYSIS RESULTS:

Bearing Strength Factor:- $N_c = 5.14$
 Bearing Strength Factor:- $N_q = 1.00$
 Bearing Strength Factor:- $N_\gamma = 0.00$

Explanation of Soil Capacity Modification Factors:

- λ** Values are dimensionless factors relating to Φ and the following:
- c** relates to: Cohesion.
- d** relates to: Footing depth.
- g** relates to: Site slope.
- i** relates to: Applied Load inclination i.e. H/V .
- q** relates to: Surcharge effects.

s relates to: The shape of the footing i.e. L/B

λ_{cs} :-	= 1.195
λ_{cd} :-	= 1.461
λ_{ci} :-	= 1.000
λ_{cg} :-	= 1.000
λ_{qs} :-	= 1.000
λ_{qd} :-	= 1.000
λ_{qi} :-	= 1.000
λ_{qg} :-	= 1.000
λ_{gs} :-	= 0.600
λ_{gd} :-	= 1.000
λ_{gi} :-	= 1.000
λ_{gg} :-	= 1.000

ULTIMATE BEARING CAPACITY = 200kPa
AVAILABLE BEARING CAP: = 89.9 kPa.
AVAILABLE LOAD CAPACITY: = 25.4 kN.

BEARING CAPACITY RATIO: = 0.79
SLIDING CAPACITY RATIO: = 0.00

Appendix C

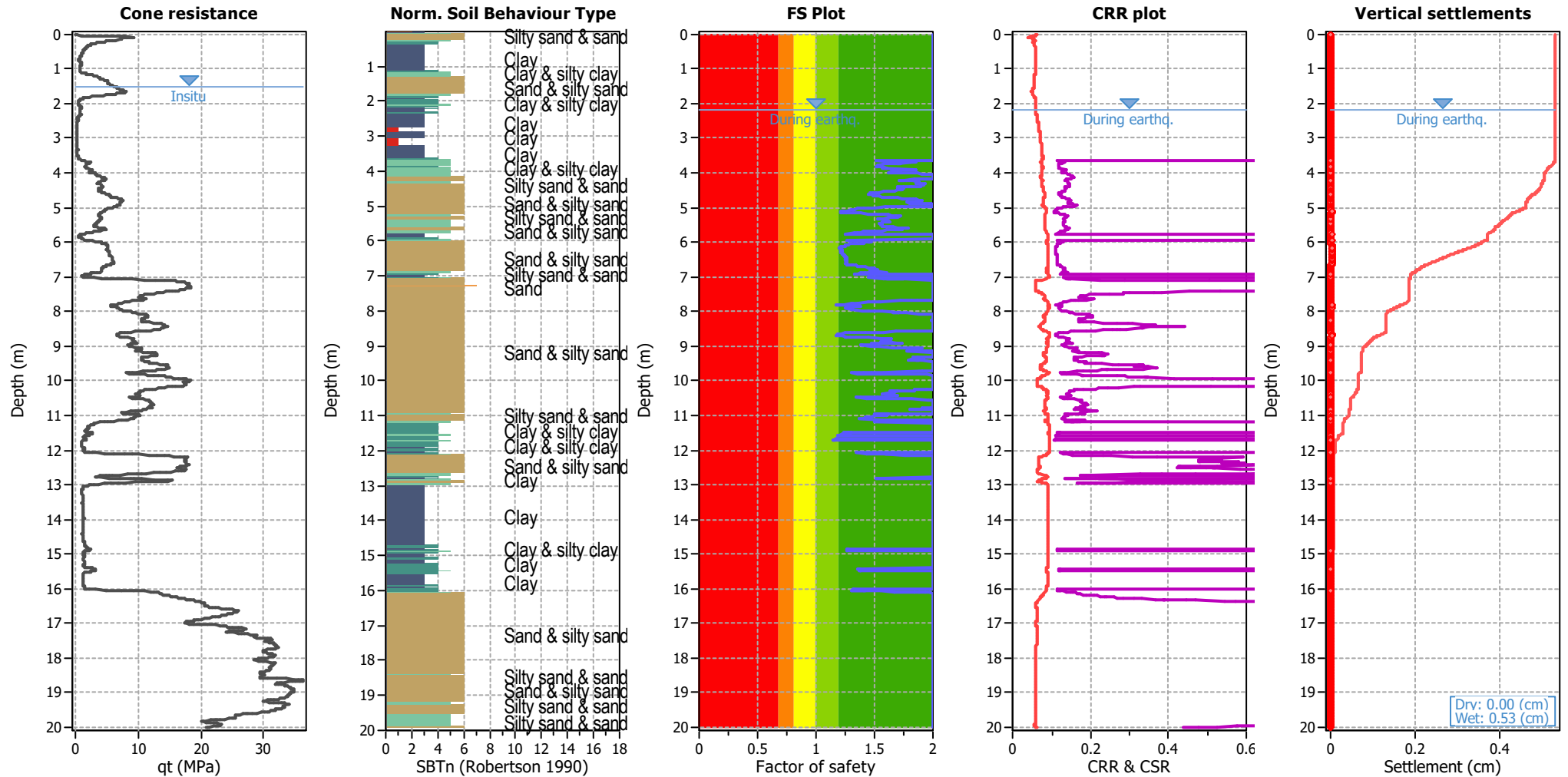
CPT data-based liquefaction risk assessment outputs

Project: Liquefaction risk assessment

Location: 74 Saint John Street, Opoiki

CPT: CPT1-SLS

Total depth: 20.00 m

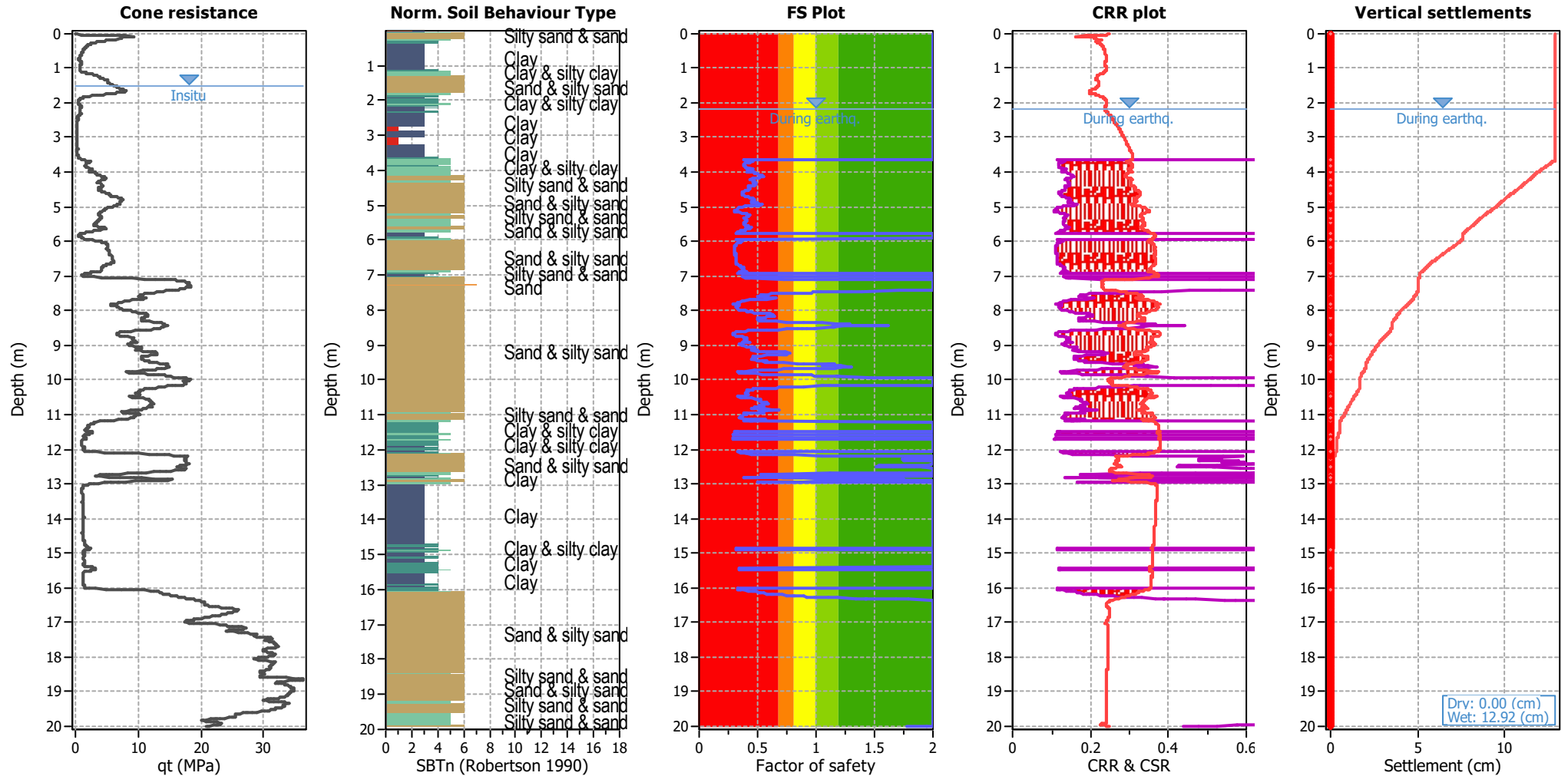


Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.20 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	6.10	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.11	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based

Project: Liquefaction risk assessment
Location: 74 Saint John Street, Opotiki

CPT: CPT1-ULS

Total depth: 20.00 m



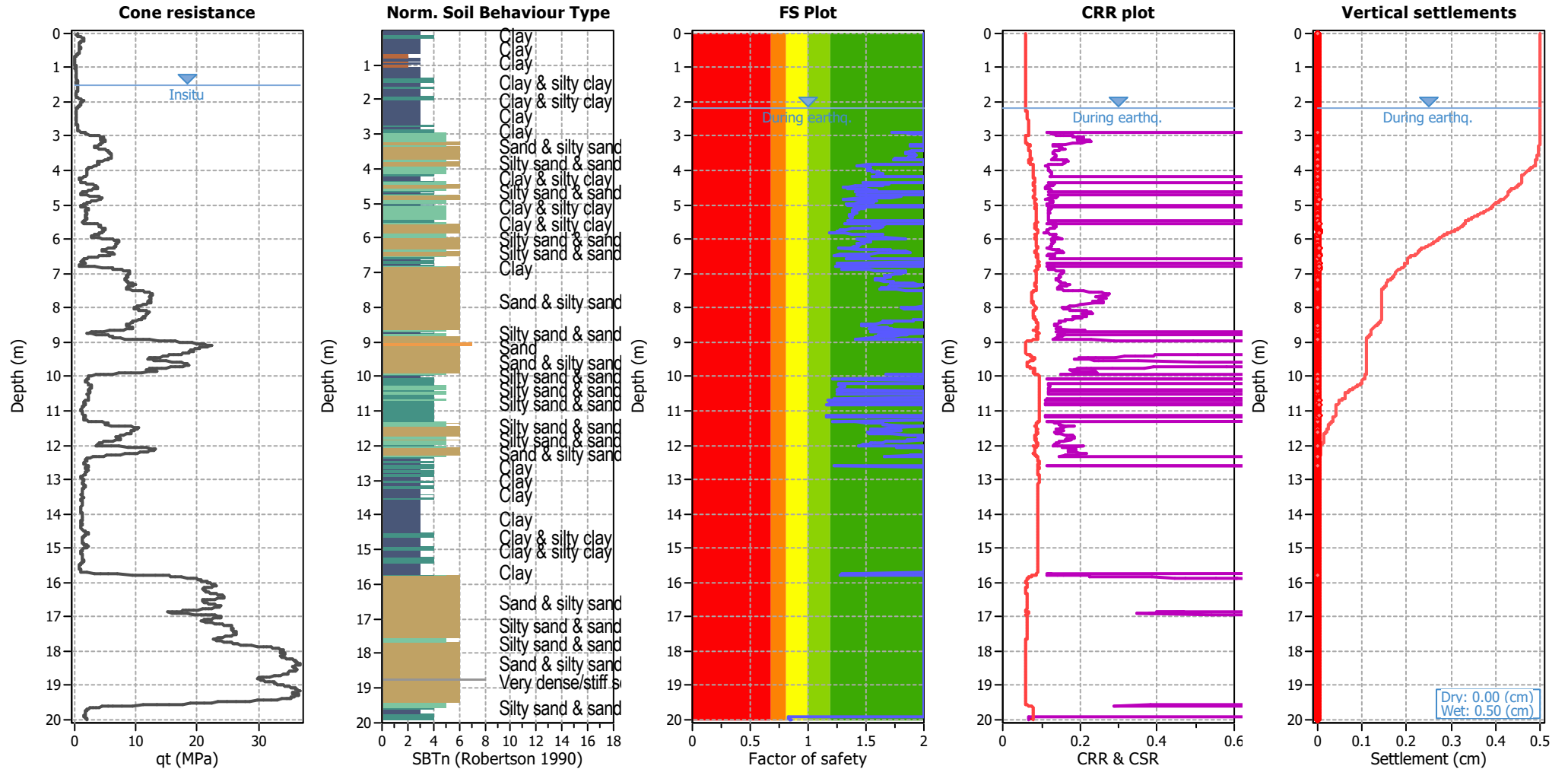
Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.20 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	6.10	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.44	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based

Project: Liquefaction risk assessment

Location: 74 Saint John Street, Opotiki

CPT: CPT2-SLS

Total depth: 20.00 m

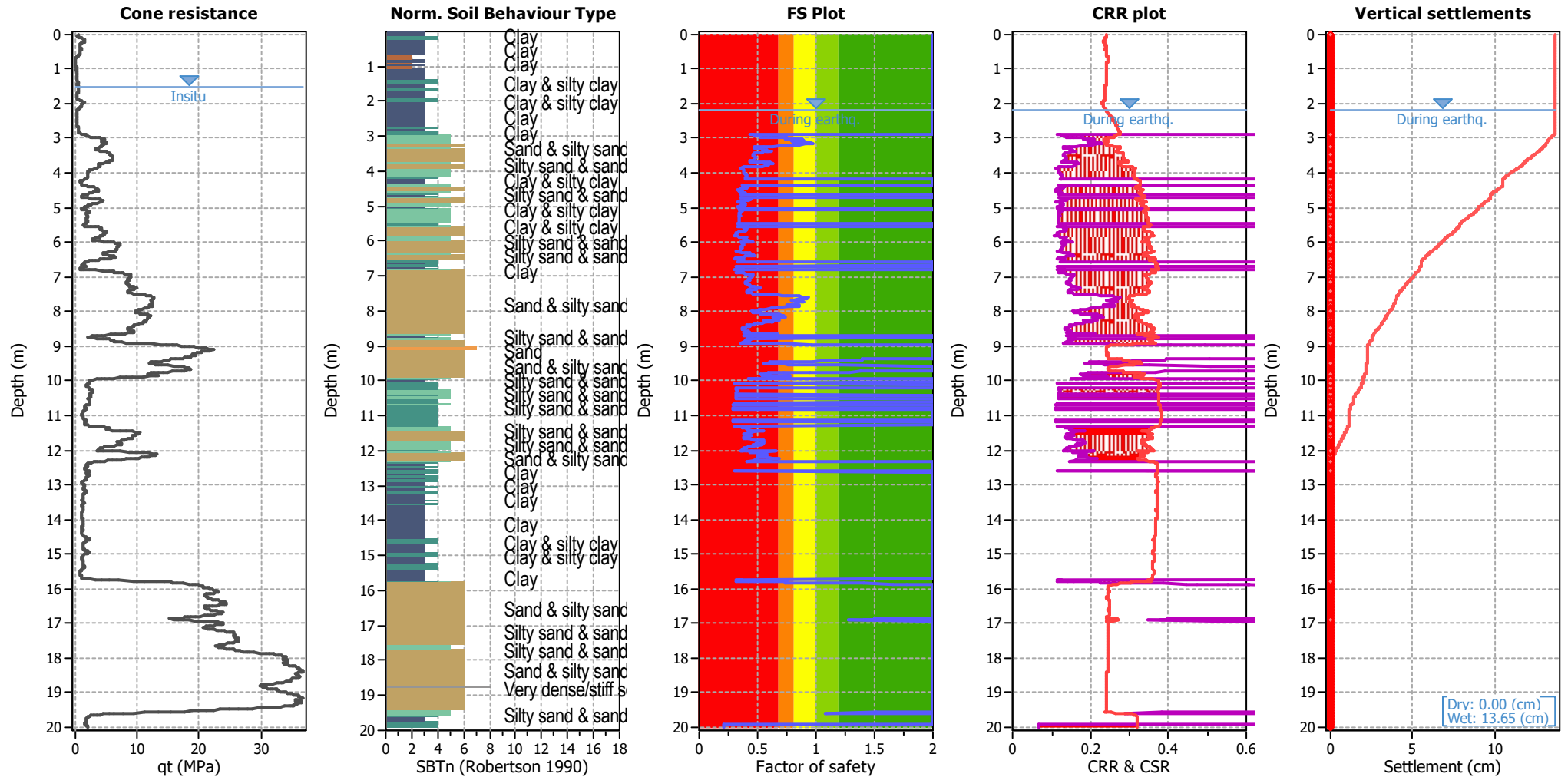


Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.20 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	6.10	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.11	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based

Project: Liquefaction risk assessment
Location: 74 Saint John Street, Opotiki

CPT: CPT2-ULS

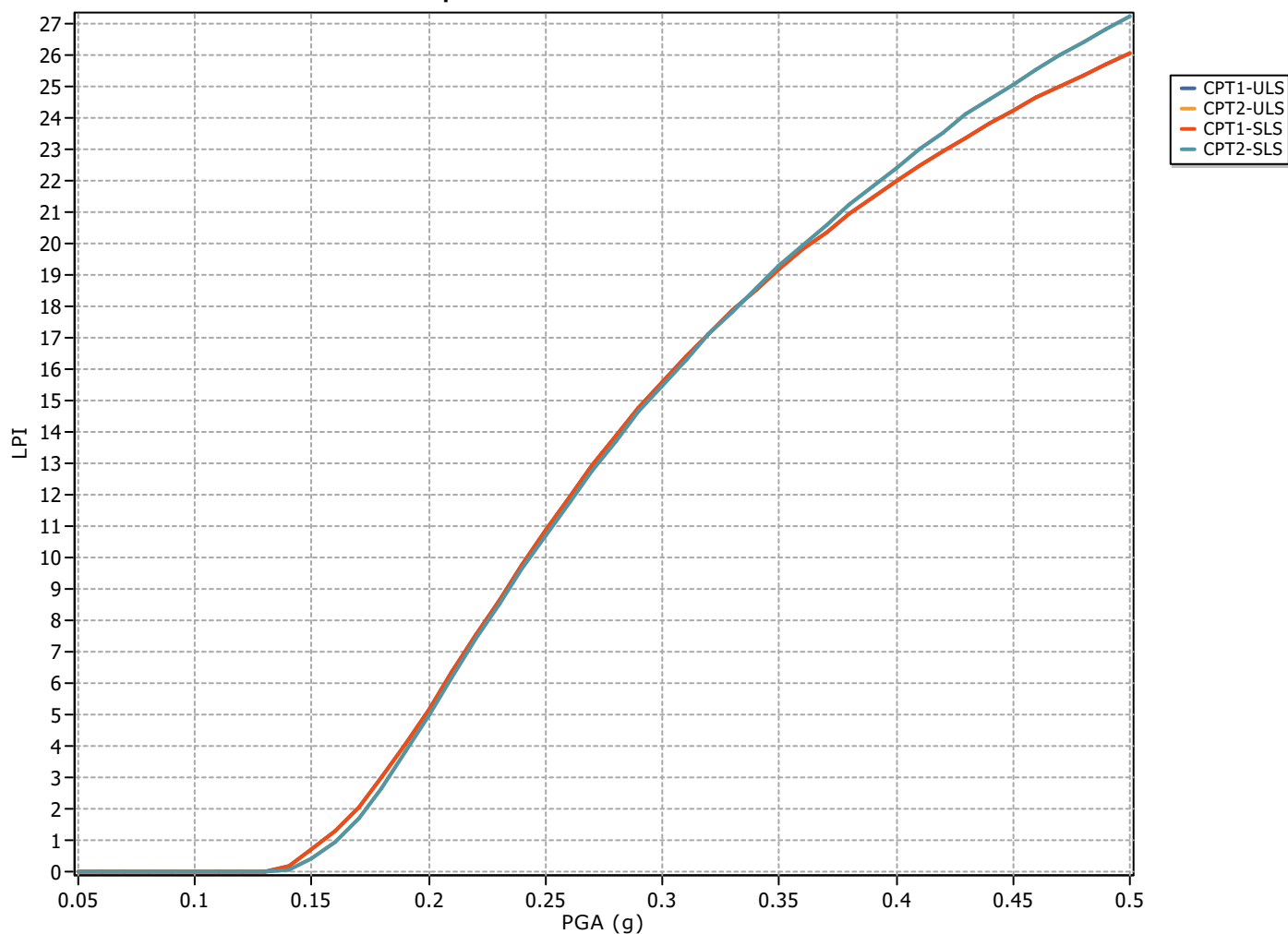
Total depth: 20.00 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.20 m	Fill height:	N/A	applied:	.
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w :	6.10	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	N/A
Peak ground acceleration:	0.44	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based

PGA Based Parametric Analysis

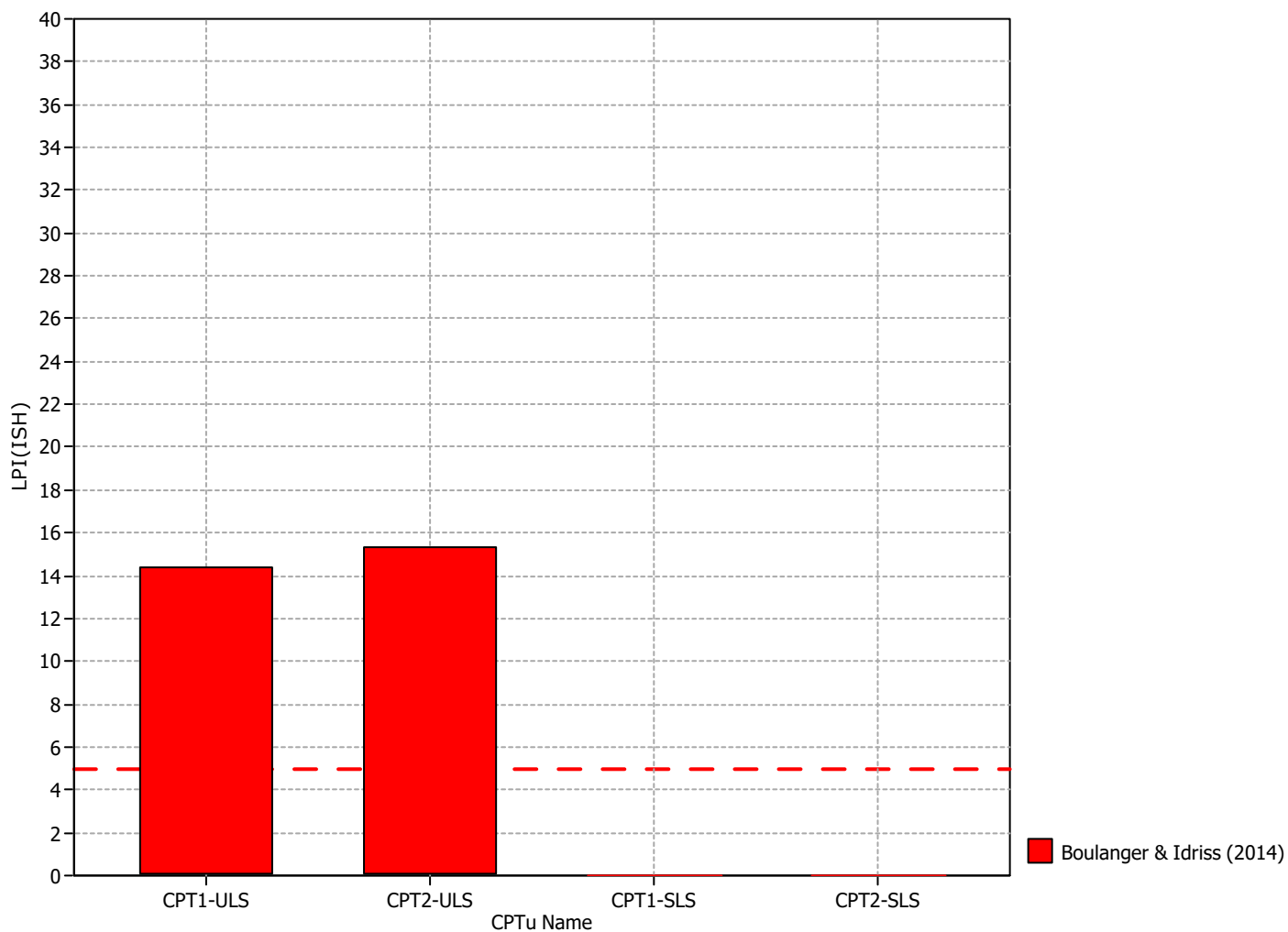
Liquefaction Potential Index vs PGA



:: CPT main liquefaction parameters details ::

CPT Name	Assesment method	Earthquake Mag.	GWT in situ (m)	GWT earthq. (m)
CPT1-ULS	Boulanger & Idriss (2014)	6.10	1.50	2.20
CPT2-ULS	Boulanger & Idriss (2014)	6.10	1.50	2.20
CPT1-SLS	Boulanger & Idriss (2014)	6.10	1.50	2.20
CPT2-SLS	Boulanger & Idriss (2014)	6.10	1.50	2.20

Overall Parametric Assessment Method

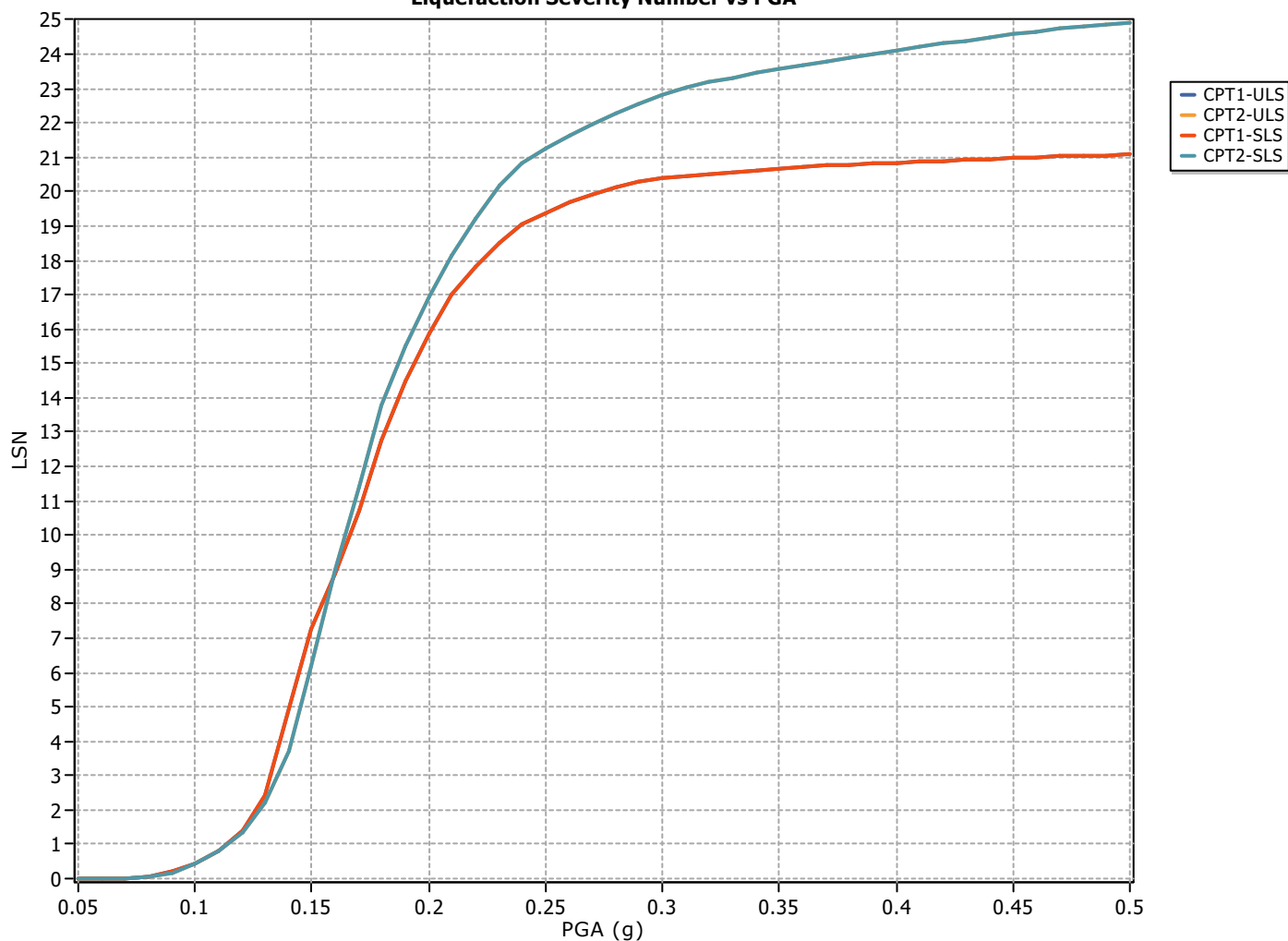


:: CPT main liquefaction parameters details ::

CPT Name	Earthquake Mag.	Earthquake Accel.	GWT in situ (m)	GWT earthq. (m)
CPT1-ULS	6.10	0.44	1.50	2.20
CPT2-ULS	6.10	0.44	1.50	2.20
CPT1-SLS	6.10	0.11	1.50	2.20
CPT2-SLS	6.10	0.11	1.50	2.20

PGA Based Parametric Analysis

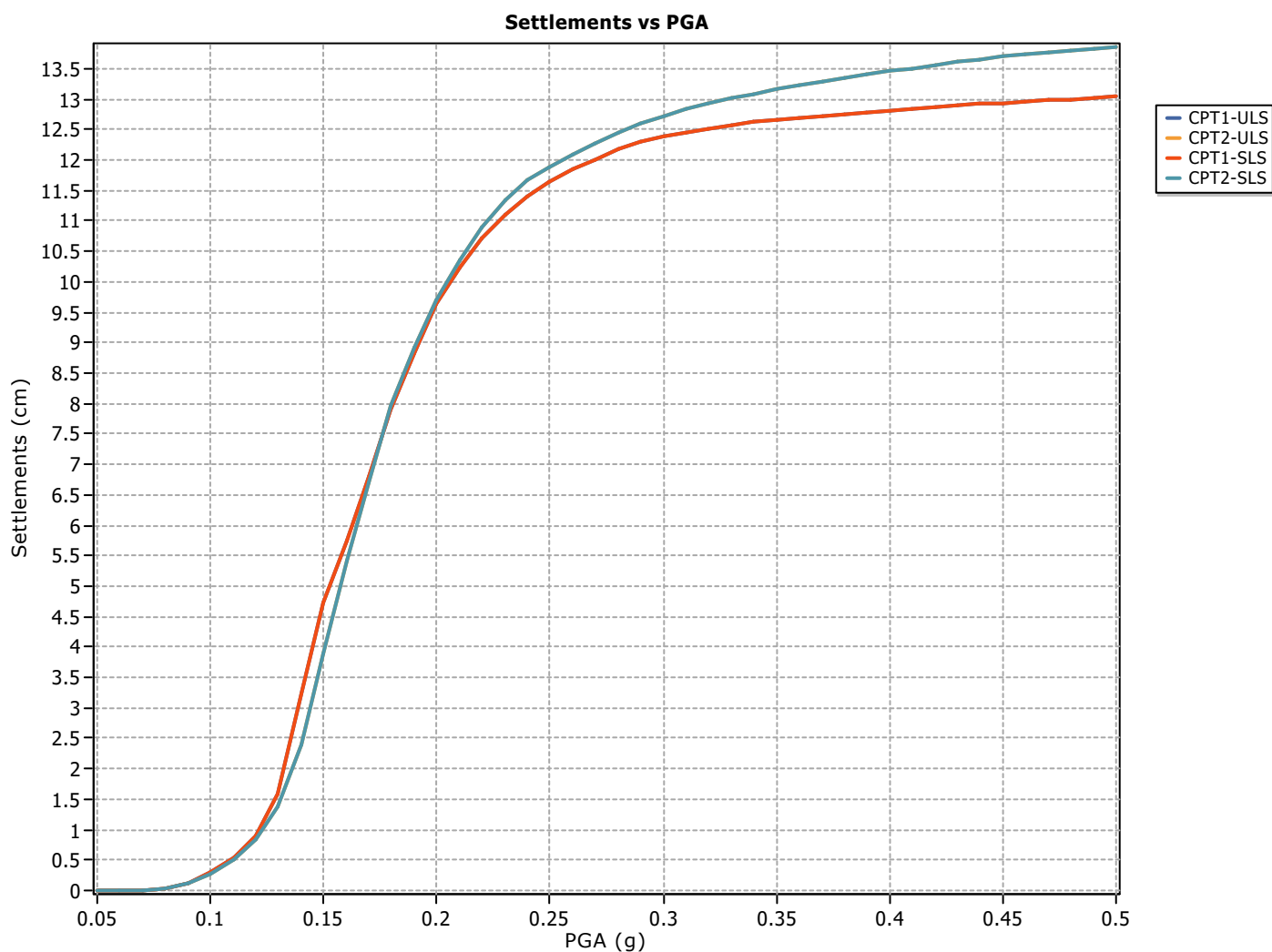
Liquefaction Severity Number vs PGA



:: CPT main liquefaction parameters details ::

CPT Name	Assesment method	Earthquake Mag.	GWT in situ (m)	GWT earthq. (m)
CPT1-ULS	Boulanger & Idriss (2014)	6.10	1.50	2.20
CPT2-ULS	Boulanger & Idriss (2014)	6.10	1.50	2.20
CPT1-SLS	Boulanger & Idriss (2014)	6.10	1.50	2.20
CPT2-SLS	Boulanger & Idriss (2014)	6.10	1.50	2.20

PGA Based Parametric Analysis



:: CPT main liquefaction parameters details ::

CPT Name	Assesment method	Earthquake Mag.	GWT in situ (m)	GWT earthq. (m)
CPT1-ULS	Boulanger & Idriss (2014)	6.10	1.50	2.20
CPT2-ULS	Boulanger & Idriss (2014)	6.10	1.50	2.20
CPT1-SLS	Boulanger & Idriss (2014)	6.10	1.50	2.20
CPT2-SLS	Boulanger & Idriss (2014)	6.10	1.50	2.20



Residential design, Additions, Renovations
Papakainga developments, Transportable homes

Date: 30/10/2024

Application for Building Consent
116 Richard Street
Opotiki

To whom it may Concern

I Graham Mervyn Brown

As a Legal owner 116 Richard Street

hereby authorize John Thompson- Harawira to make application as my agent to the Opotiki District Council on my/ our behalf.

Yours faithfully

G.M Brown



THE HOUSE INSPECTOR LTD

0800223787

booking@thehouseinspector.co.nz

<https://thehouseinspector.co.nz/>



BUILDING CONDITION REPORT FOR RELOCATION

39 Mill Rd
Whakatāne, Bay of Plenty 3120

Sanjeev Sambli

OCTOBER 3, 2024



Inspector

Jason Nicholls LBP

Qualified LBP Builder 25+yrs, Residential Property

Inspector 9+yrs

+64212225522

booking@thehouseinspector.co.nz

TABLE OF CONTENTS

1: Inspection Details	4
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3: Sub-floor & Structure	6
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10: Bathrooms	22

This Report and all information, records and recommendations are for the sole and exclusive use of the named client only.

1: INSPECTION DETAILS

Information

Date of Inspection 10/03/2024	In Attendance No others present at the time of the inspection	Occupancy Vacant, Empty house sold exyard
Orientation of main living spaces Orientation to be established by architectural designer	Temperature (approximate) 16 Celsius (C)	Weather Conditions Raining on the day of the inspection, Rain on previous days
Type of Building Freestanding Home	Approximate time of construction Likely constructed during the 1960s or 1970s	

Inspection overview / Summary of findings

Property is a single level timber frame structure on a suspended timber floor system currently awaiting relocation to the new site sitting on temporary piles in yard.

Judging by the style and materials of the building estimated time of construction circa 1960s.

The premier exterior cladding system is a modern wood composite fiber weatherboard in as new condition.

The roofing system is a modern style texture coated pressed metal tile in serviceable condition.

The building appears suitable for relocation with all remedial works to be carried out in accordance with the local council or territorial authority requirements.

Site exposure

For the new location wind and corrosion zones refer to consent application plans

The corrosion zones are the exposure zones in NZS 3604:2011. The zones relate to the severity of exposure to wind-driven salt, with B being low risk, C medium risk and D high risk. the area within 100 m of tidal estuaries and sheltered inlets. [For More Information.](#)

Wind direction, speed and frequency will influence the building design including bracing requirements, roof and wall cladding selection, weathertightness detailing, building entry locations, window size and placement and provision of shelter for outdoor spaces. [For More Information.](#)

Limitations

General

NO ACCESS TO THE ROOF SPACE

Roof Space Excluded from the Inspection and Report as there was no access available or no roof space at the time of the inspection.

2: REPORT DETAILS

Information

About The inspection:

Visual assessment only. We provide a visual cursory assessment of Weather Tightness but the property will not be measured against appendix A of the Standards or E2/AS1 of the Building Code, Matrix and Evaluation. Such a comparison requires a specialist survey.

Unless specifically ordered and provided in an additional specialist report this inspection and reporting does not include review of any property files, LIM reports or other property documents.

Under the Standards, the scope of the Inspection is limited to a visual Inspection of the components of a building, which the Inspector has reasonable access to and being in their clear line of sight. A non-invasive moisture meter will be used around accessible windows and doors or area identified as potential risk areas, moisture meters are a guide only, results are not conclusive.

Reasonable access must be provided failure to do so will limit the inspection and report.

Reasonable access means access that is safe, unobstructed and which has the minimum clearance specified below.

Roof space: 450 x 400 mm manhole access. 600 x 900 mm Crawl Space. Accessible from a 3.6 m ladder**

Sub floor: 500 x 400 mm manhole access. 400 mm vertical clearance Crawl Space Timber Floor* 500 mm vertical clearance Crawl Space Concrete Floor

Roof exterior: Viewed from a 3.6 m ladder**

* Underside of bearer

** Or such other means of access that meet HSWA requirements.

Scope Of the Report

The report should be seen as a reasonable attempt to identify any Significant Fault or Defect visible at the time of the visual Inspection rather than an all-encompassing report dealing with the home from every aspect. The reporting of any Significant Fault or Defect is on an exceptional basis, rather than reporting on items, which are in acceptable condition for their age.

Findings will be categorised into one of four areas:

1. Informational, general information about the home and its components for your reference.
2. Minor defects or maintenance items that may need attention highlighted in blue.
3. Recommended for repair items, highlighted in Orange
4. Significant defects or safety concerns which will be highlighted in Red.

Refer also to the signed contract for terms and conditions and to the limitations notes in each section.

Equipment Used

TroTec T660 Non Invasive Moisture Meter

1. A trotec T660 scanning capacitive moisture meter has been used during the inspection the reading given are not a measurement of moisture content or percentage of moisture within a materiel. They are used to measure resistance of the materials and to provide comparisons that may indicate moisture. It's important to note that these readings are for comparative purposes only. We will test multiple areas of a surface to provide a baseline range which we can then compare any unusual readings with.
2. A ladder will be used to reach elevated accessible areas of the home.
3. Flashlights will be used where required for visual assessment.
4. Measuring devises will be used where measurements may be critical. i.e. Handrail heights, access hatch dimensions etc.

3: SUB-FLOOR & STRUCTURE

Information

Floor Structure: Structural Changes

Framing appears Original

Floor Structure: Sub-floor Insulation

Torn in places, Poor condition, Retrofitted foil

[Book a full Healthy Homes Inspection and report here.](#)

Sub floor services: Plumbing

PVC waste, Copper Water



Sub floor services: Electrical

Not visible

Floor Structure: Framing & Floor Material

Ex 150x50 joists in good condition, Ex100x70 bearer, T&G Flooring

**Sub floor services: Plumbing and electrical to be reconnected upon relocation**

All disconnected sub floor plumbing and electrical to be reconnected and made good upon relocation by qualified contractors to a professional standard.

4: ROOF

Information

Roof Type/Style Gable	Roof Pitch Roof Pitch Appears Suitable for The Roofing Type	Roof Drainage Systems: Downpipes Stormwater to be reconnected to new services upon relocation The efficiency and point of storm-water discharge is not known.
		
Flashings: Flashing Types and Material Folded metal flashings, Flashings are in good condition at the time of the inspection		
Inspection Method Ladder Due to height and safety regulations, some areas of the roof may not be fully inspected.		
Roof Drainage Systems: Gutter Material Steel gutter brackets, Serviceable condition		

**Coverings: Material**

Metal, Tile

The roofing system is a modern-style texture coated pressed metal tile in relatively good condition with significant lichen growth visible that treatment may be required for.

**Skylights, Chimneys & Other Roof Penetrations: Small Penetrations (under 85mm)**

Terminal vent pipe under 85 mm, How water pressure relief pipe



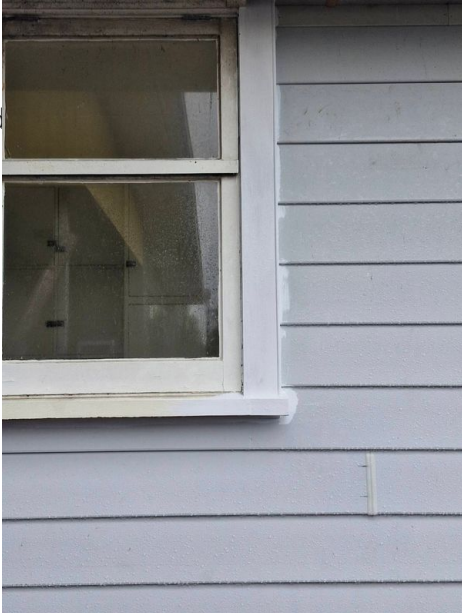
Skylights, Chimneys & Other Roof Penetrations: Large Penetrations (Over 85mm)

Multiple large penetrations, Large extraction vent



5: EXTERIOR

Information

Cladding, Flashing & Trim: Cavity System No Cavity Visible, Not Common at the Time of Construction	Cladding, Flashing & Trim: Entry Way To be reconstructed	Cladding, Flashing & Trim: Exterior Paintwork Partially Painted Cladding Surface/s, In process of repainting exterior
Cladding, Flashing & Trim: Exterior Trim Timber, Painted, Metal flashings, Good condition	Exterior Doors & Windows : Head & Sill Flashings Head flashings are not required when openings are hard up to the eaves lining, Head flashings are not required when the cladding above the window comes out over the window head	Exterior Doors & Windows : Window Flanges Timber scribes, Timber Facings, Good condition
		
Exterior Doors & Windows : Window Glass Single Glazed, No Tint Visible	Exterior Doors & Windows : Glass Seals Putty, Variable condition	Eaves, Soffits & Fascia: Eaves lining Fibre cement, Painted, Fibre cement product appears to be solid non-friable condition, Serviceable condition



Eaves, Soffits & Fascia: Fascia Material
Painted, Timber, In serviceable condition

Eaves, Soffits & Fascia: Eaves Width/s
600mm

Exterior Plumbing : Sewer Connection
New connection upon relocation



Cladding, Flashing & Trim: Structure and Exterior Cladding System/s
Multiple systems

The building is a timber frame structure on a suspended timber floor structure.

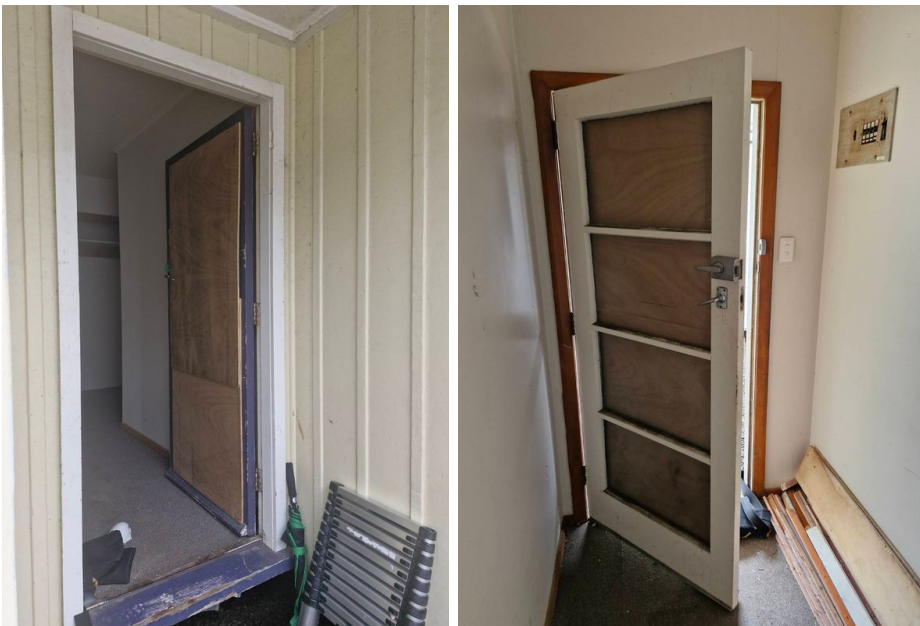
The primary exterior cladding system is a modern direct fixed wood fiber composite weatherboard in good condition. The system incorporates timber facings and scribes around window penetrations and aluminium corner flashings and appears professionally installed.

Secondary cladding system in use on the gable ends and around the entrance way is a direct fixed vertical profile overlapping joint fibre cement sheet with a painted finish in servicable condition, with some transportation damage visible that may require repair upon relocation.



Exterior Doors & Windows : Exterior Entry Door

Older likely original timber joinery, Serviceable condition



Exterior Doors & Windows : Window Frames

Older style aged but serviceable timber joinery

It appears that the bulk of the joinery is original timber joinery in variable condition, some window panes will require repair and maintenance work and putty is cracking in some areas.

Paint is flaking and generally poor condition on timber joinery.



Eaves, Soffits & Fascia: Ducting Vents and Outlets

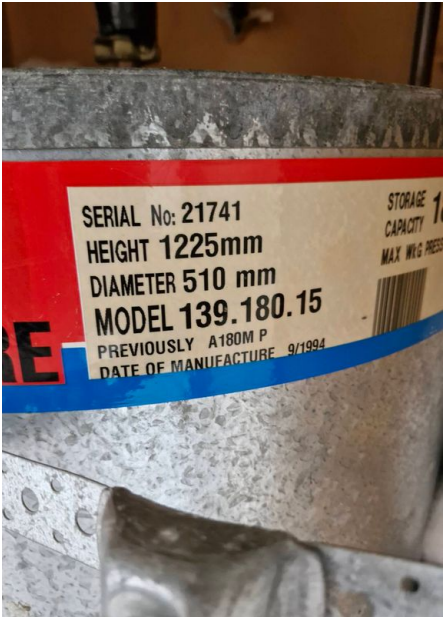
Roof outlets



6: SERVICES

Information

Plumbing : Waste Pipe Material PVC, Visible pipes are in good condition	Plumbing : Water Supply Material Copper, Visible pipes are in good condition	Hot Water Systems: Capacity 180 Litre
Hot Water Systems: Date of Manufacture Cylinder manufacturer date is 1994	Hot Water Systems: Location Kitchen Cupboard	Hot Water Systems: Power Source/Type Low Pressure, Electric
Hot Water Systems: Hot Water System Status Appears to be unused at this time	Electrical: Metre box Location Not visible	Electrical: Earth Rod Location To be reinstated upon relocation



Electrical: Fuse Box Type

Circuit Breaker, Older Style
Board, No RCD fittings

Electrical: Fuse Box Location

Hallway



Hot Water Systems: Seismic Restraint

Straps, Fixed to wall

Cylinders less than 200 L require 2 straps and they should be installed 100 mm down from the top and 100 mm from the bottom to prevent any movement. Cylinders over 200 L must have three restraints.

Limitations

Plumbing

MAJORITY OF PIPE WORK IS HIDDEN FROM VIEW

Majority of pipes are hidden from view and are therefore outside the scope of this report.

7: INTERIOR

Information

Windows: Window & Door Trim

Internal timber joinery and window / door surrounds in serviceable condition

**Ceilings: Ceiling Material**

Painted, Softboard, Serviceable condition

Doors: Door Type

Hollow Core, Good condition

Walls: Wall Material

Brick, Plasterboard, Walls in serviceable condition, Some flaking and damaged paint visible





Walls: Moisture Metre Readings

Moisture metre readings taken on the walls at the bottom corner of windows, where accessible, were in the normal range at the time of inspection unless otherwise stated in the defects section. This indicates that the surface materials and up to 30 mm deep of the wall surface was likely not holding water at this time. Normal readings: See the tools uses information section for more information on moisture meters.

Please note that environmental factors may limit or effect the accuracy of readings.

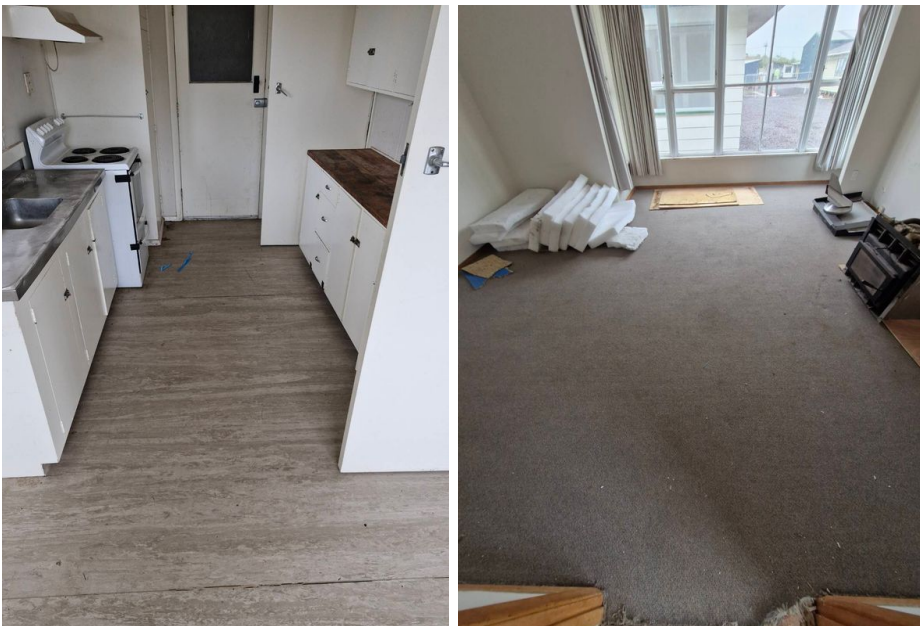
Ceilings: Smoke Alarms

None Visible

Recommend testing prior to occupation and installation of suitable alarms as required.

Floors: Floor Coverings

Vinyl, Poor condition, Carpet



8: KITCHEN

Information

Bench tops & Cabinets: Kitchen Bench Tops

Stainless steel bench tops, Solid timber benchtops



Bench tops & Cabinets: Cabinetry Old Style Timber



Bench tops & Cabinets: Splash Back

None Fitted



Sink & Services : Sink Type

Stainless Steel, Single Bowl



Sink & Services : Taps

Taps, Water not tested

Sink & Services : Under Bench Plumbing

PVC Waste Pipes



Floors: Floor Coverings

Vinyl, Poor condition



Limitations

Bench tops & Cabinets

NOT ALL CABINETS VIEWED

Not every area of the kitchen cabinets could be view due to inaccessibility and/or personal belongings hindering the view.

9: BUILT-IN APPLIANCES

Information

Range/Oven/Cooktop: Cook Top
Energy Source
Electric

Range/Oven/Cooktop: Oven
Energy Source
Electric

Range/Oven/Cooktop: Exhaust
Hood Type
Canopy Hood, Ducted to the exterior



Limitations

Range/Oven/Cooktop
APPLIANCES NOT TESTED.
Appliances Not Tested.

10: BATHROOMS

Information

Cabinets & Basins : Sink Type

Single Bowl, China Bowl,
Serviceable condition



Cabinets & Basins : Vanity Tops type

China, Serviceable condition

Cabinets & Basins : Cabinetry

Melamine, Serviceable condition



Cabinets & Basins : Taps

Taps

Drains & Ventilation : Vanity Plumbing

PVC Waste Pipes



Drains & Ventilation : Extraction

Bathroom & Ensuite

Ceiling Fan, Appears to be
ducted to the exterior



Shower area: Additional Shower Type

Bath/s: Bath and Surround

Built In, Acrylic, Wet wall
Surround, Serviceable condition,

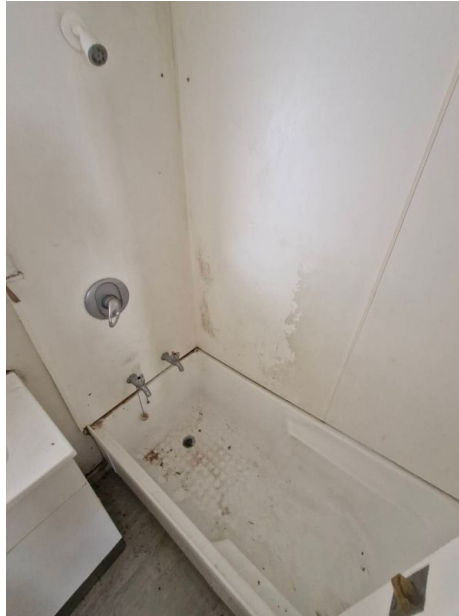
Toilets : Toilets Type/s

Older Style, acrylic, Dual-Flush,
Secured to the floor/wall,

Wet wall Surround, Over Bath,
Mixer & Spout, Serviceable
condition



Bath Taps



Serviceable condition



Floors: Floor Coverings
Vinyl, Serviceable condition



Demand Calculation Sheet

Job Details

Name:	Graham Brown
Street and Number:	116 Richard Street
Lot and DP Number:	Lot 2 Deposited Plan 3037
City/Town/District:	Opotiki
Designer:	JTH
Company:	
Date:	Oct 2024

Building Specification

Number of Storeys	1
Floor Loading	2 kPa
Foundation Type	Subfloor
Subfloor Cladding Weight	Light
	Single
Cladding Weight	Light
Roof Weight	Light
Room in Roof Space	No
Roof Pitch (degrees)	20
Roof Height above Eaves (m)	2
Building Height to Apex (m)	4.6
Ground to Lower Floor (m)	.6
Average Stud Height (m)	2.42
Building Length (m)	14.4
Building Width (m)	7.7
Building Plan Area (m²)	100

Building Location

Wind Zone = High

Earthquake Zone 3

Soil Type D & E (Deep to Very Soft)
Annual Prob. of Exceedance:1 in 500 (Default)

Bracing Units required for Wind

	Along	Across
Single Level	344	579
Subfloor Level	567	996

Bracing Units required for Earthquake

	Along & Across
Single Level	1021
Subfloor Level	1365



Subfloor Level Along Resistance Sheet

Job Name: Graham Brown

Wind	EQ
Demand	
567	1365
Achieved	
1920	1440
339%	105%

Line	Element	Length or No.	Angle (degrees)		Type	Supplier	Wind (BUs)	EQ (BUs)
A	1	4.00			Anchor Pile	NZS3604	640	480
B	1	4.00			Anchor Pile	NZS3604	640	480
C	1	4.00			Anchor Pile	NZS3604	640	480



Subfloor Level Across Resistance Sheet

Job Name: Graham Brown

									Wind	EQ
									Demand	
									996	1365
									Achieved	
Line	Element	Length or No.	Angle (degrees)		Type	Supplier	Wind (BUs)	EQ (BUs)	1920	1440
									193%	105%
M	1	3.00			Anchor Pile	NZS3604	480	360		
									480 OK	360 OK
N	1	3.00			Anchor Pile	NZS3604	480	360		
									480 OK	360 OK
O	1	3.00			Anchor Pile	NZS3604	480	360		
									480 OK	360 OK
P	1	3.00			Anchor Pile	NZS3604	480	360		
									480 OK	360 OK