RESOURCE CONSENT

GRANTED
29/06/2021

HUTT CITY COUNCIL

HUTT CITY
TE AWA KAIRANGI

LandTech
CONSULTING

GEOTECHNICAL INVESTIGATION REPORT

FOR PROPOSED RESIDENTIAL DEVELOPMENT

3-4 Johnston Grove, Taita, Lower Hutt

Client: Williams Corporation Ltd

Project Reference:	LTW21002
Revision:	A
Date:	4 March 2021

Documentation Control:

LandTech Consulting Ltd

Postal Address:
PO Box 119
Christchurch 8140

Christchurch Address:
11B Carlyle Street
Sydenham
Christchurch 8023
P. 03 390 1371

Auckland Address:
17 Nils Andersen Road
Whenuapai
Auckland 0618
P. 09 930 9334

E. info@landtech.nz
W. www.landtech.nz

Document Title:	**Geotechnical Investigation Report for Proposed Residential development**	
Address:	3-4 Johnston Grove, Taita, Lower Hutt	
Revision:	A	
Client:	**Williams Corporation Ltd**	
Reference:	LTW21002	
Author:		Cameron Baker, Engineering Geologist BSc Earth Science
Reviewed & Authorised:		Dwayne Wilson, Senior Geotechnical Engineer BEngTech (Civil), MEngSt (Geotechnical), CMEngNZ, CPEng, IntPE (NZ), Director

REPORT DISTRIBUTION:		
Recipient	**Release Date**	**Document Type**
Williams Corporation Ltd	4 March 2021	Revision A (PDF)

Table of Contents:

Appendices:

1.0 Introduction & Scope

LandTech Consulting Ltd. (LandTech) were engaged by Williams Corporation Ltd (the Client) to carry out a geotechnical investigation at 3-4 Johnston Grove, Taita, Lower Hutt (the site).

The purpose of this report is to provide geotechnical information and recommendations with regards to the proposed residential development. We are not in receipt of any development plans at the time of preparing this report, however, we understand the development will comprise the construction of two to three storey residential units.

We understand that this report will be used for design purposes and may be relied upon by Hutt City Council for corresponding consent applications associated with the proposed development. However, further geotechnical input may be required dependent on the specifics of the development proposal.

2.0 Site Description

2.1 Location

The sites (Legally described as Lot 836 & 25 DP 15394 & SEC 1014 WN33A/794 & WN5B/22 & Lot 1 DP 85872 53C/658) are located approximately 0.6 kilometres (km) northeast of Taita Central, and such and such distance north of Lower Hutt central.

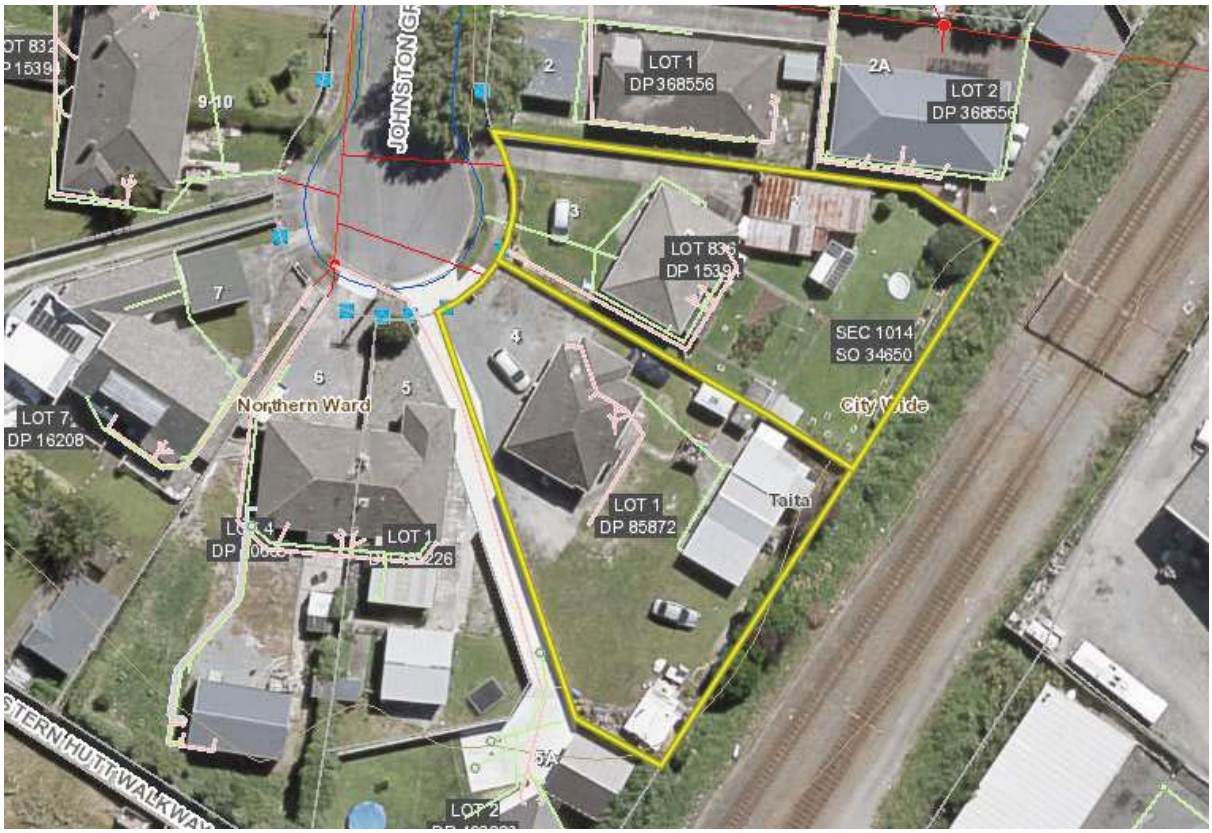
The sites (covering a combined approximate area of 1786m^2) are bound by residential development to the north and south, with the main trunk railway to the east, and both sites are currently accessed from the west via Johnston Grove.

2.2 Topography

Figure 1 shows the general site topography[1] with contours being at 5m intervals. The survey marks shown in the architectural drawings indicate that the site is generally flat.

[1] Hutt City Council Public Viewer: https://maps.huttcity.govt.nz/Html5Viewer2101/Index.html?viewer=HCC.HuttView

Figure 1: Aerial photograph of investigation site



(Source: https://maps.huttcity.govt.nz/Html5Viewer2101/Index.html?viewer=HCC.HuttView, accessed 22 Feb 2021)

2.3 Existing Structures

The current development on both lots comprises a single-storey dwelling central west to each site, both with timber framing. A garage and shed also lies in the north and east portion of each site. 4 Johnston is accessed via a gravel drive whereas 3 Johnston Grove is accessed via a concrete driveway from Johnston Grove. Both dwellings are constructed with timber weatherboard cladding, and tiled roofing. From external observations it appears both dwellings have a suspended timber floor with perimeter foundation and assumed internal piles. The garage in 4 Johnston Grove is constructed with a corrugated iron roof, and walls and likely to be sitting on a concrete pad foundation, whereas the adjacent garage in 2 Meadow Ave is constructed with timber weatherboard also likely to be sitting on a similar foundation.

2.4 Vegetation

Vegetation comprising of small to medium shrubs, gardens and trees were generally concentrated along the property boundary and around the existing buildings. The remainder of the site not occupied via structures or pathways is generally grass covered.

3.0 Proposed Development

A development plan was also not available at the time of writing this report, however it is envisaged the proposed development may contain multiple new lots each with a individual dwelling, comprising greater than one storey.

An earthworks plan was not made available at the time of writing this report, however, it is envisaged that given the relatively flat site, cut and fill earthworks will be minimal, with the exception of any foundation preparation.

4.0 Area Geology

Reference has been made to the *New Zealand Geology Web Map*, GNS Science, weblink: http://data.gns.cri.nz/geology/, accessed 22 February 2021.

The above sources indicate that the site is underlain by Holocene age Alluvial Deposits. Considering the materials encountered within our auger holes (discussed later in section 7.0) we believe Holocene Alluvial Deposits were encountered across the investigation site. These deposits comprise well sorted floodplain gravels with silt and sand lenses.

The characteristics of the Alluvial Deposits can vary widely over small distances. These variations include both vertical and horizontal differences in both soil and particle size distribution and consolidation. These materials generally comprise interbedded horizons of fine to coarse sand, silt, clay, and peat however layers of rounded to sub-rounded gravel to cobble size particles can also exist.

The geotechnical properties of Alluvial Deposits depend on a number of factors including composition, level of consolidation, groundwater, particle size distribution and potential organic content. For this reason, alluvium can be prone to differential settlement. It can also exhibit a potential for liquefaction during seismic events and lateral spreading near river systems.

5.0 Field Investigation

The field investigation took place on 24th February 2021 and comprised the following components:

- Detailed site inspection;
- Drilling of six hand auger holes with associated in-situ soil testing

The approximate location[2] of our investigation holes has been shown on the appended LandTech Test Location Plan, Drawing No. LTW21002/ 1, attached in Appendix A.

The soil conditions encountered are described[3] in detail on the appended field logs attached in Appendix B, together with the results of the various tests undertaken, plus the groundwater conditions determined during our time on site.

Soil shear strength and remould tests, factored in terms of BS1377, were performed in situ, at selected depths, using a hand-held shear vane[4]. Dynamic Cone (Scala) Penetrometer testing[5] was undertaken throughout and from the base of all the hand auger holes to determine a soil density profile at depth.

Groundwater measurements were made on the day of drilling at the completion of the fieldwork. The hand auger boreholes were subsequently backfilled.

6.0 Geotechnical Data Review

The geotechnical data review for the investigation site includes but is not limited to referencing the following sources:

- *Wellington Regional Liquefaction Potential Map*; weblink: https://koordinates.com/layer/4068-wellington-region-liquefaction-potential/, accessed 22 February 2020; and
- GNS Science Consultancy Report 2010/163, title "*It's Our Fault – Geological and Geotechnical Characterisation and Site Class Revision of the Lower Hutt Valley*", dated June 2010.

[2] Field tests and sections were located using a hand-held GPS unit and a measuring tape without survey control and are therefore approximate only.

[3] Soil was logged in accordance with New Zealand Geotechnical Society Guideline for the Description of Soil and Rock for Engineering Purposes (2005).

[4] In accordance with New Zealand Geotechnical Society Guideline for Handheld Shear Vane Test, (2001).

[5] In accordance with NZS 4402:1988, Test 6.5.2, Dynamic Cone Penetrometer.

The Wellington Regional Liquefaction Potential Map shows that the site is in an area of no liquefaction potential. The GNS report indicates that the depth to the Greywacke bedrock underlying the site is approximately 20 to 40m. The average shear-wave velocity of the top 20m of the area wide soil profile is shown to range between 250 to 360 m/s. This interval of shear wave velocities is considered to represent soils with no liquefaction potential.

7.0 Subsurface Conditions

The subsurface conditions encountered generally comprised of topsoil and fill with underlying Alluvial Deposits Formation, as per the mapped geology. A subsurface summary is provided in Table 1 and detailed descriptions are given in the subsequent sections.

Table 1: Subsurface summary

Augerhole ID	Drill Depth	Scala Depth	Depth of Topsoil & Fill	Groundwater Level
HA01	0.7*	1.2**	0.2	NE
HA02	1.0*	1.5**	0.3	NE
HA03	2.1*	2.5**	0.3	NE
HA04	1.1*	1.4**	0.2	NE
HA05	0.7*	1.0**	0.2	NE
HA06	1.5*	2.5**	0.2	NE

Table Notes: Measurements are in metres (m) below present ground level (bpgl)
* Refusal/Obstruction of Hand Auger in Borehole
** Scala penetrometer refusal (two increments of >20 blows / 100mm penetration)
NE = Not Encountered

7.1 Topsoil & Fill

Topsoil and fill were encountered from the existing ground surface to depths between 0.2m and 0.3m. Based on the variable and organic nature of the topsoil and fill, these are not suitable for the support of permanent structures (i.e., floors, pavements, dwelling foundations) due to the potential for differential settlement.

7.2 Natural Ground

Underlying the topsoil/fill, Alluvial Deposits were encountered down to the bottom of the hand auger holes. The Alluvial Deposits comprised of non to slightly plastic SILTs with varying sand and gravel increasing at depth and becoming SANDs and GRAVELs at the base of the augerholes.

Peak vane shear strengths within these soils ranged between 45kPa to an excess of 200kPa and the soils were correspondingly described as firm to very stiff materials. Sensitivity ratios were generally between 2 and 5 (moderately sensitive to sensitive).

Scala penetrometer results carried out through the hand augers ranged between 1 to 40+ blows/100mm penetration and were generally between 1 and 3 blows/100mm. Scala testing from the base of the augers encountered refusal at depths between 1.0m and 2.5m, inferred to be in contact with very dense gravel deposits at depth.

7.3 Groundwater

Groundwater measurements were undertaken on the completion of each hole and was not encountered during our time onsite. This water level may not be representative of typical groundwater conditions on the site which may be higher following times of heavy or prolonged rainfall and/or during wetter winter conditions, or lower towards the end of dry summer periods.

7.4 Site Seismicity

For the purpose of applying requirements of NZS 1170.5:2004 the site subsoil is considered Class C - Shallow Soil Site. This classification is based on the depth of soils estimated to be within those given in table 3.2 of the standard.

The Peak Ground Accelerations (PGAs) for an importance level 2 structure (IL2) under Serviceability Limit State (SLS) and Ultimate Limit State (ULS) loading were determined for the site according to the provisions of NZS1170.5:2004 and New Zealand Bridge Manual Third Edition (2016) as below:

PGA = $C_{0,1000}$ x R/1.3 x f x g

Where: 1000 Year return period (C0,1000) = 0.45 (Class C soil; Lower Hutt)
Return Period Factor (Rs) = 0.25 (SLS Seismic Loading)
Return Period Factor (Ru) = 1.0 (ULS Seismic Loading)
Site subsoil class (f) = 1.33 (Site Soil Class C from NZS1170.5: 2004)

Therefore: PGA_{SLS} = 0.45 x 0.25/1.3 x 1.33 **= 0.12g and M_{eff} = 6.2**
PGA_{ULS} = 0.45 x 1.0/1.3 x 1.33 **= 0.46g and M_{eff} = 7.1**

8.0 Qualitative Liquefaction Assessment

The site is underlain by Alluvial Deposits comprising no to slightly plastic silts with varying sand and clay, with dense sand and gravel below. The groundwater table was not encountered on site. Moderate soil densities are inferred ranging approximately 1 to 16 blows per 100mm penetration within the natural soil layers above the gravel.

Regarding lateral ground movements, the site is removed from any nearby streams or major bodies of water. Therefore, lateral spreading potential at the site is anticipated to be low.

Therefore, we believe an equivalent TC1 classification is appropriate for the site, in accordance with the MBIE Canterbury Rebuild Guidelines (December 2012). This is described as sites where liquefaction-Induced land damage is unlikely during future large earthquakes. Conventional shallow foundations are considered appropriate provided they are subject to specific engineering design based on an Ultimate Bearing Capacity of 150kPa as discussed in section 10.0.

9.0 Geotechnical Hazard Evaluation

Section 106 of the Resource Management Act 1991 outlines hazards that must be assessed when a territorial authority considers a Subdivision Consent application. This section outlines our evaluation of possible geotechnical hazards associated with the site.

9.1 Erosion

No obvious signs of erosion were noted within the site during our field investigation, and long-term erosion is not considered a risk for the proposed development.

Furthermore, erosion and sediment control measures should be utilised during earthworks to ensure excessive erosion and sediment pollution does not occur during construction. Similarly, stormwater should be collected and disposed of in a controlled manner following development.

9.2 Falling Debris

Due to no elevated land being located above the site, the risk of falling debris from upslope land slippage or rockfall is considered negligible.

9.3 Subsidence

The site is not considered prone to liquefaction-induced subsidence, in accordance with TC1 criteria. However, weak upper soil layers are encountered that do not meet NZS3604:2011 "good ground" criteria, standard non-specific designed foundations for use at the site. Refer to section 10.0 for the foundation recommendations based on this criteria.

9.4 Slippage

Due to the generally flat level nature of the site and that no obvious signs of land instability were noted during our walkover inspection, on the basis of the current topography and our site observations, we consider the risk of instability to be low.

9.5 Inundation

Wellington Water should be contacted to confirm any flooding hazard at the site, which may need to be taken into consideration within the earthworks design and finished floor levels.

10.0 Geotechnical Recommendations

Based on the results of our field investigation, observations during walkover inspection, and natural hazard assessment, we conclude that the proposed development is suitable from a geotechnical perspective. This is on the condition that the following recommendations are adhered to.

10.1.1 Earthworks

We recommend that all earthworks are carried out in accordance with the following documents:

- New Zealand Standard Code of Practice for Earthfill for Residential Development, NZS4431:1989.
- New Zealand Standard Land Development and Subdivision Infrastructure, NZS4404:2010

Any fill placed should be appropriately monitored and tested during placement and compaction and its suitability for final residential development confirmed by way of a Statement of Professional Opinion by a suitably qualified Geotechnical Engineer. Cuts and fills greater than 600mm depth should be assessed by a Geotechnical Engineer familiar with the contents of this report.

10.1.2 Erosion

Prior to any earthworks taking place, erosion and sediment control measures should be constructed at the site in line with Hutt City Council requirements. We emphasise the importance of keeping rainfall and run-off from cut faces as this may cause excessive erosion and instabilities. Permanent erosion protection to completed earthworks can be achieved via turfing, planting or covering with hardstands.

10.1.3 Unsuitable Material

We recommend the stripping of all vegetation, topsoil, and any soft or otherwise unsuitable material encountered from the building platform or earthworks area. Site excavations may expose areas comprising non-engineered fill deposits, which must be subject to further geotechnical assessment.

The competency of the exposed stripped subgrade should be confirmed by a Geo-Professional inspection. Should the assessment indicate that the non-engineered fill is unsuitable then it is to be over-excavated to a competent subgrade and replaced with engineered fill.

All excavated topsoil and unsuitable material should be removed from site or stockpiled away from the building platform and/or earthworks area and clear of the steeper site slopes in an appropriate manner so that land stability and/or adjacent structures are not compromised.

10.1.4 Cut and Fill Batter Slopes

We recommend that excavations are carried out during the drier months. However, excavations should be carried out with temporary drainage channels to intercept any groundwater ingress. These temporary drains should lead to sumps and a mechanism for sediment retention prior to discharging to the Council system. Appropriate permits will be necessary from the Council for such works.

Temporary excavations greater than 1.0m should be battered no steeper than 1H:1V, while excavations of less than 1.0m in height may generally be cut vertical. These recommendations are provided for situations where excavations are well clear of existing structures, site boundaries, neighbouring retaining walls, or any other form of surcharge. In these instances, staged excavations, shallower batters, temporary retaining etc. may be required. Maintenance of temporary stability is the responsibility of the contractor.

All permanent cuts and fills at this site should be battered at slopes less than 1V:4H or be retained by suitably designed retaining walls. Once the batter slopes have reached their finished geometry, they should be stabilized with topsoil and/or root binding vegetation

10.1.5 Subgrade Protection

Once the suitability of the stripped subgrade has been confirmed by a geo-professional it should be either covered by polythene, geotextile or at least 100mm of granular fill such as GAP40 basecourse, as soon as possible.

Leaving the subgrade exposed for a prolonged period results in soil degradation by either excessive drying (resulting in shrinkage cracking) or subgrade softening (after periods of wet weather).

Excessively dry subgrade will need to be re-hydrated and the softened will need to either be dried out as appropriate or be undercut.

Likewise, shallow and deep pile foundation inverts should be poured as soon as possible once the pile holes have been inspected by a Geo-Professional or covered with a protective layer of site concrete.

10.1.6 Fill Compaction

All fill should be placed on suitable subgrade, free of any topsoil or unsuitable materials. Fills exceeding 0.6m in height, require observation/testing of the hardfill by a Geo-Professional to cover Building Consent conditions.

The compaction of the hardfill should be undertaken using a heavy plate compactor or steel wheeled roller with low frequency dynamic compaction. Filling should be placed in layers not exceeding 200mm lifts at a time. Hardfill specifications have been given in Table 2.

Table 2: Required CIV Values for hardfill compaction

Foundation Support Type	Equivalent Clegg Impact Value (CIV)	
	Minimum	Average*
Foundation Footing / Slabs / Beams	15	20

*The Average CIV required from all the tests carried out across the foundation footprint.

We do not recommend the use of compacted soil fill as engineered building platform material due to the inherent problems arising from not achieving a satisfactory water content or adequate consistency of the soil, which can, more often than not, lead to poor quality compaction. We instead recommend importing and compacting hardfill under the building footprint.

10.2 Pavement

Based on the results of our investigation we consider that for the preliminary design of accessways and parking areas a CBR of 2% can be used can be used. We recommend that Scala penetrometer tests are carried out once the earthworks have been undertaken and completed to the trimmed subgrade pavement level to confirm this design parameter is appropriate.

10.3 Retaining Walls

Given the generally level topography, we do not anticipate any retaining walls being required for the proposed development. If retaining walls requiring engineering design are required, then they can be designed based on the following soil properties.

- Cu = 50kPa
- Ø' = 28°
- γ = 17kN/m³

10.4 Foundation Recommendations

Based on the findings of our investigation and assessment, the proposed new units may be supported on shallow foundations embedded a minimum of 0.6m below present ground level. However, due to some low strength soils in the upper profile, foundations should be subject to specific engineering design, based on an Ultimate Bearing Capacity of 150kPa. A Strength Reduction Factor of 0.5 should be applied.

All existing topsoil, fill, and building rubble following demolition should be removed from the building platforms + a 1.0m horizontal distance. We recommend an allowance of 0.3m of stripping of these materials, however, may be locally deeper following bulk cuts. Thereafter, layers of compacted hardfill should be placed to the underside of conventional NZS3604:2011 floors, or those subject to specific engineering design/detailing.

All excavations should be inspected by a geo-professional or their representative to ensure all unsuitable materials have been removed and that the design bearing capacity is available. Should deeper soft and/or unsuitable materials be encountered, they should be removed and replaced with either mass concrete or compacted hardfill.

The above recommendations are provided for developments of up to three storeys, with light roofing, and light to medium weight cladding. If taller and or heavier buildings are proposed, the matter should be referred back to us for further consideration.

11.0 Stormwater Control

All collected groundwater/stormwater flows must be carried in sealed pipes to a Council approved system. Any uncontrolled stormwater must not be allowed to saturate the ground in proximity to the proposed building platform, as this will potentially adversely affect site stability, foundations, and retaining walls.

12.0 Further Geotechnical Involvement

12.1 Drawing Review

A Geo-professional familiar with this report should be engaged to review the final drawings of the proposed development prior to submission to Hutt City Council. This is to ensure the geotechnical recommendations of this report have been implemented correctly. Further geotechnical investigation, analysis, design or reporting may be warranted at this stage subject to the specifics of the proposal.

12.2 Construction Observations

Further to the above, a Geo-professional should also be engaged to carry out observations during construction to confirm subsurface conditions are consistent with those described in this report.

- Inspections will not be carried out prior to the issue of Council Resource and/or Building Consents; unconsented works will not be inspected
- We recommend that once received, the Consent be forwarded and reviewed by us. Following the Consent review a schedule of inspections can be issued to the Client.
- Without sufficient observations during the subgrade preparation prior to placement of fill or concrete, LandTech will not be in a position to provide engineering certification (i.e. Earthworks Completion Report, or Producer Statement PS4).
- Areas where concrete or fill are placed without prior geotechnical observation will be specifically excluded from completion documentation.

13.0 Limitations

This geotechnical report has been prepared for our Client, Williams Corporation Ltd, for the purposes of supporting consent applications for the proposed development described herein. This report may be used by our Clients appointed consultants for design purposes, and for supporting Consent applications to Hutt City Council. This report shall not be extrapolated for other nearby sites, or used for any other purposes without the express approval of LandTech and their Client.

This report has been based on the results of tests at point locations; therefore, conditions could vary away from the assumed geotechnical model. Should exposed soil conditions vary from those described herein we request to be informed to determine the continued applicability of our recommendations. We have attempted to conduct a thorough investigation of soil types across the site, within the agreed scope of works. However, variations still may exist as soils can vary naturally and due to previous human activities, which LandTech have no control over and should not be held accountable for.

The geotechnical investigation was confined to geotechnical aspects of the site only and did not involve the assessment for environmental contaminants. In addition, our investigation and analyses have also not taken into account possible fault rupture or volcanic eruption that may cause deformations and displacements of the ground directly below the site. This type of assessment is outside of the scope of our geotechnical engagement.

END OF REPORT

Appendix A
Test Location Plan

KEY:

HA01 — LandTech Consulting Ltd. augerhole locations, drilled 24 Feb 2021

Existing boundary

NOTES:

Locations of features approximate only

Original sheet size A3

Boundary information on this *Test Location Plan* adapted from LINZ website: www.data.linz.govt.nz (accessed 01 March 2021)

AMENDMENTS

DATE	REV	DESCRIPTION
01/03/2021	A	Report Issue

Test Location Plan

3-4 Johnston Grove
TAITA, LOWER HUTT

LandTech CONSULTING

Christchurch Office:
11B Carlyle Street, Sydenham, Christchurch 8023

Auckland Office:
17 Nils Andersen Road, Whenuapai, Auckland 0618

Postal Address:
PO Box 119, Christchurch 8013

Website: www.landtech.nz Email: info@landtech.nz

Drawing No.	Drawn by:	Date:
LTW21002/ 1	C Baker	01 March 2021
Scale: 1: 250 (A3)	Checked by: D Wilson	Revision: A

Filename: LTW21002 - Test Location Plan.dwg

Appendix B
Field Investigation Logs

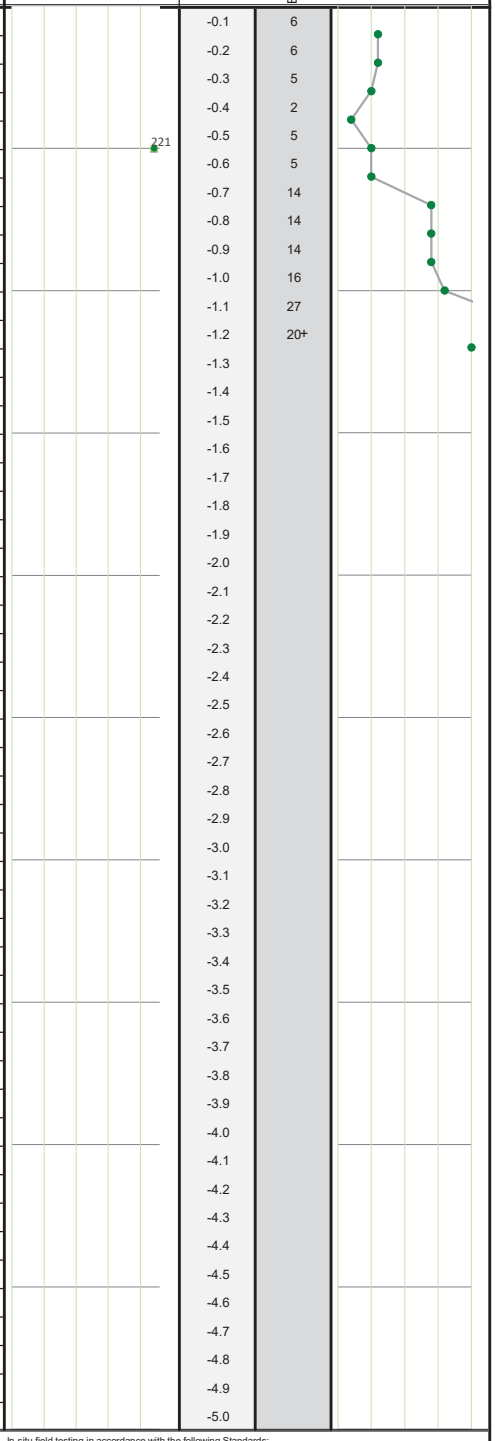
LandTech CONSULTING	Client: Williams Corporation Ltd Project: Geotechnical Investigation for Proposed Residential Development Address: 3-4 Johnston Grove, Taita, Lower Hutt	Augerhole No.	HA01
		Sheet No.	1 of 1

Drill Type:	50ml HA	Project No:	LTW21002	Logged By:	AA
Drilled By:	AA	Coordinates:	NZTM2000: E:1764807.56 ; N:5439998.38	Shear Vane No:	2715
Date Started:	24-Feb-21	Ground Conditions:	Near Level, Grass	Calibration Factor:	1.582
Date Finished:	24-Feb-21	Groundwater Level (m):	Not Encountered	Calibration Date:	21-Aug-20

Stratigraphy	Depth (m)	Graphic Log	Soil description in accordance with *Guideline for the Field Classification and Description of Soil and Rock for Engineering Purposes*, NZ Geotechnical Society Inc., 2005
TS/FILL			SILT, minor rootlets, light greyish brown, hard, dry, non-plastic
ALLUVIAL DEPOSITS			SILT, some fine sand, light orangish brown, hard, moist, non-plastic
	0.5		some fine to medium gravel
			End of Augerhole 0.7m
			[GRAVEL OBSTRUCTION]
	1.0		
	1.5		
	2.0		
	2.5		
	3.0		
	3.5		
	4.0		
	4.5		
	5.0		

Groundwater Level (m): Not Encountered

In-situ Field Testing



In-situ field testing in accordance with the following Standards:

Scala Penetrometer Testing: NZS 4402:1988, Test 6.5.2, Dynamic Cone Penetrometer

Shear Vane Testing: Guideline for Hand Held Shear Vane Test, NZGS, August 2001

LandTech Consulting Ltd. (Christchurch): 11B Carlyle Street, Sydenham
LandTech Consulting Ltd. (Auckland): 17 Nils Andersen Road, Whenuapai
Phone: (03) 390 1371
Phone: (09) 930 9334
Email: info@landtech.nz
Website: www.landtech.nz

LandTech CONSULTING	Client: Williams Corporation Ltd Project: Geotechnical Investigation for Proposed Residential Development Address: 3-4 Johnston Grove, Taita, Lower Hutt	Augerhole No.	HA02
		Sheet No.	1 of 1

Drill Type:	50ml HA	Project No:	LTW21002	Logged By:	AA
Drilled By:	AA	Coordinates:	NZTM2000: E:1764833.74 ; N:5439980.86	Shear Vane No:	2715
Date Started:	24-Feb-21	Ground Conditions:	Near Level, Grass	Calibration Factor:	1.582
Date Finished:	24-Feb-21	Groundwater Level (m):	Not Encountered	Calibration Date:	21-Aug-20

Stratigraphy	Depth (m)	Graphic Log	Soil description in accordance with *Guideline for the Field Classification and Description of Soil and Rock for Engineering Purposes*, NZ Geotechnical Society Inc., 2005
TS/FILL			SILT, minor rootlets and organic matter, brown, stiff, moist, non-plastic
ALLUVIAL DEPOSITS	0.5		SILT, some fine sand, light brown, moist, very stiff, non-plastic
	1.0		some fine to medium gravel, minor clay, slightly plastic
			End of Augerhole 1.0m [GRAVEL OBSTRUCTION]

Groundwater Level (m): Not Encountered

In-situ Field Testing

Shear Strength (kPa) — Peak: / Remoulded: — 0 50 100 150 200

111

UTP

Dynamic Cone (Scala) Penetrometer

Depth (m)	Blow Count	Scala Blow Count / 100mm
-0.1	2	
-0.2	2	
-0.3	2	
-0.4	1	
-0.5	1	
-0.6	2	
-0.7	1	
-0.8	1	
-0.9	1	
-1.0		
-1.1	6	
-1.2	12	
-1.3	14	
-1.4	20	
-1.5	20+	

0 5 10 15 20

In-situ field testing in accordance with the following Standards:

Scala Penetrometer Testing: NZS 4402:1988, Test 6.5.2, Dynamic Cone Penetrometer

Shear Vane Testing: Guideline for Hand Held Shear Vane Test, NZGS, August 2001

LandTech Consulting Ltd. (Christchurch): 11B Carlyle Street, Sydenham
LandTech Consulting Ltd. (Auckland): 17 Nils Andersen Road, Whenuapai
Phone: (03) 390 1371
Phone: (09) 930 9334
Email: info@landtech.nz
Website: www.landtech.nz

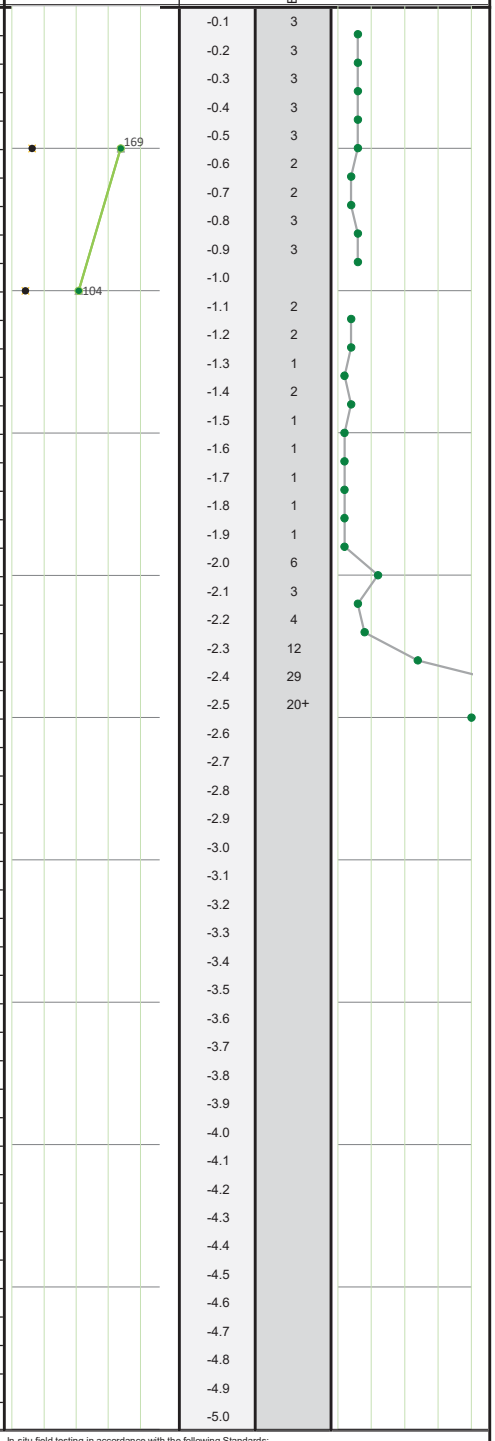
LandTech CONSULTING	Client: Williams Corporation Ltd Project: Geotechnical Investigation for Proposed Residential Development Address: 3-4 Johnston Grove, Taita, Lower Hutt	Augerhole No.	HA03
		Sheet No.	1 of 1

Drill Type:	50ml HA	Project No:	LTW21002	Logged By:	CB
Drilled By:	CB	Coordinates:	NZTM2000: E:1764844.57 ; N:5439995.49	Shear Vane No:	2486
Date Started:	24-Feb-21	Ground Conditions:	Near Level, Grass	Calibration Factor:	1.485
Date Finished:	24-Feb-21	Groundwater Level (m):	Not Encountered	Calibration Date:	5-Feb-21

Stratigraphy	Depth (m)	Graphic Log	Soil description in accordance with *Guideline for the Field Classification and Description of Soil and Rock for Engineering Purposes*, NZ Geotechnical Society Inc., 2005
TOPSOIL/FILL			SILT, minor fine to medium sand, trace organics, brown, stiff, moist, non-plastic
ALLUVIAL DEPOSITS	0.5		SILT, minor fine to medium sand, greyish brown with orange mottles, very stiff, moist, non-plastic
	1.0		some fine to medium sand, trace clay, non to slightly plastic
	1.5		fine to coarse SAND, minor silt, greyish brown, very loose, moist, non-plastic no silt minor fine to coarse sub-angular gravel
	2.0		fine to coarse Gravelly SAND, greyish brown, dense, moist, non-plastic
	2.5		End of Augerhole 2.1m [GRAVEL OBSTRUCTION]
	3.0		
	3.5		
	4.0		
	4.5		
	5.0		

Groundwater Level (m): Not Encountered

In-situ Field Testing



In-situ field testing in accordance with the following Standards:

Scala Penetrometer Testing: NZS 4402:1988, Test 6.5.2, Dynamic Cone Penetrometer

Shear Vane Testing: Guideline for Hand Held Shear Vane Test, NZGS, August 2001

LandTech Consulting Ltd. (Christchurch): 11B Carlyle Street, Sydenham
LandTech Consulting Ltd. (Auckland): 17 Nils Andersen Road, Whenuapai
Phone: (03) 390 1371
Phone: (09) 930 9334
Email: info@landtech.nz
Website: www.landtech.nz

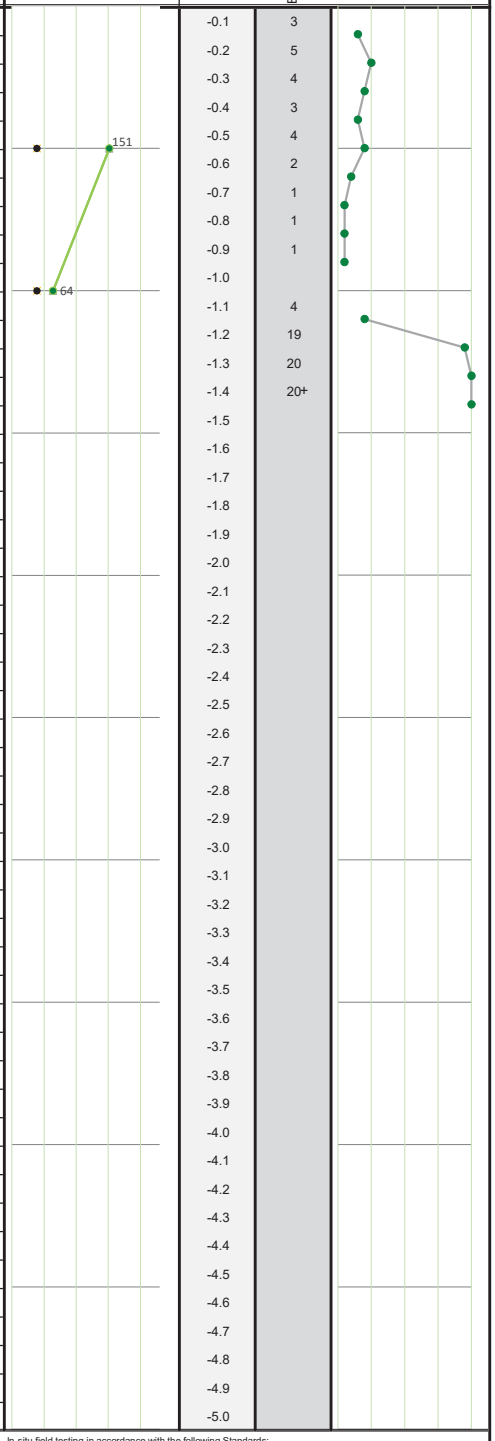
LandTech CONSULTING	Client: Williams Corporation Ltd Project: Geotechnical Investigation for Proposed Residential Development Address: 3-4 Johnston Grove, Taita, Lower Hutt	Augerhole No.	HA04
		Sheet No.	1 of 1

Drill Type:	50ml HA	Project No:	LTW21002	Logged By:	CB
Drilled By:	CB	Coordinates:	NZTM2000: E:1764814.99 ; N:5439984.27	Shear Vane No:	2486
Date Started:	24-Feb-21	Ground Conditions:	Near Level, Grass	Calibration Factor:	1.485
Date Finished:	24-Feb-21	Groundwater Level (m):	Not Encountered	Calibration Date:	5-Feb-21

Stratigraphy	Depth (m)	Graphic Log	Soil description in accordance with *Guideline for the Field Classification and Description of Soil and Rock for Engineering Purposes*, NZ Geotechnical Society Inc., 2005
TS/FILL			SILT, minor fine to medium sand, light brown, trace organics, very stiff, moist, non-plastic
ALLUVIAL DEPOSITS	0.5		SILT, minor fine to medium sand, greyish brown, very stiff, moist, non-plastic
			trace clay, non to slightly plastic
	1.0		some fine to medium sand, trace fine to coarse sub-angular gravel
			End of Augerhole 1.1m
			[GRAVEL OBSTRUCTION]
	1.5		
	2.0		
	2.5		
	3.0		
	3.5		
	4.0		
	4.5		
	5.0		

Groundwater Level (m): Not Encountered

In-situ Field Testing



In-situ field testing in accordance with the following Standards:

Scala Penetrometer Testing: NZS 4402:1988, Test 6.5.2, Dynamic Cone Penetrometer

Shear Vane Testing: Guideline for Hand Held Shear Vane Test, NZGS, August 2001

LandTech Consulting Ltd. (Christchurch): 11B Carlyle Street, Sydenham
LandTech Consulting Ltd. (Auckland): 17 Nils Andersen Road, Whenuapai
Phone: (03) 390 1371
Phone: (09) 930 9334
Email: info@landtech.nz
Website: www.landtech.nz

LandTech CONSULTING	Client: Williams Corporation Ltd Project: Geotechnical Investigation for Proposed Residential Development Address: 3-4 Johnston Grove, Taita, Lower Hutt	Augerhole No.	HA05
		Sheet No.	1 of 1

Drill Type:	50ml HA	Project No:	LTW21002	Logged By:	AA
Drilled By:	AA	Coordinates:	NZTM2000: E:1764815.42 ; N:5439965.51	Shear Vane No:	2715
Date Started:	24-Feb-21	Ground Conditions:	Near Level, Grass	Calibration Factor:	1.582
Date Finished:	24-Feb-21	Groundwater Level (m):	Not Encountered	Calibration Date:	21-Aug-20

Stratigraphy	Depth (m)	Graphic Log	Soil description in accordance with *Guideline for the Field Classification and Description of Soil and Rock for Engineering Purposes*, NZ Geotechnical Society Inc., 2005
TS/FILL			SILT, minor rootlets, trace fine to medium sub-angular gravel, very stiff, moist, non-plastic
ALLUVIAL DEPOSITS	0.5		SILT, some fine sand, trace rootlets, light brown with light grey specks, hard, moist, non-plastic
			light brown
			minor fine to medium gravel
	1.0		End of Augerhole 0.8m [GRAVEL OBSTRUCTION]
	1.5		
	2.0		
	2.5		
	3.0		
	3.5		
	4.0		
	4.5		
	5.0		

Groundwater Level (m): Not Encountered

In-situ Field Testing

Shear Strength (kPa)

Peak:

Remoulded:

0 50 100 150 200

221 at 0.5 m

Dynamic Cone (Scala) Penetrometer

Depth (m)	Blow Count
-0.1	6
-0.2	6
-0.3	4
-0.4	4
-0.5	3
-0.6	3
-0.7	2
-0.8	3
-0.9	20
-1.0	20+

Scala Blow Count / 100mm: 0 5 10 15 20

In-situ field testing in accordance with the following Standards:

Scala Penetrometer Testing: NZS 4402:1988, Test 6.5.2, Dynamic Cone Penetrometer

Shear Vane Testing: Guideline for Hand Held Shear Vane Test, NZGS, August 2001

LandTech Consulting Ltd. (Christchurch): 11B Carlyle Street, Sydenham
LandTech Consulting Ltd. (Auckland): 17 Nils Andersen Road, Whenuapai
Phone: (03) 390 1371
Phone: (09) 930 9334
Email: info@landtech.nz
Website: www.landtech.nz

LandTech CONSULTING

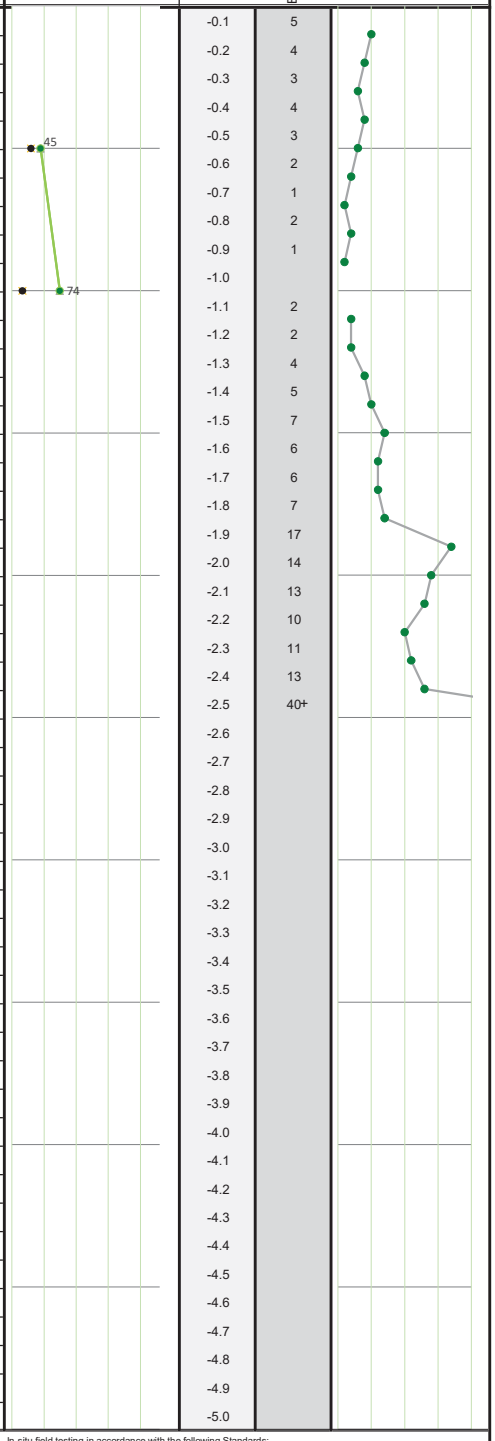
Client:	Williams Corporation Ltd
Project:	Geotechnical Investigation for Proposed Residential Development
Address:	3-4 Johnston Grove, Taita, Lower Hutt
Augerhole No.	HA06
Sheet No.	1 of 1

Drill Type:	50ml HA	Project No:	LTW21002	Logged By:	CB
Drilled By:	CB	Coordinates:	NZTM2000: E:1764814.47 ; N:5439952.83	Shear Vane No:	2486
Date Started:	24-Feb-21	Ground Conditions:	Near Level, Grass	Calibration Factor:	1.485
Date Finished:	24-Feb-21	Groundwater Level (m):	Not Encountered	Calibration Date:	5-Feb-21

Stratigraphy	Depth (m)	Graphic Log	Soil description in accordance with *Guideline for the Field Classification and Description of Soil and Rock for Engineering Purposes*, NZ Geotechnical Society Inc., 2005
TS/FILL			SILT, minor fine to medium sand, trace organics, light brown, stiff, dry, non-plastic
ALLUVIAL DEPOSITS	0.5		SILT, minor fine to medium sand, greyish brown, firm, moist, non-plastic
	1.0		trace clay, stiff, non to slightly plastic
	1.5		fine to coarse Sandy GRAVEL, greyish brown, dense, moist
			End of Augerhole 1.5m
			[GRAVEL OBSTRUCTION]

Groundwater Level (m): Not Encountered

In-situ Field Testing



In-situ field testing in accordance with the following Standards:

Scala Penetrometer Testing: NZS 4402:1988, Test 6.5.2, Dynamic Cone Penetrometer

Shear Vane Testing: Guideline for Hand Held Shear Vane Test, NZGS, August 2001

LandTech Consulting Ltd. (Christchurch): 11B Carlyle Street, Sydenham
LandTech Consulting Ltd. (Auckland): 17 Nils Andersen Road, Whenuapai
Phone: (03) 390 1371
Phone: (09) 930 9334
Email: info@landtech.nz
Website: www.landtech.nz

APPENDIX 6
INFRASTRUCTURE REPORT AND CIVIL DRAWINGS

ENVELOPE ENGINEERING
LAND
STRUCTURE
MANAGE

RESOURCE CONSENT

GRANTED
29/06/2021

HUTT CITY COUNCIL

HUTT CITY
TE AWA KAIRANGI

INFRASTRUCTURE ASSESSMENT REPORT – 4 JOHNSTON GROVE TAITA, LOWER HUTT

Williams Corporation Ltd

DOCUMENT CONTROL RECORD

CLIENT	Williams Corporation Ltd
PROJECT	4 Johnston Grove
PROJECT NO.	1609-01
DOCUMENT TYPE	Infrastructure Report
DATE ISSUED	Mar 2021
ADDRESS FOR SERVICE	Envelope Engineering Limited Level 1, 68 Dixon Street Wellington
CONTACT	Andrew Horsley – Senior Engineer andrewh@envelope-eng.co.nz +64 21 390 312

ISSUE AND REVISION RECORD

DATE OF ISSUE	29th March 2021
STATUS	For Resource Consent
ORIGINATOR	Andrew Horsley – Senior Engineer
REVIEWED	Ryan Rose – Wellington Manager
APPROVED FOR ISSUE	Ryan Rose – Wellington Manager

CONTENTS

APPENDICES

1.0 INTRODUCTION

The proposal is to develop the site at 3 and 4 Johnston Grove, Taita, Lower Hutt as detailed on the appended plans. The legal description of the site is LOT 836 DP 15394 & LOT 1 DP85782/ SEC 1014 SO34650, and it has an area of 1780m^2. The site currently is occupied by two houses which will be demolished. The proposal is to construct 19 new dwellings on the site in three terraces and two duplexes. Figure 1 below shows the site along with existing underground infrastructure and the surrounding area.

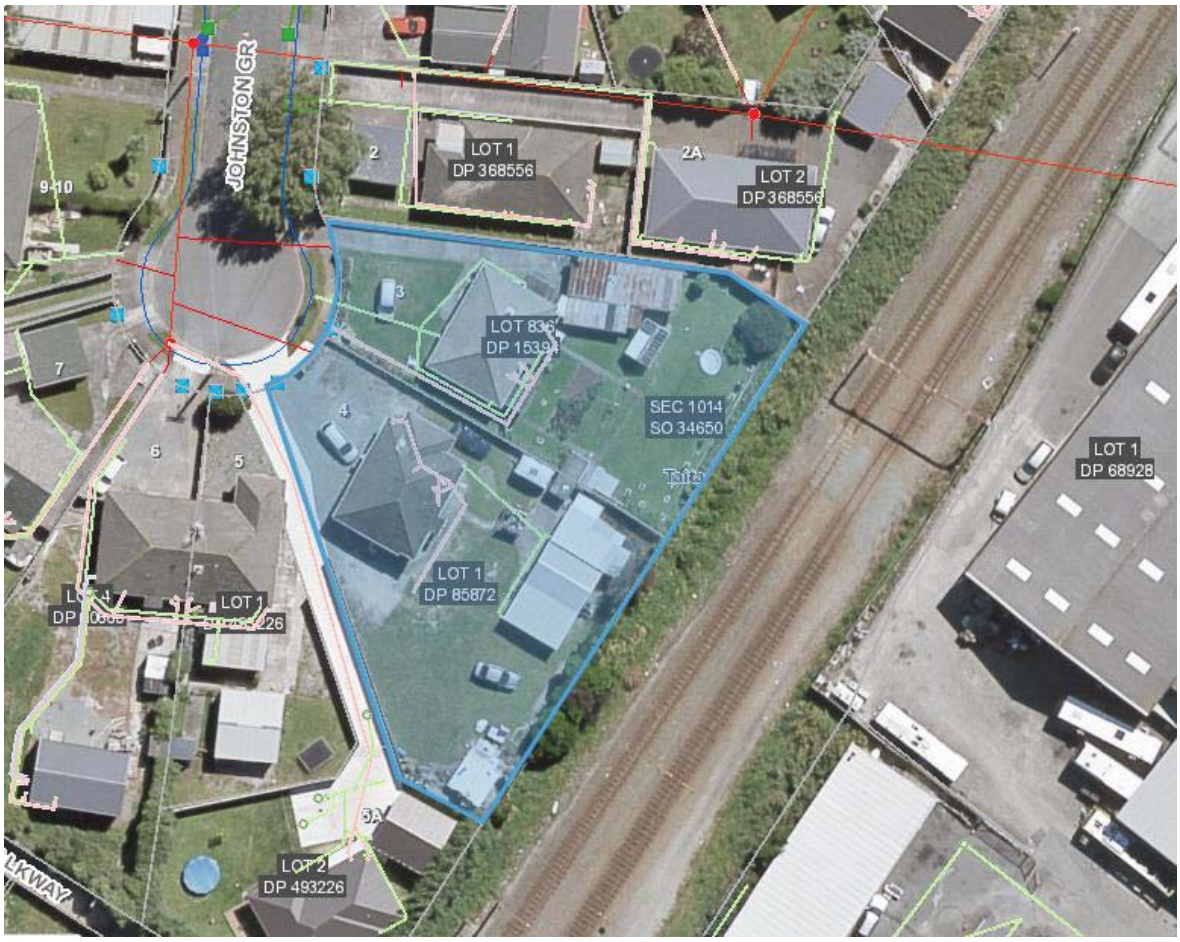


Figure 1 – Locality Plan

The land is generally flat (<5% slope in average), with a slight fall towards the east.

The engineering plans are included within Appendix 2.

2.0 INFRASTRUCTURE

2.1 WASTEWATER

Figure 1 above shows the existing public wastewater drain running in Johnston Grove with a manhole located at the end of the cul-de-sac. Based on GIS information this is an 150mm dia reinforced concrete pipe running in a north-easterly direction.

The main serves the lots in the cul-de-sac and connects onto a 150mm dia pipe running west. GIS information show the pipe then running south-west and connecting into a 525mm pipe at the corner of High St and Watkins Grove. Based on this we are satisfied there are no capacity constraints on the immediate downstream network.

As shown on plan 400 we are proposing to abandon the existing laterals from the existing properties and lay a new public 150 dia line across the cul-de-sac head to the site. The line will become private at WWMH A-1 with a shared 150mm pipe running around to the rear of the site. All dwellings are proposed to connect to the shared 150mm dia pipes with separate individual 100mm connections.

A lateral connection is provided from the terminal manholes of each branch which shall act as ventilation in accordance with Wellington Water requirements.

2.2 STORMWATER

2.2.1 Pipework

The GIS shows a public stormwater line on Johnston Grove approximately 30m north of the site. Based on site grading, connecting directly to the public pipework from the proposed development is unfeasible. It is proposed to attenuate flows to pre-existing conditions and utilise the existing kerb discharge points on Johnston Grove.

2.2.2 Attenuation

The existing site has an impervious area of just over 476m2.

The proposed post-development impervious area is 838m2 (including roof area of 588m2). In a 10% AEP event the peak runoff unattenuated would increase from 22.0l/s to 27.2l/s, in a 1% AEP event it would increase from 42.0l/s to 48.2l/s. Flow will be attenuated to the 10% AEP flowrate across two tanks. The 1% AEP volume requirement is 17,500l. On plan 400 we have shown two 10,000l tanks, each collecting half of the roof catchment, with outlet connected to an existing kerb discharge via a bubble up chamber.

2.2.3 Flooding

The site is outside of the Wellington Water 1% AEP flood hazard map area. The site is within the 0.23% AEP flood hazard map area. The proposed floor levels are compliant with Building Code E2 requirements. There is no known flooding on site, with an existing overland flowpath entering the railway corridor on the south-eastern boundary, which is lower than the site.

2.3 WATER SUPPLY

There is an existing 40mm rider main running around the Johnston Grove cul-de-sac and across the frontage of the development site. There are several dwellings connecting to this rider main and it is unlikely to have capacity for the development. We propose to upgrade the existing rider main from 40mm to a 100mm watermain as show on drawing 500. The duplex closest to the street would connect directly to the new watermain. For the remainder of the site, an 100mm watermain is proposed to be laid to the southern corner of site, with a 63mm branch laid to the north-eastern corner of the central shared lot. Each of these lines would terminate in a scour valve and have various 20mm lot connections saddled to the line.

2.4 UTILITY SERVICES

We have commenced liaison with the service providers regarding servicing this development. There are utilities available in the Johnston Grove cul-de-sac with existing overhead connections to the existing dwellings. We are proposing to run underground ducts from the existing pole to the site. We are confident this development can be adequately serviced with power and telecommunications.

2.5 ACCESS

Pedestrian access to the lots shall be provided off Johnston Grove with a shared 1.5m wide footpath.

The existing vehicle crossings shall be removed with kerb and footpath reinstated.

3.0 CONCLUSIONS

Based on the above assessments, there are no capacity issues anticipated which should affect the ability for the proposed development to be serviced by existing infrastructure.

Well established public drainage and water supply infrastructure exists on the site and is available for connection into.

4.0 LIMITATIONS

This report is for the use by Williams Corporation Ltd and should not be used or relied upon by any other person or entity or for any other project.

This report has been prepared for the project described to us and its extent is limited to the scope of work agreed between the client and Envelope Engineering Limited. No responsibility is accepted by Envelope Engineering Limited or its directors, servants, agents, staff or employees for the accuracy of information provided by third parties and/or the use of any part of this report in any other context or for any other purposes.

APPENDICES

ENVELOPE ENGINEERING
LAND
STRUCTURE
MANAGE

RESOURCE CONSENT

GRANTED
29/06/2021

HUTT CITY COUNCIL

EARTHWORKS AND CONSTRUCTION, MANAGEMENT PLAN

4 JOHNSTON GROVE, TAITA, LOWER HUTT

DOCUMENT CONTROL RECORD

CLIENT	Williams Corporation Ltd.
PROJECT	4 Johnston Grove, Taita, Lower Hutt
PROJECT NO.	1609-01
DOCUMENT TYPE	Earthworks and Construction Management Plan
DATE ISSUED	29 March 2021
ADDRESS FOR SERVICE	Envelope Engineering Limited 68 Dixon Street, Te Aro, Wellington, 6022
CONTACT	Andrew Horsley andrewh@envelope-eng.co.nz 021 390 312

ISSUE AND REVISION RECORD

DATE OF ISSUE	29 March 2021
STATUS	FOR RESOURCE CONSENT
ORIGINATOR	Andrew Horsley – Senior Engineer
REVIEWED	Ryan Rose – Senior Civil Engineer, Wellington Office Manager
APPROVED FOR ISSUE	Ryan Rose – Senior Civil Engineer, Wellington Office Manager

CONTENTS

APPENDICES

1.0 INTRODUCTION

This Earthworks and Construction Management Plan (ECMP) has been prepared as a tool that will provide direction for the management for the construction stage earthworks operation for the development at 4 Johnston Grove, Taita, Lower Hutt.

It outlines the management of:

- Sediment and erosion control
- Discharges to water and land
- Construction noise
- Construction traffic.

This ECMP should be read in conjunction with our Earthworks and Sediment & Erosion Control drawings. In support of this ECMP the geotechnical, and other specialist reports should also be read in conjunction with this report.

2.0 CONTRACTOR AND ENGINEER DETAILS

2.1 CONTRACTOR

Contractor:	TBC
Contractor Address:	TBC
Contact Person:	TBC
Mobile:	TBC
Email:	TBC

2.2 ENGINEER

Engineer:	Ryan Rose
Engineer Address:	68 Dixon Street, Wellington
Tel:	+64 21 390 305
Mobile:	+64 21 390 305
Email:	ryan@envelope-eng.co.nz

In the role of Engineer, Ryan will also be providing as-built certification and other confirmations of consent condition compliance to Hutt City Council.

2.3 ENGINEERS REPRESENTATIVES (SUPERVISING ENGINEERS)

Engineer:	Andrew Horsley, Senior Civil Engineer
Engineer Address:	68 Dixon Street, Wellington
Mobile:	+64 21 390 312
Email:	andrewh@envelope-eng.co.nz

Andrew will arrange the general engineering design and documentation, contract administration and construction observation for the engineering works for the construction phase described within this management plan.

3.0 PROJECT DESCRIPTION

3.1 GENERAL

All works associated with the proposed earthworks are to be carried out in a manner that minimises any possible adverse effects on the environment. Details of proposed earthworks are shown on the 200 series plans attached within Appendix 1.

The site at 3 & 4 Johnston Grove consists of existing urban residential lots (LOT 836 DP 15394 & LOT 1 DP85782/ SEC 1014 SO34650) and is approximately 1,780m^2 in area. There are two existing vehicle crossings and existing services connected to Johnston Grove.

The existing site is almost completely flat with no off-site overland flow path or flood hazard identified on the HCC GIS webmap.

The development site has residential neighbours on the north and west boundaries, the rail corridor to the south-eastern boundary and connects to Johnston Grove on the north-western boundary.

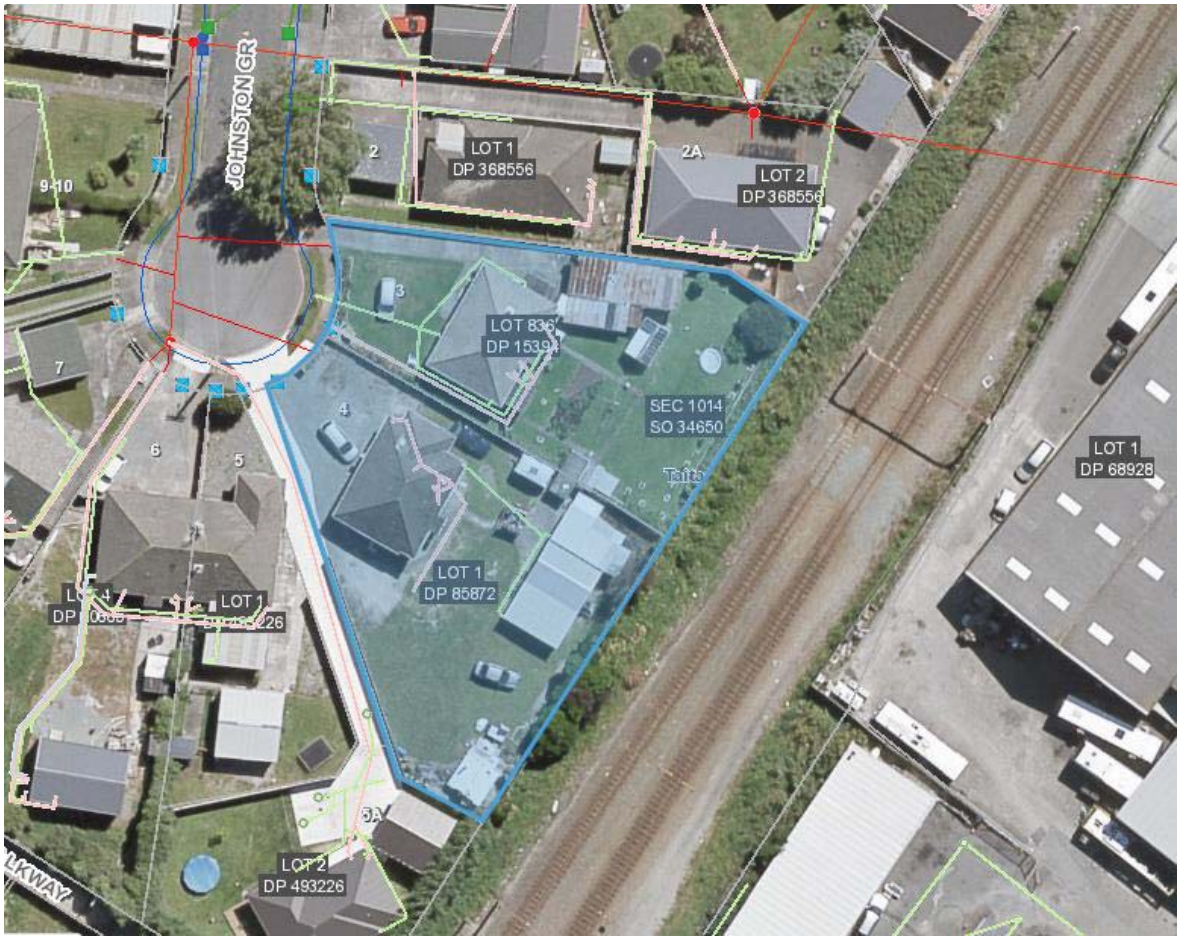


Figure 1 – Site Plan

3.2 EARTHWORKS

The proposed earthworks will involve topsoil, demolition, cut to fill and import of engineered fill. Bulk strip of topsoil and removal of existing houses will generate approximately 120m^3 of topsoil, this will be screened with good topsoil respread and excess removed off site. There is no bulk cut to fill, with levels being raised with 286m^3 of imported fill. Drainage and service trenches will generate a nominal amount of material, the bulk of which will be used for trench reinstatement. Basecourse, concrete and foundation materials will be imported to site. The earthworks management plans are shown in Appendix 1 civil drawings 200-250.

Given this is a small site with areas <2000m^2 and volume of 286m^3 it is expected this will be completed in one strip and slab stabilisation operation.

3.3 CONSTRUCTION PHASE OVERLAND FLOWPATHS

There are no offsite overland flow paths through the development site.

4.0 EROSION AND SEDIMENT CONTROL

4.1 EROSION AND SEDIMENT CONTROL OBJECTIVES

All works associated with the proposed earthworks are to be carried out in a manner that minimises any possible adverse effects on the environment.

The main objective of sediment and erosion control is to reduce the rate of erosion and minimise the amount of sediment discharged from bare earth surfaces while providing practical measures to reduce the total amount of sediment leaving the site.

The principles of **Erosion and Sediment control** that will be applied include:

- Completing all works within the minimum time practicable
- Segmentation of catchments to limit the extent of impact
- Stabilisation of exposed areas as soon as practicable
- Perimeter controls for the diversion of clean water.

Erosion and Sediment Control measures are proposed for the site taking account of the guidelines from Greater Wellington Regional Council Erosion and Sediment Control Guidelines for the Wellington Region September 2002, and/or any Land Use Consent required to be obtained prior to commencing of any site works.

4.2 EROSION CONTROL

To avoid erosion and sediment-laden stormwater generation on the site, the following erosion control measures will be implemented:

- The **Stabilised Construction Entrance** will limit the transfer of sediments from the site onto the local road environment. It will be installed in accordance with the Guideline section 4.8 details.
- Temporary **clean water diversion channels** and **runoff diversion channels** will be used across the extent of the earthworks area to minimise the erosion effects of rainfall and surface water scouring and to control the movement of silt to the proposed bunds.
- Stormwater flow management will be reviewed as works progress and applicable methods applied as required in consultation with the Supervising Engineer and Council staff. It is fully expected that the locations of diversion channels/ bunds and contour drains will be fluid and will be dictated by the -onsite conditions and levels, as work progresses.

4.3 SEDIMENT CONTROL

Silt fences will be constructed to contain material within the earthworks area if required. They are applicable where catchments are small.

Plans 230 illustrate the proposed locations of all sediment control devices. Standard details for each of these devices is shown on plan 240 and 241.

4.4 SITE STABILISATION

The standard of compaction and method of determination will be set out in NZS4431 and NZS4402. Where this is not applicable the requirements will be specified by the Geotechnical Engineer.

The Contractor will be required to arrange regular control tests to ensure that adequate compaction

has been attained over the entire area where fill materials are placed. The frequency of testing will conform with NZS4431 and control testing in accordance with NZS4402.

On completion of subgrade formation, an inspection will be carried out by the Supervising Engineer and Geotechnical Engineer to determine compliance for shape, grade, strength and uniformity.

Site stabilisation will be via stabilised base course initially for the building slabs then topsoil/grass seed/hydroseeding after groundworks and building works have been completed.

4.5 MAINTENANCE OF ESC DEVICES

We propose the following schedule for the setup and monitoring of ESC devices across the site:

MONITORING TYPE	MONITORING BY	FREQUENCY	RECORDING
Set-up of site ESC	Engineer/GWRC/HCC Rep	Prior to commencement of earthworks.	Engineer's written site inspection record.
Daily Inspection	Contractor	At the start and end of each working day.	Contractor's site diary to be retained on site and reviewed at weekly meetings.
Routine Weekly Inspection	Engineer/Contractor	Weekly (prior to site meeting).	Engineer's written meeting minutes.
During heavy rain events	Contractor	During or immediately after heavy rain events.	Contractor's inspection record to be provided to the Engineer within 24 hours of the rainfall event.
Prior to removal of ESC devices.	Engineer/GWRC/HCC Rep	Prior to removal of any ESC device.	Engineer's written site inspection record.

The Engineer will inspect ESC devices and certify that they have been correctly installed prior to the commencement of earthworks on-site.

5.0 EARTHWORKS METHODOLOGY/ SEQUENCE OF WORKS

The proposed earthworks methodology is detailed below.

5.1 INITIAL SEDIMENT AND EROSION CONTROL SITE PREPARATION WORKS

- Before the commencement of bulk earthworks, earth bunds/silt fences will be installed throughout the site. The locations of these are shown on drawing 230. The bunds will be constructed in accordance with the detail provided on drawing 240 and 241 and construction details provided in Section 4.1 of the *Erosion and Sediment Control Guide for Land Disturbing Activities in the Wellington Region 2021.*
- To prevent site access points from becoming sediment sources and to assist in minimising dust generation, a stabilised construction entranceway will be constructed in accordance with the detail on drawing 240 and construction details provided in Section 4.1 of the *Erosion and Sediment Control Guide for Land Disturbing Activities in the Wellington Region 2021.* This will generally be provided by a metalled hardstand/ manoeuvring area at the boundary of the exposed earthworks areas which allows vehicles entering the earthworks zone or leaving site to be cleaned of mud and debris. If temporary sprinkler systems are required, the Contractor will be directed accordingly.

5.2 DURING BULK EARTHWORKS

The earthworks will involve:

1. Installation of sediment and erosion control measures, which for this site will be runoff diversion channels along the low side of the site, stabilised construction entrances in the form

of metalled hardstand/ turnaround areas and clean water diversion channels around the earthwork areas.

2. Demolition of existing buildings and hardstands, stripping and removal of topsoil to subgrade for the entire site.

3. Trimming and subgrade formation of the proposed building and accessway.

4. All stormwater pipe work will be installed, and silt fences and stormwater inlet protection will be placed around the new intakes across the site.

5.3 AFTER BULK EARTHWORKS

- Upon completion of bulk earthworks interim site stabilisation of exposed surfaces will be applied. Building construction is expected to take place immediately however if not interim stabilisation of building platforms will also be undertaken by application of metal.
- The sediment & erosion control measures installed for bulk earthworks will remain in place wherever possible so that safeguard measures will continue to function as general civil works continue, i.e. installation of drainage and utility services and ongoing road construction. Where the sediment and erosion control measures have been removed, specific additional localised measures may be instructed to protected work areas affected by civil works.

6.0 SITE RESPONSIBILITIES AND COMMUNICATION

6.1 COMMUNICATIONS PROTOCOL

For the smooth functioning of the proposed works, a communications protocol will be prepared and implemented. This communications protocol will include (but not be limited to):

1. Names and contact details of key staff and/or contractors and their responsibilities.

2. Contact details of key staff within Greater Wellington Regional Council, and any other third party who have operational interests in the works.

3. Contact details and location of the main site office/Contractor and Site Foreman (refer section 2 above).

4. Details of site meetings that will be held between the Contractor and the Supervising Engineer. It will be a requirement for the Contractor to arrange for representatives of any subcontractors to be available for these meetings should they be so required.

5. Location of all relevant consents, management plans, health and safety plans, and other key project documentation.

6. Details on a feedback register that will include the process for receiving and responding to public enquires.

The site meetings will review aspects of the earthworks and construction including progress to date, updated programme showing progress against the project critical path, health and safety and hazard updates, environmental incidents and a review of erosion and sediment control measures.

6.2 CONTRACTOR RESPONSIBILITY

The appointed Contractor will be required to undertake the project with environmental protection at the forefront of their minds and carry out the project works to be consistent with the consent holder's objectives and the resource consents. Those objectives will include:

1. Complying with the resource consent conditions applicable to the Contract Works;

2. Actively encouraging a culture of environmental awareness and commitment within all staff; and,

3. Undertaking the project to enhance both the consent holder and the Contractors' reputation.

4. Provide a large (greater than 1m2) noticeboard on site that clearly identifies the name, telephone number and address for service of the site manager, including mobile phone and after hours contact number.

5. Install safety fencing and associated signage for the construction site (extents to be agreed at pre-start walkover).

6. Maintain an onsite complaint register.

6.3 CORRECTIVE ACTION MEASURES

Both the Consultants and the Contractor will respond quickly to any concerns the neighbours may have and will expeditiously rectify any unreasonable nuisance (noise, dust and traffic) that may be occurring as a result of the contract works. The following corrective action measures shall be undertaken:

1. The activity responsible for the exceedance with standards set out in the consent conditions shall cease as soon as practicable and only if safe to do so.

2. If necessary, mitigation options shall be investigated and those deemed practicable shall be implemented.

3. Monitoring shall be undertaken to confirm performance of mitigation measures.

4. A report detailing steps 1-3 shall be submitted to the Team Leader, Resource Consent Monitoring within 5 working days of the non-compliance being identified.

If there is a dispute as to levels of noise generated and whether they are compliant with relevant standards and consent conditions, the Supervising Engineer may elect to instruct the Contractor to engage a suitably qualified and experienced acoustical engineer to measure noise levels at locations around the site and at times to be determined by the Supervising Engineer.

The Consultant will advise Council's Environmental Officer of any situations that may arise through the course of the works.

7.0 EARTHWORKS AND CONSTRUCTION MANAGEMENT PLAN REVIEW

The ECMP may be reviewed for the purposes of informing any variation of the methodology or means by which the erosion and sediment controls outlined in this plan will be met.

A review may be undertaken when:

1. As a result of the findings of the daily and weekly inspections and the monthly audits;

2. A previously unforeseen event occurs;

3. Following any major environmental incidents;

4. At the end of the project (to allow for improvements in subsequent projects).

If after a review is undertaken it is found that the site's erosion and sediment control measures need to be altered in any way the Contractor and the Supervising Engineer will be responsible for contacting Greater Wellington Regional Council to request acceptance of the alterations.

All serious accidents and emergencies will be reported immediately to the relevant emergency services. All reports of accidents and other environmental emergencies, regardless of their origin will be reported to Greater Wellington Regional Council.

All incidents on the project involving environmental non-compliance will be recorded and reported through the Contractor's incident and non-conformance procedures. An environmental incident

register will be held on site. Environmental incidents will be discussed in the weekly meetings described in Section 6.0 above.

8.0 OTHER MANAGEMENT PLANS

During the course of the earthworks stage of the project other management plans will be prepared as required. For example, Site Specific Health and Safety Plans and Site Specific Traffic Management Plans will be prepared by the contractor as and when required as part of their own management practices.

8.1 NOISE AND VIBRATION

All machines onsite are to be equipped with factory fitted mufflers and are compliant with allowable noise standards within the consents. Vibrating equipment will be used for some periods of time on the project.

A safe working offset of 5m from neighbouring structures shall be implemented for vibrating equipment to reduce vibration below 5mm/s.

8.2 TRAFFIC MANAGEMENT

Control for pedestrians

During the early stages of construction truck moments will be managed with spotter when required to back into the site to load out material. Once the site has been sufficiently cleared and trucks are able to turn around on site, truck crossing signs will be implemented to warn pedestrians of the movement around the site entrance.

Pedestrian and vehicle access points past the site

Using the Johnston Grove access to the site allows for all construction traffic to pull into and out of site with clear vision to see pedestrians and vehicles coming in both directions. Construction vehicles will be parked onsite and not on the roadway so no blocking of either side of the roadway. This will be for the duration of the contract.

9.0 LIMITATIONS

9.1 GENERAL

This report is for the use by Williams Corporation and should not be used or relied upon by any other person or entity or for any other project.

This report has been prepared for the particular project described to us and its extent is limited to the scope of work agreed between the client and Envelope Engineering Limited. No responsibility is accepted by Envelope Engineering Limited or its directors, servants, agents, staff or employees for the accuracy of information provided by third parties and/or the use of any part of this report in any other context or for any other purposes.

APPENDICES

APPENDIX 1
APPLICATION DRAWINGS