



GREENHILL PARK RESIDENTIAL SUBDIVISION

STAGE 11

Area M, Greenhill Park

HAMILTON

***REPORT ON SUBDIVISION EARTHWORKS
AND RECOMMENDATIONS FOR BUILDING
DEVELOPMENT***

Our Ref: DB 171738-AREA-M-S11-01

Prepared for: Chedworth Properties Limited

Date: March 2020

Location: Stage 11, Greenhill Park, Hamilton Subdivision Completion Report

Job No: DB 171738-AREA-M-S11-01

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1.0 Subdivision Development Earthworks

1.1 Introduction

In accordance with Hamilton City Council's (HCC) Subdivision Resource Consent "011.2018.00006632.001" covering Area M of the Greenhill Park Development. Bulk earthworks have been completed to re- contour the previously agricultural landscape for Stage 11 of the Greenhill Park Residential Subdivision in Hamilton. Prior to commencement of earthworks, geotechnical investigations were carried out by Beca Ltd (Beca) in 2016 [1].

Stage 11 of Greenhill Park is currently accessed from Pardoia Boulevard. Stage 11 comprises 40 residential lots (numbered 287 to 326). The locations of these lots are shown on attached *Cut/Fill Plan*, drawing 21879-EW4 included in Appendix I.

HCC's Infrastructure Technical Specifications (ITS) set out the minimum standards for design and construction of public infrastructure within Hamilton City. Section 2.1.5 of the *Earthworks and Geotechnical Requirements* of the ITS states that the developer shall appoint a geo-professional to carry out functions as described in NZS 4404[5] Section 2.2.4. ITS Section 2.3.3.1 states that a geotechnical completion report shall be submitted as per NZS 4404 Section 2.6 including a statement of professional opinion on the suitability of land for building construction [4]. The developer has appointed DB Consulting Engineers (DBCE) Ltd as a geo-professional for this project works.

To satisfy the requirements of HCC's Resource Consent, the ITS and NZS 4404, this report summarises the observations and testing undertaken during the development of the stage, discusses the suitability of the ground for the support of the proposed residential buildings and contains recommendations for the disposal of stormwater runoff generated on individual sites.

Included in Appendix I of this report is the proposed subdivision plan comprising the original Lot 703 DP 543207 and the proposed new Lots 287-326 DP543413 for Area M Stage 11. The included earthworks plan shows the cut/fill extent of the earthworks undertaken, test positions, and road and lot locations.

1.2 Earthworks in the Subdivision

The earthworks for stage 11 of the subdivision development were undertaken between January 2019 and January 2020.

These earthworks comprised

1. The stripping of surface topsoil to expose underlying natural soils
2. The placement of filling within all lot
3. Backfilling and raising the ground level with new fill to create uniform fill platforms
4. The reinstatement of the surface topsoil cover and subsequent grassing

The soils encountered during the formation of the site and road subgrades were a mixture of silts, sands and pumiceous gravels, typical of Hinuera Formation deposits in this area of Hamilton. These soils were those that had been identified in pre-construction site investigations by the Beca Report.

The filling work was undertaken using these site soils gained from areas of cut on other stages from within the larger Greenhill Subdivision. Filling was undertaken during summer 2019 when drying back of the soils was possible to close to optimum moisture contents to achieve near maximum compaction densities.

Upon completion of the earthworks, approximately 200 to 300 mm of topsoil was placed across the sites and the finished surfaces were grassed in accordance with conditions of the Resource Consent. Areas where an initial grass strike did not take place were re-grassed. While the target topsoil depths after the earthworks were to be around 300 mm, no guarantee is implied or given that the topsoil on any part of any lot is actually 300 mm or less and it is recommended that future owners or designers or builders check topsoil depths when preparing site development plans and cost schedules.

1.3 Earthworks Standards

The earthworks in filling were undertaken using insitu silts and sands and silty sand mixtures gained from areas of cut across the larger subdivision and already used for the earlier stages of the development. The standards for the placement of filling, as stated in the earthworks contract documents, were to comply with NZS 4431:1989 "Code of Practice for Earth fill for Residential Development" and the Council ITS. Filling placed to these standards may be considered as good ground in terms of NZS 3604:2011 "Timber Framed Structures."

The compaction of the filling placed was monitored and tested for compaction density using a Scala penetrometer in sand filling and a hand-held shear vane in finer grained silts and clayey silts. Adequate strengths would be achieved when blow counts recorded with a Scala penetrometer were to be 5 or more per 100 mm of penetration in the sand filling or when an undrained shear strength of 100 kPa or more had been developed in silts and clays.

Materials used where the same basic strata as being used for the previous 9 Stages of works, with a high level of consistency based on previous test results.

1.4 Fill Ground

During the placement of filling on the road subgrades and on areas intended for residential development, the contractor, OLC, stripped and removed all topsoil and other surface organic soils. Post construction testing was carried out to confirm the interface between the cut and fill. Filling was placed in discrete layers with compaction applied through sheepfoot drum rollers and smooth drum rollers.

As most of the filling placed comprised the sands identified in the pre subdivision boreholes, testing of the compaction achieved was mostly undertaken with a Scala penetrometer.

OLC undertook their own Scala penetrometer testing throughout the contract works to verify that the filling had been placed with adequate compaction. The results indicate that the construction filling standards have been met. Foundations may therefore be detailed to NZS 3604:2011 where a timber framed subfloor containing shallow piles, bearers and joists is contemplated. Concrete floors designed to NZS3604 can be used on most lots where they are not immediately adjacent to a stormwater swale.

Notwithstanding the comments above, restriction from ground hazards (refer section 1.8.3) still apply to some lots.

1.5 Areas of Cut

No net cut was identified on this stage. All areas had some fill placed.

1.6 Test Results of Fill Materials

A summary of the tests undertaken by DBCE is present in Appendix IV. The test positions are shown on 21879-EW5 and the test results are in Appendix IV.

The Scala test results show that acceptable soil strengths had been developed in all fill areas tested.

1.7 Test Results in Areas of Cut and Natural Ground

The natural ground at the finished ground surface or under the filling comprised silty sands and sands as had been identified in the pre-subdivision investigation boreholes.

The results of the tests undertaken indicate that “good ground” as defined in NZS3604:2011 is present. No areas that were tested will require any future ground improvement work for buildings supported

1.8 Land Hazards

1.8.1 Land Stability

There are no land form stability issues within Stage 11 of the Greenhill Park Subdivision. The specification from the developer for the site earthworks was that the lots were to be graded as flat as possible with a desirable gradient of 0.5%.

1.8.2 Flooding

The final lot levels have been set based on infrastructure requirements and freeboard from flood levels developed as part of the stormwater design for the larger subdivision. The means of disposal of stormwater runoff from lots in this stage of the subdivision are described in the catchment and overland flow assessments by Beca (Interpretive Report Lot Levels Area M). In the report for area M, a 1% AEP flood event is identified for each swale system. The two relevant swales for Stage 11 are Swale 1, Swale 3A and Swale 3B. Flood levels of 37.24, 36.40 and 36.46 m R.L. respectively have been used in assessing the flood risk in stage 11. This equates to minimum lot levels of 38.000m to 39.081m R.L. across the stage (with low being the north west corner and high being the south east corner). The list of Lot Levels for Stage 11 is included in Appendix V.

Site grading during house construction must not lower finished levels below the minimum finished ground levels identified by Beca without further review of the impacts on flooding. Earthworks must not direct stormwater runoff to adjacent properties, or towards buildings, or create areas of localised ponding. All overland flow is to be towards the road frontage on each section, where falls will direct surface flow towards Swale system.

It is the responsibility of the building design professional to ensure that the requirements for mitigation for the hazard of flooding are met by the design prior to submitting to Council for consent. Confirmation of the swale construction and flood levels are excluded from the scope of this report and are to be covered separately with sign-off of infrastructure works.

1.8.3 Liquefaction

The potential for the hazard of liquefaction for Area M of the Greenhill Park Subdivision is discussed in “Greenhill Park Geotechnical Interpretation and Design - Area M” by Beca and dated 13 July 2018. Foundations within 5m of the top of the swales are classed as TC2 like foundations. Lots affected include Lots 287-294. The liquefaction summary plan is appended to this Completion report. Specifically, the requirements are:

- 0m – 1.5m no habitable dwellings to be built within 1.5 m of the swale crest.
- 1.5 – 5m adopt an enhanced TC2 _like foundation
- Beyond 5m of swale crest no specific requirements to mitigate liquefaction effects.

The Beca report refers to zones adjacent to the swales being in a TC2 type area as is defined in guidelines published by the Ministry of Business, Innovation and Employment (MBIE). MBIE recommends that TC2 type foundations should typically include ‘an enhanced foundation slab’ as is currently being installed for new houses in Christchurch. Alternatively, MBIE advises that houses may be supported on timber piles and a timber framed subfloor as detailed in NZS 3604 to meet a Type A construction as described in their guidelines.

2.0 Disposal of Stormwater

Greenhill Park has been designed with a swale network to limit peak flows from the subdivision to 80 % of the 1 % AEP pre-development rate, and 90 % of the 10 % and 50 % AEP pre-development rates (Beca Ltd. [2016] Greenhill Park - Stormwater Design, for Chedworth Properties Ltd, 29 June 2016). Area M has been designed to include roadside swales flowing in an approximately east to west direction. Stage 11 includes part of swale 4A (Lot 501) – located adjacent to Pardo Boulevard and behind lots 256 to 263 – that will collect runoff from roads within Stage 11. The depth of the swales has been designed to accommodate the fall and cover depth required of the piped drainage system. The piped drainage network has been designed to convey the 50 % AEP flows from roads and lots to the swale network, with each lot to be provided with a piped service connection. The stormwater plan is presented in the S&L Stormwater As Built DWGs reported separately.

All lots will require on-site stormwater efficiency measures as per the District Plan requirements (Rule 25.13.4.5 Water Efficiency Measures). These include:

1. Detention of stormwater to 80% of pre-development runoff by an appropriate means. This has largely been achieved by the swale network for events greater than

the 50 % AEP storm. For the 50 % AEP and smaller events, the stormwater efficiency measures are expected to provide sufficient additional mitigation to achieve this requirement.

2. Permeable surfaces protected to achieve at least 20% above the minimum standard of the zone (i.e. 40 % site permeability).
 - a. Sites within the Ruakura Medium Density Residential Zone require a minimum permeability of 20 % (Rule 4.6.5) and are limited to 50 % site coverage (Rule 4.6.6).
3. Rainwater tank for non-potable reuse system
4. Other equivalent features

Stormwater management must ensure that the rate of stormwater discharge offsite is at or below pre-development rates. Stormwater management measures shall be implemented, as appropriate, in accordance with the following drainage hierarchy:

1. Retention for reuse
2. Soakage techniques
3. Detention and gradual release to a watercourse
4. Detention and gradual release to stormwater reticulation.

Section 42 of the Subdivision Resource Consent (SRC) relating to Stages 9-15 state that “Each residential lot shall be provided with a means for disposal of stormwater, with no private stormwater pipes or soakage systems crossing from one lot to another except where covered by an easement”

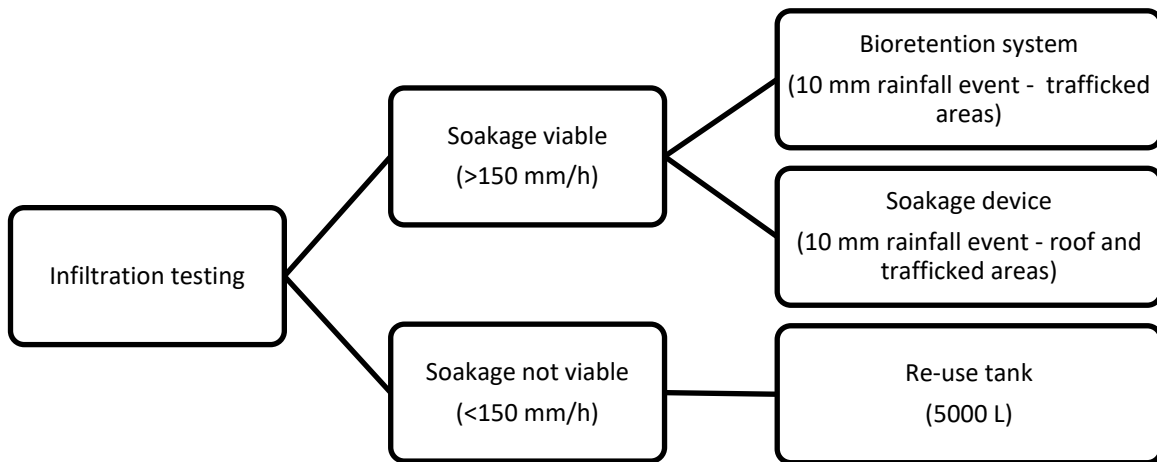
Section 43 of the SRC states that water efficiency measures for the individual residential lots are to be detailed for each subdivision stage. “Where retention for reuse tanks is proposed they shall be a minimum of 5,000L to ensure they are effective or where the lot is less than 300m² should be appropriately designed considering the specific site constraints. The required stormwater efficiency measure is to be implemented at the building consent stage and maintained on an on-going basis at the owners’ expense”.

Section 44 of the SRC requires a consent notice on each title advising of the required water efficiency measures to be implemented and maintained on an ongoing basis.

Section 55 of the SRC states the requirement for lot development to be undertaken in general accordance with the recommendations in the report: Greenhill Park Geotechnical Interpretation and Design – Area M, prepared by Beca Ltd., 13 July 2018.

In the Stage 11 development area, each site is to be tested for soakage capability by the property owners. For those sites that have a sufficient soakage capability, disposal of stormwater is to be undertaken onsite using soakage and/or bioretention systems with overflow to the lot stormwater service connection. Those sites that are not soakage viable are to retain stormwater for reuse by way of a Slimline Rain Tank or other similar type water tank. The size of the tank is to be 5000 litres and the tank is to be plumbed into the house for use as a non-potable water supply including for garden irrigation and in general accordance with the HCC guidelines for the Implementation of Water Efficiency Measures. The Slimline rain tank system is described in Appendix V. This requirement will be advised to purchasers and will be

implemented through the building consent process by HCC. A consent notice is to be registered on the certificates of titles for each lot which describes these investigation and design requirements.



Details of the required stormwater measures are included in Appendix V, sourced from the Greenhill Park Design Guidelines.

3.0 Retaining Walls

There are no retaining walls that were constructed by the developer within stage 11.

4.0 Professional Opinion

It has been demonstrated in this Geotechnical Completion Report, that earthworks have been completed and building platforms have been constructed to comply with Council's ITS specifications and the New Zealand Building Code. Recommendations have been provided within the report for the disposal of stormwater from individual lots, for the ongoing development of the lots and for the mitigation of liquefaction risk where applicable.

In accordance with ITS Section 2.3.3.1, a statement of professional opinion is enclosed in Appendix II of this document. This statement is presented in the form of Checklist 2.2 of Council's Development Manual, Volume 4: Quality Systems for Land Development, and is accompanied by a *Summary of Geotechnical Data for Individual Lots* which summarizes the information and recommendations contained in this report.

5.0 Applicability

Recommendations contained in this document are based on data from observations of site earthworks, boreholes and test results. Inferences about the nature and continuity of subsoils away from these locations are made but cannot be guaranteed.

In all circumstances, if variations in the subsoils occur which differ from those described or are assumed to exist, the site should be inspected by an engineer suitably qualified to make an informed judgement and provide advice on appropriate improvement measures.

This report has been prepared specifically for Stage 11 as shown for Lots 286-326 DP543413 of Area M Stage 11 within the Greenhill Park Residential Subdivision. No responsibility is accepted by DB Consulting Engineers Ltd for the use of any part of this report for other development sites without their written approval.

DB Consulting Engineers Ltd

Report prepared by Michael Richardson
CPEng 1005467
Geotechnical Engineer

March 2020

References

- [1] Ruakura Land Development - LDP Geotechnical Factual Report by Beca, 15 April 2016.
- [2] C. Hughes and K. Read, "Ruakura Development - Stage 1 Geotechnical Investigation – Liquefaction Potential Detailed Assessment," Opus International Consultants, Ltd., Hamilton, New Zealand, 2014.
- [3] M. Hughes and L. Shuler, "Report on Preliminary Geotechnical Investigation, Ruakura Development, Hamilton," S&L Consultants, Ltd., Tauranga, New Zealand, 2015.
- [4] "Section 2 Earthworks and Geotechnical Requirements," in *Infrastructure Technical Specifications*, Hamilton, New Zealand, Hamilton City Council, 2013.
- [5] "NZS 4404 Land Development and Subdivision Infrastructure," in *New Zealand Standards*, Wellington, New Zealand, Standards New Zealand, 2010.
- [6] "Greenhill Park - Geotechnical Interpretation and Design-Area 1" by Beca 28 October 2016.
- [7] "Part 5: Earthquake Actions - New Zealand," in *NZS 1170.5:2004 Structural Design Actions*, Standards New Zealand, 2004.
- [8] "Greenhill Park Design Report - Area I (Stage 5, 6, 7 & 8) by Beca 20 December 2016
- [9] "Clause B1: Structure," in *Acceptable Solutions and Verification Methods For New Zealand Building Code*, Wellington, Ministry of Business, Innovation and Employment, 2014.
- [10] "Part A: Technical Guidance," in *Repairing and rebuilding houses affected by the Canterbury earthquakes*, Wellington, Ministry of Business, Innovation and Employment, 2012.
- [11] "Clause E1: Surface Water," in *Acceptable Solutions and Verification Methods For New Zealand Building Code*, Wellington, Ministry of Business, Innovation and Employment, 2014.
- [12] "Section 4 Stormwater," in *Infrastructure Technical Specifications*, Hamilton, New Zealand, Hamilton City Council, 2015.

Appendices

Appendix I	<u>Reference Drawings</u> Subdivision Plan Cut/Fill Plan 21879-EW6 Site Levels Plan
Appendix II	<u>Geotechnical Completion Forms</u> Checklist 2.2 - Statement of Professional Opinion Summary of Geotechnical Data for Individual Lots
Appendix III	<u>Pre-Construction Assessment (exerts)</u> BECA Area M Liquefaction Assessment Summary Plan
Appendix IV	<u>Post-Construction Test Results</u> Tests by DCBE Ltd
Appendix V	<u>Stormwater Management</u> Slimline Rain Tank Installation Detail Lot Levels (Minimum Lot Levels)

Appendix I	<u>Reference Drawings</u>
	Subdivision Plan
	Cut/Fill Plan 21879-EW6
	Site Levels Plan



517
DP 507312

TIMEAM/PM

Areas and dimensions are approximate only and subject to survey.

This plan has been prepared for the purposes of Section 88 of the Resource Management Act 1991 and should not be relied on for any other purpose.

All Roads are to vest in the Hamilton City Council

 Stage 11 (40 Lots)
 Local Purpose (SW Management) Reserve
 Roads

		13	Abuttal Reserves Updated	30/08/18
		12	Abuttal Bdy Amended	02/08/18
		11	Bdy Amended	31/07/18
checked by	Rev. No	Description		DATE
		NAME	DATE	SIGNED
Surveyed				
Designed				
Drawn		NP	03/18	
Checked		CR	03/18	
Approved		TMB	03/18	

REFERENCES



S & L CONSULTANTS LTD
SURVEYORS - ENGINEERS - PLANNERS

36 Kereiti Street, Mt Maunganui, New Zealand
P.O. Box 231 Ph.(07)577-6069
Fax(07)577-6065
Email: slconsultants@sltga.co.nz
Web Site: www.sltga.co.nz

Title
Proposed Subdivision
of Lot 605 DP 516275
CT 804519
Greenhill Park
Area M Scheme
Stage 11



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Original Scales © A1

1:1000
(Approx. 1:2000 @ A3)

Do Not Scale Dimensions

Drawing No
21879 - M11

Revision: 13



ELEVATIONS TABLE

NUMBER	MINIMUM ELEVATION	MAXIMUM ELEVATION	COLOUR
1	-0.13	0.00	<div></div>
2	0.00	0.25	<div></div>
3	0.25	0.50	<div></div>
4	0.50	0.75	<div></div>
5	0.75	1.00	<div></div>
6	1.00	1.25	<div></div>
7	1.25	1.50	<div></div>
8	1.50	1.75	<div></div>
9	1.75	2.00	<div></div>
10	2.00	2.15	<div></div>

CUT
FILL

KEY

DBCON GEOTECH TEST LOCATIONS

CUT/FILL CONTOUR INTERVAL: 0.25M

S&L

Land Development
and Design Specialists

Ph. 07 577 6069
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P.O. Box 231, Tauranga 3140
www.sltga.co.nz

Chedworth
Properties Limited

GREENHILL
PARK

CHEDWORTH PROPERTIES LTD
GREENHILL PARK STAGE 11
CUT / FILL PLAN

Coordinate System: MT EDEN 2000 CIRCUIT				Origin of Coordinates: ALP3 DP 534481	
Height Datum: MOTURIKI VERTICAL DATUM				Origin of Height: SS 507 SO 42451 RL = 44.043	
Original Scales @ A3				Status	PRELIMINARY
1:750				Drawing No	
21879-EW5				Revision	
0				0	

0 PRELIMINARY NP SC SC 03/2020


Rev Description Dm Ckd App Date

Name Date Name Date

Surveyed Designed

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Title

**SECTION LEVELS & FLOW
GEOTECHNICAL REQUIREMENT
STAGE 11 AREA M**



Chedworth
Properties Limited

AB	ISSUE FOR GEOTECH	SRC	KU	NF	04/20
0	PRELIMINARY	SRC	KU	NF	04/20
Rev	Description	Drn	Ckd	App	Date
	Name	Date		Name	Date
Surveyed	HNC	03/2020	Designed		

Coordinate System: MT EDEN 2000 CIRCUIT
Origin of Coordinates: ALP 3 DP 534481
Height Datum: MOTURIKI VERTICAL DATUM 1953
Origin of Height: SS 507 SO 42451 RL = 44.04m

Original Scales @ A3	Status
1:600	AS-BUILT
Do Not Scale Dimensions	
Drawing No	Revision
21879-M-11-G1	AB

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NZS 4404: 2010 SCHEDULE2A (Checklist 2.2)**STATEMENT OF PROFESSIONAL OPINION AS TO SUITABILITY OF LAND FOR BUILDING CONSTRUCTION****Development:** Greenhill Park Stage 11**Developer:** Chedworth Properties Limited**At** Pardoia Boulevard, Chartwell, Hamilton**I, Michael Richardson of DB Consulting Engineers, PO Box 1123, Taupo****Hereby confirm that:**

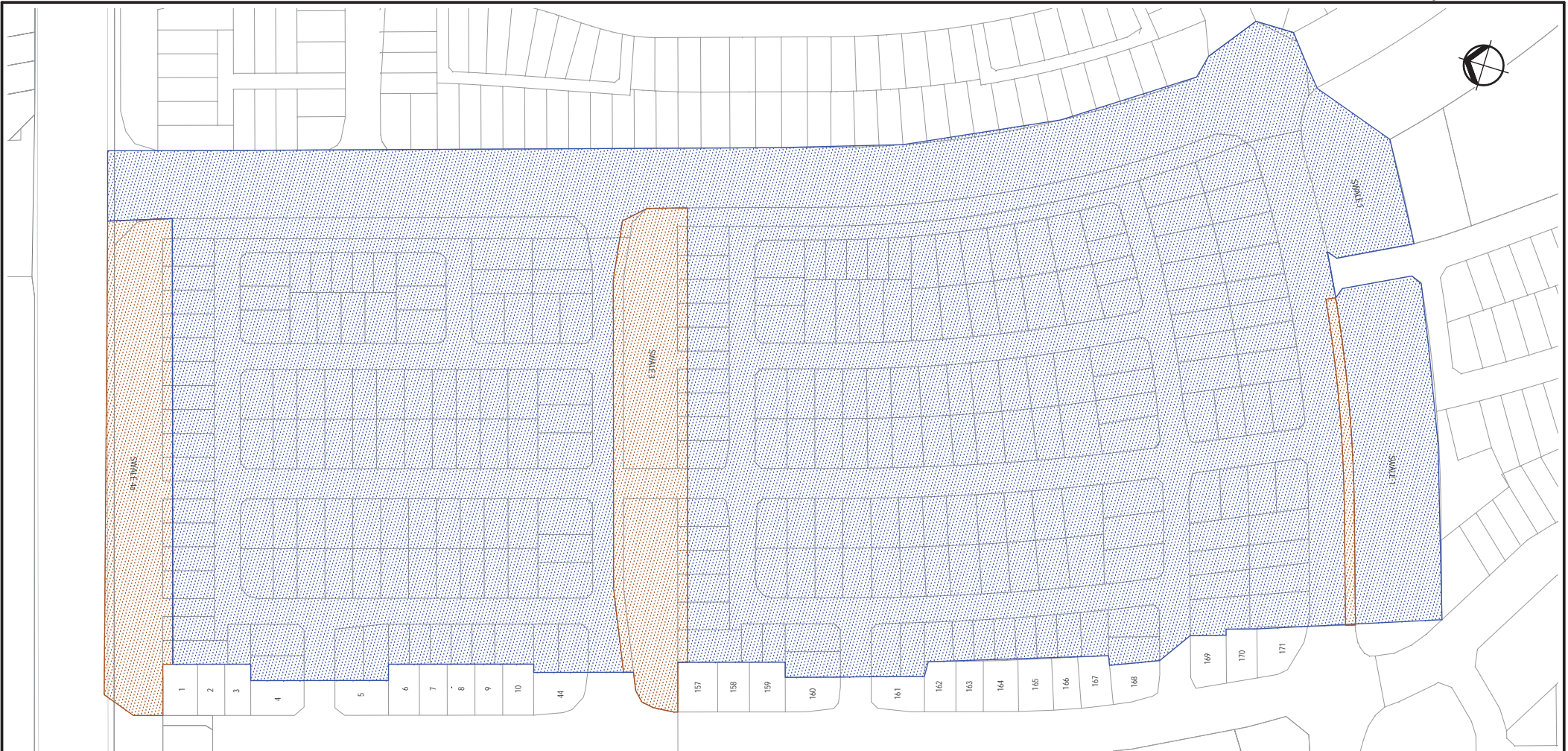
- 1.0 I am a geo-professional as defined in clause 1.2.2 of NZS 4404:2010 and was retained by the developer as the geo- professional on the above development.**
- 2.0 The extent of my inspections during construction, and the results of all tests carried out are described in my geotechnical completion report for Greenhill Park Area M Stage 11 dated April 2020 (reference 171738-AREA-M-S11-01)**
- 3.0 In my professional opinion, not to be construed as a guarantee, I consider that:**
 - a. The completed works give due regard to land slope and foundation stability considerations.**
 - b. The site ground affected by engineered certified filling is suitable for the erection thereon of buildings designed according to the report recommendations provided that:**
 - i. Lots 287-326 are subject to engineering review of foundations addressing liquefaction settlement for the ULS design case.**
 - ii. All lots are subject to an engineering inspection during foundation excavations in lieu of further soils testing. Construction supervision from an engineer shall be carried out to confirm the shallow ground conditions are in accordance with this report and suitable for NZS3604 foundations for bearing strength.**
- 4.0 This professional opinion is furnished to Hamilton City Council and the developer for their purposes alone on the express condition that it will not be relied upon by any other person and does not remove the necessity for the normal inspection of foundation conditions at the time of erection of any dwelling.**
- 5.0 This certificate shall be read in conjunction with my geotechnical completion report referred to in clause 2 above and shall not be copied or reproduced except in conjunction with the full geotechnical completion report.**

Signed

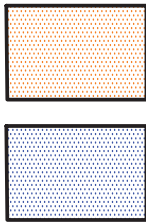
.....

Date: 7 April 2020**Michael Richardson****Chartered Professional Engineer (Geotechnical)****CPEng 1005467**

Appendix III *Pre-Construction Assessment (exerts)*
BECA Area M Liquefaction Assessment Summary Plan



KEY



EXTENT OF AREA M

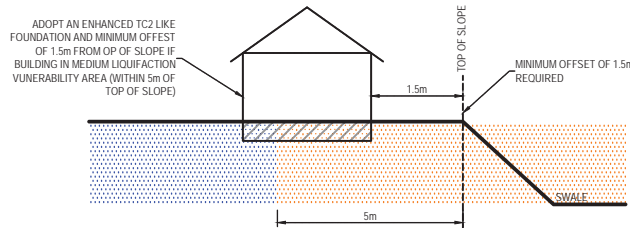
MEDIUM LIQUEFACTION VULNERABILITY

- MINOR TO MODERATE LIQUEFACTION-INDUCED GROUND DAMAGE IN 500 YEAR EARTHQUAKE
- TO MITIGATE LIQUEFACTION AND SEISMIC SLOPE INSTABILITY EFFECTS ADOPT LIQUEFACTION MITIGATION OPTION 1 OR 2.

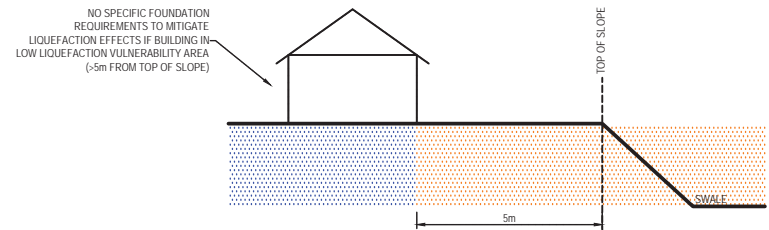
LOW LIQUEFACTION VULNERABILITY

- NONE TO MINOR LIQUEFACTION-INDUCED GROUND DAMAGE IN 500 YEAR EARTHQUAKE.
- NO SPECIFIC REQUIREMENTS TO MITIGATE LIQUEFACTION EFFECTS.

LIQUEFACTION MITIGATION OPTION 1:



LIQUEFACTION MITIGATION OPTION 2:



No.	Revision	By	Chk	Appr	Date
A	FOR INFORMATION	SM	MP	PR	12.03.18

Drawing Originator

Original Scale (A1)	Design	MLP	27.09.16	Approved For Construction*
1:3000	Drawn	SM	12.03.18	
Reduced Scale (A3)	Design Checker	EAR	12.03.18	
1:6000	Check			Date
	*Refer to Revision 1 for Original Signature			



Client

File:	AREA M LIQUEFACTION ASSESSMENT SUMMARY PLAN
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Discipline	GEOTECHNICAL
Drawing No.	3411915-GC-K068
Rev.	A

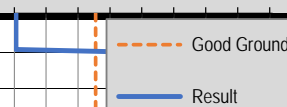
**FOR INFORMATION
NOT FOR CONSTRUCTION**

Appendix IV Post-Construction Test Results

Completion Testing by DCBE Ltd

- See Appendix I for test locations on Cut/Fill Plan

Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test Site
GetGeo	14/02/2020	1	Lot 287

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)	Soil Description	Water Table
			0 2 4 6 8 10 12 14 16		
100				FILL, sands, some fine to medium angular gravels minoir silt, light grey-brown dry to moist 500mm medium dense to dense	
200					
300		UTP			
400					
500		8		Interbedded sandy SILT with silty fine SANDS light grey, trace orange-mottling medium plasticity, stiff to hard	
600		12			
700		6			
800		4			
900		3		Fine SANDS, minor silt, light grey trace orange mottling, moist	
1000		3			
1100		4			
1200		5			
1300		4		SILT, light grey, moist to very moist	
1400		6			
1500		4			
1600		4			
1700		3		SANDS, minor silt, mottled grey to dark grey moist to very moist	
1800		5			
1900		5			
2000	146 / 25	3			
2100		3		SILT, some sands, greenish-grey, very moist	
2200		3			
2300		5			
2400		6			
2500		7		EOB @ 4000mm, Target depth	
2600		5			
2700		6			
2800		7			
2900		6			
3000		4			
3100		4			
3200		4			
3300		5			
3400		5			
3500		4			

Notes:	EOB = End Of Borehole	UTP = Unable To Penetrate	UTE = Unable To Extract
1	Weather leading up to test was fine dry and very warm		
2	Ground water was not encountered during testing		
3	Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)		
4	Shear Vane records include Re-moulded values where possible		
5	Shear Vane Serial No.: 2641	Exp. Date: 18/03/2020	

Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test Site
GetGeo	14/02/2020	2	Lot 288

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)	Soil Description	Water Table	
100			<div><div>0246810121416</div><div><div><div></div><div></div></div><div>Good Ground</div><div>Results</div></div></div>	FILL, sands, some fine to medium angular gravels minoir silt, light grey-brown dry to moist 500mm		
200						
300		UTP				
400						
500		6				
600		8		Interbedded sandy SILT with silty fine SANDS light grey, trace orange-mottling medium plasticity, stiff to hard		
700		5				
800		4				
900		4				
1000		3				
1100		4		Fine SANDS, minor silt, light grey trace orange mottling, moist		
1200		5				
1300		4				
1400		4				
1500		5				
1600		6				
1700		5		EOB @ 2000mm Target Depth		
1800		6				
1900		7				
2000		7				
2100						
2200						
2300						
2400						
2500						
2600						
2700						
2800						
2900						
3000						
3500						
4000						

Notes:	EOB = End Of Borehole	UTP = Unable To Penetrate	UTE = Unable To Extract
1	Weather leading up to test was fine dry and very warm		
2	Ground water was not encountered during testing		
3	Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)		
4	Shear Vane records include Re-moulded values where possible		
5	Shear Vane Serial No.: 2641	Exp. Date: 18/03/2020	



DB CONSULTING ENGINEERS

Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test site
GetGeo	14/02/2020	3	Lot 289

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)		Soil Description	Water Table
			0 2 4 6 8 10 12 14 16	<div><div>Good ground</div><div>Result</div></div>		
100		6			FILL, sands, silt, some fine angular gravels some topsoil, dark brown, dry to moist 600mm	
200		4				
300		5				
400		6				
500		9				
600		7				
700		7				
800		8				
900		8				
1000		8				
1100		12			Silty fine SANDS, creamy light-brown, trace orange mottling, moist	
1200		14				
1300		12				
1400		9				
1500		7				
1600		7				
1700		8				
1800		8			SILT, minor fine sands, creamy light-brown, moist	
1900		4				
2000	108 / 25	4			EOB @ 2000mm Target Depth	
2100						
2200						
2300						
2400						
2500						
2600						
2700						
2800						
2900						
3000						
3100						
3200						
3300						
3400						
3500						

Notes:	EOB = End Of Borehole	UTP = Unable To Penetrate	UTE = Unable To Extract
1	Weather leading up to test was fine dry and very warm		
2	Ground water was not encountered during testing		
3	Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)		
4	Shear Vane records include Re-moulded values where possible		
5	Shear Vane Serial No.: 2641	Exp. Date: 18/03/2020	



DB CONSULTING ENGINEERS

Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test Site
GetGeo	14/02/2020	4	Lot 290

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)	Soil Description	Water Table
			0 2 4 6 8 10 12 14 16		
100		7		FILL, respread topsoil	
200		UTP			
300		9			
400		7		FILL, silt, sands, some fine gravels, minor topsoil	
500		9		dry to moist 800mm	
600		8			
700		9		700-900 grading to orange-brown	
800		5			
900		7			
1000		9		becoming minor silt, some medium angular gravels	
1100		10			
1200		11			
1300		12			
1400		7			
1500		4		Silty fine SANDS, creamy light-brown, minor	
1600		6		orange mottling, moist to very moist	
1700		6			
1800		5			
1900		4			
2000		4		becoming wet	
2100				EOB @ 2000mm	
2200				Target Depth	
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					

Notes:	EOB = End Of Borehole	UTP = Unable To Penetrate	UTE = Unable To Extract
1	Weather leading up to test was fine dry and very warm		
2	Ground water was not encountered during testing		
3	Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)		
4	Shear Vane records include Re-moulded values where possible		
5	Shear Vane Serial No.: 2641	Exp. Date: 18/03/2020	

Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test Site
GetGeo	14/02/2020	5	Lot 291

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)		Soil Description	Water Table
			0 2 4 6 8 10 12 14 16	<div><div>Good Ground</div><div>Result</div></div>		
100		4			FILL, silt, sands, minor fine gravels mixed brown/grey, moist from 500mm	
200		4				
300		6				
400		10				
500		8				
600		12				
700		UTP				
800		9				
900		8				
1000		7				
1100		5			Silty fine SANDS, creamy light-brown minor orange mottling, moist becoming wet	
1200		4				
1300		4				
1400		5				
1500		3				
1600		4				
1700		4				
1800		4				
1900		5				
2000		6				
2100		4				
2200		3				
2300		4				
2400		3				
2500		4				
2600		5				
2700		5				
2800		5				
2900		4				
3000		6				
3100		6			SANDS, some silt, some pumiceous material minor fine gravels, grey, wet	
3200		5			3600mm	
3300		4			Organic SILT, dark brown, wet	
3400		3			3800mm, SILT, some fine sands, light grey-brown, wet, EOB 4.0m	
3500		3				

Notes:	EOB = End Of Borehole	UTP = Unable To Penetrate	UTE = Unable To Extract
1	Weather leading up to test was fine dry and very warm		
2	Ground water was not encountered during testing		
3	Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)		
4	Shear Vane records include Re-moulded values where possible		
5	Shear Vane Serial No.: 2641	Exp. Date: 18/03/2020	



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Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test Site
GetGeo	14/02/2020	6	Lot 292

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)		Soil Description	Water Table
			0 2 4 6 8 10 12 14 16	<div><div>Good Ground</div><div>Result</div></div>		
100		3			FILL, respread topsoil, angular gravels	
200		4			FILL, silt, sands, some fine gravels, brown, moist	
300		5				
400		7				
500		7				
600		5				
700		6			Silty SANDS, light-brown, moist	
800		9				
900		8				
1000		8				
1100		6				
1200		5			becoming wet	
1300		4				
1400		5				
1500		5				
1600		4				
1700		6				
1800		5				
1900		3				
2000		4				
2100						
2200						
2300						
2400						
2500						
2600						
2700						
2800						
2900						
3000						
3100						
3200						
3300						
3400						
3500						

Notes:	EOB = End Of Borehole	UTP = Unable To Penetrate	UTE = Unable To Extract
1	Weather leading up to test was fine dry and very warm		
2	Ground water was not encountered during testing		
3	Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)		
4	Shear Vane records include Re-moulded values where possible		
5	Shear Vane Serial No.: 2641	Exp. Date: 18/03/2020	



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Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test Site
GetGeo	14/02/2020	7	Lot 293

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)		Soil Description	Water Table
			0	2 4 6 8 10 12 14 16		
100					Being used as a water control area	
200						
300						
400						
500						
600						
700						
800						
900						
1000						
1100						
1200						
1300						
1400						
1500						
1600						
1700						
1800						
1900						
2000						
2100						
2200						
2300						
2400						
2500						
2600						
2700						
2800						
2900						
3000						
3100						
3200						
3300						
3400						
3500						

Notes:	
1	Weather leading up to test was fine dry and very warm
2	Ground water was not encountered during testing
3	Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)
4	Shear Vane records include Re-moulded values where possible
5	Shear Vane Serial No.: 2641 Exp. Date: 18/03/2020



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Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test Site
GetGeo	14/02/2020	8	Lot 294

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)	Soil Description	Water Table	
			0 2 4 6 8 10 12 14 16			
100			<div><div>Good Ground</div><div>Result</div></div>	FILL, respread topsoil, angular gravels		
200		UTP		FILL, sands, silt, minor topsoil, minor fine to medium gravels mixed dark-grey/dark-brown, moist		
300						
400	6					
500	5					
600	8					
700	11					
800	5			SILT, minor sands, grey-brown, some orange-mottling, moist		
900	6					
1000	7					
1100	7					
1200	5			interbedded silty fine Sands		
1300	4					
1400	2			Silty SANDS, grey, minor orange-mottling, moist		
1500	3					
1600	5					
1700	3			EOB @ 2000mm Target Deprh		
1800	3					
1900	5					
2000	5					
2100	5					
2200						
2300						
2400						
2500						
2600						
2700						
2800						
2900						
3000						
3100						
3200						
3300						
3400						
3500						

Notes:		EOB = End Of Borehole	UTP = Unable To Penetrate	UTE = Unable To Extract
1	Weather leading up to test was fine dry and very warm			
2	Ground water was not encountered during testing			
3	Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)			
4	Shear Vane records include Re-moulded values where possible			
5	Shear Vane Serial No.: 2641 Exp. Date: 18/03/2020			



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Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test Site
GetGeo	14/02/2020	9	Lot 295

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)	Soil Description	Water Table
			0 2 4 6 8 10 12 14 16		
100				FILL, respread topsoil, angular gravels	
200					
300		UTP			
400					
500		12		FILL, sands, silt, minor fine gravels, mixed brown	
600		14		dry becoming moist 600mm	
700		UTP		some gravels 600-700mm	
800					
900		8			
1000		9			
1100		17			
1200		10			
1300		10			
1400		8			
1500	108 / 16	5		SILT, light-brown, moist	
1600		5		becoming minor orange-mottling	
1700		4		grading to creamy light-grey	
1800		3			
1900		4			
2000	139 / 28	3			
2100				EOB @ 2000mm	
2200				Target Depth	
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					

Notes:		EOB = End Of Borehole	UTP = Unable To Penetrate	UTE = Unable To Extract
1	Weather leading up to test was fine dry and very warm			
2	Ground water was not encountered during testing			
3	Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)			
4	Shear Vane records include Re-moulded values where possible			
5	Shear Vane Serial No.: 2641 Exp. Date: 18/03/2020			



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Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test Site
GetGeo	14/02/2020	10	Lot 296

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)	Soil Description	Water Table
			0 2 4 6 8 10 12 14 16		
100				FILL, respread topsoil, angular gravels	
200		UTP			
300					
400		8			
500		12			
600		11			
700		9			
800		12			
900		7			
1000		8			
1100		11			
1200		8			
1300		6			
1400		7			
1500	95 / 13	6			
1600		5			
1700		3			
1800		3			
1900		3			
2000		3			
2100		4			
2200				SILT, minor fine sands, creamy light-brown some orange mottling, moist grading to light-grey, some fine sands	
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					

Notes:	EOB = End Of Borehole	UTP = Unable To Penetrate	UTE = Unable To Extract
1	Weather leading up to test was fine dry and very warm		
2	Ground water was not encountered during testing		
3	Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)		
4	Shear Vane records include Re-moulded values where possible		
5	Shear Vane Serial No.: 2641	Exp. Date: 18/03/2020	



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Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test Site
GetGeo	14/02/2020	11	Lot 297

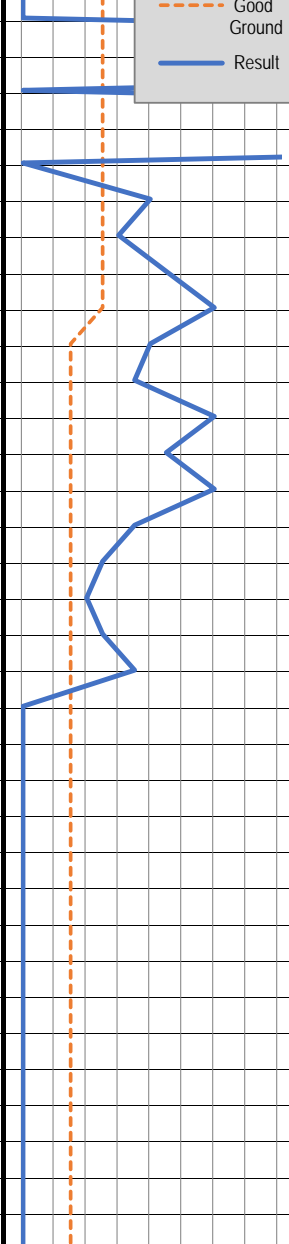
Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)	Soil Description	Water Table
			0 2 4 6 8 10 12 14 16		
100			<div><div>Result</div><div>Good Ground</div></div>	FILL, respread topsoil, angular gravels	
200		UTP		FILL, sands, silt, some topsoil, mixed brown dry becoming moist 800mm	
300					
400	7				
500	8				
600	14				
700	11				
800	8				
900	7				
1000	9				
1100	6				
1200	7			SILT, sands, light grey-brown, minor orange mottling, moist	
1300	11				
1400	7				
1500	5				
1600	5				
1700	8				
1800	4				
1900	4				
2000	4			EOB @ 2000mm Target Depth	
2100					
2200					
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					

Notes:		EOB = End Of Borehole	UTP = Unable To Penetrate	UTE = Unable To Extract
1	Weather leading up to test was fine dry and very warm			
2	Ground water was not encountered during testing			
3	Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)			
4	Shear Vane records include Re-moulded values where possible			
5	Shear Vane Serial No.: 2641 Exp. Date: 18/03/2020			



DB CONSULTING ENGINEERS

Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test Site
GetGeo	14/02/2020	12	Lot 298

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)		Soil Description	Water Table
			0 2 4 6 8 10 12 14 16			
100					FILL, respread topsoil, angular gravels	
200						
300		UTP				
400						
500		UTP			FILL, sands, silt, minor topsoil mixed brown, dry becoming moist 700mm	
600						
700	8					
800	6				some interbedded medium angular gravels	
900	9					
1000	12					
1100	8					
1200	7				SILT, some sands, light grey-brown, moist	
1300	12					
1400	9					
1500	12					
1600	7				Silty SANDS, grey, very moist	
1700	5					
1800	4					
1900	5					
2000	7				EOB @ 2000mm Target Depth	
2100						
2200						
2300						
2400						
2500						
2600						
2700						
2800						
2900						
3000						
3100						
3200						
3300						
3400						
3500						

Notes:		EOB = End Of Borehole	UTP = Unable To Penetrate	UTE = Unable To Extract
1	Weather leading up to test was fine dry and very warm			
2	Ground water was not encountered during testing			
3	Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)			
4	Shear Vane records include Re-moulded values where possible			
5	Shear Vane Serial No.: 2641 Exp. Date: 18/03/2020			



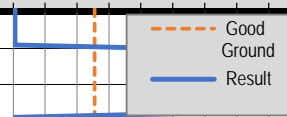
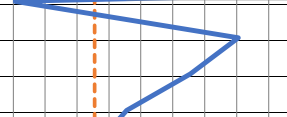
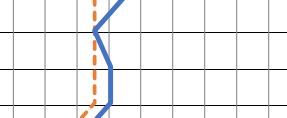

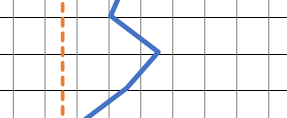
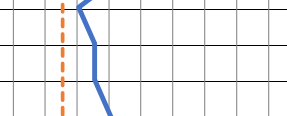
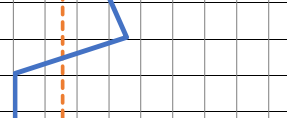
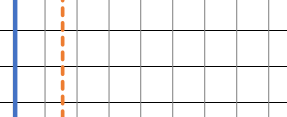
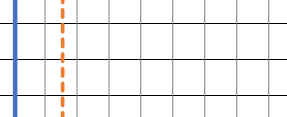
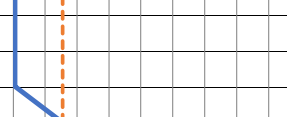
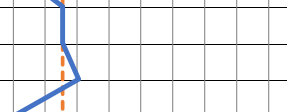
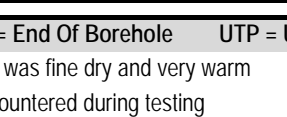
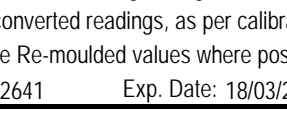


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Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test Site
GetGeo	14/02/2020	13	Lot 299

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)	Soil Description	Water Table
			0 2 4 6 8 10 12 14 16		
100				FILL, respread topsoil, angular gravels	
200		UTP			
300					
400	6			FILL, sands, silt, light grey-brown dry becoming moist 600mm	
500	5				
600	7				
700	8				
800	8				
900	5				
1000	8			SANDS, some silt, grey-brown, moist	
1100	7			becoming minor silt	
1200	5			some orange mottling	
1300	7				
1400	7			becoming some fine to medium rounded bravels	
1500	11				
1600	11			grading to dark grey	
1700	6				
1800	3				
1900	4				
2000	4				
2100				EOB @ 2000mm	
2200				Target Depth	
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					

Notes:		EOB = End Of Borehole	UTP = Unable To Penetrate	UTE = Unable To Extract
1	Weather leading up to test was fine dry and very warm			
2	Ground water was not encountered during testing			
3	Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)			
4	Shear Vane records include Re-moulded values where possible			
5	Shear Vane Serial No.: 2641 Exp. Date: 18/03/2020			

Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test Site
GetGeo	14/02/2020	14	Lot 300

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)	Soil Description	Water Table
			0 2 4 6 8 10 12 14 16		
100				FILL, respread topsoil, angular gravels	
200					
300		UTP			
400					
500	14			FILL, silt, sands, some angular gravels mixed browns/greys, dry becoming moist 700mm	
600	11				
700	7				
800	5				
900	6				
1000	6				
1100	4			SILT, creamy light brown, minor orange mottling moist	
1200	4				
1300	7				
1400	6				
1500	9			Silty SANDS, dark grey, moist	
1600	7				
1700	4			becoming very moist	
1800	5				
1900	5			becoming Sands, minor silt	
2000	6				
2100	7			EOB @ 2000mm Target Depth	
2200					
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300	3				
3400	3				
3500	4				

Notes: EOB = End Of Borehole UTP = Unable To Penetrate UTE = Unable To Extract

- Weather leading up to test was fine dry and very warm
- Ground water was not encountered during testing
- Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)
- Shear Vane records include Re-moulded values where possible
- Shear Vane Serial No.: 2641 Exp. Date: 18/03/2020



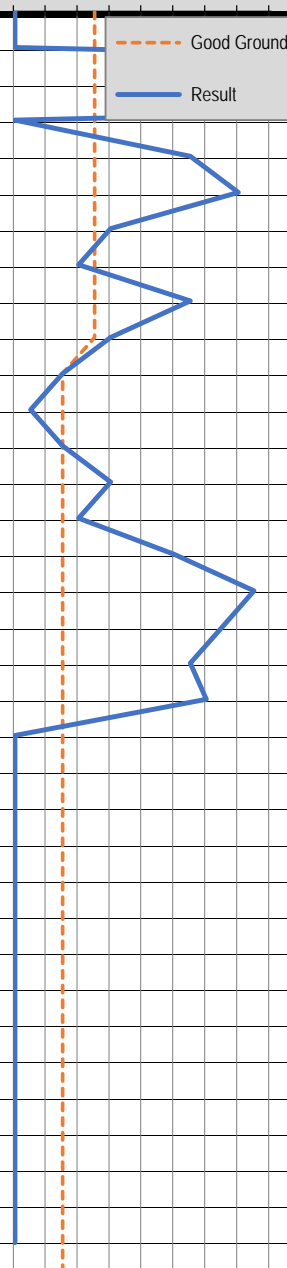
DB CONSULTING ENGINEERS

Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test Site
GetGeo	14/02/2020	15	Lot 301

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)	Soil Description	Water Table
100			<div><div>0246810121416</div><div><div><div></div><div></div></div><div><div>Good Ground</div><div>Result</div></div></div></div>	FILL, respread topsoil, angular gravels	
200		UTP			
300				FILL, sands, silt, some angular gravels some topsoil 500-700mm, dark grey, moist becoming minor silt	
400					
500	6				
600	4				
700	5				
800	7				
900	7				
1000	6			Silty SANDS, minor fine gravels dark grey-brown, moist interbedded fine sandy Silt, dark grey-brown, moist	
1100	10				
1200	10				
1300	5				
1400	4				
1500	3				
1600	5				
1700	8				
1800	11				
1900	8				
2000	7			EOB @ 2000mm Target Depth	
2100	12				
2200	11				
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					

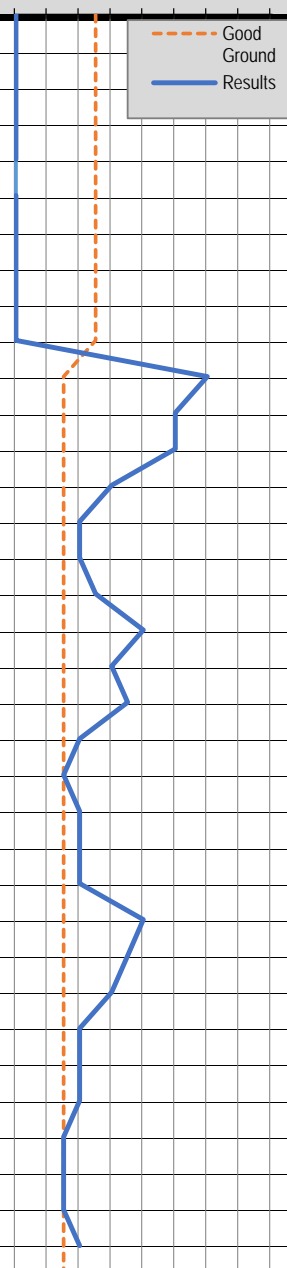
Notes:		EOB = End Of Borehole	UTP = Unable To Penetrate	UTE = Unable To Extract
1	Weather leading up to test was fine dry and very warm			
2	Ground water was not encountered during testing			
3	Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)			
4	Shear Vane records include Re-moulded values where possible			
5	Shear Vane Serial No.: 2641 Exp. Date: 18/03/2020			

Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test Site
GetGeo	14/02/2020	16	Lot 302

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)	Soil Description	Water Table
			0 2 4 6 8 10 12 14 16		
100				FILL, respread topsoil, angular gravels	
200					
300		UTP			
400					
500		11			
600		14			
700		6			
800		4			
900		11			
1000		6			
1100		3			
1200		1			
1300		3			
1400		6			
1500		4			
1600		10			
1700		15			
1800		13			
1900		11			
2000		12			
2100				EOB @ 2000mm	
2200				Target Depth	
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					

Notes:	EOB = End Of Borehole	UTP = Unable To Penetrate	UTE = Unable To Extract
1	Weather leading up to test was fine dry and very warm		
2	Ground water was not encountered during testing		
3	Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)		
4	Shear Vane records include Re-moulded values where possible		
5	Shear Vane Serial No.: 2641	Exp. Date: 18/03/2020	

Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test Site
GetGeo	14/02/2020	17	Lot 303

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)	Soil Description	Water Table			
			0 2 4 6 8 10 12 14 16					
100				400-600mm some topsoil				
200								
300								
400								
500								
600								
700								
800								
900								
1000								
1100	12			FILL, silt, sands, some topsoil some angular gravels, mixed browns/greys dry becoming moist 700mm				
1200	10							
1300	10							
1400	6							
1500	4							
1600	4							
1700	5							
1800	8							
1900	6							
2000	7							
2100	4		Silty SANDS, creamy light-brown minor orange mottling, moist	becoming some fine to medium gravels becoming minor silt, grading to grey				
2200	3							
2300	4							
2400	4							
2500	4							
2600	8							
2700	7							
2800	6							
2900	4							
3000	4							
	4		becoming wet	becoming very wet				
3500	3							
	3							
4000	3							
	4							
						EOB @ 4000mm, Target Depth		

Notes:	EOB = End Of Borehole	UTP = Unable To Penetrate	UTE = Unable To Extract
1	Weather leading up to test was fine dry and very warm		
2	Ground water was not encountered during testing		
3	Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)		
4	Shear Vane records include Re-moulded values where possible		
5	Shear Vane Serial No.: 2641	Exp. Date: 18/03/2020	



DB CONSULTING ENGINEERS

Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test site
GetGeo	14/02/2020	18	Lot 304

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)	Soil Description	Water Table
			0 2 4 6 8 10 12 14 16		
100			Good ground	FILL, respread topsoil, angular gravels	
200					
300		UTP	Result		
400					
500		8			
600		14		FILL, sands, silt, angular gravels	
700		5		mixed browns, dry becoming moist 600mm	
800		6			
900		7			
1000		9		minor topsoil 900mm-1000mm	
1100		14			
1200		11			
1300		11		SILT, light orange-brown, some dar mottling moist	
1400		8			
1500		3			
1600		2		SANDS, silt, orange-brown, moist	
1700		2		becoming minor silt	
1800		3		becoming some fine gravels,grading to grey-brown	
1900		4			
2000		5			
2100		4		EOB @ 2000mm	Target Depth
2200					
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					

Notes:	EOB = End Of Borehole	UTP = Unable To Penetrate	UTE = Unable To Extract
1	Weather leading up to test was fine dry and very warm		
2	Ground water was not encountered during testing		
3	Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)		
4	Shear Vane records include Re-moulded values where possible		
5	Shear Vane Serial No.: 2641	Exp. Date: 18/03/2020	



DB CONSULTING ENGINEERS

Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test Site
GetGeo	14/02/2020	19	Lot 305

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)	Soil Description	Water Table
			0 2 4 6 8 10 12 14 16		
100				FILL, respread topsoil, angular gravels	
200		UTP			
300					
400					
500		UTP		FILL, sands, silt, some angular gravels minor topsoil, mixed browns/greys	
600					
700	6				
800	5				
900	9				
1000	11				
1100	10				
1200	13				
1300	9			SILT, orange-brown, dark mottling, moist	
1400	7				
1500	2				
1600	3				
1700	4				
1800	6				
1900	8				
2000	6				
2100				EOB @ 2000mm Target Depth	
2200					
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					

Notes:	EOB = End Of Borehole	UTP = Unable To Penetrate	UTE = Unable To Extract
1	Weather leading up to test was fine dry and very warm		
2	Ground water was not encountered during testing		
3	Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)		
4	Shear Vane records include Re-moulded values where possible		
5	Shear Vane Serial No.: 2641	Exp. Date: 18/03/2020	



DB CONSULTING ENGINEERS

Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test Site
GetGeo	14/02/2020	20	Lot 306

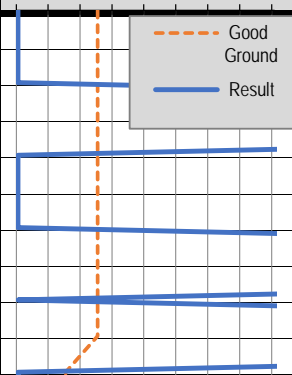
Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)		Soil Description	Water Table
			0 2 4 6 8 10 12 14 16	<div><div>Good Ground</div><div>Result</div></div>		
100		12			FILL, respread topsoil, angular gravels	
200		12				
300		UTP				
400						
500		10				
600		10			FILL, sands, silt, angular gravels, minor topsoil mixed browns, dry becoming moist 700mm	
700		UTP				
800						
900		UTP				
1000						
1100		10				
1200		10				
1300		16			angular gravels	
1400		17				
1500		14				
1600		6			SILT, minor sands, creamy light-brown some orange mottling, moist	
1700		6				
1800		6				
1900		7			SANDS, minor silt, grey, moist	
2000		8				
2100					EOB @ 2000mm	
2200					Target Depth	
2300						
2400						
2500						
2600						
2700						
2800						
2900						
3000						
3100						
3200						
3300						
3400						
3500						

Notes:		EOB = End Of Borehole	UTP = Unable To Penetrate	UTE = Unable To Extract
1	Weather leading up to test was fine dry and very warm			
2	Ground water was not encountered during testing			
3	Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)			
4	Shear Vane records include Re-moulded values where possible			
5	Shear Vane Serial No.: 2641 Exp. Date: 18/03/2020			



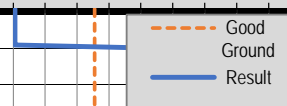

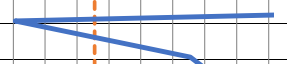





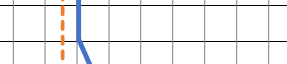

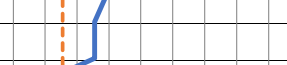

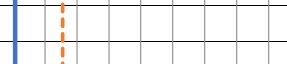
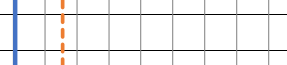
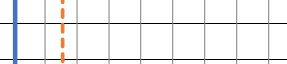



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Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test Site
GetGeo	14/02/2020	21	Lot 307

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)	Soil Description	Water Table
			0 2 4 6 8 10 12 14 16		
100				FILL, sands, angular gravels, silt grey, dry becoming moist 800mm	
200					
300					
400		UTP			
500					
600					
700					
800		UTP			
900					
1000		UTP			
1100			<p>EOB @ 1100mm Refusal - angular gravels</p>		
1200					
1300					
1400					
1500					
1600					
1700					
1800					
1900					
2000					
2100					
2200					
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					

Notes:	EOB = End Of Borehole	UTP = Unable To Penetrate	UTE = Unable To Extract
1	Weather leading up to test was fine dry and very warm		
2	Ground water was not encountered during testing		
3	Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)		
4	Shear Vane records include Re-moulded values where possible		
5	Shear Vane Serial No.: 2641	Exp. Date: 18/03/2020	

Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test Site
GetGeo	14/02/2020	22	Lot 309

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)	Soil Description	Water Table
			0 2 4 6 8 10 12 14 16		
100				FILL, respread topsoil, angular gravels	
200					
300		UTP			
400					
500		UTP			
600					
700		11			
800		14			
900		8			
1000		8			
1100		9			
1200		9			
1300		6			
1400		4			
1500		4			
1600		4			
1700		4			
1800		5			
1900		6			
2000	136 / 12	5			
2100		5			
2200					
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					

Notes:		EOB = End Of Borehole	UTP = Unable To Penetrate	UTE = Unable To Extract
1	Weather leading up to test was fine dry and very warm			
2	Ground water was not encountered during testing			
3	Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)			
4	Shear Vane records include Re-moulded values where possible			
5	Shear Vane Serial No.: 2641 Exp. Date: 18/03/2020			

Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test Site
GetGeo	14/02/2020	23	Lot 309

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)		Soil Description	Water Table
			0 2 4 6 8 10 12 14 16	<div><div>Good Ground</div><div>Result</div></div>		
100			<div><div></div><div></div></div>		FILL, sands, silt, angular gravels minor topsoil, mixed brown, dry to moist	
200						
300		UTP				
400						
500	12					
600	14					
700	7					
800	6					
900	8					
1000	8					
1100	10					
1200	9		angular gravels			
1300	10			SILT, some sands, grey-brown, minor mottling moist		
1400	12					
1500	8					
1600	5					
1700	3					
1800	3		EOB @ 2000mm Target Depth			
1900	3					
2000	136 / 12	3				
2100						
2200						
2300						
2400						
2500						
2600						
2700						
2800						
2900						
3000						
3100						
3200						
3300						
3400						
3500						

Notes: EOB = End Of Borehole UTP = Unable To Penetrate UTE = Unable To Extract

- Weather leading up to test was fine dry and very warm
- Ground water was not encountered during testing
- Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)
- Shear Vane records include Re-moulded values where possible
- Shear Vane Serial No.: 2641 Exp. Date: 18/03/2020



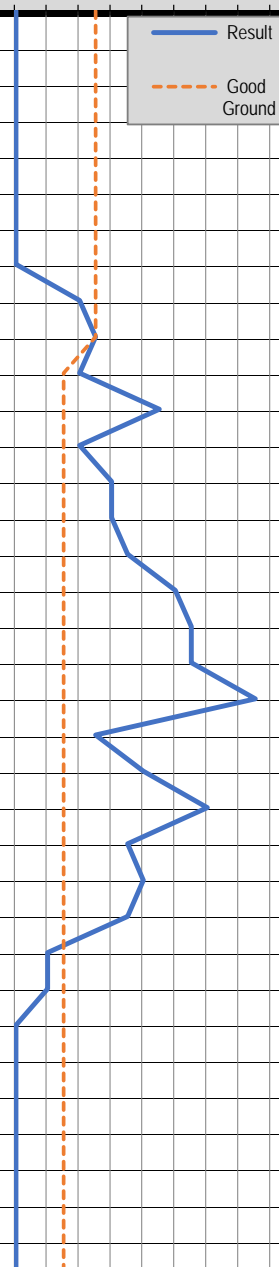
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Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test Site
GetGeo	14/02/2020	24	Lot 310

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)	Soil Description	Water Table
			0 2 4 6 8 10 12 14 16		
100			Good Ground	FILL, respread topsoil, angular gravels	
200		UTP			
300			Result		
400					
500	7			FILL, sand, silt, some topsoil, minor gravels	
600	8				
700	6				
800	6				
900	11				
1000	UTP				
1100				SANDS, silt, some gravels, dark orange-brown moist	
1200	UTP				
1300					
1400	7			SILT, some fine sands, light grey-brown, moist	
1500	4				
1600	3				
1700	4				
1800	4				
1900	5			Silty fine SANDS, grey-brown some orange mottling, moist	
2000	5				
2100	7			EOB @ 2000mm	
2200				Target Depth	
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					


Notes:		EOB = End Of Borehole	UTP = Unable To Penetrate	UTE = Unable To Extract
1	Weather leading up to test was fine dry and very warm			
2	Ground water was not encountered during testing			
3	Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)			
4	Shear Vane records include Re-moulded values where possible			
5	Shear Vane Serial No.: 2641 Exp. Date: 18/03/2020			

Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test Site
GetGeo	14/02/2020	25	Lot 311

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)	Soil Description	Water Table	
			0 2 4 6 8 10 12 14 16			
100				FILL, respread topsoil, angular gravels		
200				FILL, sands, silt, mixed brown, dry becoming moist		
300						
400						
500						
600				SANDS, silt, minor fine gravels, dark orange-brown moist		
700						
800						
900	4					
1000	5					
1100	4					
1200	9			grading to grey-brown		
1300	4			1300-1400mm interbedded Silt, light brown		
1400	6					
1500	6			becoming silty fine to medium Sands		
1600	7			grading to light grey, becoming minor silt		
1700	10					
1800	11					
1900	11					
2000	15					
2100	5					
2200	8					
2300	12					
2400	7					
2500	8					
2600	7			becoming very moist		
2700	2					
2800	2					
2900				SILT, minor sands, grey-brown trace orange-mottling, moist		
3000	104 / 25					
				becoming very moist		
3500	146 / 51			EOB @ 4000mm, Target Depth		
4000	114 / 41					

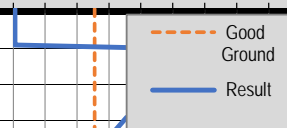
Notes:		EOB = End Of Borehole	UTP = Unable To Penetrate	UTE = Unable To Extract
1	Weather leading up to test was fine dry and very warm			
2	Ground water was not encountered during testing			
3	Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)			
4	Shear Vane records include Re-moulded values where possible			
5	Shear Vane Serial No.: 2641 Exp. Date: 18/03/2020			

Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test Site
GetGeo	14/02/2020	26	Lot 312

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)	Soil Description	Water Table
			0 2 4 6 8 10 12 14 16		
100				FILL, respread topsoil, angular gravels	
200					
300		UTP			
400					
500		7		FILL, silt, sands, some fine gravels, mixed brown	
600		8		some interbedded greys, dry becoming moist 600mm	
700		11			
800		UTP			
900					
1000		7			
1100		8			
1200		11			
1300		12			
1400		9			
1500		11		some topsoil	
1600		10			
1700		8		Silty fine SANDS, light-brown	
1800		7		trace orange mottling, moist	
1900		9			
2000	108 / 28	7		SILT, fine sands, creamy light-brown, moist	
2100			EOB @ 2000mm Target Depth		
2200					
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					

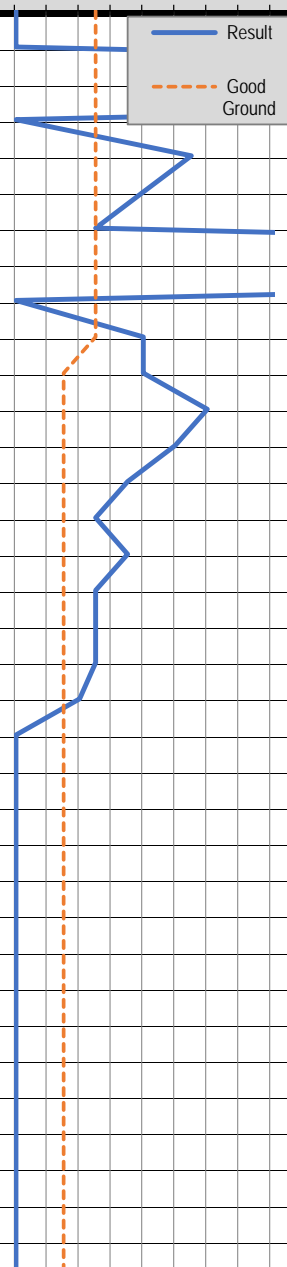
Notes:		EOB = End Of Borehole	UTP = Unable To Penetrate	UTE = Unable To Extract
1	Weather leading up to test was fine dry and very warm			
2	Ground water was not encountered during testing			
3	Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)			
4	Shear Vane records include Re-moulded values where possible			
5	Shear Vane Serial No.: 2641 Exp. Date: 18/03/2020			

Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test Site
GetGeo	14/02/2020	27	Lot 313

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)	Soil Description	Water Table
			0 2 4 6 8 10 12 14 16		
100				FILL, respread topsoil, angular gravels	
200					
300		UTP			
400		7			
500		5			
600		5			
700		11			
800		UTP			
900					
1000					
1100		UTP			
1200					
1300		11			
1400		14			
1500		10			
1600		3			
1700		3			
1800		4			
1900		3			
2000	218+ / -	3			
2100				EOB @ 2000mm	
2200				Target Depth	
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					

Notes:		EOB = End Of Borehole	UTP = Unable To Penetrate	UTE = Unable To Extract
1	Weather leading up to test was fine dry and very warm			
2	Ground water was not encountered during testing			
3	Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)			
4	Shear Vane records include Re-moulded values where possible			
5	Shear Vane Serial No.: 2641 Exp. Date: 18/03/2020			

Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test Site
GetGeo	14/02/2020	28	Lot 314

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)	Soil Description	Water Table
			0 2 4 6 8 10 12 14 16		
100				FILL, silt, sands, some angular gravels, minor topsoil dark greys/browns, dry becoming moist 700mm	
200					
300		UTP			
400					
500		11			
600		8			
700		5			
800		UTP			
900					
1000		8			
1100		8	Silty SANDS, dark grey-brown, moist		
1200		12			
1300		10			
1400		7			
1500		5			
1600		7	SILT, creamy light-brown, some mottling moist		
1700		5			
1800		5			
1900		5			
2000	218+ / -	4	EOB @ 2000mm Target Depth		
2100					
2200					
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					

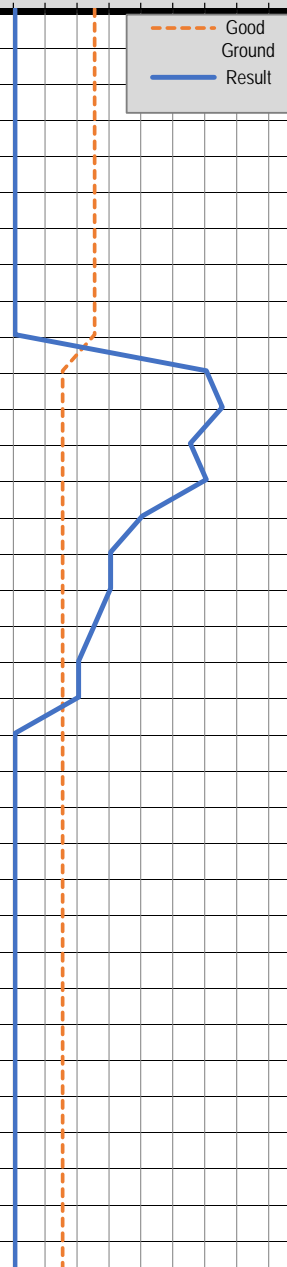
Notes:		EOB = End Of Borehole	UTP = Unable To Penetrate	UTE = Unable To Extract
1	Weather leading up to test was fine dry and very warm			
2	Ground water was not encountered during testing			
3	Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)			
4	Shear Vane records include Re-moulded values where possible			
5	Shear Vane Serial No.: 2641 Exp. Date: 18/03/2020			

Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test Site
GetGeo	14/02/2020	29	Lot 315

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)													Soil Description	Water Table
			0	2	4	6	8	10	12	14	16						
100			<div><div></div> Good Ground</div> <div><div></div> Result</div>													FILL, silt, sands, some angular gravels, minor topsoil dark greys/browns, dry becoming moist 700mm	
200																	
300																	
400																	
500																	
600																	
700																	
800																	
900																	
1000																	
1100		10														SANDS, silt, some fine to medium gravels dark grey-brown, moist	
1200		12															
1300		16															
1400		7															
1500		3															
1600		2															
1700		2															
1800		3															
1900		4															
2000		3															
2100																	
2200																	
2300																	
2400																	
2500																	
2600																	
2700																	
2800																	
2900																	
3000																EOB @ 2000mm Target Depth	
3100																	
3200																	
3300																	
3400																	
3500																	

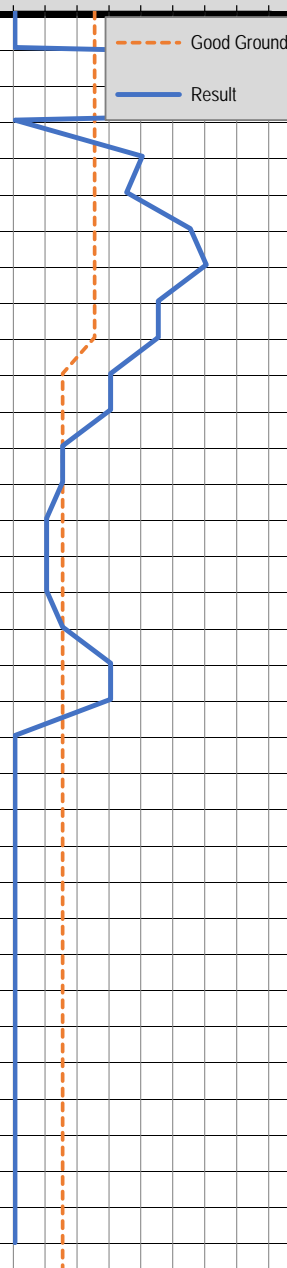
Notes:		EOB = End Of Borehole	UTP = Unable To Penetrate	UTE = Unable To Extract
1	Weather leading up to test was fine dry and very warm			
2	Ground water was not encountered during testing			
3	Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)			
4	Shear Vane records include Re-moulded values where possible			
5	Shear Vane Serial No.: 2641 Exp. Date: 18/03/2020			

Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test Site
GetGeo	14/02/2020	30	Lot 316

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)		Soil Description	Water Table
			0	2 4 6 8 10 12 14 16		
100					FILL, respread topsoil, angular gravels	
200						
300						
400						
500					FILL, sands, silt, minor angular gravels	
600					dark greys/browns, dry becoming moist 700mm	
700					minor topsoil at 700mm	
800						
900						
1000						
1100		12				
1200		13				
1300		11				
1400		12				
1500		8			Silty fine SANDS, creamy light-grey, some orange mottling, moist	
1600		6				
1700		6				
1800		5				
1900		4			SILT, creamy light-brown, some mottling, moist	
2000	146 / 25	4				
2100					EOB @ 2000mm	
2200					Target Depth	
2300						
2400						
2500						
2600						
2700						
2800						
2900						
3000						
3100						
3200						
3300						
3400						
3500						

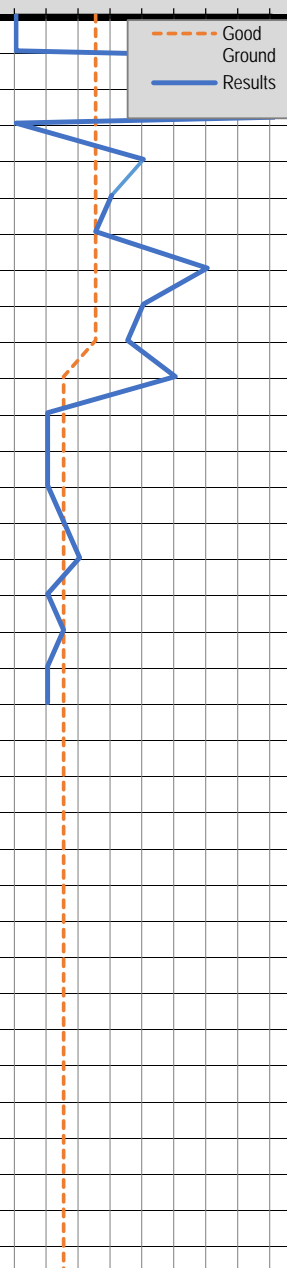
Notes:		EOB = End Of Borehole	UTP = Unable To Penetrate	UTE = Unable To Extract
1	Weather leading up to test was fine dry and very warm			
2	Ground water was not encountered during testing			
3	Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)			
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5	Shear Vane Serial No.: 2641 Exp. Date: 18/03/2020			

Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test Site
GetGeo	14/02/2020	31	Lot 317

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)	Soil Description	Water Table
			0 2 4 6 8 10 12 14 16		
100				FILL, respread topsoil, some angular gravels	
200					
300		UTP			
400					
500	8				
600	7			FILL, silt, sands, some fine to medium ang. gravels	
700	11			minor topsoil, grey-brown, dry to moist 600mm	
800	12				
900	9			some gravels 900-1000mm	
1000	9				
1100	6				
1200	6				
1300	3				
1400	3			SILT, some sands, orange-brown, moist	
1500	2			grading to brown, some orange mottling	
1600	2				
1700	2				
1800	3			SANDS, silt, minor fine gravels	
1900	6			dark orange-brown, moist	
2000	6				
2100				EOB @ 2000mm	
2200				Target Depth	
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					

Notes:		EOB = End Of Borehole	UTP = Unable To Penetrate	UTE = Unable To Extract
1	Weather leading up to test was fine dry and very warm			
2	Ground water was not encountered during testing			
3	Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)			
4	Shear Vane records include Re-moulded values where possible			
5	Shear Vane Serial No.: 2641 Exp. Date: 18/03/2020			

Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test Site
GetGeo	14/02/2020	32	Lot 318

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)	Soil Description	Water Table
100				FILL, sands, silt, some angular gravels minor topsoil, mixed browns, dry becoming moist 600mm	
200					
300		UTP			
400					
500		8			
600		6			
700		5			
800		12			
900		8			
1000		7			
1100		10			
1200		2	SILT, some sands, dark orange-brown, moist becoming mixed brown		
1300		2			
1400		2			
1500		3			
1600		4			
1700		2	SANDS, minor silt, some fine to medium gravels, dark orange-brown, moist		
1800		3			
1900		2	EOB @ 2000mm Target Depth		
2000		2			
2100					
2200					
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3500					
4000					

Notes:		EOB = End Of Borehole	UTP = Unable To Penetrate	UTE = Unable To Extract
1	Weather leading up to test was fine dry and very warm			
2	Ground water was not encountered during testing			
3	Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)			
4	Shear Vane records include Re-moulded values where possible			
5	Shear Vane Serial No.: 2641 Exp. Date: 18/03/2020			



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Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test site
GetGeo	14/02/2020	33	Lot 319

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)	Soil Description	Water Table
			0 2 4 6 8 10 12 14 16		
100				FILL, respread topsoil, some angular gravels	
200		UTP			
300					
400		4			
500		8		FILL, silt, sands, dark grey-brown, dry becoming moist 600mm	
600		11			
700		5			
800		3			
900		3		SILT, creamy light-brown, some orange mottling moist	
1000		2			
1100		1			
1200		2			
1300		1		SANDS, silt, dar orange-brown, moist	
1400		1			
1500		2		some wood fragments	
1600		3		grading to creamy light-grey	
1700		3			
1800		5		becoming minor silt	
1900		7			
2000		5			
2100		8			
2200		8			
2300		9			
2400		9		becoming coarse Sands, trace silt, dark brown	
2500		6			
2600		5		becoming some fine to medium gravels, mixed colouring	
2700		4			
2800		5			
2900		4			
3000		6		becoming some gravels	
3100		9			
3200		10			
3300		7		Gravelly SANDS, dark grey, wet	
3400		11			
3500		11		EOB @ 4.0m, Target Depth	

Notes:	EOB = End Of Borehole	UTP = Unable To Penetrate	UTE = Unable To Extract
1	Weather leading up to test was fine dry and very warm		
2	Ground water was not encountered during testing		
3	Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)		
4	Shear Vane records include Re-moulded values where possible		
5	Shear Vane Serial No.: 2641	Exp. Date: 18/03/2020	



DB CONSULTING ENGINEERS

Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test Site
GetGeo	14/02/2020	34	Lot 320

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)	Soil Description	Water Table
			0 2 4 6 8 10 12 14 16		
100				FILL, respread topsoil, some angular gravels	
200		UTP			
300					
400				FILL, silt, sands, some gravels, minor topsoil	
500	6			grey-brown, dry becoming moist 600mm	
600	11				
700	5				
800	8				
900	7				
1000	3				
1100	3			SANDS, minor silt, some gravels	
1200	4			dark orange-brown, moist	
1300	4			grading to orange-brown	
1400	4				
1500	5			becoming minor gravels, some silt	
1600	6			grading to creamy light-brown, some orange mottling	
1700	6			grading to grey	
1800	7			becoming some fine to medium gravels	
1900	7				
2000	7				
2100				EOB @ 2000mm	
2200				Target Depth	
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					

Notes:	EOB = End Of Borehole	UTP = Unable To Penetrate	UTE = Unable To Extract
1	Weather leading up to test was fine dry and very warm		
2	Ground water was not encountered during testing		
3	Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)		
4	Shear Vane records include Re-moulded values where possible		
5	Shear Vane Serial No.: 2641	Exp. Date: 18/03/2020	

Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test Site
GetGeo	14/02/2020	35	Lot 321

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)		Soil Description	Water Table
			0	2 4 6 8 10 12 14 16		
100					FILL, respread topsoil, some angular gravels	
200		UTP				
300						
400		4			FILL, silt, sands, some gravels, minor pumice	
500		7			grey-brown, dry to moist 600mm	
600		6				
700		2				
800		1			SILT, minor sands, orange-brown, moist	
900		2				
1000		2				
1100		1			Fine to medium SANDS, trace silt, light yellow-brown	
1200		1			Moist	
1300		2			grading to grey-brown	
1400		3				
1500		3				
1600		2			grading to dark grey	
1700		3				
1800		4			grading to light-grey	
1900		4				
2000		5				
2100		4			EOB @ 2000mm	
2200					Target Depth	
2300						
2400						
2500						
2600						
2700						
2800						
2900						
3000						
3100						
3200						
3300						
3400						
3500						

Notes:	EOB = End Of Borehole	UTP = Unable To Penetrate	UTE = Unable To Extract
1	Weather leading up to test was fine dry and very warm		
2	Ground water was not encountered during testing		
3	Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)		
4	Shear Vane records include Re-moulded values where possible		
5	Shear Vane Serial No.: 2641	Exp. Date: 18/03/2020	




DB CONSULTING ENGINEERS

Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test Site
GetGeo	14/02/2020	36	Lot 322

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)	Soil Description	Water Table
			0 2 4 6 8 10 12 14 16		
100			— Good Ground — Result	FILL, respread topsoil, some angular gravels	
200					
300		UTP			
400					
500					
600		UTP			
700				FILL, sands, gravels, some silt, minor topsoil greys/browns, dry becoming moist 600mm	
800		6			
900		11			
1000		4			
1100		7			
1200	161 / 25	2		SILT, orange-brown, moist	
1300		3			
1400		3			
1500		4			
1600		5			
1700		4			
1800		4		SANDS, minor silt, light orange-brown moist	
1900		4		trace silt, grading to light-grey	
2000		4			
2100				EOB @ 2000mm	
2200				Target Depth	
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					

Notes:	EOB = End Of Borehole	UTP = Unable To Penetrate	UTE = Unable To Extract
1	Weather leading up to test was fine dry and very warm		
2	Ground water was not encountered during testing		
3	Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)		
4	Shear Vane records include Re-moulded values where possible		
5	Shear Vane Serial No.: 2641	Exp. Date: 18/03/2020	

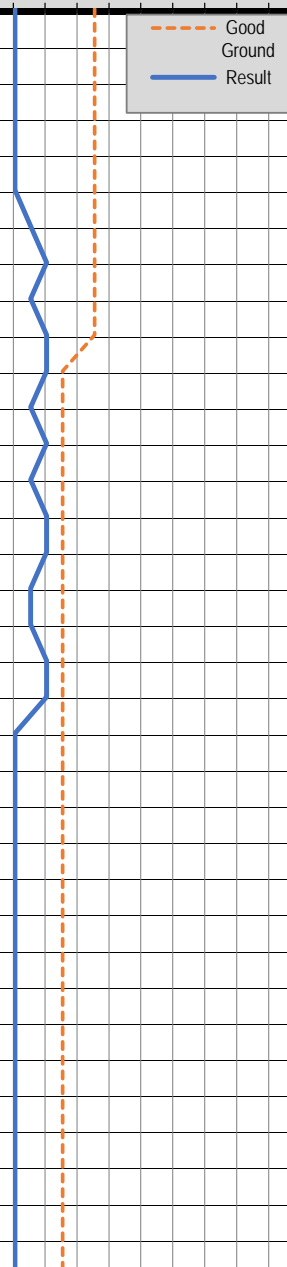
Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test Site
GetGeo	14/02/2020	37	Lot 323

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)	Soil Description	Water Table
			0 2 4 6 8 10 12 14 16		
100				FILL, respread topsoil, some angular gravels	
200					
300		UTP			
400					
500		11		FILL, sands, silt, some gravels, minor topsoil	
600		9		mixed greys/browns, dry becoming moist 700mm	
700		5			
800		8			
900		3		SILT, some sands, light yellow-brown, moist	
1000		3			
1100		4			
1200		7		SANDS, minor silt, dark orange-brown, moist	
1300		11			
1400		12		some fine gravels	
1500		9		grading to orange-brown	
1600		10			
1700		7		grading to grey-brown	
1800		5			
1900		4		grading to grey	
2000		5			
2100				EOB @ 2000mm	
2200				Target Depth	
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					

Notes:

- 1 Weather leading up to test was fine dry and very warm
- 2 Ground water was not encountered during testing
- 3 Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)
- 4 Shear Vane records include Re-moulded values where possible
- 5 Shear Vane Serial No.: 2641 Exp. Date: 18/03/2020

Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test Site
GetGeo	14/02/2020	38	Lot 324

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)		Soil Description	Water Table
			0	2 4 6 8 10 12 14 16		
100					FILL, respread topsoil, some angular gravels	
200						
300						
400						
500					FILL, sands, silt, minor fine gravels, grey-brown dry becoming moist 600mm	
600						
700	1					
800	2					
900	1				SILT, some sands, light yellow-brown, moist	
1000	2					
1100	2					
1200	1					
1300	2				SANDS, minor silt, yellow-brown some dark orange mottling, moist becoming minor fine gravels	
1400	1					
1500	2					
1600	2					
1700	1				grading to dark grey-brown	
1800	1					
1900	2					
2000	2					
2100					EOB @ 2000mm Target Depth	
2200						
2300						
2400						
2500						
2600						
2700						
2800						
2900						
3000						
3100						
3200						
3300						
3400						
3500						

Notes: EOB = End Of Borehole UTP = Unable To Penetrate UTE = Unable To Extract

- Weather leading up to test was fine dry and very warm
- Ground water was not encountered during testing
- Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)
- Shear Vane records include Re-moulded values where possible
- Shear Vane Serial No.: 2641 Exp. Date: 18/03/2020




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Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test Site
GetGeo	14/02/2020	39	Lot 325

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)	Soil Description	Water Table
			0 2 4 6 8 10 12 14 16		
100				FILL, respread topsoil, some angular gravels	
200		UTP		FILL, sands, silt, grey-brown, dry to moist	
300					
400		6			
500		5			
600		7			
700		4			
800		4		SANDS, some fine gravels, dark orange-brown, moist	
900		2			
1000		3			
1100		3			
1200		5			
1300		4		grading to yellow-brown	
1400		5			
1500		4			
1600		5			
1700		4		Fine to medium SANDS, dark grey-brown, moist	
1800		5			
1900		4			
2000		4			
2100				EOB @ 2000mm	
2200				Target Depth	
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					

Notes:		EOB = End Of Borehole	UTP = Unable To Penetrate	UTE = Unable To Extract
1	Weather leading up to test was fine dry and very warm			
2	Ground water was not encountered during testing			
3	Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)			
4	Shear Vane records include Re-moulded values where possible			
5	Shear Vane Serial No.: 2641 Exp. Date: 18/03/2020			

Project Name		Job Ref.	
Area M; Stage 11, Greenhill Park, Hamilton		171738-AREA-M-S11-01	
Tested by	Date	Sheet No.	Test Site
GetGeo	14/02/2020	40	Lot 326

Depth (mm)	Undrained Shear (kPa)	No of blows /100mm	Scala Penetrometer (Blows/100mm)	Soil Description	Water Table
			0 2 4 6 8 10 12 14 16		
100				FILL, respread topsoil, some angular gravels	
200		UTP			
300					
400		3			
500		3			
600		4			
700		4			
800		5			
900		4			
1000		3			
1100		6			
1200		11			
1300		11			
1400		8			
1500		7			
1600		5			
1700		3			
1800		3			
1900		3			
2000		3			
2100				EOB @ 2000mm	
2200				Target Depth	
2300					
2400					
2500					
2600					
2700					
2800					
2900					
3000					
3100					
3200					
3300					
3400					
3500					

Notes:		EOB = End Of Borehole	UTP = Unable To Penetrate	UTE = Unable To Extract
1	Weather leading up to test was fine dry and very warm			
2	Ground water was not encountered during testing			
3	Shear Vane readings are converted readings, as per calibration Certificate. (Values are undrained shear strength)			
4	Shear Vane records include Re-moulded values where possible			
5	Shear Vane Serial No.: 2641 Exp. Date: 18/03/2020			

Appendix V *Stormwater Management*
On-lot Water Efficiency Measures
Lot Levels (Minimum Lot Levels)

ON-LOT WATER EFFICIENCY MEASURES

WATER SUPPLY AND WASTEWATER DISPOSAL

The efficiency of taps, showers and toilets contribute to how much water we use. A reduction in the use of potable water by each house directly relates to the amount of wastewater generated (i.e. reduced water use results in reduced wastewater generation). To reduce potable water demand and the amount of wastewater generated, as a minimum, each house is required to install low demand fittings for kitchen, bathroom and laundry facilities.

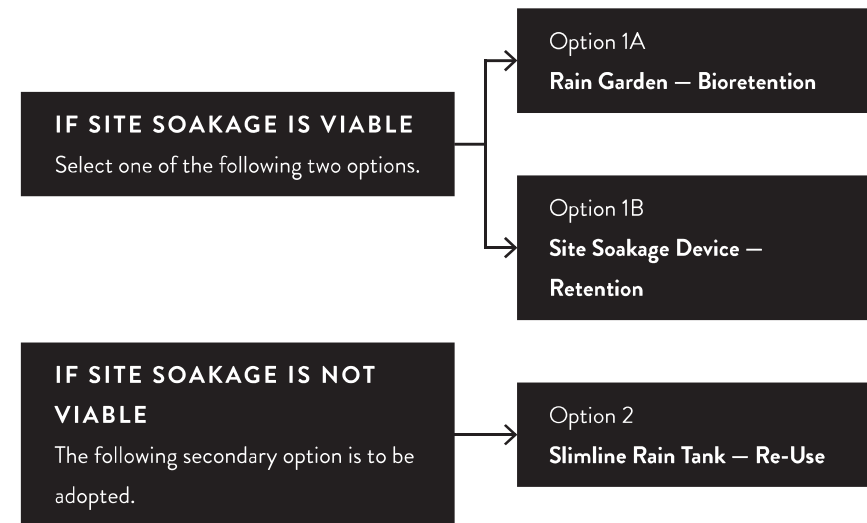
All household fittings are required to have a minimum 3 Star Rating.

STORMWATER DISPOSAL

Each lot is required to adopt an on-lot stormwater efficiency measure to ensure that surface water runoff is appropriately managed.

First, the suitability of the site for soakage needs to be assessed. Soakage is the process of helping stormwater soak into the ground using specially designed soakage devices. Soakage allows for the infiltration of stormwater into the soil which recharges the groundwater table below.

A site infiltration test is mandatory for all lots to confirm the in-situ soils are capable of achieving the minimum percolation rates. Refer to Hamilton City Council 'Three Waters Practice Note HCC 03: Soakage' for guidance on soil testing.



* Other alternative stormwater efficiency options will also be considered subject to approval by Greenhill Park and Hamilton City Council.

The selected option is to be designed by a suitably qualified Engineer and approved by the Hamilton City Council Building Control Unit. Refer to page 33 to 36 of these guidelines for further information of the design requirements for Options 1A, 1B & 2.

Hamilton City Council also encourages the installation of multiple stormwater efficiency options within a property, where practical.

Option 1A

RAIN GARDEN – BIORETENTION

Design to provide minimum 'live storage' retention for runoff from a 10mm rainfall event for trafficked hardstand areas.

The following table outlines indicative storage volumes and estimated rain garden areas for a range of lot sizes.

Lot Area (m ²)	Live Storage Volume (m ³)	Rain Garden Area (m ²)
300	0.8	4.1
350	0.9	4.7
400	1.1	5.4
450	1.2	6.1
500	1.4	6.8
550	1.5	7.4

Based on hardstand coverage equal to 30% of total lot area

KEY REQUIREMENTS

- Rain garden to be located to capture runoff from main hardstand areas within the lot (as much as practical).
- Maximum live storage depth to be 300mm (safety requirements to be considered when device is at maximum storage capacity).
- A channel and grate to be installed across vehicle entrance to capture hardstand run off and direct it to rain garden.

- Rain garden to be integrated with garden design (refer to page 34 for details).
- Overflow to be connected to stormwater connection provided.

FOR MORE INFORMATION

Refer to Hamilton City Council 'Three Waters Practice Note – HCC04 – Bio-retention (Rain Gardens)' for information on typical design requirements.

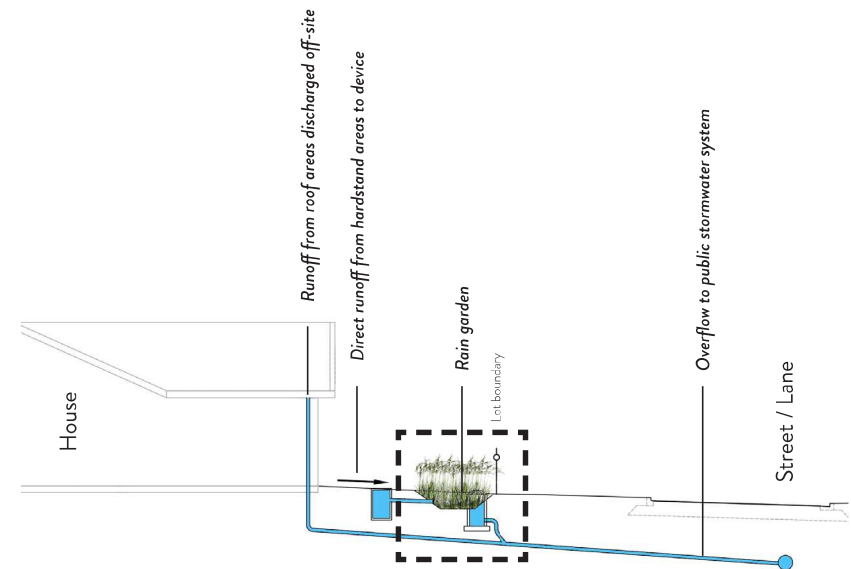


DIAGRAM — 7
Rain Garden – Bioretention

GREENHILL PARK RAIN GARDEN PLANT LIST

Native plants are encouraged, but other exotic plant species which complement your front yard planting design could be used. Deciduous plants should not be used as their leaf-fall can block the outflow.

The plants selected need to —

- Be able to tolerate short periods of inundation and longer dry periods
- Be perennial rather than annual
- Have deep fibrous root systems and a spreading growth form
- Form a dense, weed-suppressing cover



Botanical Name	Common Name
Apodasmia similis	oioi
Blechnum penna-marina	alpine hard fern
Libertia ixioides	mikoikoi
Carex dipsacea	teasel sedge
Carex secta	purei
Carex virgata	pukio
Dianella nigra	turutu
Libertia grandiflora	mikoikoi
Lobelia angulata	panakenake
Pimelea prostrata	pinatoro

All rain garden plants to be a minimum grade of Pb 8 at the time of planting. * Other plant species can be approved at the discretion of the Design Review Panel.

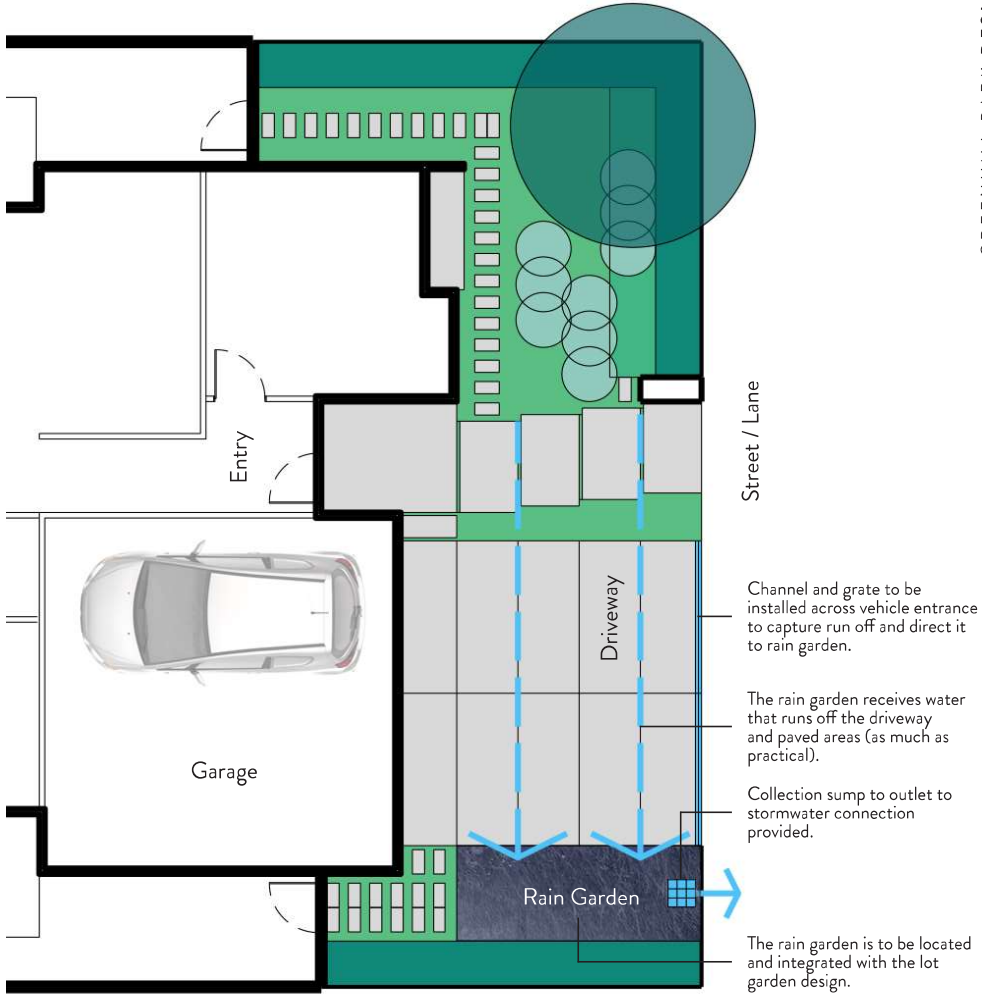


DIAGRAM — 8
Rain Garden Typical Location

Option 1B

SITE SOAKAGE DEVICE – RETENTION

Design to provide minimum 'live storage' retention for runoff from a 10mm rainfall event for roof and trafficked hardstand areas.

The following table outlines indicative storage volumes for a range of lot sizes.

Lot Area (m ²)	Live Storage Volume (m ³)
300	2.2
350	2.6
400	3.0
450	3.4
500	3.7
550	4.1

Based on 80% site coverage (roof and hardstand areas)

KEY REQUIREMENTS

- Soakage device(s) to be located to capture runoff from roof downpipes and hardstand areas (as much as practical).
- A channel and grate to be installed across vehicle entrance to capture hardstand runoff and direct it to soakage device.
- Soakage device to be integrated with garden design.
- Overflow to be connected to stormwater connection provided.

FOR MORE INFORMATION

Refer to Hamilton City Council 'Three Waters Practice Note HCC 03: Soakage' for information on typical design requirements.

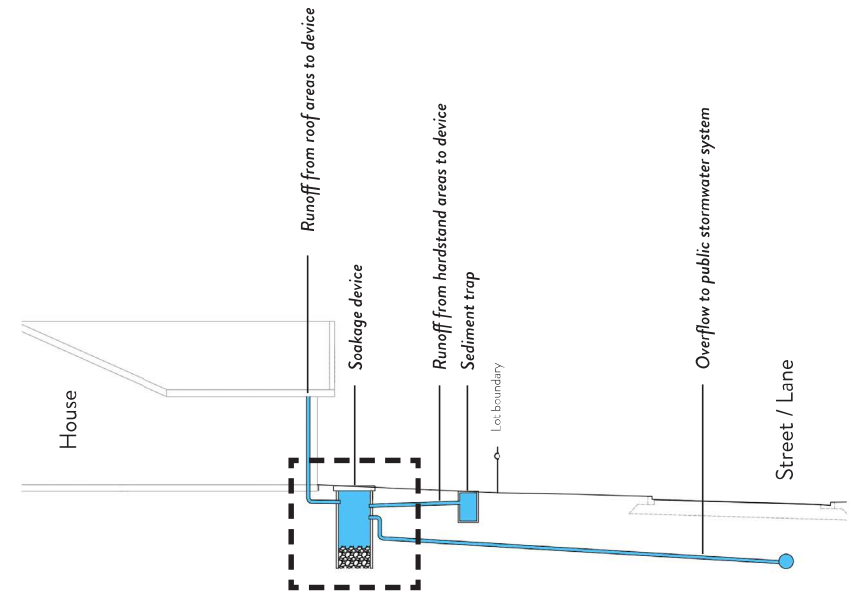


DIAGRAM — 9
Site Soakage Device – Retention

Option 2

SLIMLINE RAIN TANK – RE-USE

The slimline rain tank is to be connected to a separate grey-water household re-use system with a minimum capacity of 5,000L.

KEY REQUIREMENTS

- Rain tank to be connected into a fully integrated grey-water re-use system within the main dwelling with connections to toilets, laundry and irrigation systems.
- All roof run-off is to be captured by rain tanks and available for re-use. Run-off from hardstand areas (driveways and paving) can be discharged directly into stormwater connection provided.
- A maximum of two (2) tanks may be used to achieve the required storage and align with downpipe locations.
- Overflow to be connected to stormwater connection provided.

LOCATION AND INSTALLATION

Slimline rain tanks should be placed in the rear or side yard of the lot as unobtrusively as possible. Care should be taken, where tanks are placed next to the house, to ensure they are placed adjacent to a blank wall and not in front of a window.

COLOUR

The colour of all rain tanks should match the colour of the homes exterior wall cladding adjacent to the tank.

* Colours that do not match but are complementary to the design and materials of the house can be approved at the discretion of the Design Review Panel.

FOR MORE INFORMATION

Refer to Hamilton City Council 'Three Waters Practice Note – HCC02 – Rainwater Re-use Systems (Rain Tanks)' for information on design requirements.

APPROVED RAIN TANK PRODUCTS

Tanksalot® Slimline Tank www.tanksalot.co.nz

ThinTanks™ NZ Slimline Rainwater Poly Tank www.thintanks.co.nz

* Other rain tank products will also be considered subject to approval by Greenhill Park.

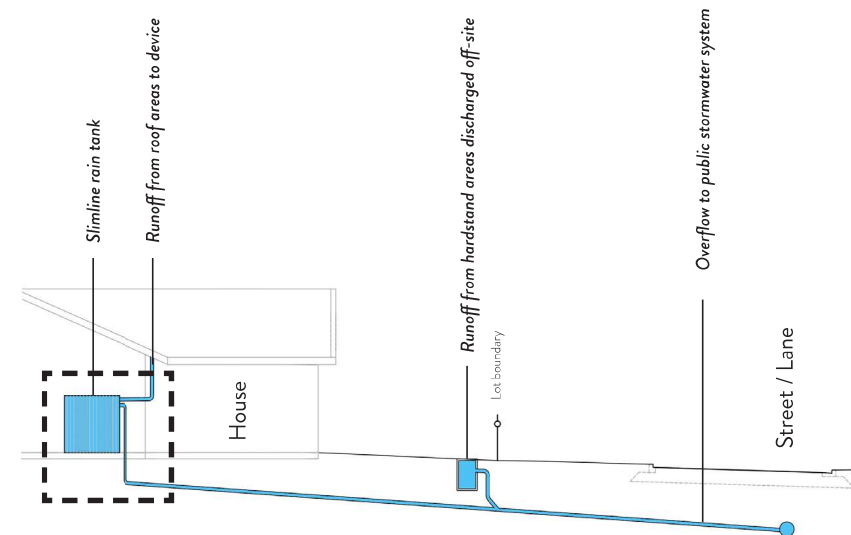


DIAGRAM — 10
Slimline Rain Tank – Re-use

Lot	Stage	Minimum Lot Level (mRL)	1% AEP Flood Level (mRL)	Flood Level Reference	Calculated Freeboard (to Lot Level)
264	10	36.886	36.10	Swale 4A	0.786
265	10	37.109	36.10	Swale 4A	1.009
266	10	37.216	36.10	Swale 4A	1.116
267	10	37.322	36.10	Swale 4A	1.222
268	10	37.428	36.10	Swale 4A	1.328
269	10	37.535	36.10	Swale 4A	1.435
270	10	37.650	36.10	Swale 4A	1.550
271	10	37.587	36.10	Swale 4A	1.487
272	10	37.410	36.10	Swale 4A	1.310
273	10	37.347	36.10	Swale 4A	1.247
274	10	37.298	36.10	Swale 4A	1.198
275	10	37.251	36.10	Swale 4A	1.151
276	10	37.197	36.10	Swale 4A	1.097
277	10	37.034	36.10	Swale 4A	0.934
278	10	37.005	36.10	Swale 4A	0.905
279	10	37.660	36.10	Swale 4A	1.560
280	10	37.763	36.10	Swale 4A	1.663
281	10	37.576	36.10	Swale 4A	1.476
282	10	37.627	36.10	Swale 4A	1.527
283	10	37.683	36.10	Swale 4A	1.583
284	10	37.739	36.46	Swale 3B	1.279
285	10	37.777	36.46	Swale 3B	1.317
286	10	37.630	36.46	Swale 3B	1.170
287	11	38.161	36.46	Swale 3B	1.701
288	11	38.150	36.46	Swale 3B	1.690
289	11	38.218	36.40	Swale 3A	1.818
290	11	38.178	36.40	Swale 3A	1.778
291	11	38.139	36.40	Swale 3A	1.739
292	11	38.095	36.40	Swale 3A	1.695
293	11	38.054	36.40	Swale 3A	1.654
294	11	38.000	36.40	Swale 3A	1.600
295	11	38.456	36.40	Swale 3A	2.056
296	11	38.464	36.40	Swale 3A	2.064
297	11	38.168	36.40	Swale 3A	1.768
298	11	38.061	37.24	Swale 1	0.821
299	11	38.252	37.24	Swale 1	1.012
300	11	38.534	36.40	Swale 3A	2.134
301	11	38.826	36.40	Swale 3A	2.426
302	11	38.964	36.40	Swale 3A	2.564
303	11	39.081	36.40	Swale 3A	2.616
304	11	39.020	36.40	Swale 3A	2.669

Lot	Stage	Minimum Lot Level (mRL)	1% AEP Flood Level (mRL)	Flood Level Reference	Calculated Freeboard (to Lot Level)
305	11	38.948	36.40	Swale 3A	2.722
306	11	38.878	36.40	Swale 3A	2.774
307	11	38.806	36.40	Swale 3A	2.826
308	11	38.737	36.40	Swale 3A	2.770
309	11	38.678	36.40	Swale 3A	2.278
310	11	38.662	36.40	Swale 3A	2.262
311	11	38.365	36.40	Swale 3A	1.965
312	11	38.467	36.40	Swale 3A	2.067
313	11	38.557	36.40	Swale 3A	2.157
314	11	38.648	36.40	Swale 3A	2.248
315	11	38.744	36.40	Swale 3A	2.344
316	11	38.841	36.40	Swale 3A	2.441
317	11	38.936	36.40	Swale 3A	2.536
318	11	39.021	36.40	Swale 3A	2.621
319	11	39.042	36.40	Swale 3A	2.642
320	11	38.944	36.40	Swale 3A	2.544
321	11	38.845	36.40	Swale 3A	2.445
322	11	38.730	36.40	Swale 3A	2.330
323	11	38.645	36.40	Swale 3A	2.245
324	11	38.561	36.40	Swale 3A	2.161
325	11	38.463	36.40	Swale 3A	2.063
326	11	38.250	36.40	Swale 3A	1.850
327	12	38.169	36.46	Swale 3B	1.709
329	12	38.082	36.46	Swale 3B	1.622
330	12	38.191	36.46	Swale 3B	1.731
331	12	38.298	36.46	Swale 3B	1.838
332	12	38.406	36.46	Swale 3B	1.946
333	12	38.581	36.46	Swale 3B	2.121
334	12	38.712	36.46	Swale 3B	2.252
335	12	38.806	36.46	Swale 3B	2.346
336	12	39.003	36.46	Swale 3B	2.543
337	12	38.766	36.46	Swale 3B	2.306
338	12	38.814	36.46	Swale 3B	2.354
339	12	38.896	36.46	Swale 3B	2.436
340	12	38.977	36.46	Swale 3B	2.517
341	12	39.065	36.46	Swale 3B	2.605
342	12	38.987	36.46	Swale 3B	2.527
343	12	38.902	36.46	Swale 3B	2.442
344	12	38.835	36.46	Swale 3B	2.375
345	12	38.804	36.46	Swale 3B	2.344
346	12	38.803	36.46	Swale 3B	2.343