

Lots 800 and 801 Donegal Stud Residential Subdivision, Stage 17 Flat Bush

Geotechnical Completion Report

Hugh Green Limited



Reference: GENZAUCK16856AG

17 February 2022

DONEGAL STUD RESIDENTIAL SUBDIVISION, STAGE 17

Geotechnical Completion Report

Report reference number: GENZAUCK16856AG

17 February 2022

PREPARED FOR

Hugh Green Limited

C/- Harrison Grierson Consultants Limited
P.O. Box 5760
Wellesley Street
Auckland 1051

PREPARED BY

Tetra Tech Coffey

Level 4, 25 Teed Street, Newmarket
Auckland
1023 New Zealand
p: +64 9 379 9463

NZBN 9429033691923

QUALITY INFORMATION

Revision history

Revision	Description	Date	Author	Reviewer	Approver
0	Final	17/02/2022	RB	LB	RB

Distribution

Report Status	No. of copies	Format	Distributed to	Date
Final	1	PDF	Hugh Green Limited	17/02/2022

In April 2021, Coffey changed its legal name from Coffey Services (NZ) Ltd to Tetra Tech Coffey (NZ) Ltd. All other aspects of our business remain the same including our bank account number, company number, NZBN and GST number.

CONTENTS

1.	INTRODUCTION	1
2.	RELATED REPORTS	1
3.	EARTHWORKS OPERATIONS	2
3.1	general	2
3.2	recent earthworks plant.....	2
3.3	Recent construction program	2
4.	QUALITY ASSURANCE AND CONTROLS.....	3
4.1	Inspections	3
4.2	Quality Control Criteria.....	3
4.2.1	Compaction.....	3
4.3	Quality Assurance Testing	4
4.3.1	Compaction.....	4
5.	PROJECT EVALUATION	4
5.1	Bearing Capacity and Settlement of Building Foundations.....	4
5.2	Fill Induced Settlement.....	4
5.3	Expansive Soils.....	5
5.4	Lot Gradients.....	5
5.5	Retaining walls	6
5.5.1	General	6
5.5.2	Gabion Basket	6
5.5.3	In-Ground Palisade Retaining Wall	6
5.6	restricted building areas	6
5.7	Service Trenches	6
5.8	Vegetation Cover	6
5.9	Stormwater Controls	7
5.10	Topsoil.....	7
5.11	Contractor's Work	7
6.	OPINION ON SUITABILITY OF LAND FOR INTENDED PURPOSES	7
7.	LIMITATIONS.....	9

LIST OF TABLES

Table 1: Harrison Grierson Consultants Limited As-Built Plan Schedule (Appendix A).....	1
Table 2: Minimum Shear Strength and Maximum Air Voids Method	3
Table 3: Suitability Statement Summary	10

APPENDICES

APPENDIX A: HARRISON GRIERSON CONSULTANTS LIMITED AS-BUILT DRAWINGS	14
APPENDIX B: LABORATORY TEST RESULTS	19
APPENDIX C: BUILDING RESTRICTION ZONE DRAWINGS	34
APPENDIX D: PRODUCER STATEMENTS (PS4)	37

1. INTRODUCTION

This Geotechnical Completion Report (GCR) has been prepared for Hugh Green Limited as part of the documentation required to be submitted to the Auckland Council following residential subdivisional development. It contains our Suitability Statement, relevant test data and the Harrison Grierson Consultants Limited as-built plan set relating to Stage 17 (Lot 800 & Lot 801) of the Donegal Stud Residential Subdivision are as follows:

Table 1: Harrison Grierson Consultants Limited As-Built Plan Schedule (Appendix A)

Title	Reference No.	Date
Lot 800 Finished Contours As-Built Plan	147692-17--AB201	19 January 2022
Lot 800 Cut-Fill As-Built Plan	147692-17--AB221	19 January 2022
Lot 801 Finished Contours As-Built Plan	147692-17--AB201	1 December 2021
Lot 801 Cut-Fill As-Built Plan	147692-17--AB220	1 December 2021

This report covers the construction period from April 2021 to December 2021. It is intended to provide certification for:

- 35 residential lots numbered Lots 1 to 35, (Lots 1 to 19 within Lot 800, Lots 20 to 35 within Lot 801).
- 2 jointly owned accessways named JOAL 1 and 2 (both within Lot 801).

Stage 17 is located at Castlebane Drive (Lot 800) and Castlebane Drive (Lot 801), Flat Bush. As can be seen on the cut/fill as-built plans in Appendix A, earthworks within Lot 800 has mostly been confined to the installation of services. However, Lot 801 has been subject to minor cuts and fill, to a maximum depth of up to approximately 1 metre in the vicinity of the gabion basket retaining wall and less than 0.5m depth elsewhere.

2. RELATED REPORTS

Geotechnical reports prepared on nearby stages of the Donegal Stud subdivision by Tetra Tech Coffey are as follows:

- Geotechnical Investigation Report on Donegal Stud subdivision, GENZNEWP15126, dated 26 May 2011.
- Stage 1 Geotechnical Completion Report reference GENZAUCK15126, dated 11 June 2012.
- Stage 3 Geotechnical Completion Report reference GENZAUCK15126AC, dated 20 August 2013.
- Geotechnical Earthworks Plan Review of Donegal Glen Stage 6, reference GENZAUCK15126AF, dated 21 August 2013.
- Stage 4 Geotechnical Completion Report reference GENZAUCK15126AC, dated 11 November 2013.
- Stage 6 Geotechnical Completion Report, reference GENZAUCK15126AF, dated 16 June 2014.
- Stage 7 Geotechnical Investigation Report, reference GENZAUCK15126AG, dated 11 July 2014.
- Stage 7 Geotechnical Completion Report, reference GENZAUCK15126AF, dated 22 October 2015.
- Geotechnical Investigation Report of Residential Superlot 800 Castlebane Drive and Lot 801 Hughs Way, Flat Bush, GENZAUCK16856ag, dated 28 July 2020.
- Superlot 801 Palisade and Gabion Wall Design Memorandum, reference GENZAUCK16856AG, dated 5 October 2020.
- Sanitary Sewer Pipe Bridge Cross Geotechnical Report, reference GENZAUCK16856AG, dated 17 December 2020.

The conclusions and recommendations of these documents (where relevant) have been reviewed during the preparation of this report.

3. EARTHWORKS OPERATIONS

3.1 GENERAL

Earthworks have previously been conducted within Lots 800 and 801 during the construction of Stages 3, 4 and 6. The earthworks conducted during the construction of these previous stages have been certified accordingly. The relevant Geotechnical Completion Reports for these stages are listed above in Section 2 and contain complete records relating to earthworks conducted within Lots 800 and 801. The construction events conducted within Lots 800 and 801 during the construction of Stages 1, 3, 4, 6 and 7 will not be reiterated in this report.

3.2 RECENT EARTHWORKS PLANT

The main items of plant used by the Contractor, Dempsey Wood Limited were:

- 20 tonne Excavators
- Tractors
- Pad Foot Compactors
- 5 Tonne Excavators
- Graders
- Vibrating Drum Rollers
- Trucks

3.3 RECENT CONSTRUCTION PROGRAM

Earthworks for Stage 17 commenced in April 2021 with the installation of site services. By August 2021 the installation of services was well underway and at this time earthworks operations expanded to include the installation of the in-ground palisade wall along the southern boundary of Lot 28.

During the advancing of the in-ground palisades we noted alternating layers of very stiff to hard, orange and light grey silty clay and clayey silts up to 6 to 7m depth before transitioning into dense dark grey sands and then siltstone rock. Groundwater flows were also observed at the material interface. All palisades were drilled to a minimum of 9m depth below existing ground level at 1.75m centres before being cast into 0.6m diameter boreholes.

Following installation, the caps of the palisade were cast into a concrete foundation constructed for the gabion baskets to sit on. Bedding material was then spread over the concrete and the baskets were placed and constructed along the alignment of the palisades. Once constructed, a perforated drain coil and geotextile cloth were placed behind the baskets and then engineered fill was placed to design subgrade level.

Minor contouring works involving cut and the placement of fill was undertaken after the installation of the palisade wall and construction of the gabion basket retaining wall was completed. As these works were conducted the sanitary sewer line bridge crossing was constructed. After the construction of the sanitary sewer line bridge crossing was completed in early November 2021, we returned to site to confirm the ground conditions for the piles supporting the abutments for the sanitary sewer line bridge crossing.

During the advancing of our boreholes, we noted a surficial layer of very stiff silty clay fill up to 0.5m in thickness. The natural subsoils beneath the fill comprised stiff to hard, orange, grey clayey silt with trace fine sand and iron oxide staining.

Once completed, the site earthworks focussed on accessway construction followed by topsoil spreading.

4. QUALITY ASSURANCE AND CONTROLS

4.1 INSPECTIONS

During the earthworks engineering inspections were undertaken on a regular basis to assess compliance with NZS 4431 and our project specific recommendations and specifications. Project specific inspections were required on this stage of the development for:

- Topsoil stripping.
- Observation of bulk cut to fill operations.
- In-ground palisade retaining wall installation.
- Gabion basket retaining wall construction.
- Sanitary sewer pipe bridge crossing construction.

4.2 QUALITY CONTROL CRITERIA

4.2.1 Compaction

Due to the varying soil types being used as filling, the compaction control criteria of minimum allowable shear strength and maximum allowable air voids were mainly used for quality assurance purposes.

Specification details were as follows:

Minimum Shear Strength and Maximum Air Voids Method

Table 2: Minimum Shear Strength and Maximum Air Voids Method

(a)	<u>Air Voids Percentage</u>	
	(As defined in NZS 4402)	
	General Fill	
	Average value less than	10%
	Maximum single value	12%
(b)	<u>Undrained Shear Strength</u>	
	(Measured by Pilcon shear vane - calibrated using NZGS 2001 method)	
	General fill	
	Average value not less than	140 kPa
	Minimum single value	120 kPa

Note: The average value shall be determined over any ten consecutive tests

4.3 QUALITY ASSURANCE TESTING

4.3.1 Compaction

Regular in-situ density, strength and water content tests were carried out on all areas of the filling at (or in excess of) the frequency recommended by NZS 4431. Control tests carried out on the filling showed that on a few occasions the required compaction standards were not achieved. Results of these test failures were relayed to the site foreman and/or his staff, and to the best of our knowledge the affected areas of fill were re-worked as necessary. In each case, further testing was carried out until compliance with the above standards was achieved.

As stated above in Section 3.1, the compaction control test reports were presented in previously issued Geotechnical Completion Reports produced for Donegal Stud Residential Subdivision. Due to the relatively minor amounts of fill placed during the recently completed earthworks the fill placed was subject to geotechnical observation and shear vane testing which complied to the criteria stated above in Table 2.

5. PROJECT EVALUATION

5.1 BEARING CAPACITY AND SETTLEMENT OF BUILDING FOUNDATIONS

Based on the findings our boreholes we have assessed that at current subgrade levels, all cut, filled and undisturbed natural ground has a geotechnical ultimate bearing capacity of 300 kPa within the zone of influence of conventional shallow residential building foundation loads.

It should be noted that NZS 3604 only allows a maximum backfill depth of 600mm over the building platform of a dwelling unless an Engineering design solution is proposed, on account of the risk of induced consolidation of the subsoils caused by the weight of the backfill.

As required by Section B1/VM4 of the New Zealand Building Code Handbook, a strength reduction factor of 0.50 should be applied to all recommended geotechnical ultimate soil capacities in conjunction with their use in factored design load cases for static and earthquake overload conditions respectively.

5.2 FILL INDUCED SETTLEMENT

As a result of our pre-fill inspections and the elapsed time since the placement of the filling, we are of the opinion that induced differential settlements beneath or within the certified filling due to its imposed weight will be insignificant with respect to conventional residential building development. However, to restrict development induced settlements in the substrata to acceptable levels, floor and hardfill loadings should not exceed the limits specified in the following Suitability Statement. In addition, all buildings should be designed to tolerate differential settlements of up to 25mm vertical settlement over 6m horizontal distance (1 in 240), as required by the NZ Building Code Handbook, under the serviceability limit state load combination of NZS4203 or NZS1170.0.

5.3 EXPANSIVE SOILS

Laboratory expansive soil tests were carried out on samples collected from Stages 1, 3, 4, 6 and 7 and within the zone of likely influence of shallow building foundations, refer Appendix B.

These tests were carried out in accordance with NZS 4402, "Methods of Testing Soils for Civil Engineering Purposes" test section 2 and were primarily intended to assess the Expansive Classes of the site materials as defined in AS 2870, "Residential Slabs and Footings – Construction".

All test results are IANZ (International Accreditation New Zealand) endorsed and full details are included in Appendix B.

The AS 2870 expansive site Class for Stage 17 is assessed to be M (moderate) and is based on the laboratory results together with our visual-tactile assessment and local knowledge. Specific design alternatives for this expansive site Class are presented in the following Suitability Statement.

Further testing to confirm the site specific expansivity classification at each lot within the subdivision is recommended.

On some expansive clay sites if cast on-grade floor slab construction takes place during a long dry summer, exposed building platform soils may dry out and become highly desiccated.

Over time the presence of the floor slab will cause capillary rise of moisture to the underside of the damp proof course and potentially expansive dry ground may wet up and swell, causing floor slab uplift. The effect may be very slight in some cases and extreme in others, especially if free water can reach the central underside of the slab as could occur if any subsoil drainage is discharged beneath the slab or an under-slab water pipe leaks.

Floor slab uplift usually remains unnoticed in carpeted homes but can cause distress on tile floors and in garages where cracks are more apparent. It may also rack upper storeys if non-load bearing ground floor walls are lifted and act as struts. Further, it may cause drainage problems on flat roofed houses where gutter gradients may be reversed.

Thorough soaking (in the form of low flow sprinklers for an extended period - rather than flooding of the surface with a hose only once - is recommended to allow for infiltration into the soil) of the exposed building platform area a few days before hardfill placement can help to reduce this potential problem. Careful detailing of construction joints in brittle building elements can also be of benefit. Alternatively, removal and replacement of the desiccated surface layers could be carried out.

5.4 LOT GRADIENTS

The appended Harrison Grierson Consultants Limited Finished Contours Plan shows Lots 800 and 801 as having gradients steeper than 1 in 4. The extent of these areas has been determined by as-built site gradients. We are generally satisfied that these areas are not subject to the hazards described in Section 71(3) of the Building Act.

Details of resulting building and earthworks restrictions in the vicinity of these areas are presented in the Suitability Statement.

5.5 RETAINING WALLS

5.5.1 General

Some areas of the site have been stabilised by the construction of retaining walls in the locations shown on the Harrison Grierson Consultants Limited Lot 801 Finished Contours As-Built Plan. Copies of the compliance certification documents are given in Appendix D.

5.5.2 Gabion Basket

Gabion basket retaining walls were designed and inspected by Tetra Tech Coffey. They have been constructed along the southern boundary of Lot 28 and reach a maximum height of approximately 1 metre, as labelled on Lot 801 Finished Contours As-Built Plan, dated 1 December 2021 and presented in Appendix A.

5.5.3 In-Ground Palisade Retaining Wall

An in-ground palisade retaining wall was designed and inspected by Tetra Tech Coffey. The in-ground palisade retaining wall has been installed along the crest of very steep slopes adjacent to the southern boundary of Lot 28. The palisades reach a maximum depth of approximately 9.0 metres, as labelled on Lot 801 Finished Contours As-Built Plan, dated 1 December 2021 and presented in Appendix A.

5.6 RESTRICTED BUILDING AREAS

The appended Building Restriction Zone Plans, refer Appendix C, show areas that are considered prohibitive to development. This is due to inherent slope stability risk with steep slope gradients and/or from increased loads being placed on the in-ground palisade wall that may exceed the walls design capacity, ultimately leading to slope failure.

5.7 SERVICE TRENCHES

As is normal on all subdivisions, building developments involving foundations within a 45 degree zone of influence from pipe inverts will require engineering input.

5.8 VEGETATION COVER

Wherever practical on sloping land beyond building platform areas, any existing grass cover should be maintained and even supplemented with new plantings. Any vegetation beyond the immediate area of building platforms for temporary construction purposes should be replanted as soon as possible.

The contribution of appropriate vegetation cover to overall site stability and erosion control should not be underestimated.

5.9 STORMWATER CONTROLS

It is important on all sloping lots that due care is paid to the design and construction of appropriate stormwater disposal systems. These systems should serve to collect all runoff from roofs, decks and paved areas, together with discharges from retaining wall drains and other subsoil drains and should connect directly into the public stormwater drainage network.

Uncontrolled stormwater discharges onto the ground surface or into soakage pits can cause erosion, scour and/or instability on sloping land and should not be permitted under any circumstances where stability could be compromised.

5.10 TOPSOIL

Topsoil depths in likely building platform areas were checked by the drilling of a shallow borehole probe in the approximate centre of each lot. Our findings, which are indicative only and subject to variation at other locations, show that topsoil depths ranged between 150mm and 375mm.

5.11 CONTRACTOR'S WORK

We have relied on the Contractor's work practices and assume that the works have been carried out in accordance with:

- (i) The approved Contract drawings and design details.
- (ii) The approved Contract specifications.
- (iii) Authorised Variations to (i) and (ii) during the execution of the works.
- (iv) The conditions of Resource, Earthworks and Building Consents where applicable.
- (v) The relevant Tetra Tech Coffey reports, recommendations and site instructions.

And that all as-built information and other details provided to the Client and/or Tetra Tech Coffey are accurate and correct in all respects.

6. OPINION ON SUITABILITY OF LAND FOR INTENDED PURPOSES

I, Lee Buhagiar, of Tetra Tech Coffey (NZ) Limited, hereby confirm that:

- I am a Chartered Professional Engineer experienced in the field of geotechnical engineering as defined in section 1.2.3 of NZS 4404 and was retained by the Developer as the Geotechnical Engineer on Stage 17 of the Donegal Stud residential subdivision, Flat Bush.
- The extent of preliminary investigations carried out to date are described in the Coffey Geotechnical Investigation Report, reference GENZAUCK15126, dated 18 December 2014. The conclusions and recommendations of that document have been re-evaluated during the preparation of this report. Details of the results of all tests carried out are appended.
- In my professional opinion, not to be construed as a guarantee, I consider that:
 - a. The earth fills shown on the appended Harrison Grierson Consultants Limited Cut to Fill as-built plan have been placed in compliance with NZS 4431 and related documents.
 - b. A geotechnical ultimate bearing capacity of 300 kPa may be assumed for shallow foundation design on all residential lots. Where a geotechnical bearing capacity greater than 300 kPa is required, (i.e. outside the limits of NZS 3604, such as when piling is undertaken), further specific

site investigation and design of foundations should be carried out prior to building consent application.

- c. **'Building Setback Lines'** is shown on the appended Building Restriction Zone Plans. No building and / or earthworks is to take place beyond this line unless endorsed by a chartered professional Engineer experienced in geomechanics.
- d. **'Building Restriction Zones'** on the appended Building Restriction Zone Plans show areas of the development not considered suitable for future building construction and earthworks, unless piling of the leading-edge (gully facing) foundations is undertaken. The structural designer should attend to all details of pile spacing, diameter and load capacity and must also ensure that the design allows for any differential movement that may occur between the piled and unpiled portions of the dwelling.
- e. The completed earthworks give due regard to land slope and foundation stability considerations within the residential lots however, as shown on the appended HGCL Finished Contours as-built plan, areas within Lots 1, 3, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17 and Lot 18 have gradients steeper than 1V:4H or are adjacent to land having such gradients.

No building construction and no earthworks which increases the slope angle or surcharge loading should take place anywhere within the areas shown as steeper than 1 in 4 in the area of Lots 1, 3, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18 and Lot 28 unless endorsed by a Chartered Professional Engineer experienced in geomechanics, as such operations may, in certain circumstances, have detrimental effects on overall site stability. Depending on the building design proposals and location on site, this may require geotechnical investigations.

- f. The completed earthworks give due regard to land slope and foundation stability considerations within the residential lots and as shown on the appended HGCL Finished Contours as-built plan, areas within or are immediately adjacent to Stage 17 have gradients steeper than 1V:4H or are adjacent to land having such gradients.

No building construction and no earthworks which increases the slope angle or surcharge loading should take place anywhere within the areas shown as steeper than 1 in 4 on these lots, or elsewhere if similar gradients exist, unless endorsed by a Chartered Professional Engineer experienced in geomechanics, as such operations may, in certain circumstances, have detrimental effects on overall site stability. Depending on the building design proposals this may require geotechnical investigations. As a minimum, lateral loads from potential soil creep should be addressed in these areas if the landforms are to remain unmodified following building development.

- g. The backfilling and compaction of the stormwater and sanitary sewer trenches on this subdivision has where possible been carried out to appropriate standards having regard for the prevailing ground conditions and associated compaction induced pipe loadings.

Nevertheless, no building development should take place within the 45-degree zone of influence of drain inverts unless endorsed by specific site investigations, foundation designs and by construction inspections undertaken by a Chartered Professional Engineer experienced in geomechanics to ensure that lateral stability and differential settlement issues are addressed and that building loads are transferred beyond the influence of the pipe and the trench backfill.

- h. Although unlikely to be an issue, the function of the gabion basket retaining wall discharge drain and outlet structure placed near the southern boundary of Lot 27 must not be impaired by any future building development or landscaping works. In particular, any trenched services, bored or driven piles must be positioned to avoid damaging this drain. The presence of any such drain should be recorded on Council's Hazard Register.
- i. The assessed AS 2870:2011 expansive site Class for all residential lots in Stage 17 is M (moderate).
- j. Subject to the geotechnical recommendations and expansive soil assessment associated with 3(b), 3(c), 3(d) 3(e), 3(f), 3(g) and 3(h) above:

- (i) The cut, filled and original ground within residential lot boundaries is generally suitable for residential buildings constructed in accordance with NZS 3604 (that incorporates specific foundation and associated structural design on account of the expansive soils site Class) and related documents.

- (ii) On all residential lots in Stage 17 foundation design may be carried out in accordance with AS 2870:2011 (Class M) or alternatively, a specific foundation and structural design may be undertaken by a Chartered Professional Engineer who should allow for expansive soil effects in the design. The minimum recommended foundation depth below cleared ground level following topsoil removal and benching of building platform areas is 600mm for NZS3604 type strip and pad foundations.
- (iii) Any building foundations and/or excavations within a distance of 3 metres from the back of the gabion basket and palisade retaining wall will require specific endorsement by a geotechnical engineer familiar with the contents of this report, in order to ensure no additional surcharges are applied to the wall.

The as-built plans and the professional opinions contained within this report are furnished to the Auckland Council and Hugh Green Limited for their purposes alone on the express condition that they will not be relied upon by any other person. Prospective purchasers should still satisfy themselves as to any specific conditions pertaining to their particular land interest.

7. LIMITATIONS

The as-built plans and the professional opinion contained within this report are furnished to the Auckland Council and Hugh Green Limited, for their purposes alone on the express condition that they will not be relied upon by any other person. Prospective purchasers should still satisfy themselves as to any specific conditions pertaining to their particular land interest.

For and on behalf of Tetra Tech Coffey

Prepared By:



Ray Berry
Associate Engineering Geologist

Reviewed and authorised by:



Lee Buhagiar
BE(Hons) CPEng, CMEng.NZ IntPE (NZ)
Associate Geotechnical Engineer

Table 3: Suitability Statement Summary

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)	AS2870:2011 Class
1	Specific engineering endorsement required for any building development or earthworks within the area demarcated as having gradients steeper than 1 (v) in 4 (h). Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M
2	Specific engineering endorsement required for any building development or earthworks within the area demarcated as having gradients steeper than 1 (v) in 4 (h). Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M
3	Specific engineering endorsement required for any building development or earthworks within the area demarcated as having gradients steeper than 1 (v) in 4 (h). Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M
4	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M
5	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	375	300	M
6	Specific engineering endorsement required for any building development or earthworks within the area demarcated as having gradients steeper than 1 (v) in 4 (h). Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
7	Specific engineering endorsement required for any building development or earthworks within the area demarcated as having gradients steeper than 1 (v) in 4 (h). Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	M
8	Specific engineering endorsement required for any building development or earthworks within the	350	300	M

	area demarcated as having gradients steeper than 1 (v) in 4 (h). Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.			
9	Specific engineering endorsement required for any building development or earthworks within the area demarcated as having gradients steeper than 1 (v) in 4 (h). Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M
10	Specific engineering endorsement required for any building development or earthworks within the area demarcated as having gradients steeper than 1 (v) in 4 (h). Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M
11	Specific engineering endorsement required for any building development or earthworks within the area demarcated as having gradients steeper than 1 (v) in 4 (h). Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	M
12	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	M
13	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
14	Specific engineering endorsement required for any building development or earthworks within the area demarcated as having gradients steeper than 1 (v) in 4 (h). Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
15	Specific engineering endorsement required for any building development or earthworks within the area demarcated as having gradients steeper than 1 (v) in 4 (h). Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	M
16	Specific engineering endorsement required for any building development or earthworks within the	375	300	M

	area demarcated as having gradients steeper than 1 (v) in 4 (h). Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.			
17	Specific engineering endorsement required for any building development or earthworks within the area demarcated as having gradients steeper than 1 (v) in 4 (h). Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
18	Specific engineering endorsement required for any building development or earthworks within the area demarcated as having gradients steeper than 1 (v) in 4 (h). Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
19	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
20	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	M
21	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
22	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	M
23	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
24	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
25	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
26	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	M
27	Building Restriction Zone shown as hatched areas on Figure SP-02, Appendix C, due to presence of retaining wall drainage discharge line and outlet. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M

28	Building Restriction Zone shown as hatched areas on Figure SP-02, Appendix C due to presence of retaining wall and specific engineering endorsement required for any building development or earthworks within the area demarcated as having gradients steeper than 1 (v) in 4 (h). Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M
29	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M
30	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
31	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	M
32	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	150	300	M
33	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	350	300	M
34	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M
35	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	M

APPENDIX A: HARRISON GRIERSON CONSULTANTS LIMITED AS-BUILT DRAWINGS





ASSOCIATION OF CONSULTING
ENGINEERS NEW ZEALAND

ISO 9001
QUALITY
ASSURED

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF, AND MAY NOT BE REPRODUCED OR ALTERED, WITHOUT THE WRITTEN PERMISSION OF HARRISON GRIERSON CONSULTANTS LIMITED. NO LIABILITY SHALL BE ACCEPTED FOR UNAUTHORISED USE OF THIS DRAWING.

NOTES:

- ORIGIN OF LEVELS
S 66 SO 48643
RL 54.50m
- ORIGIN OF COORDINATES
S 66 SO 48643
5905356.71mN
1770941.22mE
- SURVEY INFORMATION PROVIDED BY DEMPSEY WOOD CIVIL LTD AND TO THE BEST OF OUR KNOWLEDGE IS ACCURATE.

LEGEND:

- EARTHWORKS BOUNDARY
- STAGE BOUNDARY
- CONTOUR MAJOR AT 0.2m INTERVALS
- CONTOUR MINOR AT 0.2m INTERVALS
- EXISTING CONTOURS

ENGINEERING APPROVAL
ENG-60370829



HUGH GREEN
LIMITED



AUCKLAND OFFICE
LEVEL 4, 96 ST GEORGES BAY ROAD
PARNELL AUCKLAND 1052
T +64 9 917 5000
W www.harrisongrierson.com

A	AS-BUILT	WJK	17.01.22
REF	REVISIONS	BY	DATE

PROJECT:

HUGH GREEN LIMITED
DONEGAL STAGE 17
CASTLEBANE DRIVE, FLAT BUSH

TITLE:

LOT 800
FINISHED CONTOURS
AS-BUILT PLAN

ORIGINATOR:	DATE:	SIGNED:	PLOT BY:
KKA	19.11.21		KKA
DRAWN:	DATE:	SIGNED:	PLOT DATE:
WJK	17.01.22		19.11.21
CHECKED:	DATE:	SIGNED:	SURVEY BY:
DAS	19.01.22		DEMPSEY WOOD
APPROVED:	DATE:	SIGNED:	SURVEY DATE:
DAS	19.01.22		11.2021

ISSUE STATUS:

AS-BUILT

PROJECT No:	SCALES:	A1
1050-147692-01	1:500-A1 1:1000-A3	
DRAWING No:		REV
147692-17-AB201		A





ASSOCIATION OF CONSULTING
ENGINEERS NEW ZEALAND

ISO 9001
QUALITY
ASSURED

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF, AND MAY NOT BE REPRODUCED OR ALTERED, WITHOUT THE WRITTEN PERMISSION OF HARRISON GRIERSON CONSULTANTS LIMITED. NO LIABILITY SHALL BE ACCEPTED FOR UNAUTHORISED USE OF THIS DRAWING.

NOTES:

- ORIGIN OF LEVELS
S 66 SO 48643
RL 54.50m
- ORIGIN OF COORDINATES
S 66 SO 48643
5905356.71mN
1770941.22mE
- EARTHWORKS VOLUMES :
AREA = 1,379m²
CUT VOLUME (UNADJUSTED) = 51m³
FILL VOLUME (UNADJUSTED) = 120m³
NET (UNADJUSTED) = 70m³ FILL
- SURVEY INFORMATION PROVIDED BY DEMPSEY WOOD CIVIL LTD AND TO THE BEST OF OUR KNOWLEDGE IS ACCURATE.

LEGEND:

 CUT CONTOURS SHOWN AT 0.2m INTERVALS

 FILL CONTOURS SHOWN AT 0.2m INTERVALS

 EARTHWORKS BOUNDARY

 STAGE BOUNDARY

ENGINEERING APPROVAL
ENG-60370829



HUGH GREEN
LIMITED



AUCKLAND OFFICE
LEVEL 4, 96 ST GEORGES BAY ROAD
PARNELL AUCKLAND 1052
T +64 9 917 5000
W www.harrisongrierson.com

A	AS-BUILT	WJK	17.01.22
REF	REVISIONS	BY	DATE

PROJECT:

HUGH GREEN LIMITED
DONEGAL STAGE 17
CASTLEBANE DRIVE, FLAT BUSH

TITLE:

LOT 800
EARTHWORKS CUT-FILL
AS-BUILT PLAN

ORIGINATOR: KKA	DATE: 19.11.21	SIGNED:	PLOT BY: KKA
DRAWN: WJK	DATE: 17.01.22	SIGNED:	PLOT DATE: 19.11.21
CHECKED: DAS	DATE: 19.01.22	SIGNED:	SURVEY BY: DEMPSEY WOOD
APPROVED: DAS	DATE: 19.01.22	SIGNED:	SURVEY DATE: 11.2021

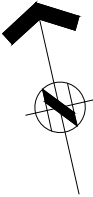
ISSUE STATUS:

AS-BUILT

PROJECT No: 1050-147692-01	SCALES: 1:500-A1 1:1000-A3	A1
DRAWING No:		REV

147692-17-AB221

A



ASSOCIATION OF CONSULTING
ENGINEERS NEW ZEALAND

ISO 9001
QUALITY
ASSURED

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF, AND MAY NOT BE REPRODUCED
OR ALTERED, WITHOUT THE WRITTEN PERMISSION OF HARRISON GRIERSON CONSULTANTS
LIMITED. NO LIABILITY SHALL BE ACCEPTED FOR UNAUTHORISED USE OF THIS DRAWING.

NOTES:

1. ORIGIN OF LEVELS
S 66 SO 48643
RL 54.50m

2. ORIGIN OF COORDINATES
S 66 SO 48643
5905356.71mN
1770941.22mE

3. SURVEY INFORMATION PROVIDED BY DEMPSEY
WOOD CIVIL LTD AND TO THE BEST OF OUR
KNOWLEDGE IS ACCURATE.

LEGEND:

EARTHWORKS BOUNDARY

STAGE BOUNDARY

55.0

CONTOUR MAJOR

55.5

CONTOUR MINOR AT 0.5m INTERVALS

EXISTING CONTOURS

RETAINING WALL SUBSOIL DRAIN

PALISADE-GABION RETAINING WALL

ENGINEERING APPROVAL
ENG-60363080

HUGH GREEN
LIMITED

AUCKLAND OFFICE
LEVEL 4, 96 ST GEORGES BAY ROAD
PARNELL AUCKLAND 1052
T +64 9 917 5000
W www.harrisongrierson.com

B	AS-BUILT (PALISADE WALL)	WXX	01.12.21
A	AS-BUILT	WXX	30.11.21
REF	REVISIONS	BY	DATE

PROJECT:

HUGH GREEN LIMITED
DONEGAL STAGE 17
CASTLEBANE DRIVE, FLAT BUSH

TITLE:

LOT 801
FINISHED CONTOURS
AS-BUILT PLAN

ORIGINATOR:	DATE:	SIGNED:	PLOT BY:
KKA	19.11.21		KKA
DRAWN:	DATE:	SIGNED:	PLOT DATE:
KKA	19.11.21		19.11.21
CHECKED:	DATE:	SIGNED:	SURVEY BY:
WXX	25.11.21		DEMPSEY WOOD
APPROVED:	DATE:	SIGNED:	SURVEY DATE:
DAS	26.11.21		11.2021

ISSUE STATUS:

AS-BUILT

PROJECT No:	SCALES:	A1
1050-147692-01	1:500-A1 1:1000-A3	
DRAWING No:		REV
147692-17-AB200		B





ASSOCIATION OF CONSULTING
ENGINEERS NEW ZEALAND

ISO 9001
QUALITY
ASSURED

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF, AND MAY NOT BE REPRODUCED OR ALTERED, WITHOUT THE WRITTEN PERMISSION OF HARRISON GRIERSON CONSULTANTS LIMITED. NO LIABILITY SHALL BE ACCEPTED FOR UNAUTHORISED USE OF THIS DRAWING.

NOTES:

- ORIGIN OF LEVELS
S 66 SO 48643
RL 54.50m
- ORIGIN OF COORDINATES
S 66 SO 48643
5905356.71mN
1770941.22mE
- EARTHWORKS VOLUMES :
AREA = 5,541.5m²
CUT VOLUME (UNADJUSTED) = 426m³
FILL VOLUME (UNADJUSTED) = 143m³
NET (UNADJUSTED) = -284m³
- SURVEY INFORMATION PROVIDED BY DEMPSEY WOOD CIVIL LTD AND TO THE BEST OF OUR KNOWLEDGE IS ACCURATE.

LEGEND:

- CUT CONTOURS SHOWN AT 0.5m INTERVALS
- FILL CONTOURS SHOWN AT 0.5m INTERVALS
- EARTHWORKS BOUNDARY
- STAGE BOUNDARY

ENGINEERING APPROVAL
ENG-60370829



HUGH GREEN
LIMITED



AUCKLAND OFFICE
LEVEL 4, 96 ST GEORGES BAY ROAD
PARNELL AUCKLAND 1052
T +64 9 917 5000
W www.harrisongrierson.com

B	AS-BUILT (PALISADE WALL)	WKK	01.12.21
A	AS-BUILT	WKK	30.11.21
REF	REVISIONS	BY	DATE

PROJECT:

HUGH GREEN LIMITED
DONEGAL STAGE 17
CASTLEBANE DRIVE, FLAT BUSH

TITLE:

LOT 801
EARTHWORKS CUT-FILL
AS-BUILT PLAN

ORIGINATOR:	DATE:	SIGNED:	PLOT BY:
KKA	19.11.21		KKA
DRAWN:	DATE:	SIGNED:	PLOT DATE:
KKA	19.11.21		19.11.21
CHECKED:	DATE:	SIGNED:	SURVEY BY:
WKK	25.11.21		DEMPSEY WOOD
APPROVED:	DATE:	SIGNED:	SURVEY DATE:
DAS	26.11.21		11.2021

ISSUE STATUS:

AS-BUILT

PROJECT No:	SCALES:	
1050-147692-01	1:500-A1 1:1000-A3	A1
DRAWING No:		REV
147692-17-AB220		B

APPENDIX B: LABORATORY TEST RESULTS

Report No: ASM:ETAM12W01256

Issue No: 1

Material Test Report

Client: Coffey Geotechnics NZ (Newmarket) Ltd
P.O. Box 8261, Symonds Street
Auckland NZ 1150

Principal: Attn : Ray Berry

Project No.: INFOETAM00585AA

Project Name: Donnegan Stud, 89 Flatbush School Road

Lot No.: NA **TRN:** NA

Tests indicated as not accredited are outside the scope of the laboratory's accreditation.



(Signature)

Approved Signatory: Ramir Casidsid
(Laboratory Supervisor)
IANZ Accredited Laboratory Number: 105
Date of Issue: 29/05/2012

Material Details

Source:	As below	Sampled From:	Borehole(sampled by client)
Description:	As below	Location:	Flatbush
Specification:	NA	Sample Method:	Submitted by client(not IANZ endorsed)

Sample Details

Sample ID:	ETAM12S-00426	ETAM12S-00427	ETAM12S-00428
Field Sample ID:	S1(HA01)	S2(HA02)	S3(HA03)
Date Sampled:	17/05/2012	17/05/2012	17/05/2012
Date Submitted:	17/05/2012	17/05/2012	17/05/2012
Sample Location:	S1	S2	S3
	HA 01	HA 02	HA 03
	(0.4 -0.7)m	(0.4 -0.7)m	(0.4 - 0.7)m
	Silty CLAY	Silty CLAY	Silty CLAY

Other Test Results

Description	Method	Results			Limits
Liquid Limit	NZS 4402:1986 Test 2.2	117	100	87	
Plastic Limit	NZS 4402:1986 Test 2.3	N/A	N/A	N/A	
Plasticity Index	NZS 4402:1986 Test 2.4	N/A	N/A	N/A	
Linear Shrinkage	NZS 4402:1986 Test 2.6	29	19	14	
Sample History	Natural state	Natural state	Natural state		
Test performed on	Passing 425µm sieve	Passing 425µm sieve	Passing 425µm sieve		
Moisture Content (%)	NZS 4402:1986 Test 2.1	92.4	41.8	35.3	

Comments

Attachments : Individual test reports

Tested by SS(17.05.12 - 18.05.12)

Material Test Report

Report No: ETAM12S-00426-1

Issue No: 1

Client: Coffey Geotechnics NZ (Newmarket) Ltd
P.O. Box 8261, Symonds Street
Auckland NZ 1150

Principal: Attn : Ray Berry

Project No.: INFOETAM00585AA

Project Name: Donnegan Stud, 89 Flatbush School Road

Lot No.: NA

TRN: NA

Tests indicated as not accredited are outside the scope of the laboratory's accreditation.



Approved Signatory: Ramir Casidsid
(Laboratory Supervisor)
IANZ Accredited Laboratory Number: 105
Date of Issue: 29/05/2012

Sample Details

Sample ID: ETAM12S-00426
Client Sample: H1(HA01)
Date Sampled: 17/05/2012
Source: As below
Material: As below
Specification: NA
Sampling Method: Submitted by client(not IANZ endorsed)
Project Location: Flatbush
Sample Location: S1
HA 01
(0.4 -0.7)m
Silty CLAY

Test Results

Description	Method	Result	Limits
Liquid Limit	NZS 4402:1986 Test 2.2	117	
Plastic Limit	NZS 4402:1986 Test 2.3	N/A	
Plasticity Index	NZS 4402:1986 Test 2.4	N/A	
Linear Shrinkage	NZS 4402:1986 Test 2.6	29	
Sample History		Natural state	
Test performed on		Passing 425µm sieve	
Date Tested		22/05/2012	
Moisture Content (%)	NZS 4402:1986 Test 2.1	92.4	
Date Tested		21/05/2012	

Comments

Work Order No : ETAM12W01256

Tested by SS

Material Test Report

Client: Coffey Geotechnics NZ (Newmarket) Ltd
P.O. Box 8261, Symonds Street
Auckland NZ 1150

Principal: Attn : Ray Berry

Project No.: INFOETAM00585AA

Project Name: Donnegan Stud, 89 Flatbush School Road

Lot No.: NA **TRN:** NA

Tests indicated as not accredited are outside the scope of the laboratory's accreditation.




Approved Signatory: Ramir Casidsid
(Laboratory Supervisor)
IANZ Accredited Laboratory Number:105
Date of Issue: 29/05/2012

Sample Details

Sample ID: ETAM12S-00427

Client Sample: S2(HA02)

Date Sampled: 17/05/2012

Source: As below

Material: As below

Specification: NA

Sampling Method: (not IANZ endorsed)Submitted by client

Project Location: Flatbush

Sample Location: S2
HA 02
(0.4 -0.7)m
Silty CLAY

Test Results

Description	Method	Result	Limits
Liquid Limit	NZS 4402:1986 Test 2.2	100	
Plastic Limit	NZS 4402:1986 Test 2.3	N/A	
Plasticity Index	NZS 4402:1986 Test 2.4	N/A	
Linear Shrinkage	NZS 4402:1986 Test 2.6	19	
Sample History		Natural state	
Test performed on		Passing 425µm sieve	
Date Tested		22/05/2012	
Moisture Content (%)	NZS 4402:1986 Test 2.1	41.8	
Date Tested		21/05/2012	

Comments

Work Order No : ETAM12W01256

Tested by SS

Material Test Report

Report No: ETAM12S-00428-1

Issue No: 1

Client: Coffey Geotechnics NZ (Newmarket) Ltd
P.O. Box 8261, Symonds Street
Auckland NZ 1150

Principal: Attn : Ray Berry

Project No.: INFOETAM00585AA

Project Name: Donnegal Stud, 89 Flatbush School Road

Lot No.: NA

TRN: NA

Tests indicated as not accredited are outside the scope of the laboratory's accreditation.



Approved Signatory: Ramir Casidsid
(Laboratory Supervisor)
IANZ Accredited Laboratory Number: 105
Date of Issue: 29/05/2012

Sample Details

Sample ID: ETAM12S-00428
Client Sample: S3(HA03)
Date Sampled: 17/05/2012
Source: As below
Material: As below
Specification: NA
Sampling Method: (not IANZ endorsed) Submitted by client
Project Location: Flatbush
Sample Location: S3
HA 03
(0.4 - 0.7)m
Silty CLAY

Test Results

Description	Method	Result	Limits
Liquid Limit	NZS 4402:1986 Test 2.2	87	
Plastic Limit	NZS 4402:1986 Test 2.3	N/A	
Plasticity Index	NZS 4402:1986 Test 2.4	N/A	
Linear Shrinkage	NZS 4402:1986 Test 2.6	14	
Sample History		Natural state	
Test performed on		Passing 425µm sieve	
Date Tested		22/05/2012	
Moisture Content (%)	NZS 4402:1986 Test 2.1	35.3	
Date Tested		17/05/2012	

Comments

Work Order No :ETAM12W01256

Tested by SS



Material Test Report

East Tamaki Laboratory

Coffey Geotechnics NZ Limited

144A Cryers Road, East Tamaki NZ 2013
PO Box 58877, Botany, Manukau NZ 2163

Phone: +64 9 272 3375
Fax: +64 9 272 3378

Report No: ASM:ETAM13W01243

Client: Coffey Geotechnics NZ Ltd (NEWP)
PO Box 8261
Symonds Street, Auckland NZ 1150

Principal: Ray Berry
Project No.: GENZETAM00231AA
Project Name: GENZAUCK15126AC - Donegal Stud Stg 2-4
Lot No.: N/A TRN: N/A

Date of Issue:

Material Details

Source	As Below (Sampled by Client)	Sampled From	Unknown
Description	As Below (Not IANZ Endorsed)	Location	Donegal Stud Stage 2-4
Specification	No Specification	Sampling Method	Unknown (Not IANZ Endorsed)

Sample Details

Sample ID	ETAM13S-00343	ETAM13S-00344	ETAM13S-00345
Field Sample ID	983CC	984CC	985CC
Date Sampled	8/05/2013	8/05/2013	13/05/2013
Date Submitted:	17/05/2013	17/05/2013	17/05/2013
Sample Location:	Lots 46/48/49/51	Lots 191/192	Lots 252/253
	0.4 - 0.7m	0.4 - 0.7m	0.4 - 0.7m
	Clayey SILT	Silty CLAY	Silty CLAY
	light grey brown	black grey brown	light yellow orange
			grey brown

Other Test Results

Description	Method	Results	Limits
Liquid Limit	NZS 4402:1986 Test 2.2	56	102
Plastic Limit	NZS 4402:1986 Test 2.3	Not Tested	Not Tested
Plasticity Index	NZS 4402:1986 Test 2.4	N/A	N/A
Linear Shrinkage	NZS 4402:1986 Test 2.6	11	20
Sample History	Natural state	Natural state	Natural state
Fraction Tested	Passing 425µm sieve	Passing 425µm sieve	Passing 425µm sieve
Moisture Content (%)	NZS 4402:1986 Test 2.1	22.9	55.5

Comments

PROVISIONAL RESULTS - Subject to Validation

Tested By: CP
Date Tested: 17/05/2013 - 20/05/2013



East Tamaki Laboratory

Coffey Geotechnics NZ Limited

144A Cryers Road, East Tamaki NZ 2013
PO Box 58877, Botany, Manukau NZ 2163

Phone: +64 9 272 3375
Fax: +64 9 272 3378

Report No: ASM:ETAM13W02113

Issue No: 1

Material Test Report

Client: Coffey Geotechnics NZ Ltd (NEWP)
PO Box 8261
Symonds Street, Auckland NZ 1150

Principal: Ray Berry

Project No.: GENZETAM00231AA

Project Name: GENZAUCK15126AC - Donegal Stud Stg 2-4

Lot No.: N/A TRN: N/A

Tests indicated as not accredited are outside the scope of the laboratory's accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}



James McKelvey

Approved Signatory: James McKelvey
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 11/10/2013

Material Details

Source	Unknown (Sampled by Client)	Sampled From	Unknown
Description	Subgrade	Location	Donegal Stud, 89 Flatbush School Road
Specification	No Specification	Sampling Method	Unknown (Not IANZ Endorsed)

Sample Details

Sample ID	ETAM13S-00905	ETAM13S-00906
Field Sample ID	571CD	572CD
Date Sampled	4/10/2013	4/10/2013
Date Submitted:	4/10/2013	4/10/2013
Sample Location:	HA04	HA09
	0.4 - 0.7m	0.4 - 0.7m
	Clayey SILT	Clayey SILT
	grey streaked	trace fine gravel
	yellow-brown	dark brown

Other Test Results

Description	Method	Results	Limits
Liquid Limit	NZS 4402:1986 Test 2.2	58	93
Plastic Limit	NZS 4402:1986 Test 2.3	Not Tested	Not Tested
Plasticity Index	NZS 4402:1986 Test 2.4	N/A	N/A
Linear Shrinkage	NZS 4402:1986 Test 2.6	14	23
Sample History	Natural state	Natural state	
Fraction Tested	Passing 425µm sieve	Passing 425µm sieve	
Moisture Content (%)	NZS 4402:1986 Test 2.1	26.3	39.3

Comments

Sampling Method and Material Description are not IANZ Endorsed as part of this Report.
Tested By: CP
Test Date: 7/10/2013 - 8/10/2013



East Tamaki Laboratory

Coffey Geotechnics NZ Limited

144A Cryers Road, East Tamaki NZ 2013
PO Box 58877, Botany, Manukau NZ 2163

Phone: +64 9 272 3375
Fax: +64 9 272 3378

Material Test Report

Report No: ETAM14S-00834-1

Issue No: 1

Client: Coffey Geotechnics NZ Ltd (NEWP)
PO Box 8261
Symonds Street, Auckland NZ 1150

Principal: Ray Berry

Project No.: GENZETAM00231AF

Project Name: GENZAUCK15126AF - DONEGAL STUD STAGE 6

Lot No.: N/A TRN: N/A

Tests indicated as not accredited are outside the scope of the laboratory's accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

IANZ
ACCREDITED LABORATORY

Approved Signatory: James McKelvey
(Senior Technician)
IANZ Accredited Laboratory Number: 105
Date of Issue: 1/04/2014

Sample Details

Sample ID: ETAM14S-00834

Client Sample: -

Date Sampled: 24/03/2014

Source: Unknown (Sampled by Client)

Material: Disturbed Soil

Specification: No Specification

Sampling Method: Unknown (Not IANZ Endorsed)

Project Location: Donegal Stud Stage 6

Sample Location: HA03
Lot 99/100
0.4 - 0.7m
Clayey SILT, light yellowish grey

Test Results

Description	Method	Result	Limits
Liquid Limit	NZS 4402:1986 Test 2.2	67	
Plastic Limit	NZS 4402:1986 Test 2.3	Not Tested	
Plasticity Index	NZS 4402:1986 Test 2.4	N/A	
Linear Shrinkage	NZS 4402:1986 Test 2.6	15	
Sample History		Natural state	
Fraction Tested		Passing 425µm sieve	
Date Tested		31/03/2014	
Moisture Content (%)	NZS 4402:1986 Test 2.1	32.5	
Date Tested		28/03/2014	

Comments

Sampling Method and Material Description are not IANZ Endorsed as part of this Report.

Work Order: ETAM14W01073

Tested By: CP



East Tamaki Laboratory

Coffey Geotechnics NZ Limited

144A Cryers Road, East Tamaki NZ 2013
PO Box 58877, Botany, Manukau NZ 2163

Phone: +64 9 272 3375
Fax: +64 9 272 3378

Material Test Report

Report No: ETAM14S-00835-1

Issue No: 1

Client: Coffey Geotechnics NZ Ltd (NEWP)
PO Box 8261
Symonds Street, Auckland NZ 1150

Principal: Ray Berry

Project No.: GENZETAM00231AF

Project Name: GENZAUCK15126AF - DONEGAL STUD STAGE 6

Lot No.: N/A TRN: N/A

Tests indicated as not accredited are outside the scope of the laboratory's accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

IANZ
ACCREDITED LABORATORY

James McKelvey

Approved Signatory: James McKelvey
(Senior Technician)
IANZ Accredited Laboratory Number:105
Date of Issue: 1/04/2014

Sample Details

Sample ID: ETAM14S-00835

Client Sample: -

Date Sampled: 27/03/2014

Source: Unknown (Sampled by Client)

Material: Disturbed Soil

Specification: No Specification

Sampling Method: Unknown (Not IANZ Endorsed)

Project Location: Donegal Stud Stage 6

Sample Location: HA07
Lot 177/204
0.4 - 0.7m
Silty CLAY, light orange brown

Test Results

Description	Method	Result	Limits
Liquid Limit	NZS 4402:1986 Test 2.2	80	
Plastic Limit	NZS 4402:1986 Test 2.3	Not Tested	
Plasticity Index	NZS 4402:1986 Test 2.4	N/A	
Linear Shrinkage	NZS 4402:1986 Test 2.6	19	
Sample History		Natural state	
Fraction Tested		Passing 425µm sieve	
Date Tested		31/03/2014	
Moisture Content (%)	NZS 4402:1986 Test 2.1	34.7	
Date Tested		28/03/2014	

Comments

Sampling Method and Material Description are not IANZ Endorsed as part of this Report.

Work Order: ETAM14W01073

Tested By: CP



East Tamaki Laboratory

Coffey Geotechnics NZ Limited

144A Cryers Road, East Tamaki NZ 2013
PO Box 58877, Botany, Manukau NZ 2163

Phone: +64 9 272 3375
Fax: +64 9 272 3378

Material Test Report

Report No: ETAM14S-00836-1

Issue No: 1

Client: Coffey Geotechnics NZ Ltd (NEWP)
PO Box 8261
Symonds Street, Auckland NZ 1150

Principal: Ray Berry

Project No.: GENZETAM00231AF

Project Name: GENZAUCK15126AF - DONEGAL STUD STAGE 6

Lot No.: N/A TRN: N/A

Tests indicated as not accredited are outside the scope of the laboratory's accreditation.
{This document may not be altered or reproduced except in full. This report relates only to the positions tested.}

IANZ
ACCREDITED LABORATORY

Approved Signatory: James McKelvey
(Senior Technician)
IANZ Accredited Laboratory Number: 105
Date of Issue: 1/04/2014

Sample Details

Sample ID: ETAM14S-00836

Client Sample: -

Date Sampled: 27/03/2014

Source: Unknown (Sampled by Client)

Material: Disturbed Soil

Specification: No Specification

Sampling Method: Unknown (Not IANZ Endorsed)

Project Location: Donegal Stud Stage 6

Sample Location: HA16
Lot 338/339
0.4 - 0.7m
Clayey SILT, greyish brown

Test Results

Description	Method	Result	Limits
Liquid Limit	NZS 4402:1986 Test 2.2	73	
Plastic Limit	NZS 4402:1986 Test 2.3	Not Tested	
Plasticity Index	NZS 4402:1986 Test 2.4	N/A	
Linear Shrinkage	NZS 4402:1986 Test 2.6	17	
Sample History		Natural state	
Fraction Tested		Passing 425µm sieve	
Date Tested		31/03/2014	
Moisture Content (%)	NZS 4402:1986 Test 2.1	26.2	
Date Tested		28/03/2014	

Comments

Sampling Method and Material Description are not IANZ Endorsed as part of this Report.

Work Order: ETAM14W01073

Tested By: CP

CLASSIFICATION TEST RESULTS

Test Methods: NZS 4402:1986 Tests 2.1, 2.2 & 2.6



Tests / comments
indicated * are
outside the scope of
the laboratory's
accreditation

James McKelvey Approved Signatory

JOB NO

GENZETAM00231AG

PROJECT

GENZAUCK15126AG - Stage 7 Donegal Stud
Flat Bush

CLIENT

Coffey Geotechnics NZ Ltd, Auckland

Borehole No

HA05

Sample No

ETAM15S-06374

Depth

0.4 - 0.7 m

Water Content

%

20.7

Samples prepared from 'As Received' Natural Water Content

Soil fraction used

< 0.425mm

Liquid Limit

51

Linear Shrinkage

%

14

*Sampling is not IANZ endorsed as part of this report.



East Tamaki Laboratory
Coffey Geotechnics NZ Limited
144A Cryers Road, East Tamaki, Auckland NZ 2013
PO Box 58877, Botany, Auckland NZ 2163
Phone: +64 9 272 3375, Fax: +64 9 272 3378
www.coffey.com

DATE

29.6.15

CHECKED

JM

CLASSIFICATION TEST RESULTS

Test Methods: NZS 4402:1986 Tests 2.1, 2.2 & 2.6



Tests / comments
indicated * are
outside the scope of
the laboratory's
accreditation

James McKelvey Approved Signatory

JOB NO

GENZETAM00231AG

PROJECT

GENZAUCK15126AG - Stage 7 Donegal Stud
Flat Bush

CLIENT

Coffey Geotechnics NZ Ltd, Auckland

Borehole No

HA17

Sample No

ETAM15S-06375

Depth

0.4 - 0.7 m

Water Content

%

30.5

Samples prepared from 'As Received' Natural Water Content

Soil fraction used

< 0.425mm

Liquid Limit

70

Linear Shrinkage

%

16

*Sampling is not IANZ endorsed as part of this report.



East Tamaki Laboratory
Coffey Geotechnics NZ Limited
144A Cryers Road, East Tamaki, Auckland NZ 2013
PO Box 58877, Botany, Auckland NZ 2163
Phone: +64 9 272 3375, Fax: +64 9 272 3378
www.coffey.com

DATE

29.6.15

CHECKED

JM

PARTICLE SIZE DISTRIBUTION

HYDROMETER NZS 4402:1986 TEST 2.8.4



Tests / comments
indicated * are
outside the scope of
the laboratory's
accreditation

J. McKelvey

J. McKelvey Approved Signatory

JOB NO

GENZETAM00231AG

PROJECT

GENZAUCK15126AG - Donegal Stud Stage 7

CLIENT

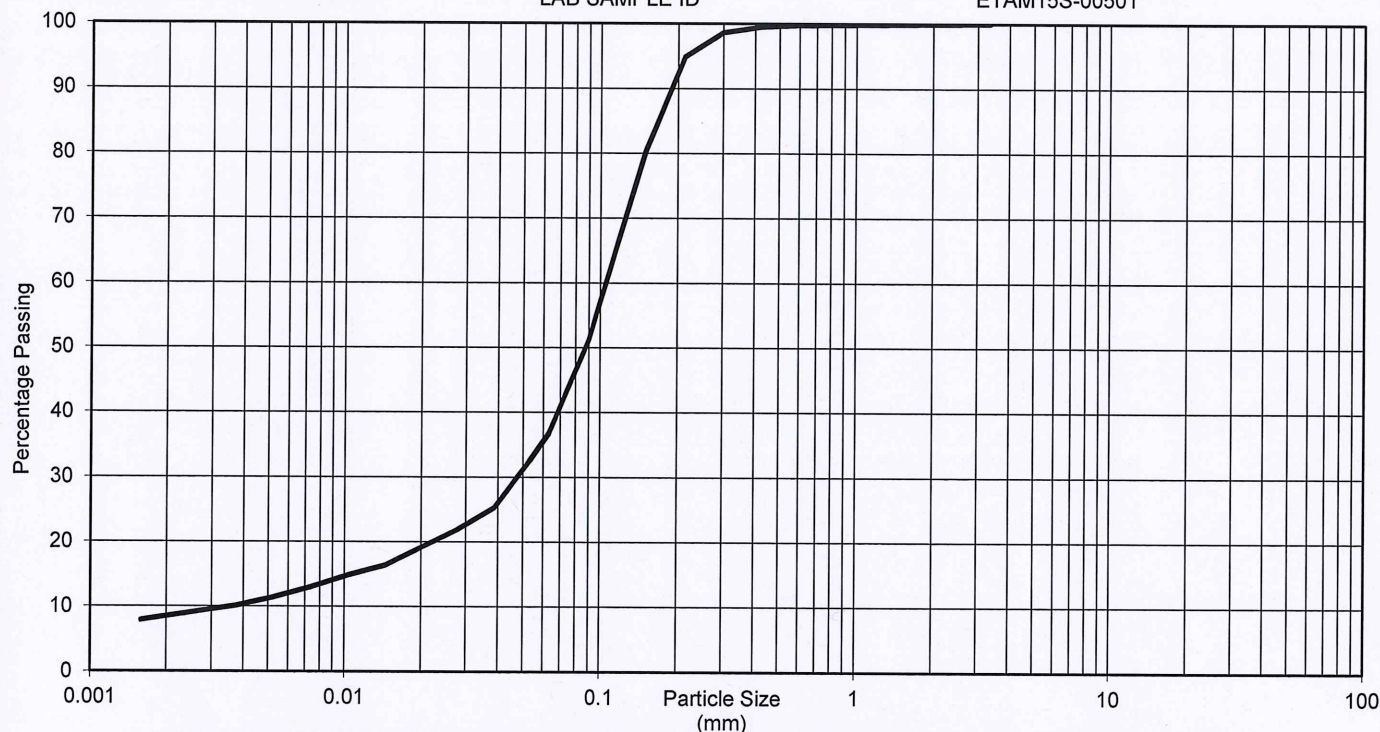
Coffey Geotechnics NZ Limited, Auckland

CLIENT REF

Pond 1, S1

LAB SAMPLE ID

ETAM15S-00501



	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE
CLAY									
	SILT			SAND			GRAVEL		

Tested from 'As received natural' state without pretreatment

pH 8.0

Solid Density 2.65 Assumed

'As received' natural water content 39.1 %

Percentage passing obtained by difference

SIZE	FRACTION	RANGE mm	%	*Size parameters	
				diam	% passing
COBBLES		> 60		d ₈₅	0.17
GRAVEL	Coarse	60 - 20		d ₆₀	0.10
	Medium	20 - 6		d ₅₀	0.087
	Fine	6 - 2		d ₃₀	0.048
SAND	Coarse	2 - 0.6		d ₁₅	0.011
	Medium	0.6 - 0.2	8	d ₁₀	0.0036
	Fine	0.2 - 0.06	57	d ₅	-
SILT	Coarse	0.06-0.02	16	*Uniformity Coefficient C _u	
	Medium	0.02-0.006	7		
	Fine	0.006-0.002	4	*Curvature Coefficient C _c	
CLAY		<0.002	8		
					29
					6.0



East Tamaki Laboratory
Coffey Geotechnics NZ Limited
144A Cryers Road, East Tamaki, Auckland NZ 2013
PO Box 58877, Botany, Auckland NZ 2163
Phone: +64 9 272 3375, Fax: +64 9 272 3378
www.coffey.com

DATE

29.01.15

CHECKED

JM

PERMEABILITY TEST RESULTS

CONSTANT HEAD (TRIAXIAL)

AS 1289.6.7.3 - 1999



Tests / comments
indicated * are
outside the scope of
the laboratory's
accreditation

James McKelvey
James McKelvey Approved Signatory

JOB NO GENZETAM00231AG
PROJECT GENZAUCK15126AG - Stage 7 Donegal Stud, Flat Bush
CLIENT Coffey Geotechnics NZ Ltd, Auckland
TRIAL PIT NO TP2
SAMPLE NO -
DEPTH 2.8 - 3.1m

LAB SAMPLE ID

ETAM14S-00678

SAMPLE DETAILS

Sample received disturbed sealed in a plastic bag and remoulded prior to testing

Sample prepared from 'As received' natural state

* Material *Fine sandy SILT, dark grey, moderately plastic, wet, soft*

Height	mm	62
Diameter	mm	62
Water Content	%	37.0
Bulk Density	t/m ³	1.92
Dry Density	t/m ³	1.41

SATURATION

Cell Pressure	kPa	360
Back Pressure	kPa	350
Pore Pressure Parameter B after saturation		0.96

CONSOLIDATION

Cell Pressure	kPa	380
Back Pressure	kPa	350
Effective Consolidation Pressure	kPa	30

PERMEABILITY

Cell Pressure	kPa	380	380	380
Back Pressure	kPa	355	360	365
Drain Pressure	kPa	345	340	335
Effective Confining Pressure	kPa	30	30	30
Effective Head Pressure	kPa	10	20	30
Effective Head of Water	m	1.0	2.0	3.1
*Hydraulic Gradient	kPa	16	33	49
PERMEABILITY VALUE k	m/s	1.3E-09	1.5E-09	1.6E-09



East Tamaki Laboratory
Coffey Geotechnics NZ Limited
144A Cryers Road, East Tamaki, Auckland NZ 2013
PO Box 58877, Botany, Auckland NZ 2163
Phone: +64 9 272 3375, Fax: +64 9 272 3378
www.coffey.com

DATE 17.06.14
CHECKED *JM*

PERMEABILITY TEST RESULTS

CONSTANT HEAD (TRIAxIAL)

AS 1289.6.7.3 - 1999



Tests / comments
indicated * are
outside the scope of
the laboratory's
accreditation

James McKelvey
James McKelvey Approved Signatory

JOB NO GENZETAM00231AG
PROJECT GENZAUCK15126AG - Stage 7 Donegal Stud, Flat Bush
CLIENT Coffey Geotechnics NZ Ltd, Auckland
LOCATION Pond 1
SAMPLE NO S1
DEPTH -

LAB SAMPLE ID

ETAM15S-00501

SAMPLE DETAILS

Sample received disturbed sealed in a plastic bag and remoulded prior to testing

Sample prepared from 'As received' natural state

* Material Silty fine SAND, dark grey, slightly plastic, wet, soft

Height	mm	61
Diameter	mm	62
Water Content	%	38.3
Bulk Density	t/m ³	1.77
Dry Density	t/m ³	1.28

SATURATION

Cell Pressure	kPa	260
Back Pressure	kPa	250
Pore Pressure Parameter B after saturation		0.96

CONSOLIDATION

Cell Pressure	kPa	340
Back Pressure	kPa	300
Effective Consolidation Pressure	kPa	40

PERMEABILITY

Cell Pressure	kPa	340
Back Pressure	kPa	315
Drain Pressure	kPa	285
Effective Confining Pressure	kPa	40
Effective Head Pressure	kPa	30
Effective Head of Water	m	3.1
*Hydraulic Gradient	kPa	50
PERMEABILITY VALUE k	m/s	3.6E-09



East Tamaki Laboratory
Coffey Geotechnics NZ Limited
144A Cryers Road, East Tamaki, Auckland NZ 2013
PO Box 58877, Botany, Auckland NZ 2163
Phone: +64 9 272 3375, Fax: +64 9 272 3378
www.coffey.com

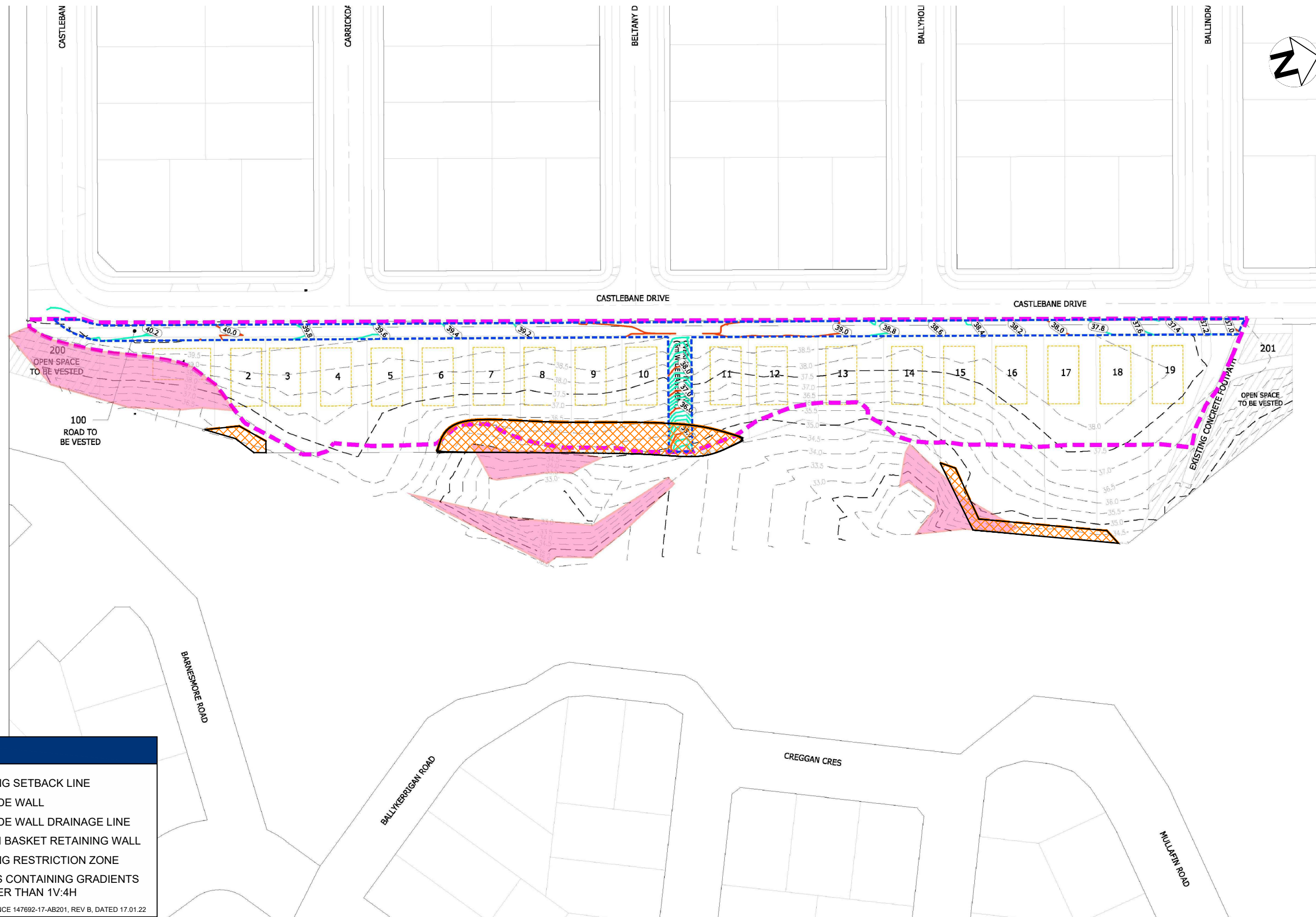
DATE 30.01.15

CHECKED

JM

APPENDIX C: BUILDING RESTRICTION ZONE DRAWINGS

PLOT DATE: 10/02/2022 1:02:37 PM DWG FILE: C:\USERS\RAY BERRY\DESKTOP\DONEGAL STUD\STAGE 17 GCR\CAD\16856AG LOT800 GCR SETBACK.DWG

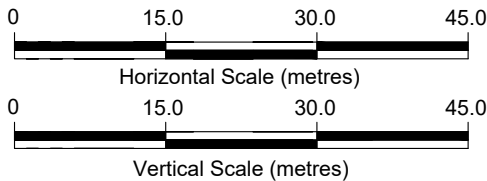


LEGEND

- BUILDING SETBACK LINE
- PALISADE WALL
- PALISADE WALL DRAINAGE LINE
- GABION BASKET RETAINING WALL
- BUILDING RESTRICTION ZONE
- SLOPES CONTAINING GRADIENTS GREATER THAN 1V:4H

IMAGE SOURCE: HGCL, REFERENCE 147692-17-AB201, REV B, DATED 17.01.22

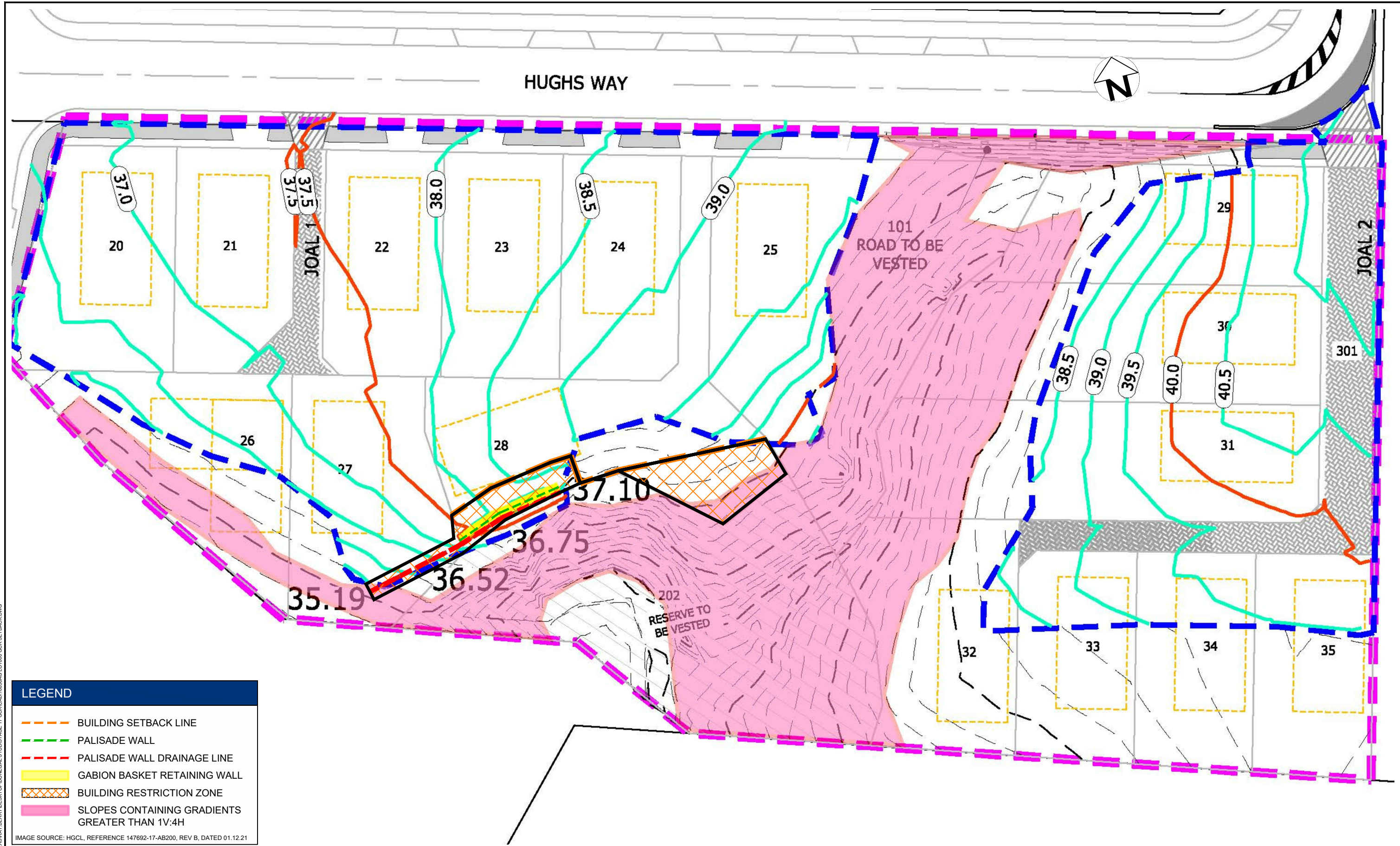
revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE	##	##	09/02/2022



drawn	RB
approved	CAA
date	08/02/2022
scale	1:750
original size	A3



client:	HUGH GREEN LIMITED		
project:	DONEGAL STUD STAGE 17 LOT 801		
title:	BUILDING RESTRICTION ZONE PLAN		
project no:	GENZAUCK16856AG	figure no:	SP-01
rev:	A		

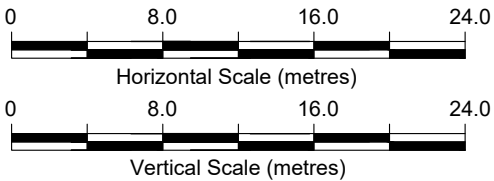


LEGEND

- BUILDING SETBACK LINE
- PALISADE WALL
- PALISADE WALL DRAINAGE LINE
- GABION BASKET RETAINING WALL
- BUILDING RESTRICTION ZONE
- SLOPES CONTAINING GRADIENTS GREATER THAN 1V:4H

IMAGE SOURCE: HGCL, REFERENCE 147692-17-AB200, REV B, DATED 01.12.21

revision	no.	description		drawn	approved	date
	A	ORIGINAL ISSUE		##	##	09/02/2022



drawn	RB
approved	CAA
date	08.02.2022
scale	1:400
original size	A3

TETRA TECH
COFFEY

client:		HUGH GREEN LIMITED	
project:		DONEGAL STUD STAGE 17 LOT 801	
title:		BUILDING RESTRICTION ZONE PLAN	
project no:	GENZAUCK16856AG	figure no:	SP-02
		rev:	A

PLOT DATE: 10/02/2022 1:08:16 PM DWG FILE: C:\USERS\WAYBERRY\DESKTOP\DONEGAL STUD STAGE 17 GCR\CAD\16856AG LOT801 GCR SETBACK DWG

APPENDIX D: PRODUCER STATEMENTS (PS4)

3 November 2021

Our ref: 773-GENZAUCK16856AG

Hugh Green Limited
C/- Harrison Grierson Consultants Limited
PO Box 5760
Wellesley Street
Auckland 1051

Attention: Mr W Kirk

Dear Will,

Foundation Observations for Palisade and Gabion Basket Retaining Wall Construction at Lot 801, Donegal Stud Stage 17 Residential Subdivision, 2 Drumbuoy Drive, Flat Bush (BCO10318868)

This is to confirm that we visited the above site on several occasions between 4 August 2021 and 2 November 2021 to observe the installation of the In-Ground Palisade and the subsequent Gabion Basket retaining walls along the southern boundary of Lot 28 at the above location.

During the advancing of the in-ground palisades we noted alternating layers of very stiff to hard, orange and light grey silty clay and clayey silts up to 6 to 7m depth before transitioning into dense dark grey sands and then siltstone rock. Groundwater flows were also observed at the material interface. All palisades were drilled to a minimum of 9m depth below existing ground level at 1.75m centres before being cast into 0.6m diameter boreholes.

Following installation, the caps of the palisade were cast into a concrete foundation constructed for the gabion baskets to sit on. Bedding material was then spread over the concrete and the baskets were placed and constructed along the alignment of the palisades. Once constructed, a perforated drain coil and geotextile cloth were placed behind the baskets and then engineered fill was placed to design subgrade level.

On the basis of our site observations and insitu testing, we are satisfied that the ground conditions for the palisade and gabion basket retaining wall at Lot 801, Donegal Stud Stage 17 were generally consistent with those encountered in our investigation boreholes and those that formed the basis of the recommendations contained in our Palisade and Gabion Wall Design Report prepared for the subdivision, reference GENZAUCK16856AG, dated 5 October 2020. We are also satisfied that the completed works meet Tetra Tech Coffey's geotechnical design assumptions.

For and on behalf of Tetra Tech Coffey

Prepared By:


Ray Berry
Associate Engineering Geologist

Reviewed and Authorised By:


Chris Armstrong
Geotechnics Team Leader Auckland
CMEng.NZ, CPEng

Attachments - Producer Statement – Construction Review (PS4)

Building Code Clause(s) B1 STRUCTURE**PRODUCER STATEMENT – PS4 – CONSTRUCTION REVIEW**ISSUED BY: C. ARMSTRONG of TETRA TECH COFFEY (NZ) LIMITED
(Construction Review Firm)TO: HUGH GREEN LIMITED
(Owner)TO BE SUPPLIED TO: AUCKLAND COUNCIL
(Building Consent Authority)IN RESPECT OF: FOR CONSTRUCTION OF PALISADE AND GABION BASKET RETAINING WALLS
(Description of Building Work)AT: DONEGAL STUD STAGE 17, 2 DRUMBUOY DRIVE, FLAT BUSH
(Address)
LOT 801 DP 492446 PTTETRA TECH COFFEY (NZ) LIMITED has been engaged by HUGH GREEN LIMITED
(Construction Review Firm) (Owner)To provide ☐CM1 ☐CM2 ☒CM3 ☐CM4 ☐CM5 (Engineering Categories) or ☐ observation as per agreement with owner/developer
EARTHWORKS AND FOUNDATION CONSTRUCTION FOR PALISADE AND GABION BASKET
or ☐other **RETAINING WALLS**
AS PER TETRA TECH COFFEY LETTER DATED 3 NOVEMBER 2021 (REFERENCE GENZAUCK16856AG)(Extent of Engagement)
in respect of clause(s) B1 STRUCTURE of the Building Code for the building work described indocuments relating to Building Consent No. BCO10318868 and those relating toBuilding Consent Amendment(s) Nos. N/A issued during the

course of the works. We have sighted these Building Consents and the conditions attached to them.

Authorised instructions / variation(s) No. N/A (copies attached)or by the attached Schedule ☐ have been issued during the course of works.On the basis of ☒this ☐these review(s) and information supplied by the contractor during the course of the works and **on behalf of the firm** undertaking this Construction Review, **I believe on reasonable grounds** that ☐All ☒Part only of the building works have been completed in accordance with the relevant requirements of the Building Consent and Building Consent Amendments identified above, with respect to Clause(s) B1 STRUCTURE of the Building Code. I also believe on reasonable grounds that the persons who have undertaken this construction review have the necessary competency to do so.I, C. ARMSTRONG am: ☒CPEng No. 102 5833
(Name of Construction Review Professional)☐Reg Arch No. _____I am a Member of: ☒EngNZ ☐NZIA and hold the following qualifications: MA, MSc

The Construction Review Firm issuing this statement hold a current policy of Professional Indemnity Insurance no less than \$200,000*.

The Construction Review Firm is a member of ACENZ : ☐**SIGNED BY:** C. ARMSTRONG **ON BEHALF OF** TETRA TECH COFFEY (NZ) LIMITEDDate: 3 NOVEMBER 2021 Signature: CA

Note: This statement shall only be relied upon by the Building Consent Authority names above. Liability under this statement accrues to the Design Firm only. The total maximum amount of damages payable arising from this statement and all other statements provided to the Building Consent Authority in relation to this building work, whether in contract, tort or otherwise (including negligence), is limited to the sum of \$200,000.*

3 November 2021

Our ref: 773-GENZAUCK16856AG

Hugh Green Limited
C/- Harrison Grierson Consultants Limited
PO Box 5760
Wellesley Street
Auckland 1051

Attention: Mr W Kirk

Dear Will,

Ground Condition Testing for Sanitary Sewer Pipe Bridge Crossing at Lot 801, Donegal Stud Stage 17 Residential Subdivision, 2 Drumbuoy Drive, Flat Bush (BCO10321594)

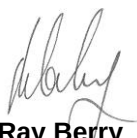
This is to confirm that we visited the above site on 3 November 2021 and drilled a 2m deep hand auger borehole immediately adjacent to each piled bridge abutment for the above sanitary sewer line bridge crossing.

During the advancing of our boreholes, we noted a surficial layer of very stiff silty clay fill up to 0.5m in thickness. The natural subsoils beneath the fill comprised stiff to hard, orange, grey clayey silt with trace fine sand and iron oxide staining.

On the basis of our insitu testing, we are satisfied that the ground conditions for Lot 801 Sanitary Sewer Bridge crossing abutments were generally consistent with those encountered in our investigation boreholes and those that formed the basis of the recommendations contained in our Sanitary Sewer Pipe Bridge Crossing Geotechnical Report prepared for the subdivision, reference GENZAUCK16856AG, dated 17 December 2020. We are also satisfied that the completed works meet the Harrison Grierson Consultants Limited geotechnical design assumptions.

For and on behalf of Tetra Tech Coffey

Prepared By:


Ray Berry
Associate Engineering Geologist

Reviewed and Authorised By:



Chris Armstrong
Geotechnics Team Leader Auckland
CMEng.NZ, CPEng

Attachments - Producer Statement – Construction Review (PS4)

Building Code Clause(s) B1 STRUCTURE**PRODUCER STATEMENT – PS4 – CONSTRUCTION REVIEW**ISSUED BY: C. ARMSTRONG of TETRA TECH COFFEY (NZ) LIMITED
(Construction Review Firm)TO: HUGH GREEN LIMITED
(Owner)TO BE SUPPLIED TO: AUCKLAND COUNCIL
(Building Consent Authority)IN RESPECT OF: FOR CONSTRUCTION OF SANITARY SEWER PIPE BRIDGE CROSSING
(Description of Building Work)AT: DONEGAL STUD STAGE 17, 2 DRUMBUOY DRIVE, FLAT BUSH
(Address)
LOT 801 DP 492446 PTTETRA TECH COFFEY (NZ) LIMITED has been engaged by HUGH GREEN LIMITED
(Construction Review Firm) (Owner)To provide ☒CM1 ☐CM2 ☐CM3 ☐CM4 ☐CM5 (Engineering Categories) or ☐ observation as per agreement with owner/developeror ☐ other FOUNDATION CONSTRUCTION FOR SANITARY SEWER PIPE BRIDGE CROSSING ABUTMENTS
AS PER TETRA TECH COFFEY LETTER DATED 3 NOVEMBER 2021 (REFERENCE GENZAUCK16856AG)(Extent of Engagement)
in respect of clause(s) B1 STRUCTURE of the Building Code for the building work described indocuments relating to Building Consent No. BCO10321594 and those relating toBuilding Consent Amendment(s) Nos. N/A issued during the

course of the works. We have sighted these Building Consents and the conditions attached to them.

Authorised instructions / variation(s) No. N/A (copies attached)or by the attached Schedule ☐ have been issued during the course of works.

On the basis of ☒this ☐these review(s) and information supplied by the contractor during the course of the works and **on behalf of the firm** undertaking this Construction Review, **I believe on reasonable grounds** that ☐All ☒Part only of the building works have been completed in accordance with the relevant requirements of the Building Consent and Building Consent Amendments identified above, with respect to Clause(s) B1 STRUCTURE of the Building Code. I also believe on reasonable grounds that the persons who have undertaken this construction review have the necessary competency to do so.

I, C. ARMSTRONG am: ☒CPEng No. 102 5833
(Name of Construction Review Professional)☐Reg Arch No. _____I am a Member of: ☒EngNZ ☐NZIA and hold the following qualifications: MA, MSc

The Construction Review Firm issuing this statement hold a current policy of Professional Indemnity Insurance no less than \$200,000*.

The Construction Review Firm is a member of ACENZ : ☐**SIGNED BY:** C. ARMSTRONG **ON BEHALF OF** TETRA TECH COFFEY (NZ) LIMITEDDate: 3 NOVEMBER 2021 Signature: 

Note: This statement shall only be relied upon by the Building Consent Authority names above. Liability under this statement accrues to the Design Firm only. The total maximum amount of damages payable arising from this statement and all other statements provided to the Building Consent Authority in relation to this building work, whether in contract, tort or otherwise (including negligence), is limited to the sum of \$200,000*.