

Hugh Green Limited

Geotechnical Completion Report on Donegal Stud Stage 9 at 80 Drumbuoy Drive, Flat Bush, Auckland

Project No GENZAUCK16856AA

4 August 2017



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Donegal Stud Stage 9 at 80 Drumbuoy Drive, Flat Bush, Auckland

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

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Our Reference: GENZAUCK16856AA

4 August 2017

Dear Matthew

RE: Geotechnical Completion Report for Residential Subdivision at Donegal Stud Stage 9, 80 Drumbuoy Drive, Flat Bush, Auckland

This report presents all supporting geotechnical data and our Suitability Statement in relation to land development works undertaken at the above location.

It has been prepared in accordance with instructions received from Harrison Grierson Consultants Limited and forms part of the documentation required by Auckland Council to achieve certification under Section 224(c) of the Resource Management Act.

If you have any queries or you require any further clarification on any aspects of this report, please do not hesitate to contact the undersigned.

For and on behalf of Coffey

Kah-Weng Ho Senior Principal

Quality information

Revision history

Revision	Description	Date	Author	Reviewer	Signatory
0	Final	04/08/2017	RB	KWH	KWH

Distribution

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1. Introduction and Description of Subdivision

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 9 of the Donegal Stud Residential Subdivision as follows:

Title	Reference No.	Date
Stage 9 Finished Level Contours As-Built Plan	139707-AB200 Rev A	31 July 2017
Stage 9 Earthworks Cut and Fill As-Built Plan	139707-AB210 Rev A	31 July 2017
Stage 9 Earthworks Minimum Floor Level As-Built Plan	139707-AB301 Rev A	26 July 2017
Stage 9 Earthworks Pavement As-Built Plan Sheet 1	139707-AB330 Rev A	26 July 2017
Stage 9 Earthworks Pavement As-Built Plan Sheet 2	139707-AB331 Rev A	26 July 2017
Stage 9 Earthworks Pavement As-Built Plan Sheet 3	139707-AB332 Rev A	26 July 2017
Stage 9 Earthworks Pavement As-Built Plan Sheet 4	139707-AB333 Rev A	26 July 2017
Stage 9 Earthworks Services As-Built Plan	139707-AB550 Rev A	26 July 2017

Table 1: Harrison Grierson Consultants Limited As-Built Plans

This report covers the construction period early-August 2016 to mid-November 2016. It is intended to be used for certification purposes for:

- 53 residential lots numbered 1 to 53; and
- 6 new roads named Road 1 to Road 6.

Stage 9 of the subdivision is located at 80 Drumbuoy Drive and as can be seen on the cut fill as-built plan, most of the lots have been partly or totally affected by filling, to a maximum depth of up to approximately 2.5 metres.

2. Related Reports

Geotechnical Reports prepared on the subject land by this consultancy are as a follows:

- Geotechnical Investigation Report on Donegal Stud subdivision, reference GENZNEWP15126; dated 26 May 2011;
- Geotechnical Completion Report on Donegal Stud Stage 4, reference GENZAUCK15126AC, dated 11 November 2013;
- Geotechnical Completion Report on Donegal Stud Stage 6, reference GENZAUCK15126AF, dated 16 June 2014;
- Geotechnical Investigation Report on 62 Thomas Road, Flat Bush, reference GENZNEWP16403, dated 18 December 2014;
- Geotechnical Completion Report on Donegal Stud Stage 7, reference GENZAUCK15126AG-AB, dated 22 October 2015; and

• Geotechnical Completion Report on Donegal Stud Stage 8, reference GENZAUCK16403AA, dated 6 December 2016.

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

3. Earthworks Operations

3.1. Plant

The main items of plant used by the Contractor, HEB Contractors Limited were:

- 2 x Motor scrapers;
- 1 x Bulldozer and scoop;
- 1 x Bulldozer;
- 1 x Moxy Dump Truck;
- 4 x Excavators;
- 3 x Tractor;
- 1 x Water Cart;
- 1 x loader;
- 1 x 825 Caterpillar Sheep Foot compactors;
- 1 x Grader; and
- 2 x Vibrating Drum Rollers.

3.2. Construction Programme

Earthworks operations for Stage 9 commenced in early November 2016 with the construction of a temporary silt pond just beyond the western boundary of the development area. Prior to the formation of the pond (and all subsequent temporary silt ponds) the existing topsoil was removed from its footprint. During this phase of works, areas containing soft alluvial deposits (namely the western side of the pond) were undercut by approximately 0.5m. The excavated materials were then replaced with compacted Soft Pit Run rock (SPR). Filling to form the pond bunds commenced shortly after the completion of the undercut. Enabling works then expanded to include the construction of the western temporary silt ponds located within Lot 36 and immediately south of Lot 36 (below Road 4).

By mid-November 2016 the enabling works were completed. At this time topsoil stripping commenced and during this period, numerous stockpiles of topsoil, building debris and clay were uplifted and removed off site. By late November the majority of the stockpiles and topsoil had been removed and earthworks then focussed on the construction of the fill batter adjacent to Road 2. A bench was formed at the toe of the slope prior to the placement of filling to form the batter. Once the bench was formed, filling sourced from the down cutting of lots was placed to an Engineer certified standard until design subgrade levels were achieved.

By early December 2016 the, construction of Road 2 fill batter was complete and topsoil was respread over the batter face. At this time the fill area located between Road 1 and Road 3 was placed and compacted. However, due to soft subgrade the required compaction criteria could not be achieved and the fill materials within Lots 6, 7, 15 and 16 were undercut by approximately 0.6m. The excavated materials were then reconditioned and replaced to an engineer certified standard.

By mid to late December 2016 bulk earthworks to form Lots 1 to 36 were mostly complete apart from the trimming of the internal accessways to subgrade level. At this time installation of site services commenced in the north western corner of the site and continued steadily toward Lot 26. Internal roads were then trimmed to design subgrade level as the installation of services progressed toward the east.

Earthworks recommenced in early January 2017 after the Christmas holiday period with the stripping of topsoil and removal of stockpiles comprised of unsuitable material. Topsoil stripping and stockpile removal was initially focussed on the northern slopes below and encompassing Road 4 road reserve. The removal of materials in this area revealed uncertified filling that was most likely placed to form a pre-existing farm track. This material was then uplifted and the toe of the slope benched ready to receive engineer certified filling.

Due to portions of Road 4 containing engineer certified fill embankments with typical slope gradients exceeding 1(V):2.5(H), biaxial geogrid was placed parallel to the face of the embankment, every 0.5m lift. Geogrid was included in the embankment design to provide additional strength and to prevent any adverse effects related to long term soil creep from occurring. Construction of the engineer fill batter commenced shortly thereafter.

By mid- January 2017 earthworks to construct a Soft-Pit-Run (SPR) engineer certified fill embankment near the intersection of Road 4 and Road 5. The initial works focussed on removing the soft saturated alluvial deposits from the toe of the proposed embankment to provide a stable foundation. An undercut up to 2m below the existing ground level was conducted to remove the weak materials and to expose weathered moderately dense sand commonly associated with the East Coast Bays transition to bedrock.

By late January 2017 the undercut had been backfilled with SPR compacted to an engineer certified standard. At this time two underfill drains comprised of a 160mm perforated drain coil surrounded by drainage metal and then fully wrapped in geotextile were installed in shallow trenches at the toe and into the natural subsoils forming the slope behind the SPR fill embankment.

SPR was the placed over the trenches and then construction of the engineer fill embankment commenced. Due to the slopes in this portion of the embankment exceeding 1(V):1.5(H) biaxial geogrid was placed parallel to the face of the embankment, every 0.5m lift. The geogrid was added to prevent shallow slumping from occurring in the face of the embankment.

Construction of the SPR batter continued until late January 2017 when the surface of the SPR was approximately 1m below design subgrade level. At this time the fill material was substituted with cohesive clay fill so that uniformity of Road 4 subgrade could be maintained. Once the final batter gradients had been formed the stabilised embankments were covered with topsoil.

From early February2017 the installation of site services and the formation of Roads 4, 5 and 6 became the focus of the site earthworks operations. By late April 2017 the bulk of the site services had been installed and the temporary stormwater pond to the north of Road 4 was prepared for backfilling so that a stormwater outlet structure and associated pipework could be constructed.

The preparation works involved the removal of any soft saturated alluvial deposits from within the pond as well as the removal of any soft and unduly weak deposits of alluvium from the toe of the pond batter adjacent to the stream. Due to the soft materials at the location of the toe an approximately 1m deep undercut was performed to provide a hard base for the filling to be compacted on. Once the undercut was backfilled with SPR, filling of the pond and construction of the batter commenced.

The installation of outlet structure and associated pipework commenced once the fill level reached the design subgrade level. Filling over the pipework and formation of the final batter commenced once the outlet structure and associated pipework were installed.

By early May 2017 the earthworks to construct the embankment over the stormwater outlet and pipework was complete. At this time work to construct a gabion basket retaining wall along the crest of Road 4 SPR embankment commenced.

The enabling works for the gabion basket wall involved the removal of the surface layer of clay fill placed over the SPR that was within the footprint of the proposed retaining wall. GAP40 hardfill was then placed over the SPR and compacted with a 500kg vibrating plate compactor to an engineer certified standard. Construction of the gabion basket retaining wall commenced once the base had been formed.

The remainder of Road 4 was formed once the construction gabion basket retaining was completed.

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;
- Mucking out of the gully areas prior to the placement of fill materials to ascertain that all mullock and soft inorganic subsoils had been removed to our satisfaction;
- Silt pond stripping and subsequent preparation prior to backfilling to ensure that all soft unsuitable material had been removed;
- Placement of geogrid in mechanically stabilised batters;
- Observed bulk cut to fill operations; and
- Observe the removal of unsuitable fill.

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)	Air Voids Percentage	
	(As defined in NZS 4402)	
	General Fill	
	Average value less than	10%
	Maximum single value	12%
	Maximum value	

(b)	Undrained Shear Strength	
	(Measured by Pilcon shear vane - calibrated using NZGS 2001 method)	
	General fill	
	Average value not less than	140 kPa
	Minimum single value	120 kPa

Table 3: Clegg Impact Value (CIV) Testing

(a)	Clegg Impact Value	
	(As defined in ATSM D 5874-2002)	
	4.5kg Clegg	
	Average value less than	25
	Minimum single value	20

4.3. Quality Assurance Testing

4.3.1. Compaction

Regular insitu 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. For completeness all testing undertaken during the 2016 to 2017 earthworks construction season are appended herein.

Testing conducted on the initial layers on SRP filling placed for the stability undercut at the toe of Embankment D, (as shown on the attached Geotechnical Building Zones and Engineered Embankments Plan) failed to meet the required standard. This was due to saturation of the SPR from high groundwater levels. However, as an added check, the materials was proof rolled with a 8 tonne compactor and deemed suitable

5. Project Evaluation

5.1. Restricted Building Area

The appended Geotechnical Building Zone and Engineer Certified Embankments plan (Figure 1, Appendix D) shows areas requiring specific foundation design (Specific Design Zone A) due to the allotments containing or being immediately adjacent to slope gradients greater than 1(V):4(H).

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

5.2. Bearing Capacity and Settlement of Building Foundations

Following the completion of earthworks operations, we returned to the site on 18 May 2017 and 26 May 2017 and drilled a series of hand auger boreholes at appropriate natural ground locations in order to evaluate likely foundation options for future building development. Topsoil depths on each lot were also assessed at this time.

At current subgrade levels all filled and undisturbed natural ground has a geotechnical ultimate bearing capacity of 300 kPa within the 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.

5.3. Expansive Soils

Two sets of Expansive soil tests were carried out on samples selected from within the zone of likely influence of shallow building foundations in Stage 9 development area.

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 appended.

The AS 2870 Site Class for this subdivision is M (moderate), and is based on the laboratory results together with our visual-tactile assessment and local knowledge. Specific design alternatives for this Site Class are presented in the Suitability Statement.

5.4. Lot Gradients

The stability of the critical areas of the site, including the steep batters in the vicinity of Road 4 and adjacent to Lots 26 and 36 to 37 have been assessed for potential circular failure under worst case scenario groundwater conditions. The soil parameters selected were based on assumed realistic conditions.

For Lots 26 and 36 to 37, the appended stability analyses demonstrates that factors of safety against instability in excess of 1.5 (under prevailing groundwater conditions) and in excess of 1.3 (under elevated groundwater conditions), refer Appendix D. We consider that these results are satisfactory and are therefore satisfied that these lots are <u>not</u> subject to the hazards described in section 71(3) of the Building Act.

However, slope gradients immediately adjacent to the south eastern boundaries of Lots 26 and 36 to 37 contain slope gradients steeper than 1V:4H (14 degrees). Slope gradients steeper than 1V:4H are susceptible to a natural process known as soil creep and as a result two geotechnical zones have been introduced, refer Figure 1, Appendix D.

For Road 4 SPR embankment, our stability analyses demonstrated that the required factor of safety against instability of 1.5 under prevailing groundwater conditions was achievable whereas, the required factor of 1.3 under of safety under elevated groundwater conditions could not be achieved. Therefore underfill drains were installed beneath and behind the SPR embankment to provide control over the groundwater regime in this area. As an added measure, biaxial geogrid was placed every 0.5m lift to provide additional strength to the embankment.

Stability assessments conducted on Road 2 and Road 4 engineer fill embankments (reported on in our geotechnical investigation report, dated 29 July 2016) returned stability assessments in excess of the required criteria under prevailing and elevated groundwater conditions. However, as an added measure, the engineer fill embankment for Road 4 was reinforced with biaxial geogrid placed parallel to the batter face every 0.5m lift.

Details of the resulting building and earthworks restrictions within the geotechnical zones and adjacent, are presented in the Suitability Statement.

5.5. Fill Induced Settlement

As a result of our pre-fill inspections and quality control testing, we are of the opinion that induced differential settlements beneath or within the certified filling due to its imposed weight should be insignificant with respect to conventional NZS 3604 residential building developments.

5.6. Vegetation Cover

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

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

5.7. 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.

5.8. 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. However, it is unlikely to be an issue for Stage 8 based on the as-built plans.

5.9. Road Subgrades

Dynamic Cone Penetrometer (DCP) testing was undertaken at regular intervals on the road subgrades and the results were subsequently forwarded to Harrison Grierson Consultants Limited for pavement design purposes. We understand that all of Road 4 was undercut by 300mm and the undercut was then replaced with GAP65 hardfill.

5.10. Underfill Drains

During the construction of Road 4 SPR fill embankment two perforated underfill drains were placed under the toe of the SPR embankment and extending back into the natural soils forming the existing slopes to tap groundwater seepages prior to filling, as required by NZS 4431.

These drains were intended to intercept localised groundwater seepages and springs during earthworks and to help provide general control over groundwater levels. They are buried beneath 0.5 to 2.5m depth of engineered filling placed during the construction season of 2016 to 2017. In the event of any foundation solutions being constructed in the 45 degree zone of influence of these drains, they must be endorsed by an Engineer to ensure they do not compromise the function of the drains.

5.11. Topsoil

Topsoil depths in likely building platform areas were checked by the drilling of a borehole in the approximate centre of each of the lots. Our findings, which are indicative only and subject to variation at other locations, show that likely topsoil depths are between 200 mm and 400 mm.

5.12. 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 Coffey Geotechnics reports, recommendations and site instructions,

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

6. Statement of Professional Opinion as to the Suitability of Land for Building Development

I, Kah-Weng Ho, of Coffey Geotechnics (NZ) Limited, Auckland, hereby confirm that:

- 1. 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 9 of the Donegal Stud residential subdivision, Flat Bush.
- The extent of preliminary investigations carried out to date are described in Geotechnical Investigation Report, reference GENZAUCK16856AA, dated 29 July 2016. The conclusions and recommendations of that document have been re-evaluated in the preparation of this report. Details of the results of all tests carried out are appended.
- 3. 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-Fill As-Built Plan have been placed in compliance with NZS 4431 and related documents.
 - b. The land encompassing Lot 26 and Lots 36 and 77 have been categorised into two Geotechnical Zones, namely Zone A and Zone B, as shown on the Geotechnical Building Zones and Engineered Embankments Plan in Appendix D. Specific comments on these zones are provided in (c) and (d) below.
 - c. Subject to the geotechnical limitations, restrictions, recommendations and expansive soil requirements set out below, the finished ground within the land classified as 'Zone A' on the appended Geotechnical Zonation Plan is considered suitable for the construction of conventional light industrial buildings, as described in sub-section (h) below.
 - d. 'Zone B' on the appended Geotechnical Zonation Plan is considered suitable for future building construction and earthworks provided that piling of the leading edge 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. A geotechnical ultimate bearing capacity of 300 kPa may be assumed for shallow foundation design on all 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.

f. 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.

- g. The assessed AS 2870:2011 expansive site Class for all lots is M (moderate).
- h. Subject to the geotechnical recommendations and expansive soil assessment associated with 3(b), 3(c) 3(d) and 3(e) 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 lots 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 <u>cleared</u> ground level following topsoil removal and benching of building platform areas is 600mm for <u>NZS3604</u> type strip and pad foundations.
- 4. Road subgrades have been formed having due regard for slope stability and settlement, although CBR values will likely vary between natural and filled ground as is to be expected.

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.

The appended table summarises the status of each residential lot covered by this Suitability Statement.

For and on behalf of Coffey

Prepared By:

Ray Berry Senior Engineering Geologist

Authorised By:

Kah-Weng Ho Senior Principal

Coffey GENZAUCK16856AA 4 August 2017

Table 4: Suitability Statement Summary

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)	AS2870:2011 Class
1	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	М
2	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	М
3	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	М
4	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	М
5	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	М
6	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	М
7	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	М
8	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	М
9	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	М
10	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	М
11	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	М
12	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	М
13	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	Μ
14	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	М
15	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	М
16	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	М
17	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	М
18	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	М
19	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	М
20	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	М
21	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	М
22	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	М
23	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	М

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)	AS2870:2011 Class
24	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	М
25	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	М
26	Specific site investigation, foundation design and construction inspections required in Building Zone B as shown on Geotechnical Building Zone & Engineered Embankments Plan (Figure 1, Appendix D) due to slope gradients greater than 1 in 4 and due to the potential for adverse effects to foundations from long term soil creep. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	Μ
27	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	М
28	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	М
29	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	М
30	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	М
31	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	М
32	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	М
33	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	М
34	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	М
35	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	М
36	Specific site investigation, foundation design and construction inspections required in Building Zone B as shown on Geotechnical Building Zone & Engineered Embankments Plan (Figure 1, Appendix D) due to slope gradients greater than 1 in 4 and due to the potential for adverse effects to foundations from long term soil creep. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	Μ
37	Specific site investigation, foundation design and construction inspections required in Building Zone B as shown on Geotechnical Building Zone & Engineered Embankments Plan (Figure 1, Appendix D) due to slope gradients greater than 1 in 4 and due to the potential for adverse effects to foundations from long term soil creep. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	Μ
38	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	250	300	М

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)	AS2870:2011 Class
39	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	М
40	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	М
41	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	М
42	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	400	300	М
43	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	400	300	М
44	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	400	300	М
45	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	400	300	М
46	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	200	300	М
47	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	М
48	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	350	300	М
49	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	350	300	М
50	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	М
51	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	М
52	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	М
53	AS 2870 foundation design or NZS 3604 with minimum footing depth 600mm.	300	300	М

Appendix A – Harrison Grierson Consultants Limited As-Built Plans



/	ASSOCIATION OF CONSULTING ENGINEERS NEW ZEALAND	ISC QU) 9001 ALITY
	THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF, AND MAY NOT OR ALTERED, WITHOUT THE WRITTEN PERMISSION OF HARRISON GRIERS	BE REPR	ODUCED
	IMITED. NO LIABILITY SHALL BE ACCEPTED FOR UNAUTHORISED USE O	F THIS DI	VAWING.
	1. ORIGIN OF LEVELS S 66 SO 48643 RL 54.50m		
	2. ORIGIN OF COORDINATES S 66 SO 48643 5905356.71mN 1770941.22mE		
	LEGEND:		
	(42.5) CONTOUR MAJOR		
/ 800 DP 492446	(43.0) CONTOUR MINOR		
// ,	TOP OF RETAINING WA	LL	
/	BOTTOM OF RETAINING	WALL	-
// /	TOP OF BANK		
	BOTTOM OF BANK		
	EXTENT OF EARTHWOR	KS	
/ 805 / DP 49244	6 100Ø NOVACOIL UNDEF	RFILL I	DRAIN
/	/		
	ENGINEERING APPROVAL ENG 51364	-	
	I CERTIFY THAT THESE ASBUILT PLANS ARE AN ACCURAT THE WORKS UNDERTAKEN AND THAT: • THE COORDINATES (X, Y) ARE IN TERMS OF NZTM OI (2000), AND ARE WITHIN ±50mm. • THE LEVELS (Z) ARE IN TERMS OF THE AUCKLAND 1: LINZ DATUM (DOSLI DATUM), AND ARE WITHIN ±10 UNIT DATUM (DOSLI DATUM), AND ARE WITHIN ±10 CHARTERED PROFESSIONAL ENGINEER Date:	E RECC	IRD OF
JAUMEAD ROP	AUCKLAND OFFICE DILWORTH HOUSE 71 GREA NEWWARKET AUCKLAND 10 T +64 9 917 5000 W www.harrisongrierson.co	r SOUTH 51 m	ROAD
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×	A AS-BUILT REF REVISIONS	WJP BY	28.07.17 DATE
	DONEGAL STUD 80 DRUMBUOY DRIVE FLAT BUSH		
	STAGE 9 FINISHED LEVEL CONTOU AS-BUILT PLAN	IR	
		BY:	
	EXC 07.2016	DATE:	ВКВ
	DXK 07.2017 CHECKED: DATE: SIGNED: CLIRVI	EY BY:	31.07.17
	WJP 28.07.17 JUNE STORED	Y DATE:	
	WJP 28.07.17 SIGNED: SURVE	DATE:	
		S-Bl	JILT
	PROJECT No: SCALES: 1:500-A1 1050-139707-01 1:1000-A3		A1
	DRAWING No:		REV
	139707-AB200		A



	ASSOCIATION OF CONSULTING ENGINEERS NEW ZEALAND	ISO 9001 QUALITY ASSURED
	THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF, AND MAY NOT OR ALTERED, WITHOUT THE WRITTEN PERMISSION OF HARRISON GRIERSC	BE REPRODUCED
	LIMITED. NO LIABILITY SHALL BE ACCEPTED FOR UNAUTHORISED USE OF NOTES:	THIS DRAWING.
	1. ORIGIN OF LEVELS S 66 SO 48643	
/ /	RL 54.50m	
	2. ORIGIN OF COORDINATES S 66 SO 48643	
	5905356./1mN 1770941.22mE	
	LEGEND:	
//	CUT AREA	
// 800 DP 492446	FILL AREA	
// /	CUT CONTOUR	
/	EXTENT OF EARTHWORK	<s< th=""></s<>
/ / 805		
/ DP 492446		
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	ENGINEERING APPROVAL	_
	ENG 51364	
	I CERTIFY THAT THESE ASBUILT PLANS ARE AN ACCURATI	E RECORD OF
	THE WORKS UNDERTAKEN AND THAT: • THE COORDINATES (X,Y) ARE IN TERMS OF NZTM ON (2000) AND ADE WITLIN L FORMER	NZGD
Y Í I	(2000), AND ARE WITHIN # SOUTH AUCKLAND 19 LINZ DATUM (DOSLI DATUM), AND ARE WITHIN ±10	946 (MSL) mm.
	JHAF PLE	
Y /	Signed: CHARTERED PROFESSIONAL ENGINEER	
	Date:	
	Name: WILLIAM JOHN FREDERICK PLATTS	
	Email: w.platts@harrisongrierson.com	
RUN		
AFE	DILWORTH HOUSE 71 GREAT	F SOUTH ROAD 51
DR	T +64 9 917 5000 W www.harrisongrierson.com	n
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T	A AS-BUILT REF REVISIONS	WJP 28.07.17 BY DATE
	PROJECT:	
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RATI		
B	STAGE 9	
is the	EARTHWORKS CUT & FILI	L
	AS-BUILT PLAN	
27	ORIGINATOR: DATE: SIGNED: PLOT E	3Y:
	CAL U/.2010 DRAWN: DATE: SIGNED: PLOT D	DATE:
	CHECKED: DATE: SIGNED: SURVE	31.07.17
	WJP 28.07.17 APPROVED: DATE: SIGNED: SURVE	Y DATE:
	WJP 28.07.17 ISSUE STATUS:	
		5-BUILT
	1050-139707-01 1:1000-A3	A1
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	NOTES	<u>5:</u>	SHALL BE ACCEPTED FOR UNAUTHO	RISED USE OF	- THIS D	RAWING.
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	RL S	54.50m				
	2. ORI S 6	IGIN OF 6 SO 48	COORDINATES			
	177	0941.2	2mE			
	3. ALL	. PAVEM	IENT COVERED IN 35mr	n HOTMI>	(MI)	(10)
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DP 492446			150mm AP 65 (SUBBA 150mm AP 40 (BASE)	SE)		
			CONCRETE JOAL 175mm (25 MPa) CON	CRETE		
			100mm AP 40 (BASE)			
			100mm (20 MPa) CON	CRETE		
			PRAM CROSSING			
/ 805 / DP 492446			GRASS BERM			
			GABION BASKET			
			MANARC RESIDENTIAL	VEHICLE	E CRO	SSING
λ / / / /		o	ROADSIDE BARRIER		_	
	E	NGI	NEERING APPR ENG 51364	ROVAL	-	
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$\langle \rangle \rangle = \langle \rangle \langle \rangle \rangle$		Eriterit (UFPlat			
	Signed.	CHARTE	RED PROFESSIONAL ENGINE	R		
	Date: Name:	WILLIAM	I JOHN FREDERICK PLATTS			
	Phone:	09-917-	5000			
DR	Email:	w.platts@	Dharrisongrierson.com			
UMF			AUCKLAND OF	FICE JSE 71 GREAT	r south	ROAD
B			T +64 9 917 50 W www.harris	AUCKLAND 10: 000 ongrierson.com	51 n	
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062	-	1.11	AS-BUILT PLA	N		
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1 045	DRAWN:	DATE: 05.2017	SIGNED:	PLOT D	DATE:	26.07 17
1	CHECKED: WJP	DATE: 26.07.17	SIGNED:	SURVE	Y BY:	20.07.17
1760	APPROVED: WJP	DATE: 26.07.17	SIGNED:	SURVE	Y DATE:	
360 1	ISSUE STATUS	5:		Δ.	S-BI	JILT
	PROJECT No:	07-01	SCALES: 1:500-A1	7.5		A1
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ISO 9001 QUALITY ASSURED ASSOCIATION OF CONSULTING ENGINEERS NEW ZEALAND ACENZ S DRAWING AND DESIGN REMAINS THE PROPERTY OF, AND MAY NOT BE REPRODUCED I TIERED, WITHOUT THE WRITTEN PERMISSION OF HARRISON GRIERSON CONSULTANTS TED. NO LIABILITY SHALL BE ACCEPTED FOR UNAUTHORISED USE OF THIS DRAWING. ENGINEERING APPROVAL ENG 51364 I CERTIFY THAT THESE ASBUILT PLANS ARE AN ACCURATE RECORD OF THE WORKS UNDERTAKEN AND THAT: THE WORKS UNDERLAREN AND THAT: THE COORDINATES (X/) ARE IN TERMS OF NZTM ON NZGD (2000), AND ARE WITHIN ±50mm. THE LEVELS (2) ARE IN TERMS OF THE AUCKLAND 1946 (MSL) LINZ DATUM (DOSLI DATUM), AND ARE WITHIN ±10mm. HHFP at Signed: . CHARTERED PROFESSIONAL ENGINEER Date: 26.07.2017 Name: WILLIAM JOHN FREDERICK PLATTS Phone: 09-917-5000 Email: w.platts@harrisongrierson.com AUCKLAND OFFICE DLWORTH HOUSE 71 GREAT SOUTH ROAD NEWMARKET AUCKLAND 1051 T +64 9 917 5000 www.harrisongrierson.co WJP 26.07.1 A AS-BUILT REF REVISIONS BY DATE OJECT DONEGAL STUD 80 DRUMBUOY DRIVE FLAT BUSH TITLE: STAGE 9 PAVEMENT AS-BUILT SECTIONS SHEET 1 OF 4 RIGINATOR: DATE: XC 07.2016 PLOT BY BKB DATE: 07.2017 PLOT DATE: RAWN: 26.07.17 DATE: 26.07.17 URVEY BY: ECKED DATE: 26.07.17 SURVEY DATE: WJP SUE STATUS AS-BUILT PRO1ECT N SCALES: AS SHOWN A1 1050-139707-01 RAWING No REV 139707-AB330 А







ASSOCIATION OF CONSULTING ENGINEERS NEW ZEALAND ISO 9001 QUALITY ASSURED S DRAWING AND DESIGN REMAINS THE PROPERTY OF, AND MAY NOT BE REPRODUCED I TIERED, WITHOUT THE WRITTEN PERMISSION OF HARRISON GRIERSON CONSULTANTS TED. NO LIABILITY SHALL BE ACCEPTED FOR UNAUTHORISED USE OF THIS DRAWING. ENGINEERING APPROVAL ENG 51364 I CERTIFY THAT THESE ASBUILT PLANS ARE AN ACCURATE RECORD OF THE WORKS UNDERTAKEN AND THAT: THE WORKS UNDERLAKEN AND THAT: THE COORDINATES (X/) ARE IN TERMS OF NZTM ON NZGD (2000), AND ARE WITHIN ±50mm. THE LEVELS (2) ARE IN TERMS OF THE AUCKLAND 1946 (MSL) LINZ DATUM (DOSLI DATUM), AND ARE WITHIN ±10mm. HHFP at Signed: . CHARTERED PROFESSIONAL ENGINEER Date: 26.07.2017 Name: WILLIAM JOHN FREDERICK PLATTS Phone: 09-917-5000 Email: w.platts@harrisongrierson.com AUCKLAND OFFICE DLWORTH HOUSE 71 GREAT SOUTH ROAD NEWMARKET AUCKLAND 1051 T +64 9 917 5000 www.harrisongrierson.co WJP 26.07.17 A AS-BUILT REF REVISIONS BY DATE OJECT DONEGAL STUD 80 DRUMBUOY DRIVE FLAT BUSH TITLE: STAGE 9 PAVEMENT AS-BUILT SECTIONS SHEET 2 OF 4 RIGINATOR: DATE: XC 07.2016 PLOT BY: BKB DATE: 07.2017 PLOT DATE: RAWN: 26.07.17 DATE: 26.07.17 SURVEY BY: ECKED D: DATE: 26.07.17 SURVEY DATE: WJP SUE STATUS AS-BUILT SCALES: AS SHOWN PRO1ECT N A1 1050-139707-01 RAWING No: REV 139707-AB331 А







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. ENGINEERING APPROVAL ENG 51364 I CERTIFY THAT THESE ASBUILT PLANS ARE AN ACCURATE RECORD OF THE WORKS UNDERTAKEN AND THAT: THE WORKS UNDERLAKEN AND THAT: THE COORDINATES (X/) ARE IN TERMS OF NZTM ON NZGD (2000), AND ARE WITHIN ±50mm. THE LEVELS (2) ARE IN TERMS OF THE AUCKLAND 1946 (MSL) LINZ DATUM (DOSLI DATUM), AND ARE WITHIN ±10mm. HHFP at Signed: . CHARTERED PROFESSIONAL ENGINEER Date: 26.07.2017 Name: WILLIAM JOHN FREDERICK PLATTS Phone: 09-917-5000 Email: w.platts@harrisongrierson.com AUCKLAND OFFICE DLWORTH HOUSE 71 GREAT SOUTH ROAD NEWMARKET AUCKLAND 1051 T +64 9 917 5000 www.harrisongrierson.co WJP 26.0 A AS-BUILT REF REVISIONS BY DATE OJECT DONEGAL STUD 80 DRUMBUOY DRIVE FLAT BUSH TITLE: STAGE 9 PAVEMENT AS-BUILT SECTIONS SHEET 3 OF 4 RIGINATOR: DATE: XC 07.2016 PLOT BY BKB DATE: 07.2017 PLOT DATE: RAWN: 26.07.17 DATE: 26.07.17 SURVEY BY: ECKED D: DATE: 26.07.17 SURVEY DATE: WJP SUE STATUS AS-BUILT PRO1ECT N SCALES: AS SHOWN A1 1050-139707-01 RAWING No REV 139707-AB332 А



ISO 9001 QUALITY ASSURED ASSOCIATION OF CONSULTING ENGINEERS NEW ZEALAND 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. ENGINEERING APPROVAL ENG 51364 LEVEL TERMS OF THE AUXIL TERMS OF THE AUXIL TERMS OF THE AUXIL THESE ASBUILT PLANS ARE AN ACCURATE RECORD OF THE WORKS UNDERTAKEN AND THAT:
 THE COORDINATES (X,Y) ARE IN TERMS OF NZTM ON NZGD (2000), AND ARE WITHIN ±50mm.
 THE LEVELS (Z) ARE IN TERMS OF THE AUCKLAND 1946 (MSL) LINZ DATUM (DOSLI DATUM), AND ARE WITHIN ±10mm. JUHF Plat Date: 26.07.2017 Name: WILLIAM JOHN FREDERICK PLATTS Phone: 09-917-5000 Email: w.platts@harrisongrierson.com AUCKLAND OFFICE DILWORTH HOUSE 71 GREAT SOUTH ROAD NEWMARKET AUCKLAND 1051 T +64 9 917 5000 W www.harrisongrierson.com
 WJP
 26.07.17

 BY
 DATE
 A AS-BUILT REF REVISIONS PROJECT: DONEGAL STUD 80 DRUMBUOY DRIVE FLAT BUSH TITLE: STAGE 9 PAVEMENT AS-BUILT SECTIONS SHEET 4 OF 4 ORIGINATOR: DATE: EXC 07.2016 PLOT BY: вкв DATE: 07.2017 DRAWN: PLOT DATE: 26.07.17 CHECKED: WJP DATE: 26.07.17 SURVEY BY: APPROVED: DATE: WJP 26.07.17 SURVEY DATE: SSUE STATUS: AS-BUILT PROJECT No: 1050-139707-01 SCALES: AS SHOWN A1 DRAWING No: REV 139707-AB333 А



	ASSOCIATION OF CONSULTING ENGINEERS NEW ZEALAND	ISO QU/ ASS	9001 ALITY SURED
	THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF, AND M OR ALTERED, WITHOUT THE WRITTEN PERMISSION OF HARRISON LIMITED. NO LIABILITY SHALL BE ACCEPTED FOR UNAUTHORISEI	GRIERSON CONSU	DUCED JLTANTS
	NOTES: 1. ORIGIN OF LEVELS S 66 S0 48643 RL 54.50m 2. ORIGIN OF COORDINATES S 66 S0 48643 S 905356.71mN 1770941.22mE	J USE OF THIS DA	AWING.
800 DP 492446	LEGEND: G NEW GAS PIPE NEW POWER NEW TELECOM W NEW POWER TH T NEW TELECOM W NEW STREETLI	JD PLINTH GHT	
	ENGINEERING APPRO ENG 51364 I CERTIFY THAT THESE ASBUILT PLANS ARE AN ACT THE WORKS UNDERTAKEN AND THAT: • THE COORDINATES (X,Y) ARE IN TERMS OF NZ	VAL CURATE RECO 2TM ON NZGD	RD OF
DR	THE LEVELS (2) ARE IN TERMS OF THE AUCKL LINZ DATUM (DOSLI DATUM), AND ARE WITHI UNIT DATUM (DOSLI DATUM), AND ARE WITHI CHARTERED PROFESSIONAL ENGINEER Date:	AND 1946 (MS N ±10mm.	SL)
IMFAD ROAD	AUCKLAND OFFICE DINORTH HOUSE NEWMARKET AUCK T +64 9 917 5000 W www.harrisongrie	1 GREAT SOUTH LAND 1051 erson.com	ROAD
\backslash			
\backslash	A AS-BUILT	WJP	19.07.17
	REFT REVISIONS PROJECT: DONEGAL STUD 80 DRUMBUOY DRI' FLAT BUSH	VE	DATE
	TITLE:		
	STAGE 9 SERVICES AS-BUIL	T	
Jz F			
Ukc (ORIGINATOR: DATE: SIGNED:	PLOT BY:	_
Tatz	DRAWN: DATE: SIGNED:	PLOT DATE:	BKB
	BB U/.2017 CHECKED: DATE: SIGNED:	SURVEY BY:	ນຮ.08.17
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ofer	PROJECT No: SCALES: 1:500-41	AS-BL	
	1050-139707-01 1:1000-A3		A1 REV
otz	139707-AB550		Α
			L

Appendix B – Classification Test Data



Material Test Report

 Client:
 Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150

 Principal:
 Ray Berry

 Project No.:
 773-ETAM00071AA

 Project Name:
 773-GENZAUCK16856AA - DONEGAL STUD STAGE 9 FLAT BUSH Lot No.:

 As Below
 TRN:

Sample Details

Sample ID: Client Sample: Date Sampled: Source: Material: Specification: Sampling Method: Project Location: Sample Location: ETAM17S-04253 -18/05/2017 Unknown (Sampled by Client) Disturbed Soil No Specification Unknown (Not IANZ Endorsed) Donegal Stud Stage 9, Flat Bush Lot 9 / Lot 14 0.40 - 0.80 m

Test Results

Description	Method	Result	Limits
Liquid Limit	NZS 4402:1986 Test 2.2	83	
Plastic Limit	NZS 4402:1986 Test 2.3	Not Tested	
Plasticity Index	NZS 4402:1986 Test 2.4	Not Tested	
Linear Shrinkage	NZS 4402:1986 Test 2.6	18	
Curling		No	
Cracking		No	
Sample History		Natural state	
Fraction Tested		Passing 425µm sieve	
Date Tested		24/05/2017	
Moisture Content (%)	NZS 4402:1986 Test 2.1	32.0	
Date Tested		23/05/2017	

Work Order: ETAM17W01874 Tested By: CP

East Tamaki Laboratory

Coffey Services (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: ETAM17S-04253-1

Issue No: 1

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.}



pes.

Approved Signatory: Cesar Pura (Senior Technician) IANZ Accredited Laboratory Number:105 Date of Issue: 26/05/2017



Material Test Report

 Client:
 Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150

 Principal:
 Ray Berry

 Project No.:
 773-ETAM00071AA

 Project Name:
 773-GENZAUCK16856AA - DONEGAL STUD STAGE 9 FLAT BUSH Lot No.:

 As Below
 TRN:

Sample Details

Sample ID: Client Sample: Date Sampled: Source: Material: Specification: Sampling Method: Project Location: Sample Location: ETAM17S-04254 -18/05/2017 Unknown (Sampled by Client) Disturbed Soil No Specification Unknown (Not IANZ Endorsed) Donegal Stud Stage 9, Flat Bush Lot 39 0.40 - 0.80 m

Test Results

Description	Method	Result	Limits
Liquid Limit	NZS 4402:1986 Test 2.2	99	
Plastic Limit	NZS 4402:1986 Test 2.3	Not Tested	
Plasticity Index	NZS 4402:1986 Test 2.4	Not Tested	
Linear Shrinkage	NZS 4402:1986 Test 2.6	20	
Curling		No	
Cracking		No	
Sample History		Natural state	
Fraction Tested		Passing 425µm sieve	
Date Tested		24/05/2017	
Moisture Content (%)	NZS 4402:1986 Test 2.1	31.7	
Date Tested		23/05/2017	

Work Order: ETAM17W01874 Tested By: CP

East Tamaki Laboratory

Coffey Services (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: ETAM17S-04254-1

Issue No: 1

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.}



pes.

Approved Signatory: Cesar Pura (Senior Technician) IANZ Accredited Laboratory Number:105 Date of Issue: 26/05/2017 Appendix C - Field Density Test Summary Sheets

envices NZ Ltd Auckland 2103 Auckland 2103 51+92723376		× fi	86 Tests	All Volat (%)	2.7	4,4	G.L	
Cottoy 5 East Tamald, ny, Manukau, t+64 9272031		Cesar Pur	ZS 4402:19	Soud Demany	2.70	2.70	2.70	
Cryers Road, x 58877, Bota		1	ance with N	Dry Density (tm ²)	1.40	1,41	124	
144A PO Be		Signatory: ssue date:	is (in accord	Deen Water Content (%)	31.9	30.8	41.9	
		Approved :	/ Calculation	Net Denaty (1.84	1.84	1.76	
			(1): Density	h kPa	159	£	154	
	0071AA	outside	986 Test 2	Strength is ble to periot	215+	163	145	
	-ETAMO	ndicated as redited are pe of the ory's accred	VZS 4402-1	field Shear	+ 215+	515+	1 215+	
	773- 1 of	Tests if not acc the sco y laborat	ance with h	-	215	215	19	
	CODE:		Content Testing (in accord	Comments	750mm below FL	750mm below FL	550mm below FL	
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			lance with	Northing	5905657	5905665	5905664	
) (in accord	Briting	770415	770399	770377	
	2		insometer Testing	Offset from E	•			
			Nuclear Do	Offset (m)				
			GS 2001):	Chainage			•	
		FLAT BUSH	r vane in accordance with NZ	dorsed as part of this report. Location	Refer to plan	Refer to plan	Refer to plan	
	150	UD STAGE 9	(using field Shea	Material Material	Sily CLAY	Silty CLAY	Sity CLAY	
) ickland 1	EGAL ST	r Strength	Layer	Ē	Ē	Ē	
	Auckland Street At	A - DONI	with: Shea	by Test	-	2	"	
	NZ Ltd (K16856A	ccordance	Tested	Ę.	¢.	R R	
\$	Coffey Services	Ray Beny Matt Illingworth 773-GENZAUC	With Test Methods in a	4.1.1.5(b)). Pleas Work Order No:	ETAM16W0390	ETAM16W0390	ETAM16W0390	interest or repreduced every
coff	Client	Attention: c.c: Project:	Location:	Date	22/11/2016	22/11/2016	22/11/2016	This report must be that the transmission of t



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ey Services N ski, Aucicand au, Aucitand au, Aucitand 3375 f +9272		y en	016 1988 Tests	ar voo	19	6.1	
Coff d, East Tame tany, Manuk t+64 9272		Cesar	1/12/20 NZS 4402	N Solid Dense	2.70	2.70	
A Cryets Roz lox 58877, Bc			dance with	Ory Dens (m)	1.46	1.36	
144 PO E		Signatory	ssue date ns (in accor	Oven Water Centers (%)	27.8	31.9	
		Approved	/ Calculatio	Net Density	1.86	1.79	
			0.1): Density	o KPa	204	17	
	0071AA	outside	1986 Test 2	Strength in	12	164	
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	773 1 of	Tests i not act the soc	tance with I	-	15	41	
		2	g (in accord	ments	nade	aber	
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			o with NZ	thing	Seec	SGE4	
			accordance	Nor Por	02 590	79 590	
			5	asti	10	7703	
			Testing		1	-	
			ensometer Testing	Offset from E	- 17	,	
			Nuclear Densometer Testing	Offset from E	17		
			2GS 2001):Nuclear Densometer Testing	Chainage Offset from E	17		
			nce with NZGS 2001);Nuclear Densometer Testing	Chainage Offset from E	17		
		HSN8.	in accordance with NZGS 2001):Nuclear Densometer Testing	Location Chainage Othert Officet from E	Road 2 17	Road2 1	
		SE 9 FLAT BUSH	Shaar vane in accordance with NZGS 2001);Nuclear Densometer Testing	I Location Chainerse Offset from E	AY Road 2 17	4Y Road2 1	
	150	UD STAGE 9 FLAT BUSH	(using field Shear vane in accordance with NZGS 2001).Nuclear Densometer Testing	Not intervent cristerated as participants National Location Chamage Officet from E	Sity CLAY Road 2 17	Siliy CLAY Road 2 1	
) uckland 1150	EGAL STUD STAGE 9 FLAT BUSH	r Strength (using field Shear vane in accordance with NZGS 2001);Nuclear Densometer Testing	Layer Material Location Change Office from E	Fill Sily CLAY Road 2 17	Fill SilyCLAY Road2 1	
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	s NZ Ltd (Auckland) 3)monds Street, Auckland 1150	K16856AA - DONEGAL STUD STAGE 9 FLAT BUSH	coordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001);Nuclear Densometer Testing	er inder trant zim vorur eminantis at of non-prover environment and service and se	1 AB 4 Fin SityCLAY Road2 17	1 AB 5 Fill Silty-CLAY Road2 1	
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fey 💝	Coffey Services NZ Ltd (Auckland) PO Box 8261. Symonds Street, Auckland 1150	Ray Berry Matt Illingworth 773-GENZAUCK16856AA - DONEGAL STUD STAGE 9 FLAT BUSH	Wiri Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001);Nuclear Densometer Testing	Writh Arrivation Treased inter that An involve international and the international and pair an analysis of the international and the international international and	S ETAM16W03911 AB 4 FIII SIIVCLAY Road2 17	s ETAM16W03911 AB S Fill SilyCLAY Road2 1	



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PO Box 58 877, Botany, Manukau 2163, New Zealand	Work Order No: ETAM16W03961	Tested by: FP				
(+64 9 272 3375 f+64 9 272 3378 www.coffey.com	Pade No: 2 of 2	Date tested: 24/11/2016				
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•	Services NZ Ltd (Auckland) : 8261, Symonds Street, Auckland 1150	rry ngworth :NZAUCK16856AA - DONEGAL STUD STAGE 9 FLAT BUSH	hode in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001).Nuclear Densometer Testing (in acco 3). Please note that Air Vold calculations are not IANZ endorsed as part of this report.	Order No: Tosted by Tost Layer Matorial Location Chainese Crimet Offices from Easting	6W04063 AB+JBG 8 FIII SIIIY CLAY General FII 1770214	6W04063 AB + JBG 9 FIII SIIIY CLAY General FIII 770210
ey 🍫	Coffey Services NZ Ltd (Auckland) PO Box 8261, Symonds Street, Auckland 1150	Ray Berry Matt Illingworth 773-GENZAUCK16856AA - DONEGAL STUD STAGE 9 FLAT BUSH Wir	Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001).Nuclear Densometer Testing (in acco 4.1.1.5(b)). Please note that Air Void calculations are not IANZ endorsed as part of this report.	Work Order No: Tested by No. Layer Material Location Chainese Crimet Officet from Easting	ETAM15W04063 AB+JBC 8 Fill StlyCLAY General Fill 1770214	ETAM15W04063 AB+JBG 9 Fill Silty CLAY General Fill 770210
offey 💝	: Coffey Services NZ Ltd (Auckland) is PO Box 8261, Symonds Street, Auckland 1150	Ion: Ray Berry Mattillingworth t: 773-GENZAUCK16856AA - DONEGAL STUD STAGE 9 FLAT BUSH n: Wir	Tost Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001).Nuclear Demometer Testing (in accordance with Sto). Please note that Air Void calculations are not IANZ endorsed as part of this report.	tee Work Order No: Tested by No. Layer Material Location Chainese Crimet Officet from Easting	2016 ETAM16W04083 AB+JBC 8 Fill SilyCLAY General Fill 1770214	72016 ETAM16W04063 AB+JBG 9 Fill Silty CLAY General Fill 770210

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Services NZ L1 Auckland 216 Auckland 216 75 f +9272337		ivey	86 Tests	Air Volds (%	4.4	
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ey 🔶	Coffey Servic PO Box 8261.	Ray Berry Matt Illingwort 773-GENZAU	VVIIT Test Methods in 4.1.1.5(b)). Plea	Work Order N	ETAM16W041	alterind or reportuoed evo to the positioon tented. story No.105
COH	Client: Address	Attention: c.c: Project:	Location: Test method:	Date	30/11/2016	This report must not be This report relates only IAVI, Accredited Labor UPLUTH Inwa dia delititi

IETRA TECH COMPANY	Proiect No: 773-ETAM00071AA
SITE PLAN	Work Order No: ETAM16W04106
ct: 773-GENZAUCK16856AA - DONEGAL STUD STAGE 9 FLAT BU	Hage No: 2 of 2
tion: Refer to plan	Tested by: FP and JBG Date tested: 30/11/2016

colfev.com	х	ests	Voids (%)	5.2	2.2	
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and 1150	AL STUD STAGE 9 FLAT BUSH	ength (using fleid Shear vane in accordance with NZGS 2001);Nuclear C atlons are not IANZ endorsed as part of this report.	Layer Material Location Chainage Offset (m)	ubgrade Silty CLAY Roadway Fill	Fill Silty CLAY General Fill	
skland) ∋et, Auckland 1150	DONEGAL STUD STAGE 9 FLAT BUSH	: Shear Strength (using field Shear vane in accordance with NZGS 2001);Nuclear D Void calculations are not IANZ endorsed as part of this report.	Test Material Location Chainage Offset (m)	11 Subgrade Silty CLAY Roadway Fill	12 Fill Sity CLAY General Fill	
2 Ltd (Auckland) ionds Street, Auckland 1150	8856AA - DONEGAL STUD STAGE 9 FLAT BUSH	dance with: Shear Strength (using field Shear vane in accordance with NZCS 2001);Nuclear E te that Alr'Vadd calculations are nat IANZ endorsed as part of this report.	Frated by Test Layer Material Location Cashing Officer	AB 11 Subgrade Sity CLAY Roadway Fill	AB 12 Fill Silty CLAY General Fill - </td <td></td>	
srvices NZ Ltd (Auckland) 1261, Symonds Street, Auckland 1150	y sworth IZAUCK16856AA - DONEGAL STUD STAGE 9 FLAT BUSH	da in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001).Nuclear D Please new that Air Vold colcutions are not JANZ endorsed as part of this report.	der No: Treated by No. Layer Material Location Channage Othert	204187 AB 11 Subgrade Sity CLAY Roadway Fill	W04187 AB 12 Fill Siliy CLAY General Fill - -	
Coffey Services NZ Ltd (Auckland) PO Box 8261, Symonds Street, Auckland 1150	Ray Berry Matt Illingworth 775-GENZAUCK16856AA - DONEGAL STUD STAGE 9 FLAT BUSH	VIII Test Nethods in accordance with: Shear Strength (using field Shear vane in accordance with NZCS 2001);Nuclear E Test 36(b); Dates once hart Art Void calculations are not IANZ endored as part of this report.	Vork Order No: Treated by Teat Layer Material Location Chainage Oriest (m)	ETAM16W04187 AB 11 Subgrade Slity CLAY Roadway Fill	ETAM16W04187 AB 12 FII Sily CLAY Ceneral FII	



ckland 2103 +92723378 v coffey.com		6	Tests	ur Volds (%)	4.8	1 5
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mey <	Coffey Se PO Box 8	n: Ray Ber Matt Illin 773-GEN	Wiri Test Me	4.1.1.5	DAA	116 ETA

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Coffey Services NZ Ltd 144A Cryers Road, East Tamaki, Auckland 2103, New Zealand PO Box 58 877, Botany, Manukau 2163, New Zealand t+64 9 272 3375 f+64 9 272 3378 www.coffey.com	Project No:773-ETAM00071AAWork Order No:ETAM16W04187Page No:2 of 2	BUSH Tested by: FP and JBG Date tested: 2/12/2016	
Coffey 3	SITE PLAN NOT TO SCALE	 ject: 773-GENZAUCK16856AA - DONEGAL STUD STAGE 9 FLAT I cation: Refer to plan 	

ites N2. Let / Auditandi ties N2. Let / Aud	Cottey Servers NZ Ltd 144A Cryers Road: East Tomaie, Jurdidand 2103 PO Bex 58877, Bdamy, Manufau, Auckland 2103 1 - Ga 02720376 1 + 202720370	ices NZ Ltd (Auckland) PROJECT CODE: 773-ETAM00071AA S1, Symonds Street, Auckland 1150 Page: 1 of 2	orth AUCK16556AA - DONEGAL STUD STAGE 9 FLAT BUSH AUCK16556AA - DONEGAL STUD STAGE 9 FLAT BUSH ACCREDITED LABORATORY Isboratory's accreditation Approved Signatory: Cesar Pura	ACCREDITED LABORATORY laboratory's accreditation Approved Signatory: Cesar Pura Issue date: 12/12/2015	in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001):Nuclear Densometer Testing (in accordance with NZS 4407/2015 Test 4.2): Water Content Testing (in accordance with NZS 4402/1986 Test 2.1): Density Calculations (in accordance with SS 4407/2015 Test 4.2): Water Content Testing (in accordance with NZS 4402/1986 Test 2.1): Density Calculations (in accordance with SS 4407/2015 Test 4.2): Water Content Testing (in accordance with NZS 4407/2015 Test 4.2): Please note that Air Void calculations are not IANZ endorsed as part of this report.	r No: Tested by No. Tested by No. Location (m)	04183 JBG 15 BTW Lot 1-16 1770200 5905689 150 - 150 UTP 229+ UTP UTP 1.77 33.6 1.32 2.7 5.7	04183 JBG 15 BTW Let1-16 1770217 S905698 150 229+ UTP 229+ 177 1.84 29.9 1.42 2.7 5.1
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144A Cryers Road, East Tamaki, Auckland 2103, New Zealand PO Box 58 877, Botany, Manukau 2163, New Zealand t+64 9 272 3375 f+64 9 272 3378 www.coffey.com	Project No:773-ETAM00071AAWork Order No:ETAM16W04183Page No:2 of 2	JSH Tested by: JBG Date tested: 5/12/2016	
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ryers Road, E 58977, Botam				. 4	Catculation	Ory Density (Um ³)	1.40	1.47		
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	VZ Ltd (Au monds St		16856AA		ordance wil is 4.1.1.5(b)	Tested by	JBG	JBG		
	services h 8261, Syi	ry gworth	NZAUCK	Ę	10ds in acc	order No:	SW04214	SW04214	64 66 66 64 14 14 14 14 14 14 14 14 14 14 14 14 14	
S.	Coffey S PO Box	Ray Ber Matt Illin	773-GE	Flat Bus	Test Meth NZS 4402	Work C	ETAM1	ETAM1	tend of reproduc	
Ö ÍÍ	nt ess	ntion:	ect	ation:	method:	Date	112/2016	112/2016	tis editoria entremente servicio de la construcción	
O ŧ	Clie	Atte	Pro 0	Loc	Test		7	7	n ne ne 1 The ne 2 Zada 1 The	

144A Cryers Road, East Tamaki, Auckland 2103, New Zealand PO Box 58 877, Botany, Manukau 2163, New Zealand t+64 9 272 3375 f+64 9 272 3376 www.coffey.com	Project No:773-ETAM00071AAWork Order No:ETAM16W04214Page No:2 of 2	SH Tested by: JBG Date tested: 7/12/2016	
COTES STERA TECH COMPANY	SITE PLAN NOT TO SCALE	Project: 773-GENZAUCK16856AA - DONEGAL STUD STAGE 9 FLAT BU Location: Refer to plan	

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dena 21 deana 21 deana 21 - s27263		Y		Inco with	r Voids (8.4	
offey Sen amaki, Au ukau, Au 2723375 f		9,	r Pura	accordi	A Dia Can	5	
od, East Tr bany, Mar t +64 0		K	Cesa 13/12	ations (in	2005		
Cryers Ro: x 58377, Bo				ty Calcult	Dry Densi (Um ³)	1.80	
144A PO Be			inatory: le dater	(1): Dens	n Water	13.8	
			oved Sig	986 Test 2	n) Con	35	
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	JECT		AC	NZS 440	Depth mm) Inished	50	
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		AGE 9 F		ld Shear d calcula			
	150	UD ST/		using fiel t Air Voic	Location	Fill area	
	ckland 1	GAL ST		strength (
	ckland) eet, Auc	DONE		r: Shear S	Test No.	19	
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	ey Serv 3ox 826	Berry Illingwo GENZA	Bush	Methods 4402:196	ork Order	AM16W0	ms fortied,
fe	POI	Ray Matt 773-	Flat	Test NZS	We	6	e attered er rej to the position carbony Nor105 htte
Of	int ress	ect:	ation:	method:	Date	112/2016	at must not b at relation only treatine Labor howe ann datify
U ŧ	Clie	Atte C.C: Proj	Loc	Test		ຶ	This rep AT Interes A SACK A Contraction

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Comey Services NZ Lto 144A Cryers Road. East Tamaki. Auckland 2103, New Zealand PO Box 58 877, Botany. Manukau 2163, New Zealand t+64 9 272 3375 f+64 9 272 3378 www.coffey.com	Project No: 773-ETAM00071AA Work Order No: ETAM16W04319	Page No: 2 of 2	SH Tested by: JBG Date tested: 9/12/2016	
COTEV 3	SITE PLAN	NOT TO SCALE	Project: 773-GENZAUCK16856AA - DONEGAL STUD STAGE 9 FLAT BU: Location: Refer to plan	

																	144 PO E	A Cryers Road, lox 58877, Botal t	Coffey S East Tamaki, i ny, Manukau, i +64 9272337	iervices NZ L Auckland 216 Auckland 216 5 f +927233
ont:	Coffey Services N	IZ Ltd (Auc	ckland)							PRC	DJECT CODE:		773-ET)	AM0007	1AA					
dress	² O Box 8261, Syr	nonds Str	eet, Auch	kland 1150	0					Pag	e:		1 of 2				S. W. M.			
tention:	Ray Berry Aatt Illingworth	CRECAA	DONEG		STAGE 9 FI	AT RUSH							rsts indicat ot accredite e scope of t	ed as d are outsid he	ę			40	2. Polon	
oject. cation:	Tat Bush	- 220000			01706 211	2					ACCREDITED LA	BORATORY I	boratory's a	occreditation		Approv	red Signatory Issue date		Eric Pator 29/12/2010	د 9
st method:	Test Methods in acco	ordance with \$ 4402:1986	h: Shear S 7 Tests 4.1	trength (usir .1.5(b)). Plo	ng field Shear v ease note that	ane in accordance with NZG Air Void calculations are not	S 2001):Nucl IANZ endorse	ear Densom	eter Testing this report.	(ir accordar	ice with NZS 4407:2015 '	Test 4.2): Water	Content Te	isting (in a	cordance w	ith NZS 440	2:1986 Test 2.1	(): Density Ca	Iculations (ir	
Date	Work Order No:	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	Lane	RL FL	Finished Comn	nents	Field	Shear Strer = Unable to	ngth in kPa penetrate	Wet Don (t/m ³)	uty Oven Water Content (%)	Dry Density (Um ³)	Solid Density (t/m ²)	Air Voids (?
14/12/2016	ETAM16W04399	JBC	20	Ē	Soil	Pond A	1770515	5905511	•		150 -		196	216	216 177	7 1.78	32.0	1.35	2.7	6.7
14/12/2016	ETAM16W04399	JBG	21	III	Soil	Pond A	1770461	5905622	·		150 -		158	136	136 135	3 1.82	30.8	1.39	2.7	5.4
											3									
report must not be aft report relates only to II Accordinal Laborator 2711 hear day out 2014	ied or reproduced except in ful e positions rested. No:105	-																		

Coffey Services NZ Ltd 144A Cryers Road, East Tamaki, Auckland 2103, New Zealand PO Box 58 877, Botany, Manukau 2163, New Zealand t+64 9 272 3375 f+64 9 272 3378 www.coffey.com 14/12/2016 JBG 773-ETAM00071AA * ETAM16W04399 Date tested: Tested by: 0 2 of 2 P Project No: Work Order No: ij 191 8 ECO CE 21 Page No: ê 20 8 0 773-GENZAUCK16856AA - DONEGAL STUD STAGE 9 FLAT BUSH No. 0 0 ANE DRIM 顶 NO CON Custo Ø SITE PLAN NOT TO SCALE Pond A Location: Project:



ces NZ Ltd kland 2103 kland 2163 +92723378					(%) spion.	6.4	11	
Coffey Serv Coffey Serv at Tamaki, Auc Manukau, Auc		Peter	ic Paton 01/2017	culations (in	Solid Au Density (t/m ³)	2.7	2.7	
yers Road, Ea 1877, Botany, t +6		W I	10 16 1	Density Cale	ry Density (t/m ³)	1.47	1.42	
144A C PO Box			gnatory: ue date:	36 Test 2.1);	n Water D tent (%)	26.6	25.7	
		č	roved Sig	S 4402:198	Density Ove m ³) Con	.86	.79	
			App	ce with NZ	a Wet	TP 1	4 L	
	71AA	side	5	n accordan	ength in KP.	UTP	UTP	
	AMOOO	ted as ed are out fthe		Testing (Ir	Shear Stre	UTP	UTP	
	773-ET 1 of 2	lests indica not accredit the scope of		er Content	Field	UTP	ЧTР	
	CODE:	N	CCREDITED LABORATORY	VZS 4407:2015 Test 4.2): Wat	Comments	~2.0m below FL	~1.5m below FL	
	PROJECT Page:		A	cordance with I	Test Depth (mm) FL = Finished level	150	150	
				ing in ac	RL	•	•	
				f this repo	Lane	•	•	
				bar Denson od as part o	Northing	5905637	5905645	
				S 2001):Nucle IANZ endorse	Easting	1770409	1770375	
		AT BUSH		ane in accordance with NZG Air Void calculations are not	Location	General fill	General fill	
	0	0 STAGE 9 FL		ing field Shear vi lease note that	Material tested	Silty CLAY	Sity CLAY	
	dand 115	AL STUD		trength (us	Layer	Ē	E	
	skland) set, Auc	DONEG		: Shear S Tests 4.1	Test No.	24	25	
	JZ Ltd (Auc monds Stre	16856AA -		ordance with \$ 4402:1986	Tested by	AB	AB	-
ey	Coffey Services N PO Box 8261, Syn	Ray Berry Matt Illingworth 773-GENZAUCK [·]	Flat Bush	Test Methods in acc accordance with NZS	Work Order No:	ETAM17W00125	ETAM17W00125	fores or reproduced except in ful the poslicins leated. ary Nor.105
	Client: Address	Attention: c.c: Project:	Location:	Test method:	Date	12/01/2017	12/01/2017	This roport must not be al This roport relates only to IANZ Accredited Laborate UPS-0711 huus dae 9027016



vices NZ Ltd Jckland 2103 Jckland 2163 f +92723378				c	Air Voids (%)	6	6.1		
Coffey Sei Loffey Sei , Manukau, Ai 64 92723375		Perter ric Paton	\$/01/2017	iculations (i	Solid Density (Um ³)	2.7	2.7		
ryers Road, Eé 58877, Botany		<i>М</i> . п	16	Density Ca	Ory Density (t/m ³)	1.23	1.22		
144A C PO Box		jnatory:	le date:	36 Test 2.1):	n Water E tent (%)	36.8	39.7		
		proved Sig	Issi	2S 4402:19	Um ³) Con	1.69	1.71		
		Apl		nce with N2	Pa Wei	UTP	٩IJ		
	071AA	tside	-	(In accorda	rength in kf to penatrate	UTP	UTP		
	TAM000	cated as dited are ou of the f's accredita		nt Testing	d Shear St JTP = Unable	UTP	UTP		
	773-E 1 of 2	Tests indi not accre the scope laborator,		/ater Conte	Fiel	đ	ЧТР		
	CODE:	CCREDITED LABORATORY		NZS 4407:2015 Test 4.2): W	Comments	2.5m below FL	2.5m below FL	*	
	PROJECT			ordance with	Test Depth (mm) FL = Finished level	150	150		
		4		g (n acc	л. К	1	•		
				ster Testin this report	Lane	,	•		
				ar Densom	Northing	5905636	5905627		
				S 2001):Nuclet IANZ endorsed	Easting	1770402	1770432		
		AT BUSH		ine in accordance with NZG vir Void calculations are not	Location	General Fill	General Fill		
	0) STAGE 9 FL/		ing field Shear va	Material tested	Slity CLAY	Silty CLAY		
	kland 115	3AL STUC		Strength (us 1.1.5(b)). F	Layer	E	Ē		
	ckland) eet, Aud	DONE		n: Shear : 5 Tests 4.	Tost No.	26	27		
	NZ Ltd (Au monds Str	16856AA -		Sordance with S 4402:1986	Tested by	JBG	JBG		5
¢ \$	Coffey Services PO Box 8261, SV	Ray Berry Matt Illingworth 773-GENZAUCK	Flat Bush	Test Methods in ac accordance with N2	Work Order No:	ETAM17W00126	ETAM17W00126		affered or reproduced except in 1 o the positions tested. by No: 105
Coff	Client: Address	Attention: c.c: Project:	Location:	Test method:	Date	13/01/2017	13/01/2017		This report must not be a This report relates only tr JANZ Accredited Laboration UPSUTF11 Ixua can outTots UPSUTF11 Ixua can outTots



COLF																			144A C PO Box	ryers Road, Ea 58877, Botany, t+(Coffey Ser Ist Tamaki, Au Manukau, Au 64 92723375	vices NZ Ltd ckland 2103 ckland 2163 *+92723378 * +92723378	
Client:	Coffey Services N	Z Ltd (Au	ckland)							a.	OJECT (CODE:		773-1	ETAMO	AA1700							_
Address	² O Box 8261, Syr	nonds St.	reet, Au	ickland 1150	0					Pa	je:			1 of	01								
Attention: c.c: Project:	Ray Berry Matt Illingworth 73-GENZAUCK1	6856AA	- DONE	GAL STUD	STAGE 9 FI	LAT BUSH						N	Tests indica not accredit the scope of laboratory's	nted as ted are our f the accreditat	side					νΩ u	Peter		
Location:	-lat Bush										AC	CCREDITED LABORATC	CENTRON PORT					Approved S	signatory: sue date:	1 8	ric Haton	-	
Test method:	Test Methods in acco VZS 4402:1986 Test:	s 4.1.1.5(b)	h: Shear). Pleas	Strength (usin e note that Air	ng field Shear v Ir Void calculati	vane in accordance with NZGS ions are not IANZ endorsed as	2001):Nucles part of this re	hr Densome port.	ter Testing	t (in accor	dance with	NZS 4407:2015 Test 4.	.2): Water Conten	t Testing	(in accord	ance with	NZS 440	2:1986 Test 2.	1): Density Ca	alculations (ir	n accordanc	e with	
Date	Work Order No:	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	Lane	RL F	st Depth (mm) : Finished	Comme	hnts	Ĕ	old Shear	Strength it le to penetr	n kPa ate	Wet Demaity O	ven Water I ontent (%)	Dry Density (tum ³)	Solid Density (t/m ³)	ur Volds (%)	
17/01/2017	ETAM17W00201	JBG	28	ШЦ	Clay	Road 4, parallel to creek	1770401	5905641			150 2	Om above base of fill		UTP	UTP	UTP	UTP	1.74	35.1	1.29	2.7	6.9	
17/01/2017	ETAM17W00201	JBG	29	III	Clay	Road 4, parallel to creek	1770420	5905630		Ĩ	150 2	Om above base of fill		UTP	45	ЧТР	đ	1.68	40.7	1.19	2.7	7.3	
his report must not be atter his operating traises with the transmission E.Z. According the aboverior PS-0711 have not ext7016	d or reproduced ancept in full. positions tested. 40:105																						



IZ Ltd 2103 23378 23378						1 (%) s			
Services N Auckland Auckland 375 f +9277			V3 1	17	ance with	Air Voic	9.	2.3	
Coffey East Tamak y, Manukau +64 92723			8 Put	5/02/20	(in accord	Solid Density (t/m ³)	2.7	2.7	
ryens Road, E 58877, Botan t				- 0	alculations	Dry Density (t/m ³)	1.46	1.52	
144A C PO Box				gnatory: le date:	: Density C	n Water tent (%)	25.2	27.3	
	10.0			oroved oig	36 Test 2.1)	Density Ove um ³) Con	1.83	1.93	
				d Y	\$ 4402:198	a Wei	ЧТС	ЧЦ	
	1AA				with NZ	ngth in kP penetrate	JTP 1	TP 1	
	M0007				cordance	hear Stree	UTP (dTD	
	73-ETA	of 2	is e outside editation		ting (in ac	Field St UTP =	UTP	UTP 1	
	7	۲	ndicated a redited ar ipe of the onu's accrr		ntent Tes			-	
	1000		Tests in not acc the sco		Water Co				
			N	JRATORY	est 4.2):	omments	_	_	
			Z	LAB	07:2015 7	o	low FL	IOW FL	
	CODE			ACCREDI	n NZS 44		1.0m be	1.0m be	
	OJECT	je:			dance with	t Depth (mm) Finished	150	150	
	PR	Pag			(in accor	RL 1	-		
					r Testing	Lane	- 1	r	
					Densomete	Vorthing	5905627	5905625	
					1):Nuclear	asting	70416	70406	
					ZGS 200 d as part	<u> </u>	sk 17	sk 17	
			H		cordance with N2 ot IANZ endorsed	Location	, parallel to cree	, parallel to cree	
			AT BUS		ane in acc		Road 4	Road 4	
		0	STAGE 9 FL		ig field Shear v. r Vold calculatio	Material tested	Slity CLAY	Sity CLAY	
		dand 1150	AL STUD		rength (usin note that Ali	Layer	E	E	
	kland)	et, Aucl	DONEG		Shear St Please	Test No.	30	31	
	CLtd (Auc	onds Stre	3856AA -		dance with: 4.1.1.5(b)).	rested by	JBG	JBG	
A	vices NZ	61, Sym	/orth AUCK16		's in accon 386 Tests	ar No: 1	00231	00231	xdept in full,
>	offey Ser) Box 82	ay Berry att Illingw 3-GENZ	at Bush	st Method S 4402:15	Nork Ord	TAM17W	TAM17W	r reproduced a sitions tested. 105
ffe	ပိ	PC	n: Ma 77:	Fla	od: Tes	~	017 E	017 E	not be altered o s only to the pos Laboratory Ne:1 o407201s
	Client:	Address	Attentio c.c: Project:	Location	Test meth	Date	18/01/2	18/01/2	This report must This report relate IANZ Accredited UPS-01911 www date



uckland 2163 t +92723378 w coffey com		ey		with NZS	Ar Volds (%)	7.7	5.3	
centry Set Latt Tamaki, Al y, Manukau, Al +64 02723375		A-Arfuly es McKelv	2/02/2017	accordance	Solid Density , (Vm [*])	2.7	2.7	
Cryers Road, E c 58877, Botan t		nan Lam	8	culations (in	Dry Density (t/m ²)	1.54	1.42	
144A (PO Box		gnatory:	ue date:	Density Cal	n Water ftent (%)	22.9	29.9	
		proved Si	lss	6 Test 2.1):	t Density Ove (t/m ³) Con	1.89	1.84	
		Å		S 4402:198	cPa We	đ	۹IJ	
	71AA			e with NZ	ength in k	45	ß	
	AMOOO	å e		iccordance	Shear Str P = Unable t	ЧŢЛ	đ	
	773-ET 1 of 2	ed as d are outsi he ccreditatior		esting (in r	Field	45	аIJ	
		sts indicati t accredite e scope of t ooratory's a		Content T				
				L2): Water	nents			
				015 Test	Comn			
·	:eode:			ZS 4407-2				
	JECT C		ł	nce with N	Depth nm) "inished	50 -	50 -	
	PRO Page			n accorda				
				Testing (ir	Lane R1			
				ensometer	lorthing	905633	905625	
):Nuclear D s report.	Isting N	70404 5	70423 5	
				ZGS 2001 part of this	8	ok 17	ok 17.	
				nce with N dorsed as	tion	allel to cre	allel to cre	
		HSUS		n accorda	Loca	oad 4, part	oad 4, par	
		9 FLAT E		lear vane	a p	AY R	AY R	
		STAGE		ng field Sh id calculati	Materi	Silty CL	Sity CL	
	dand 1150	AL STUD		trength (usi that Air Vo	Layer	Ĩ	FIII	
	kland) iet. Auck	DONEG		I: Shear S ase note	Test No.	32	33	
	Z Ltd (Auc	3856AA -		rdance with .5(b)). Ple	Tested by	JBG	JBG	
	rvices NZ 261. Svm	worth ZAUCK16		ds in accor Tests 4.1.1	ter No:	V00256	V00256	ed except in full ind.
	Coffey Se	Ray Berry Aatt Illing 73-GEN	flat Bush	est Metho 402:1986	Work Or	ETAM17V	ETAM17V	be poulions tes r No:105
offe		. u 2 ト .u .u	۳ ت	thod: 7	ite	/2017	//2017	must not be all relates only to ti dited Laboratory a date 040/2016
Ŭ.	Client: Address	Attenti c.c: Project	Locatio	Test me	ŏ	19/01	19/01	This report This report IANZ Acore UPS-07F11 Ins

Coffey Services NZ Ltd 144A Cryers Road, East Tamaki, Auckland 2103, New Zealand PO Box 58 877, Botany, Manukau 2163, New Zealand t+64 9 272 3375 f+64 9 272 3378 www.coffey.com	Project No: 773-ETAM00071AA Work Order No: ETAM17W00256 Page No: 2 of 2	ISH Tested by: JBG Date tested: 19/01/2017	
Coffey A	SITE PLAN NOT TO SCALE	Project: 773-GENZAUCK16856AA - DONEGAL STUD STAGE 9 FLAT BL Location: Road 4, parallel to stream	

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IZ Ltd 2103 2163 23378	Hoy				a (%)			
Services N 1, Auckland 1, Auckland 375 f +9275		5	17	lance with	Air Voic	10	3.	
Coffey East Tamaki ny, Manukau t +64 927233		Cesar Pi	10/02/20	(in accord	Solid Density (t/m ³)	2.7	2.7	
Cryers Road, x 58877, Bota				Calculations	Dry Density (Um ³)	1.27	1.36	
144A PO Bo		Cionatone	signatory. ssue date:	.1): Density (Oven Water Content (%)	34.0	33.6	
		percent	si li	986 Test 2	et Density ((t/m ³)	1.70	1.82	
		4	¢	ZS 4402:1	cPa v	UTP	UTP	
	071AA			Ice with N	rength in k to penetrate	ЧТР	UTP	
	ramoo(ų c		accordar	Shear St P = Unable	UTP	UTP	
	773-E	ed as d are outsi the ccreditatio		Testing (in	Field	ИТР	UTP	
		Tests indicate not accredite the scope of t laboratory's a		ater Content				
		N		st 4.2): Wi	mments			
		Z	EU LABU	7:2015 Te	Col			
	CODE		ACCREDIT	NZS 440				,
	COJECT			dance with	st Depth (mm) Finished lavel	150	150	
	A B B B			(in actor	RL 18	1	1	
				er Testing	Lane	1	•	
				r Densomet	Northing	5905611	5905623	
				001):Nuclear	Easting	1770434	1770409	
				NZGS 20		roek	reek	
				dance with ANZ endo	cation	arallel to c	arallel to c	
		T BUSH		e in accon s are not l	2	Road 4, p:	Road 4, p	
		SE 9 FLA		Shear van	orial	CLAY	CLAY	
	50	JD STAG		sing field a	Mate	Silty	Silty 0	
	kland 11	GAL STL		Strength (u note that	Layer	Ē	I	
	ickland) reet Aud	- DONE		h: Shear ()). Please	Test No.	45	35	
	Z Ltd (Au	6856AA		rdance wit	Tested by	JBG	JBG	
	vices Ni 61 Svm	vorth ZAUCK1		Is in accou 986 Tests	er No:	/00274	/00274	so cest th hull
	offey Se	tay Berry latt Illing/ 73-GEN	lat Bush	ost Methor ZS 4402:1	Work Orc	ETAM17V	ETAM17V	or reproduced
coffe	lient: C	ttention: R .c: N roject: 7	ocation: F	est method: T	Date	20/01/2017	20/01/2017	s report must not be allowed s report nature so by to the p 2.2. According Laboratory M.



irvices NZ Ltd uckland 2103 uckland 2163 if +92723378 <u>w coffev com</u>					ice with	Air Voids (%)	3.2	0.0	
Coffey S. ast Tamaki, <i>F</i> , Manukau, <i>F</i> +64 92723371			Sear Purc	0/02/2017	in accordar	Solid Density (t/m ³)	2.7	2.7	
Cryers Road, E ¢ 58877, Botan) t-		a same		, -	Calculations (Dry Density (t/m ³)	1.38	1.51	
144A PO Bo				signatory. ssue date:	.1): Density (oven Water Content (%)	33.2	30.5	
				Island	1986 Test 2	Wet Density (1.84	1.96	
	1			Ì	NZS 4402:	n kPa rate	đ	410	
_	00071A/				dance with	r Strength i able to penel	UTP	UTP	
	3-ETAM	of 2	outside		ng (in acco	Field Shea UTP = Un	TP UT	TP UT	
	11	1	indicated as coredited are tope of the tonu's accret		ontent Test			ر -	
			Tests not ac the sc	X	2): Water C	st			
			Z	LABOKATO	015 Test 4.	Commer			
	:ODE:			CREDITED	IZS 4407.20				
	OJECT O	ge:		AC	dance with h	st Depth (mm) Finished level	150	150	
	A A	Pag			g (in accor	RL L.	F	•	
					eter Testing	Lane	•	•	
					ar Densom	Northing	5905627	5905617	
					2001):Nucle	Easting	1770413	1770431	
			AT BUSH		the in accordance with NZGS ins are not IANZ endorsed as	Location	Road 4, parallel to creek	Road 4, parallel to creek	
			AGE 9 FL		eld Shear va	Material tested	Ity CLAY	ity CLAY	
		nd 1150	STUD ST		igth (using fi that Air Vo	ayer	III.	Fill Si	
	dand)	et, Auckla	DONEGAL		Shear Strer Please not	Test L	36	37	
	Ltd (Auck	onds Stree	856AA - E		tance with: 1.1.1.5(b)).	ested by	JBG	JBG	
	offey Services NZ	O Box 8261, Sym	tay Berry 1att Illingworth 73-GENZAUCK16	lat Bush	est Methods in accord 75 4402-1986 Tests	Work Order No: 1	ETAM17W00323	ETAM17W00323	4 or replicatend except in Mil. positions traves.
	Client: C	Address P	Attention: R c.c: N Project: 7	Location: F	Test method: T	Date	23/01/2017	23/01/2017	This report must set be allowed to the second design of the set of the allowed MAC According to Second design of the Lifetoffit is we are edd Topics



Z Ltd 2103 2163 3378 com					nce	(%) s				
Services N , Auckland , Auckland , 5 f +9272				c ^	accorda	Air Void	2.2	3.4		
Coffey East Tamak y, Manukau +64 927233			cler	Eric Patc 5/01/201	lations (in	Solid Density (t/m ³)	2.7	2.7		
Cryers Road, E 58877, Botar t			an	ш ₍ ,	ensity Calcu	Dry Denaity (t/m ³)	1.34	1.34		
144A (PO Box				gnatory: ue date:	Test 2.1): Do	in Water itent (%)	35.9	35.1		
				roved Si Iss	402:1986	Density Ove m ³) Cor	.82	.81		
				App	with NZS 4	1) (t	d L	4 F		
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	AM0007		dicated as edited are be of the	ry's accred	ting (in acc	hear Strei = Unable to	۹Ľ	ЧТР		
	773-ET/	1 01 2	Tests in not accr the sco	laborato	ontent Test	Field S UTP	đ	UTP		
			N	ORATORY	: Water Co					
		1		DITED LAB	5 Test 4.2)	ots				
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					ar Densor his report.	Northin	590559	590560		
					2001):Nucle as part of t	Easting	1770469	1770450		
					th NZGS 2 endorsed					
			_		ordance wit	ocation	eneral fill	eneral fill		
			AT BUSH		ane in acco lations are		0	0		
			GE 9 FL/		d Shear va Vold calcu	aterial	CLAY	/ CLAY		
		1150	'UD STA		(using field te that Air	r Ma	Sity	Silty		
		uckland .	EGAL ST		rr Strength Please no	Laye	Ē	Ē		
	Aucklano	Street, A	NOC - A		with: Shea 1.1.5(b)).	by Test No.	8	39		
	NZ Ltd (ymonds	<16856A		cordance 6 Tests 4.	Tested	AB	AB	i i i i i i i i i i i i i i i i i i i	
	Services	rrv rrv	ngworth	sh	hods in ac 4402:198	Order No:	17W00354	17W00354	Librad except h 1	
ev	Coffey	PO Boy Rav Be	Matt III. 773-GE	Flat Bu:	Test Mol with NZS	Work	ETAM	ETAM:	termed or respond	
COF	lient:	ddress ttention:	.c: roject:	ocation:	est method:	Date	24/01/17	24/01/17	the ropert must not be a	42. Addreeting Lawris



ces NZ Ltd kland 2103 +92723378 coffey com				e with	r Volds (%)		4.6	12	
Coffey Serv at Tamaki, Auc Manukau, Auc 4 92723375 f		0	//	1 accordanc	Solid	Density (t/m ³)	2.7	2.7	
/ers Road, Eac 3877, Botany, t +6			м ш <i>С</i>	Iculations (ir	irv Density	(ma)	1.49	1.24	
144A Cŋ PO Box Si			inatory: e date:	Density Ca	Water D	ent (%)	26.9	42.6	
			proved Sig	36 Test 2.1):	Density Over	tim ³) Con	1.89	1.77	
			side ion App	S 4402:198	Wet	e	dTU	UTP	
	71AA	ar pro-	acco as ited are out of the s accreditat	ice with NZ		ength in kl to penetrate	206	UTP	
	AM000	aree ladie	not accred the scope c aboratory's	accordan		Shear Str P = Unable	177	UTP	
	773-E1		LATORY	Testing (ir		per 5	161	UTP	
			TED LABOR	tter Content					
	ü		ACCREDI	ist 4.2): Wa		nents			
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	PROJE Page:			vith NZS 44					
				cordance w		est Depth (mm) - Finished leve	150	150	
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				ar Densom	eport.	Northing	5905630	5905607	
				2001):Nucle	part of this r	Easting	1770430	1770425	
		AT BUSH			te in accordance will need as p is are not IANZ endorsed as p	Location	Road 4, parallel to creek	Road 4, parallel to creek	
	ç	ę	D STAGE 9 FL/	ing field Cheer war	Air Void calculation	Material tested	Silty CLAY	Silty CLAY	
	111 pricity		GAL STUI	transh (110	note that	Layer	Ē	E	
	uckland)	מפפוי אמי	- DONE	the Change	th: Shear ()). Please	V Test No.	40	41	
	VZ Ltd (Al	o spilolit	16856AA	her an and an	ts 4.1.1.5(b	Tested by	BG	JBG	4
	Coffey Services I	CU BOX 0201, 0) Ray Berry	Ray Berry Matt Illingworth 773-GENZAUCŀ ≓lat Bush	Flat Bush	Test Methods in act VZS 4402:1986 Tes	Work Order No:	FTAM17W00339	ETAM17W00339	red or reproduced except (n [§] he positions tested. y No:105
	Client:	Address P	c.c: Project:	Location:	Test method:	Date	25/01/2017	25/01/2017	This report must not be alth This report maters only to 11 TANZ Accordited laboration LPSOTF11 sear der 0072016




Ţ	2103 2103 3378 3378						(%)				
Services N2	Auckland 3 Auckland 3 Auckland 2 75 f +92723			~ 3	c	ance with	Air Void:	4	6.1		
, netto	Colley s st Tamaki, Manukau, 64 927233			8 Perco	tric Pato 5/02/201	n accord	Solid Density	2.7	2.7		
	ers Road. Ea 877, Botany. t +t			40	Ш 33	culations (I	y Density (Um ³)	1.50	1.52		
	144A Cry PO Box 58				atory: date:	Density Cal	Water Di	6.4	24.7		
					oved Sign Issue	Test 2.1): [ansity Oven V	0	90		
					Appro	4402:1986	Wet Do (thm	1.0	46 1.9		
		A				with NZS	gth in kPa	41 1	41 1		
	_	10001				ordance	ar Streng	Inable to p	32		
		S-ETAN	4	outside	tation	in acc	Field She		57 10		
		517	-	cated as dited are	j's accredi	ont Testin	-		- ¥		
				fests indi not accret	aboratory	tter Conte					
					TORY	4.2): Wa	ments				
				2	LABORA	015 Test	Comr	fill for	ase of fill		
		DDE:			SEDITED	S 4407.2		m from h	m from b		
		ECT CO			ACCI	e with NZ	epth	anea	0.4		
		PROJE	rage.			coordanc	lest De mm	level	150		
						ting (in a	ā				
						neter Tes	anel		2 5		
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						2001):Nucle	Footion	n internet	1770451		
						with NZGS			ckfill		
				į	HS	Iccordance			silt pond ba		
				ļ		vane in a	ations are			4	
				I	TAGE 9 F	ield Shear	old calcula Material	tested	sity CLAY		
			1150 br		STUD S	gth (using t	o that Air V	ayor		-	
		(pue	t, Aucklaı		ONEGAL	hear Stren	Please not	No.	45 45		
		-td (Auckl	nds Stree		356AA - C	ance with: S	.1.1.5(b)).	osted by	AB AB		
		ces NZ I	1, Symo	ţ	UCK16	n accords	16 Tests 4	:oN	0390 1390	-	coept in full.
		ey Servit	3ox 826	Berry Illingwoi	GENZA	Methods	4402:198	ork Order	AM17WO		reproduced on Itions tested. 05
	fey	Coffe	POE	Ray Matt	-213-	Test	NZS	Ŵ			t be attered or nity to the post boratory No:10 272016
	μÖ	ŧ	ress	ention:	ject:	ation:	- moundail	Date	27/101/17		report must no report relates o 2. Accredited La 7111 Issue date out
	U Ę	Clie	Add	Atte c.c:	Pro	Loc	20-				This IANZ Lesso



103 163 378		1				(%)			
arvices N2 Auckland 2 Auckland 2 5 f +92723 M coffev					hce with	Air Volds	3.7	4.7	
Coffey S. t Tamaki, <i>I</i> Manukau, <i>I</i> 4 9272337			Perfor	02/2017	accordar	Solid Density (t/m ³)	2.7	2.7	
yers Road, Eas 18877, Botany, 1 t+6			ης ú	05/	Ilculations (in	Dry Density (t/m ³)	1.46	1.51	
PO Box 5				ignatory: sue date:	1): Density Ca	ren Water E	29.1	26.1	
				proved S	36 Test 2.	Um ³) Co	1.88	1.90	
				Api	\$ 4402:198	a Wet	dTC	175	
	1AA				e with NZS	ngth in kP	UTP	190	
	7000M				scordance	hear Stre	141	162	
	73-ETA		as re outside editation		sting (in a	Field S	152	182	
	K +		ndicated a credited ar ope of the		ontent Tes				
			Tests i not ac the sci		Water Co				
				ORATORY	Test 4.2):	comments			
				TED LAB	107:2015		subgrade	subgrade	
	r cobi		-0)	ACCREDI	th NZS 44		1.5m to	2.0m to	
	ROJEC	; p			rdance wi	est Depth /mm/ . = Finished level	150	150	
	a a				g (in acco	RL R			
	-				er Testing	Lane	1	1	
					- Densomet	Northing	5905660	5905664	
					1):Nuclear of this rep	asting	70454	70453	
					IZGS 200	ŭ	17	17	
			L BUSH		in accordance with N are not IANZ endorse	Location	Silt pond backfill	Silt pond backfill	
			E 9 FLAT		thear vane	dal ba	LAY	LAY	
	C L	20	JD STAG		sing field S Air Vold ci	Mate	Silty O	Silty C	
		מאומות -	GAL STU		Strength (u	Layer	Ē	Ē	
	uckland)	ine 'iaai	- DONE		th: Shear	Test No.	46	47	
	Z Ltd (At	nonas ol	6856AA		rdance wit	Tested by	AB	AB	
	rvices N	201, Syr	worth ZAUCK1		ds in acco 986 Tests	ter No:	V00400	V00400	d except in full.
	offey Se	O Box 8 ay Berry	1att Illing 73-GEN	lat Bush	est Metho ZS 4402:1	Work Ore	ETAM17V	ETAM17V	d ar reproduce positions tester Vo:105
offe	tt gt	ntion: R	ect: 7	ttion: F	method: 1	Date	21/10/21	21/10/23	bort must not be allar out relates only to the correlated Laboratory 1 1 team date 04072016
O	Clie	Attel	c.c: Proj	Loce	Test		1~	~	This rat This rat IANZ A UPS-071

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ices NZ Ltd kland 2103 +92723378 coffev.com		s with	r Volds (%)	5.8	6.3	
Coffey Serv at Tamaki, Auc Manukau, Auc 4 92723375 f	Performante ic Paton 102/2017	accordance	Solid A Density (t/m ³)	2.7	2.7	
yers Road, Eas 8877, Botany, I t +6	() () () () () () () () () () () () () (Iculations (in	ity Density (t/m ³)	1.52	1.53	
144A Cr PO Box 5	gnatory: ue date:): Density Ca	on Water D Itent (%)	25.1	24.1	
Octoy Services NLLid 144.4 Cryets Road, East Tamaid, Auckland 2103 PO Box 58977, Botany, Manukau, Auckland 213 PO Box 58877, Botany, Manukau, Auckland 213<	proved Si	986 Test 2.1)	st Density Ove (t/m ³) Cor	1.90	1.90	
	A	S 4402:15	Pa	UTP	ЧТР	
	71AA	ce with N2	ength in k	UTP	ИТР	
	am000	accordance	Shear Str = Unable t	UTP	ЧТР	
	773-ET 1 of 2 d as d as d as creditation	esting (in :	Field :	UTP	ЧТР	
	ts indicate accredited scope of th oratory's ac	Content T				
	Tes DRY lab	2): Water	onts			
	ABORATC	015 Test 4	Comme	rade		
		S 4407:20		m to subg	subgrade	£
		ICO WITH NZ	Depth mished	50 0.6	50 at :	
	PRO.	accordar	Test /m FL = FI	15	15	
		Testing (ir	ane RL	•	•	
		Densometer rt.	lorthing L	905666	905671	
		1):Nuclear D	asting N	70452 5	70448 5	
		VZGS 200	Ea	17	17	
		ance with I NZ endors	cation	nd backfill	nd backfill	
	T BUSH	e in accord	Loc	Silt por	Silt por	
	E B FLA.	Shear vane alculations	od	SLAY	SLAY	
	150 UD STAG	using field : t Air Void o	Mate	Silty 0	Silty 0	
	l) uckland 1 EGAL ST	r Strength (Layer	Ē	Ē	
	Auckland Street, A A - DON	with: Shea	by Test No.	48	49	
	NZ Ltd (A ymonds \$ K16856A	cordance v	Tested	AB	AB	
	Services c 8261, S irry ngworth :NZAUCh	thods in ac	Order No:	17W00404	17W00404	A second encoded in A
ev	Coffey PO Box Ray Be Matt Illii 773-GE	Test Mel	Work	ETAM	ETAM	a thread or reprod
	Client: Address Attention: c.c: Project:	Location: Test method:	Date	31/01/17	31/01/17	a da fan fundi na fan fan fan fan fan fan fan fan fan



is NZ Ltd and 2103 2723378 flev.com		with /oids (%)	5.6	3.7	
Coffey Service Tamaki, Aucki lanukau, Aucki 92723375 f +6	. P. P.	accordance solid Density (um ³)	2.7	2.7	
ers Road, East 877, Botany, M t +64	1776	v Density (in t	1.66	1.49	
144A Cry PO Box 58	natory: e date:	Density Cal	19.8	27.5	
	proved Sig	B6 Test 2.1): Density Over tum ³) Cont	1.99	1.90	
	tside tion Apt	ZS 4402:198	UTP	۹IJ	
	0071AA licated as edited are ou y's accredita	ance with N Strength in H	UTP	ЧТР	
	ETAMOC 2 Tests ind not accre the scop	g (in accord lield Shear S UTP = Unab	o UTP	o UTP	
	773 1 of V	ntent Testing	5	5	
		i: Water Co			
	CODE:	15 Test 4.2 Comments			
	GUECT -	ZS 4407:20	n below FL	m below FL	i.
	<u>д</u> д	Depth Dmm)	150 0.21	150 0.21	
		Test (r			
		ssting (ir	-	•	
		g La	4		
		lear Densor report. Northin	590567	590567	
		5 2001):Nuc s part of this Easting	1770468	1770459	
	AT BUSH	ine in accordance with NZGS ins are not IANZ endorsed as Location	North east, fill area	North east, fill area	
	50 D STAGE 9 FL	Air Void calculatio Material tested	Silty CLAY	Silty CLAY	
	ckland 11	Strength (us note that , Layer	Ē	Ē	
	ckland) eet, Au	r. Shear : Please Test No.	50	51	
	IZ Ltd (Au monds Str 16856AA -	Tested by	JBG	JBG	
	Coffey Services N 20 Box 8261, Syi Ryan Hayes datt Illingworth 73-GENZAUCK1 itat Bush	Test Methods in acc VZS 4402:1986 Test Work Order No:	ETAM17W00485	ETAM17W00485	ed er reproduced except in full. Positions tosted. No:105
	ilient: (ddress F ddress F	est method:	2/02/2017	2/02/2017	is report must not be altert lis report relates only to the LA Accredited Laboratory 5-07F11 www eth 0072010

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COTTeX, COTT			with NZS	(%) spion.		5.7	7.0
XXXXX		h fun s McKelve	accordance	ild Dematty Au	(r,m,r)	2.7	2.7
		James	culations (in a	ry Density So	(nm ³)	1.32	1.30
		gnatory:	: Density Calc	in Water D	itent (%)	-34.2	-34.4
	A Mont	pproved Si	86 Test 2.1):	et Density Ove	(t/m [*]) Cor	1.78	1.75
		utside tation A	ZS 4402:15	M	kPa e	UTP	dTD
071AA		licated as edited are o e of the y's accredi	nce with N		trength in e to penetrat	UTP	196
ETAMOO		Tests inc not accri the scop laborator	in accorda		uttP = Unabl	196	154
773-E	10	N ORATORY	t Testing (-	Fig	d 173	d 158
ROJECT CODE:	age:	ACCREDITED LAR	IZS 4407:2015 Test 4.2): Water Conter		Comments	5m below FL. *Field nuc water content appli	5m below FL. *Field nuc water content appli
ā à	ĩ		rdance with h	at Depth	(mm) (= Finished	150 1.6	150 1.5
			g (in acco	1 e	RL R		•
			eter Testin		Lane		•
			ar Densom		Northing	5905654	5905677
			2001):Nucles	of this report.	Easting	1770454	1770472
		T BUSH	ne in accordance with NZGS	e not IANZ endorsed as part	Location	North east, batter	North east, batter
		AGE 9 FLA	field Shear va	alculations ar	Material tested	Clay	Clay
0977	land 1150	AL STUD S	rength (using	hat Alr Void	Layer	E	Filt
kland)	eet, Auck	DONEG	I: Shear St	ase note t	Test No.	52	53
Z Ltd (Auc	ionds Str(3856AA -	dance with	1.5(b)). Pld	Tested by	Sau	JBG
toffey Services NZ	O Box 8261, Sym	tay Berry Aatt Illingworth 73-GENZAUCK16	est Methods in accor	402:1986 Tests 4.1.	Work Order No:	ETAM17W00549	ETAM17W00549
Client:	Address	Attention: F .c: N Project: 7	ocation: F	lest method: 4	Date	3/02/2017	3/02/2017

Coffey Services NZ Ltd 144A Cryers Road, East Tamaki, Auckland 2103, New Zealand PO Box 58 877, Botany, Manukau 2163, New Zealand t+64 9 272 3375 f+64 9 272 3378 www.coffey.com	Project No:773-ETAM00071AAWork Order No:ETAM17W00549Page No:2 of 2	ISH Tested by: JBG 3/02/2017 Date tested: 3/02/2017	
Coffey S	SITE PLAN NOT TO SCALE	Project: 773-GENZAUCK16856AA - DONEGAL STUD STAGE 9 FLAT BU Location: Northeast batter	

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BUSH not larcertan Road 31 Road 31	Z endorsed with NZSS 2 Z endorsed as part of the space o	101)/Muclear L his report. 770222 9 770221 5 770221 5	Verthing Si905539 Si905668	Testing		Depth Depth 150 0. 0. 0.		DJECT CODE: le: additional additional addi	e: 773-E e: 1012 AccretorTeoDe: 773-E 1012 AccretorTeoDeContent Testing (in u UTP in o subgrade UTP in o subgrade UTP in o subgrade UTP	DECT CODE: 773-ETAM000 Indication Indication Add7:2015 Test 42; Water Content Testing (In accordance to subgrade Test addresses Into subgrade UTP UTP Into subgrade UTP UTP	Discrit CODE: 773-ETAM00071AA 1 of 2 1 of 2 1 of 2 1 of 2 Ad07:2015 Trat 4.2): Water Content Testing (in accordance with NZS concentre to unper vite according to accordance with NZS unper vite unper vi	T73-ETAM00071AA Res T33-ETAM00071AA I of 2 Total Manual States a state and state a state and state a state and state a state and and and a state and	DECT CODE: 773-ETAM00071AA I of 2 I of 2 Resolution I of 1 of 2 I of 2 Resolution I of 1 of 2 I of 2 Resolution I of 1 of 2 I of 2 I of 2 Resolution I of 1 of 1 of 2 I of 2 I of 2 Resolution I of 1 of 1 of 1 of 2 I of 2 I of 2 Resolution I of 1 of 1 of 1 of 2 I of 2 I of 2 Resolution I of 1 of 1 of 1 of 2 I of 2 I of 2 I of 2 Resolution I of 1 of 1 I of 2	Distribution T/3-ETAM00071AA Ic: 1012 Ic: 1012 Ic: 1012 Ic: 1012 Ic: Approxed Signatory Ic: Ic: Ic: Approxed Signatory Ic: Ic: Ic: Ic: Ic: Approxed Signatory Ic: Ic: Ic: <th>T3-ETAN00071AA T3-ETAN00071AA te: 1012 T3-ETAN00071AA T3-ETAN00071AA T3-ETAN00071AA T3-ETAN00071AA T3-ETAN00071AA T3-ETAN00071AA T3-ETAN00071AA Tananovariante T3-ETAN00700071AA Tananovariante T3-ETAN0070071AA Tananovariante T3-ETAN0070071AA Tananovariante T3-ETAN0070071AA Tananovariante T3-ETAN0070071AA Tananovariante</th>	T3-ETAN00071AA T3-ETAN00071AA te: 1012 T3-ETAN00071AA T3-ETAN00071AA T3-ETAN00071AA T3-ETAN00071AA T3-ETAN00071AA T3-ETAN00071AA T3-ETAN00071AA Tananovariante T3-ETAN00700071AA Tananovariante T3-ETAN0070071AA Tananovariante T3-ETAN0070071AA Tananovariante T3-ETAN0070071AA Tananovariante T3-ETAN0070071AA Tananovariante
9 FLAT BUSH ons are not lANZ end at AY Road 31 AY Road 31	A S S S S S S S S S S S S S S S S S S S	on on of area of a transmission of the spart	on Easting 7 OT 111 1770221 5 OT 111 1770221 5	ee with NZGS 2001);Nuclear Densometer sreed as part of this report. on Easting Northing in area 1770208 5905699 OT fill 1770227 5905668 OT fill 1770227 5905668	ee with NZCS 2001).Nuclear Densometer Testing Control and Easting Northing Lane Filance 11770208 5905699	on aread as part of this report. aread as part of this repor	Image: control of the second	ProJect CODE: exam: Encorect CODE: encorect Encorect CoDE:	PROJECT CODE: 773-E1 Page: 1012 Antimitiation of the source of the so	PROJECT CODE: 773-ETAMOOT PROJECT CODE: 772-ETAMOOT	Total Total <th< th=""><th>PPOLECT CODE: T73-ETA/000071AA Page: 1 of 2 Page: 1</th><th>FROLECT CODE: 772-ET-AN00071Ai PeroLECT CODE: 1012 Image: State of the state of the</th><th></th><th>All contractions All contractions<</th></th<>	PPOLECT CODE: T73-ETA/000071AA Page: 1 of 2 Page: 1	FROLECT CODE: 772-ET-AN00071Ai PeroLECT CODE: 1012 Image: State of the		All contractions All contractions<

Coffey Services NZ Ltd 144A Cryers Road, East Tamaki, Auckland 2103, New Zealand PO Box 58 877, Botany, Manukau 2163, New Zealand t+64 9 272 3375 f+64 9 272 3378 www.coffey.com	Project No:773-ETAM00071AAWork Order No:ETAM17W00634Page No:2 of 2	Tested by: JBG Date tested: J3/02/2017	
Coffey V	SITE PLAN NOT TO SCALE	Project: 773-GENZAUCK168566AA - DONEGAL STUD STAGE 9 FLAT E Location: Road 3 and LOT fill	

kland 2103 kland 2103 kland 2163 +92723378 coffey.com		cordance	r Voids (%)	4.8	5.1	
Coffey Serv Tamaki, Auv fanukau, Auv 92723375 f	ar Pura	ons (in ac	Solid A bensity (Vm ³)	2.7	2.7	
s Road, East 77, Botany, N t+64	Ces	ty Calculati	Density (m ³)	.27	.49	
144A Cryer PO Box 588	bry: late:	2.1): Densi	ther Dry ((b)	-	8	
	/ed Signal	::1986 Test	sity Oven Wa Content (38.	26.	
	Approv	NZS 4402	Wet Den (t/m ³)	1.75	+ 1.89	
	AA d as are outside re creditation	rdance with	th in kPa netrate	6 132	217+	
	M00071 tts indicated a accredited oratory's ac	ng (in acco	lear Streng	146 14	204 18	
	of 2 of 2 not the the tory lab	ntent Testir	Field Sh UTP =	152	190	x
		Water Col				
	CREDITE	5 Test 4.2);	st			
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	ge:	e with NZS				
	R C	accordanc	Depth mm) finished	50	50	
		Testing in	RL Test	.50 1	.50 1	
		nsometer port.	F	5620 37	5629 37	
		Juclear De t of this re	ION DC	50 590	53 590	
n		SS 2001):h	Eastir	17704	17704	
		ce with NZG ANZ endor	5	A	A	
	HSD	accordance ns are not	Locati	Pond	Pond	
	9 FLAT B	ear vane in I calculation		X	Y	
	0 STAGE	ng field Sh lat Air Voic	Materia tested	Silty CL	Silty CL	
	dand 115 AL STUD	trength (us) ase note th	Layer	E	EII	
	ckland) eet, Aucl DONEG	1: Shear S (5(b)), Ple	Test No.	58	59	
	Z Ltd (Au nonds Str 6856AA -	rdance with Tests 4.1.1.	Tested by	AB	AB	
•	ervices N: 3261, Syn y jworth iZAUCK1	ods in acco 1402:1986	der No:	W01623	W01623	ad encoder in full.
No.	Coffey S PO Box i Ray Berr Matt Illinç 773-GEN Flat Bush	Test Metho with NZS 4	Work OI	ETAM17	ETAM17	the de fregmentation Net of the positions leader
	Client: Address Attention: c.c: Project: Location:	Test method:	Date	27/04/17	27/04/17	The report much relie on the second control of the second control



IZ Ltd 2103 2163 23378				nce	fr (%)	10		
Services N. Auckland , Auckland , Auckland , Auckland , Auckland		, ç	21	accorda	Air Void	3		
Coffey East Tamaki y, Manukau +64 927233		Puller Pate	3/05/20-	lations (in	Solid Density (t/m ³)	2.7		
yers Road, E 8877, Botan t		W m	0	nsity Calcu	ry Density (t/m ³)	1.43		
144A Cr PO Box 5		atory:	date:	st 2.1): Der	Vater D t (%)	0.6		
		ved Sign	Issue	:1986 Tes	sity Oven V Conten	ð		
		Approv		NZS 4402	Wet Den (t/m ³)	1.86		
	\$	as re outside reditation		dance with	n in kPa tetrate	211		
	000714	indicated credited a cope of the		(in accord	ar Strength nable to pen	3 240		
	8-ETAM f2	Tests not at the so		nt Testing	Field Shet UTP = U	19 22		
	1 0	N	BORATOR	ater Conte		5		
			DITEDLA	st 4.2): W:				
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	ECT CO			NZS 440	ö		э.	
	PROJE Page:			tance with				
			7.	(in accord	st Depth (mm) - Finished Ievel	150		
				r Testing	RL RI	38.30		
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				ance with NZG of IANZ endors	ation	Backfill		
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	00	O STAGE		sing field S that Air Vo	Mate	Silty C		
	kland 11	AL STUI		trength (u	Layer	μL		
	ckland) eet, Auc	DONEG		5(b)). Ple	Test No.	60		
	Z Ltd (Au ronds Str	6856AA -		rdance with Tests 4.1.1	Tested by	LW		
	ervices N. 261, Syn	y worth ZAUCK1	200-	ds in acco 402:1986	der No:	W01654		ad except in full. ad.
	Coffey St	Ray Berr Matt Illing 773-GEN	Flat Bush	Test Metho with NZS 4	Work Or	ETAM17		red or reproduc to positions test / No:105
Soffe	ent:	iention:	cation:	t method:	Date	28/04/17		oport must not be alte oport relates only to th Accredited Laboratory Fill insue sale 64072018
V	Add	Att C.C Prc	Ľ	Tes				sift SNR1 Toeru

Coffey Services NZ Ltd 144A Cryers Road, East Transk, Auckland 2102 PO Box 58877, Botany, Auckland 2162 1+64 9272375 1+9272375	1 of 2 1 of 2 Tests indicated as the scope of the the scope of the scope of the the scope of the scope of the the scope of the scope of the the scope of the scope of the scope of the the scope of the scope of t	Content Testing (in accordance with NZS 4402:1986 Test 2.1); Density Calculations (in accordance	Field Shear Strength in KPa Wet Damary Dven Water Dry Demary Solid Air Voids (%) UTP = Unable to penetrate (um ³) Content (%) (um ³) (um ³) (um ³)	136 141 141 1.86 28.7 1.45 2.7 4.8		
	PROJECT CODE: Page:	g in accordance with NZS 4407:2015 Test 4.2): Water C	est Depth (rhm) P. = Presente	150 At top of culvert pipe	At top of culvert pipe	
		oter Testing	RL Te	•	•	
		ar Densom his report.	Northing	5905624	219 2008 21	
		92	6un	0441	770457	
12		2001):Nuc d as part o	East	177	-	
	AT BUSH	ane in accordance with NZGS 2001):Nuc Jations are not IANZ endorsed as part o	Location	Pipeline (Above) 177(Pipeline (Above)	
	TAGE 9 FLAT BUSH	(field Shear vane in accordance with NZGS 2001);Nuc Air Void calculations are not IANZ endorsed as part o	Material Location East	Clay Pipeline (Above) 177(Sily CLAY Plpeline (Above)	
	dand 1150 AL STUD STAGE 9 FLAT BUSH	rength (using field Shear vane in accordance with NZGS 2001);Nuc ase note that Air Void calculations are not IANZ endorsed as part o	Layer Material Location East	Fill Clay Pipeline (Above) 177	Fill Sily CLAY Pipeline (Above)	
	ckland) eet, Auckland 1150 DONEGAL STUD STAGE 9 FLAT BUSH	:: Shear Strength (using field Shear vane in accordance with NZGS 2001);Nuc 5(b)). Please note that Air Void calculations are not IANZ endorsed as part o	Tost Layer Material Location East No.	61 Fill Clay Pipeline (Above) 177	62 Fill Sily CLAY Plpeline (Above)	
	lZ Ltd (Auckland) monds Street, Auckland 1150 I6856AA - DONEGAL STUD STAGE 9 FLAT BUSH	ordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001);Nuc Tests 4.1.1.5(b)). Please note that Air Void calculations are not IANZ endorsed as part of	Tested by Tost Layer Material Location East	AB 61 Fill Clay Pipeline (Above) 177	AB 62 FII Sily CLAY Plealine (Above)	
	Coffey Services NZ Ltd (Auckland) PO Box 8261, Symonds Street, Auckland 1150 Ray Berry Matt Illingworth 773-GENZAUCK16856AA - DONEGAL STUD STAGE 9 FLAT BUSH	Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001);Nuc with NZS 4402:1986 Tests 4.1.1.5(b)). Please note that Air Void calculations are not IAN2 endorsed as part o	Work Order No: Tested by Test Layer Material Location East	ETAM17W01712 AB 61 Fill Clay Pipeline (Above) 177	FTAM17W01712 AB 62 FII Sily CLAY Pleatine (Above) 1	

COLT A RUMA ROMON	ey 💸																		144A Cry PO Box 56	ers Road, Ear 1877, Botany, t +6	Coffey Sen t Tamaki, Au Manukau, Au 4 92723375 f	ces NZ Ltd kland 2103 kland 2163 +92723378
Client: Address	Coffey Services h PO Box 8261, Syi	NZ Ltd (, monds ;	Auckland Street, Au	() uckland 11:	50							PROJECT CO Page:	DE:	773-E 1 of 2	TAMOOO	71AA						
Attention: c.c:	Ray Berry Matt Illingworth	10000			U V FS	H V Li U						2	LN S	Tests	indicated a	is re outside				d's	2 more	
Project.		Yacool				ר ע ר	E 000					ACC	CREDITED LABORATO	the site of the si	cope of the story's accre	ditation	App	oved Sign	natory:	Шş	c Paton	
Test method:	Test Methods in acc with NZS 4402-1986	ordance V	with: Shea	r Strength (u	Ising field S	Shear vane	e in accordance with NZG	S 2001):Nuclea	r Densome	eter Testin	g (in accor	dance with NZS 4407	":2015 Test 4.2): Water	Content T	asting (in a	ccordance	with NZS 44	02:1986 Te	e date: ist 2.1): Dens	sity Calculat	/ LOZ/SC	ordance
Date	Work Order No:	Tested	by Test No.	Layer	Mater	nial	Location	Easting	Northing	RL	Test Depth (mm)	Č	mments	Field	I Shear Str TP = I Innho	ength in kP	a Wet D	Density Oven	Water Dry nt (%)	· Density (Vm ³)	Solid A Density (Vim ³)	(%) spio/.
5/05/17	ETAM17W01726	AB	83	Subgrade	e Silty CI	:LAY	Roadway Fill	1770466	5905600	1	150			152	141	157	1.	87	30.6	1.43	2.7	3.3
5/05/17	ETAM17W01726	AB	64	Subgrade	e Silty C)LAY	Pipeline Fill	1770454	5905613	•	150			152	162	157	175 1.	29 3	35.7	1.32	2.7	4.0
This report must not be al. This report must not be al.	I freed or reproduced evened in full. The positions based.											ε										
UNZ Accredited Laboration	oy No.105																					

Coffey Services NZ Ltd 144A Cryers Road. East Tamaki. Auckland 2103. New Zealand PO Box 58 877, Botany. Manukau 2163. New Zealand t+64 9 272 3375 f+64 9 272 3378 www.coffey.com

Client:

Principal:

Project No.:

Project Name:

Lot No.:

Nuclear Density Report

Auckland 1150

773-ETAM00071AA

Ray Berry

Coffey Services (NZ) Limited (Auckland)

773-GENZAUCK16856AA - DONEGAL STUD STAGE 9 FLAT BUSH

TRN: -

PO Box 8261, Symonds Street

East Tamaki Laboratory

Coffey Services (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: ND:ETAM17W00232

Issue No: 2 This report replaces all previous issues of report no 'ND:ETAM17W00232'.

> 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.}

Approved Signatory: Eric Paton (Laboratory Manager) IANZ Accredited Laboratory Number:105 Date of Issue: 20/06/2017

Testing D	etails	Compaction Target Details	
Site Tested:	Retaining wall fill, CH 00m = Northern edge of fill	Material Sample ID: External MDD Method: ~	
Tested By: Date Tested:	Alistair Brown 18/01/2017	Max. Dry Density: 1.89 t/m ³ @ 7.5 %	
Time Tested:	08:00	Solid Density Type:	
Material: Field Methods	Run of Pit : NZS 4407:2015 Test 4.3		
Test	14 -		

lest nesu	แอ							
Chainage (m)	Offset (m)	Offset From	Layer	Probe Depth (mm)	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
10	2.0	Eastern edge of fill	1.5m from *BOF	0	8.5	2.19	2.02	106.9
20	2.0	Eastern edge of fill	1.5m from *BOF	0	9.0	2.24	2.06	108.9

Coffey Services (NZ) Limited

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A IE INA IEUN UU	WEAN1					Repo	TT NO: ND:ETAM	17000233
Nuclea	r Density	Report			This rep	ort replaces all pre	vious issues of report no 'NE	Issue No: 2 ETAM17W00233'.
Client:	Coffey Services (PO Box 8261, Sy Auckland 1150	NZ) Limited (Auck monds Street	land)			Tests ir scope o {This do except tested.}	ndicated as not accredited an of the laboratory's accreditati ocument may not be altered in full. This report relates on	e outside the on. or reproduced y to the positions
Principal:	Ray Berry				\odot	NZS	01	
Project No.:	773-ETAM00071	AA			ACCREDITED L	ABORATORY	Kon	
Project Name:	773-GENZAUCK168	56AA - DONEGAL ST	UD STAGE 9 FLA	T BUSH		Approv (Labora	ed Signatory: Eric Paton atory Manager)	
Lot No.: -		TRN:	-			IANZ A Date of	ccredited Laboratory Number Issue: 20/06/2017	er:105
Testing De	etails			Compact	ion Ta	rget Deta	ils	
Site Tested:	Road 4 CH 00m = Culvert wal	l, northbound		Material Samp MDD Method:	ole ID:	Ēxternal ~		
Tested By:	Jock Barns-Graham			Max. Dry Dens	sity:	1.89 t/m³ @ 7	7.5 %	
Date Tested:	18/01/2017			Min. Dry Dens	sity (t/m³):	1.80		
Time Tested:	11:30			Solid Density	Type:			
Material:	SPR			_				
Field Methods:	NZS 4407:2015 Test 4	1.3						
Test Resu	lts							
Chainage (m)) Offset (m)	Offset From	Probe Depth (mm)	Moisture	(%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)

0

9.0

2.14

1.97

104.2

Comments

10

1.5

~ Test was conducted externally and is not accredited by this laboratory. Percentage of Relative Compaction calculations are not IANZ endorsed as part of this report. Minimum Dry Density is assumed

Silt fence

Coffey Services (NZ) Limited

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A TETRA TECH CO	MPANY			Report No: ND:ETAM17W00258
Nuclea	r Density Report		This report r	Issue No: 3 replaces all previous issues of report no 'ND:ETAM17W00258'.
Client:	Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150			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.}
Principal:	Ray Berry			L 8 0 k
Project No.:	773-ETAM00071AA		ACCREDITED LABO	RATORY Approved Signatory Eric Datan
Project Name:	773-GENZAUCK16856AA - DONEGAL STUD STAGE 9 FL	AT BUSH		(Laboratory Manager)
Lot No.: -	TRN: -			IANZ Accredited Laboratory Number:105 Date of Issue: 20/06/2017
Testing De	etails	Compact	ion Targ	et Details
Site Tested:	Road 4, SPR fill area by the stream Ch 00m = Culvert wall, northbound	Material Sam MDD Method:	ple ID: Ē	xternal
Tested By:	Jock Barns-Graham	Max. Dry Den	sity: 1.	89 t/m³ @ 7.5 %
Date Tested:	19/01/2017	Min. Dry Dens	sity (t/m³): 1.	80
Time Tested:	08:00	Solid Density	Type:	
Material:	SPR			
Field Methods:	NZS 4407:2015 Test 4.3			
Test Resu	Its			

Chainage (m)	Offset (m)	Offset From	Probe Depth (mm)	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction
22	1.5	Silt fence	0	7.5	2.20	2.05	(%)

Comments

~ Test was conducted externally and is not accredited by this laboratory. Percentage of Relative Compaction calculations are not IANZ endorsed as part of this report. Minimum Dry Density is assumed

Client:

Principal:

Project No.:

Project Name: Lot No.: -

Nuclear Density Report

Auckland 1150

773-ETAM00071AA

Ray Berry

Coffey Services (NZ) Limited (Auckland)

773-GENZAUCK16856AA - DONEGAL STUD STAGE 9 FLAT BUSH

TRN: -

PO Box 8261, Symonds Street

East Tamaki Laboratory

Coffey Services (NZ) Limited

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Report No: ND:ETAM17W00286

Issue No: 4

This report replaces all previous issues of report no 'ND:ETAM17W00286'.

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.}

Approved Signatory: Eric Paton (Laboratory Manager) IANZ Accredited Laboratory Number:105 Date of Issue: 20/06/2017

Testing D	etails	Compaction Ta	arget Details
Site Tested:	SPR embankment, CH 00m = Northern edge of SPR embankment	Material Sample ID: MDD Method:	Ēxternal ~
Tested By: Date Tested:	Alistair Brown 20/01/2017	Max. Dry Density:	1.89 t/m³ @ 5.5 %
Time Tested:	13:45	Solid Density Type:	
Material: Field Methods	SPR : NZS 4407:2015 Test 4.3		
Test Desi	140		

lest resu	แอ							
Chainage (m)	Offset (m)	Offset From	Layer	Probe Depth (mm)	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
5	1.5	Embankment edge	3.0m to FL	0	7.0	1.99	1.86	98.2
15	1.5	Embankment edge	3.0m to FL	0	6.5	2.03	1.91	101.1
25	1.5	Embankment edge	3.0m to FL	0	7.5	2.07	1.93	101.9

Comments

~ Test was conducted externally and is not accredited by this laboratory. Percentage of Relative Compaction calculations are not IANZ endorsed as part of this report.

Nuclear Density Report

 Client:
 Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street Auckland 1150

 Principal:
 Ray Berry

 Project No.:
 773-ETAM00071AA

 Project Name:
 773-GENZAUCK16856AA - DONEGAL STUD STAGE 9 FLAT BUSH

 Lot No.:

East Tamaki Laboratory

Coffey Services (NZ) Limited

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Report No: ND:ETAM17W00324

Issue No: 3

This report replaces all previous issues of report no 'ND:ETAM17W00324'.

Date of Issue: 20/06/2017

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.}

Approved Signatory: Eric Paton (Laboratory Manager) IANZ Accredited Laboratory Number:105

Testing D	etails	Compaction Target Details
Site Tested:	Road 4 - SPR fill beside the stream, Refer to plan	Material Sample ID: External MDD Method: ~
Tested By:	Jock Barns-Graham	Max. Dry Density: 1.89 t/m³ @ 5.5 %
Date Tested:	23/01/2017	Min. Dry Density (t/m³): 1.80
Time Tested:	08:30	Solid Density Type:
Material:	SPR	
Field Methods	: NZS 4407:2015 Test 4.3	
Test Dest	lta	

lest result	5						
Chainage (m)	Offset (m)	Offset From	Probe Depth (mm)	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
24	2.0	Culvert wall	0	8.5	1.90	1.75	92.7
34	2.0	Culvert wall	0	9.0	2.04	1.87	99.1
40	2.0	Culvert wall	0	8.5	1.97	1.81	95.8

Comments

~ Test was conducted externally and is not accredited by this laboratory. Percentage of Relative Compaction calculations are not IANZ endorsed as part of this report. Minimum Dry Density and Optimum Moisture Content are assumed

Nuclear Density Report

Auckland 1150

Client: Coffey Services (NZ) Limited (Auckland) PO Box 8261, Symonds Street

Principal: Ray Berry Project No.: 773-ETAM00071AA **Project Name:** 773-GENZAUCK16856AA - DONEGAL STUD STAGE 9 FLAT BUSH Lot No.: TRN: -

East Tamaki Laboratory

Coffey Services (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

Date of Issue: 20/06/2017

Testing D	etails	Compaction Ta	arget Details
Site Tested:	Stream abutment, CH 00m = Northern edge of abutment	Material Sample ID: MDD Method:	External ~
Tested By:	Alistair Brown	Max. Dry Density:	1.89 t/m³ @ 5.5 %
Date Tested:	24/01/2017	Min. Dry Density (t/m ³	3): 1.80
Time Tested:	08:00	Solid Density Type:	
Material:	SPR		
Field Methods	:: NZS 4407:2015 Test 4.3		
Test Desi	Jta		

Test nesu	แอ							
Chainage (m)	Offset (m)	Offset From	Layer	Probe Depth (mm)	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
5	1.5	Edge of abutment	2.5m to FL	0	6.5	2.02	1.89	100.2
15	1.5	Edge of abutment	2.5m to FL	0	7.5	2.04	1.90	100.8
25	1.5	Edge of abutment	2.5m to FL	0	6.5	2.03	1.90	100.6

Comments

Test was conducted externally and is not accredited by this laboratory. Percentage of Relative Compaction calculations are not IANZ endorsed as part of this report. Minimum Dry Density and Optimum Moisture Content are assumed

Lot No.:

Nuclear Density Report

 Client:
 Coffey Services (NZ) Limited (Auckland)
PO Box 8261, Symonds Street
Auckland 1150

 Principal:
 Ray Berry
773-ETAM00071AA

 Project No.:
 773-GENZAUCK16856AA - DONEGAL STUD STAGE 9 FLAT BUSH

TRN: -

East Tamaki Laboratory

Coffey Services (NZ) Limited

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

Report No: ND:ETAM17W00367

Issue No: 2

This report replaces all previous issues of report no 'ND:ETAM17W00367'.
Tests indicated as not accredited are outside the

Date of Issue: 20/06/2017

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.}

Approved Signatory: Eric Paton (Laboratory Manager) IANZ Accredited Laboratory Number:105

Testing Details		Compaction Target Details
Site Tested:	Road 4, SPR fill area, CH 00m = Culvert wall, northbound	Material Sample ID: External MDD Method: ~
Tested By:	Julia Vaka	Max. Dry Density: 1.89 t/m ³ @ 7.5 %
Date Tested:	26/01/2017	Min. Dry Density (t/m³): 1.80
Time Tested:	07:45	Solid Density Type:
Material:	Soft Pit Run	
Field Methods	s: NZS 4407:2015 Test 4.3	
Test Beer		

lest Result	5						
Chainage (m)	Offset (m)	Offset From	Probe Depth (mm)	Moisture (%)	Wet Density (t/m³)	Dry Density (t/m³)	Relative Compaction (%)
28	2	Edge of works	0	13.5	2.11	1.86	98.2
34	2	Edge of works	0	12.5	2.12	1.89	99.8
40	2	Edge of works	0	12.0	2.07	1.85	98.0

Coffey Services (NZ) Limited

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East Tamaki Laboratory

Coffey Services (NZ) Limited

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				Fax: +	54 9 272 3378		
					Rep	ort No: Cl	LEG:ETAM17W00340
Clegg Impact Value Test Report						Issue No:1	
01099					This report replace	s all previous issue	s of report no. 'CLEG:ETAM17W00340'
Client:	Coffey Services (NZ) L	imited (Auckland	d)		All te acco	ests reported her rdance with the l	an have been performed in aboratory's scope of accreditation.
	PO Box 8261, Symono	ls Street		Ó	This	document may	not be altered or reproduced except ates only to the positions tested.}
	Auckland 1150			ACCREDITED I	ABORATORY		
Principal:	Ray Berry				\$	201	
Project No	.: 773-ETAM00071AA	773-ETAM00071AA			2	Y Non	
Project Name: 773-GENZAUCK16856AA - DONEGAL STUD		. STUD STAGE		Appr (Lab	oved Signatory: oratory Manager	Eric Paton	
Lot No.: TRN: -			IANZ	Accredited Lab	oratory Number: 105		
Site Det	aila				Date	UI ISSUE.	
Site Det	ans						
Work Order	ID: ETAM17W00340			Date Sa	mpled: 25/	01/2017	
Sample ID:	ETAM17S-00622 To ETA	M17S-00624		Sample	d by: Joc	k Barns-Gra	ham
Material:	Kaipara- Brookby Quarry	SPR					
Project Loca	ation: Road 4 - SPR fill area, R	efer to plan-retest	from 23/1/17				
Start Locatio	on: Refer to plan						
General		M D5074 00001 *			•• (1.)	4.50	
Test Method		W D5874-2002j *		Hamme	r Mass (kg):	4.50	
		O ((a) (1))	O %= at (a)		011/		0
Test No.	Chainage (m)	Offset (m)	Unset fro	m			Comments
1	24	2.0	Edge of wo	rks 24			
2	34	2.0	Edge of works		20		
3	40	2.0	Edge of wo	orks	25		
			CASTLEAVE COLOR				

Not to scale

Form Number: R016 Issue Date: 09/08/2016

Coffey Services (NZ) Limited

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				Report No: CLEG:ETAM17W00367			
Clegg Impact Value Test Report				Issue No:1 This report replaces all previous issues of report no. 'CLEG:ETAM17W00367'			
Client:	Coffey Services (NZ) Li PO Box 8261, Symonds Auckland 1150	mited (Auckland s Street	(k	All tests reported herein have been performed in accordance with the laboratory's scope of accreditation. (This document may not be altered or reproduced except in full. This report relates only to the positions tested.)			
Principal: Project No.:	Ray Berry 773-ETAM00071AA			Jo-Mighty			
Project Name:	773-GENZAUCK16856	AA - DONEGAL	STUD STAGE	Approved Signatory: James McKelvey (Senior Technician)		Signatory: James McKelvey chnician)	
Lot No.: -		TRN: -		IANZ Accredited Laboratory Number: 105 Date of Issue: 1/02/2017		edited Laboratory Number: 105 ue: 1/02/2017	
Site Details	S						
Work Order ID:	ETAM17W00367			Date Sample	ed: 26/01/20	017	
Sample ID:	ETAM17S-00685 To ETAM17S-00687			Tested by: Jock Barns-Graham			
Material:	Soft Pit Run						
Project Location	Project Location: Road 4						
Start Location: Culvert wall, northbound							
General Te	General Test Information						
Test Method: Clegg Impact Value [ASTM D5874-2002] *		Hammer Mass (kg): 4.50					
Test Resul	lts						
Test No.	Chainage (m)	Offset (m)	Offset fro	m	CIV	Comments	
1	28	2.0	Edge of wo	rks	20		
2	34	2.0	Edge of wo	rks	24		
3	40	2.0	Edge of wo	rks	26		

Appendix D – Stability Analysis Test Results and Geotechnical Building Zone

A-A LONGITUDINAL SECTION BETWEEN 0.00 AND 43.44

SECTION A-A SCALE HOR 1:200 VER 1:200

B-B

LONGITUDINAL SECTION BETWEEN 0.00 AND 56.94

SECTION B-B SCALE HOR 1:200 VER 1:200

ASSOCIATION OF CONSULTING ENGINEERS NEW ZEALAND	ISO QU/ ASS	ISO 9001 QUALITY ASSURED				
INIS DRAWING AND DESIGN REMAINS THE PROPERTY OF, AND MAY N OR ALTERED, WITHOUT THE WRITTEN PERMISSION OF HARRISON GRIEF LIMITED. NO LIABILITY SHALL BE ACCEPTED FOR UNAUTHORISED USE	OF THIS DR	JUTANTS AWING.				
LEGEND: INDICATES AS-BUILT GROUN INDICATES DESIGN GROUNI INDICATES EXISTING GROU	ND SURFA	FACE ICE FACE				
HUGH GREEN GROUP HUGH GREEN GROUP HUGH GREEN GROUP HUGHTH HOUSE 71 GRE NEWMARKET AUCKLAND T +64 9 917 5000 W www.harrisongrierson.d	REEN ED	ROAD				
	+]				
2 SCALE UPDATED	DXK	18.05.17				
REF REVISIONS	BY	09.05.1/ DATE				
DONEGAL STUD 80 DRUMBUOY DRIVE FLAT BUSH TITLE: DESIGN CONTOURS (STREAM BANK) LONGITUDINAL SECTION PROFILES						
ORIGINATOR: DATE: SIGNED: PLO	T BY:	עעח				
DRAWN: DATE: SIGNED: PLO	T DATE:	UXK				
DXK 09.05.17	VEV RV-	.0.08.17				
WJP 05.2017	VET BT:					
APPROVED: DATE: SIGNED: SUR WJP 05.2017	VEY DATE:					
ISSUE STATUS:						
PROJECT No: SCALES: 1:200 H 1:200 V (A1)		111				
1050-139707-01 1:400 H 1:400 V (A3) DRAWING No:		A1 REV				
139707-221-AB 2						





		v v	20.0	40.0	00.0		
ORIGINAL ISSUE						approved	кімн
			Horizontal Scale (metres)				
		0	20.0	40.0	60.0	date	03/08/17
			Vertical Sc	ale (metres)		scale	1:1000
						original	
						size	A3

coffev	project:
A TETRA TECH COMPANY	^{title:} GE
	project r

913 9476804 1804 DP 492	N				
B					
HUGH GREEN LIMITED DONEGAL STUD STAGE 9 FLAT BUSH					
OTECHNICAL BUILDING ZONES & ENGINE	ERED EMBANKMENTS				
D: 773-GENZAUCK16856AA figure no:	1 rev: A				

Appendix E – Producer Statement (PS4)



Level 11, 7 City Road, Grafton Auckland 1010 PO Box 8261, Symonds Street Auckland 1150 New Zealand

> t: +64 9 379 9463 f: +64 9 307 2654

> > coffey.com

4 August 2017

Our ref: GENZAUCK16856AA

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

Attention: Mr W Platts

Dear Will

Earthworks Inspections for Construction of Road 2 and Road 4 Engineer Fill Embankments and Road 4 Gabion Basket Retaining Wall Foundation, Donegal Stud Residential Subdivision, Stage 9 at 80 Drumbuoy Drive, Flat Bush

This is to confirm that we visited the above site on several occasions from November 2016 and May 2017 to observe the earthworks to construct the reinforced engineer certified fill embankments and Gabion basket retaining wall foundations for Road 2 and Road 4 of the proposed Donegal Stud Residential Subdivision, Stage 9.

During our visits we noted that topsoil had been stripped from the area to be earthworked. By late November construction of the fill batter adjacent to Road 2 commenced. At this time a bench was formed at the toe of the slope to enable the placement of filling to form the Embankment (Embankment E). Once the bench was formed, filling sourced from the down cutting of lots was placed to an Engineer certified standard until design subgrade levels were achieved.

Earthworks to construct the reinforced engineer fill embankment (Embankment C) commenced in early January 2017. The removal of topsoil at the toe of this area revealed uncertified filling that was most likely placed to form a pre-existing farm track. This material was then uplifted and the toe of the slope benched ready to receive engineer certified filling. Due to typical design slope gradients exceeding 1(V):2.5(H) (at Embankment C), biaxial geogrid was placed parallel to the face of the embankment, every 0.5m lift to provide additional strength and to prevent long term soil creep from causing adverse effects related to building foundations.

By mid- January 2017 earthworks to construct a Soft-Pit-Run (SPR) engineer certified fill embankment (Embankment D) near the intersection of Road 4 and Road 5 commenced. The initial works focussed on removing the soft saturated alluvial deposits from the toe of the proposed embankment to provide

Coffey Services (NZ) Limited NZBN: 9429033691923

a stable foundation. An undercut of up to 2m below the existing ground level was conducted to remove the weak materials and to expose weathered moderately dense sand commonly associated with the East Coast Bays transition to bedrock.

The undercut was then backfilled with SPR compacted to an engineer certified standard. At this time two underfill drains comprised of a 160mm perforated drain coil surrounded by drainage metal and then fully wrapped in geotextile were installed in shallow trenches at the toe and into the natural subsoils forming the slope behind the SPR fill embankment. Due to the slopes in this portion of the embankment exceeding 1(V):1.5(H) biaxial geogrid was placed parallel to the face of the embankment, every 0.5m lift. The geogrid was added to prevent shallow slumping from occurring in the face of the embankment.

Construction of the SPR batter continued until late January 2017 when the surface of the SPR was approximately 1m below design subgrade level. At this time the fill material was substituted with cohesive clay fill so that uniformity of Road 4 subgrade could be maintained. Once the final batter gradients had been formed the stabilised embankments were covered with topsoil.

By early May 2017 work to construct a gabion basket retaining wall along the crest of Road 4 SPR embankment commenced. The enabling works for the gabion basket wall involved the removal of the surface layer of clay fill placed over the SPR that was within the footprint of the proposed retaining wall. GAP40 hardfill was then placed over the SPR and compacted with a 500kg vibrating plate compactor to an engineer certified standard. Construction of the gabion basket retaining wall commenced once the base had been formed.

On the basis of our site observations and insitu soils testing, we are satisfied that the ground conditions exposed during the construction were generally consistent with those encountered in our investigation boreholes and those that formed the basis of the recommendations contained in our Geotechnical Investigation Report reference GENZAUCK16856AA, dated 29 July 2016, and in our later Road 4 Embankments memo reference GENZAUCK16856AA, dated 18 January 2017.

For and on behalf of Coffey

Prepared By:

Ray Berry Senior Engineering Geologist

Reviewed / Authorised By:

Kah-Weng Ho Senior Principal

Attachments - Producer Statement – Construction Review (PS4) Road 4 Embankment Recommendations Memorandum, dated 18 January 2017 Road 4 Stability Analysis Test Results



Building Code Clause(s) B1 STRUCTURE

PRODUCER STATEMENT – PS4 – CONSTRUCTION REVIEW

ISSUED BY:	COFFEY GEOTEC	HNICS (NZ) LIMIT	ED				
		(Construction Review F	īrm)				
то:	HUGH GREEN LIMI	TED					
		(Contractor)					
TO BE SUPPLIED TO:	AUCKLAND COUNC		·····				
		(Building Consent Auth	ority)				
IN RESPECT OF: RC	AD 4 REINFORCED E	NGINEER FILL EN	BANKMENT DESIG	SN / CONSTRUCTION	1&		
G <i>F</i>	BION BASKET RETAIL	(Description of Building	Nork)				
AT.			211				
AI.	NO. 00 DICOMBOOT	(Address)					
		LOT 900	DP 492	2446 SO -			
COFFEY GEOTECHNICS	(NZ) LIMITED h	as been engaged b	y HUGH GREEN	I LIMITED			
(Construction Review Firm) (Contractor)							
or Souther OBSERVATION OF SITE PREPARATION, EARTHWORKS, STABILITY UNDERCUTS, PLACEMENT							
COFFEY LETTER DATED	2 JULY 2017, REFER	ENCE GENZAUCK	(16856AA	LL FOUNDATIONS, /	AS PER		
in respect of clause(s)	B1 STRUCTL	(Extent of Engagement) JRE	of the Building Code	e for the building work	described in		
decumente relating to Duil	ding Concept No. N/	Δ	C C	and the	a ralating to		
documents relating to Buil	aing Consent No. N/	4		and those	se relating to		
Building Consent Amendn	nent(s) Nos.		N/A	issue	ed during the		
course of the works. We h	ave sighted these Build	ing Consents and t	he conditions attach	ed to them.			
Authorised instructions / v	ariation(s) No.		N/A	(copi	es attached)		
or by the attached Schedu	ile 🗌 have been issued	during the course	of works				
On the basis of Sthis	\Box these review(s) and	information supplie	ed by the contracto	r during the course of	of the works		
and on behalf of the firm	n undertaking this Con	struction Review, I	believe on reason	able grounds that	□All ⊠Part		
only of the building works	s have been completed	I in accordance wi	th the relevant requ	irements of the Build	ing Consent		
and Building Consent Ame	endments identified abo	ve, with respect to	Clause(s) B1 STRU	CTURE of the Building	g Code.		
I also believe on reasonab	ole grounds that the pers	sons who have und	ertaken this construe	ction review have the	necessary		
competency to do so.							
		am.		45290			
I, KAH-W	ENG HO	an	⊠CPEng No.	10200			
I, KAH-W (Name of Construction	ENG HO on Review Professional)		⊠CPEng No.	10200			
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To form to accompany forms 6 or 8 of the Building (Form) Regulations 2004 for the issue of a Code Compliance Certificate. THIS FORM AND ITS CONDITIONS ARE COPYRIGHT TO ACENZ, IPENZ AND NZIA PRODUCER STATEMENT PS4 1 Octob