15 September 2017

HUAPAI TRIANGLE SUB PRECINCT A, STAGE 1C

GEOTECHNICAL COMPLETION REPORT

Cabra Developments Limited

Ref: AKL2016_0634AE Rev: 1

Table of Contents

Appendices

1. INTRODUCTION

In accordance with our instructions, this Geotechnical Completion Report has been prepared for Cabra Developments Limited as part of the documentation to be submitted to Auckland Council following earthworks to form Stage 1C of the Huapai Triangle Sub Precinct A development. Construction of this residential subdivision has been undertaken in accordance with the Auckland Council Resource Consent number SUB-65117 and Engineering Approval letter dated 23 February 2017. Specific structures constructed during the civil works to create the subdivision include timber pole retaining walls and segmental block retaining walls, and two timber boardwalks across the stormwater utility reserve.

This report contains our Suitability Statement, specific comments related to items raised in the Resource Consent, relevant test data and the Cato Bolam Limited as-built plan set as provided in Appendix B.

This report covers the construction period December 2016 to September 2017 and is intended to be used for certification purposes for new lots (listed below) created from Lot 119 DP 508664 as follows:

- 38 new residential lots numbered 93 to 130, with lots 93, 97 and 101 being superlots;
- 1 new road numbered lot 1006 and named Jane Maree Road;
- 1 new stormwater utility reserve numbered lot 1000;
- 1 new local purpose accessway numbered lot 1111; and,
- 1 new right of way numbered lot 501.

This stage of the Huapai Triangle Sub Precinct A is located off Vinistra Road. As can be seen from the as-built plans, 15 of the lots have been affected by filling as part of the earthworks operations to a maximum depth of approximately 2.5 metres.

2. PROJECT BACKGROUND

The geotechnical investigations and design were undertaken by Coffey Geotechnics (NZ) Limited and CMW Geosciences (NZ) Limited as presented in the following reports:

- Geotechnical Constraints Report prepared by Coffey Geotechnics, referenced GENZAUCK16252AA, and dated 12 March 2014.
- Geotechnical Investigation Report prepared by CMW Geosciences, referenced 2015_1029AB Rev. 0, and dated 24 November 2014.
- Retaining Wall Design Report prepared by CMW Geosciences, referenced AKL2016_0634AV Rev. 0, and dated 20 January 2017.

3. DESCRIPTION OF EARTHWORKS

Earthworks operations for the development began in early December 2016 with the installation of silt fences and other environmental controls. The temporary silt ponds for this stage were located on the neighbouring stages. Cut/Fill for this stage was conducted in conjunction with the other stages of this development and with neighbouring developments, all of which were under the observation of CMW Geosciences. The majority of this stage is in areas of cut, with a small area of filling required to form the western lots and the stormwater ‘greenfinger’ which borders the stage to the west and north.

By January 2017 the bulk earthworks for the stage were mostly complete. An area of organically stained material was observed in the south-eastern corner of the site, affecting road 12 and some of the surrounding lots. This material was undercut as part of the road subgrade formation.

Civil works including road construction began in January 2017 and continued until stage completion in July 2017.

Construction of the timber pole and segmental block retaining walls began in February 2017. The timber pole retaining walls were completed by March 2017 and the segmental block retaining walls in June 2017.

The two timber boardwalks across the stormwater utility reserve and the associated gabion structures were constructed in August 2017.

4. GEOTECHNICAL QUALITY CONTROL

4.1. Site Observations

During the earthworks site visits were typically undertaken several times each week to assess compliance with NZS 4431 and specific design recommendations and specifications.

Site visits were carried out to observe and confirm compliance relating to:

- Adequate topsoil stripping;
- Fill areas prior to the placement of fill materials to ascertain that all mullock and soft inorganic subsoils had been removed;
- Excavation and backfilling of sewer and stormwater trenches;
- Retaining wall pile excavations;
- Construction of cantilever pole retaining walls including ground conditions, pile size, spacing and depth;
- Construction of keystone walls including ground conditions, block placement, geogrid placement and hardfill backfill;
- Placement and compaction of engineered fills; and,
- Installation of subsoil drainage.

4.2. Compaction Control

Compaction of engineered earth fills was controlled by undrained shear strength measured by hand held shear vane calibrated using the NZGS 2001 method and by air voids as defined by NZS4402.

General Fills

The criteria for undrained shear strength were a minimum single value of 110 kPa and minimum average of any 10 consecutive tests of 140 kPa.

The criteria for air voids were a maximum single value of 12% and maximum average of any 10 consecutive tests of 10%.

Vane shear strength, water content and in situ density tests were carried out on all areas of the engineered filling to at least the frequency recommended by NZS 4431.

These tests showed on multiple occasions that the required compaction standards were not being achieved due to the fill materials being too wet, and to the best of our knowledge the failing areas of fill were re-worked as necessary. Subsequent testing confirmed compliance with the specification.

5. EVALUATION OF COMPLETED EARTHWORKS

5.1. Natural Hazards

The appended as-built drawings depict the extents of zones that contain limitations intended to ensure that future building and/ or earthworks on the lots is undertaken in a manner that does not lead to buildings being subject to any of the natural hazards described in section 106 of the Resource Management Act, i.e. erosion, falling debris, subsidence, slippage, and inundation. Consideration of the inundation hazard was outside the scope of CMW's brief and has been assessed by others. The applied zones include:

- **Specific Design Zones (retaining)** - intended to protect the retaining walls from overloading at the crest or undermining at the toe that could lead to instability;
- **Specific Design Zones (slope)** – intended to protect building development from long term creep effects on or adjacent to steep slopes and to protect the slopes from inappropriate loading or undermining.

Full descriptions of the restrictions associated with these zones are presented in the Suitability Statement (Appendix A) and their locations are depicted on the appended Cato Bolam Limited As-built Plans. Additional information is also provided in some of the following sections.

5.2. Natural Soils Geotechnical Assessment

Portions of lots within this stage of the subdivision are formed partially within natural soils, which are predominantly of alluvial origin.

During construction and earthworks, lenses of firm to stiff organically stained clay soils were observed and were undercut and replaced with engineered fill.

Hand auger boreholes conducted in the centre of each lot as part of the post earthworks investigations did not encounter further lenses of organically stained soils, but observed relatively low strength natural subsoils.

While not expected, some discrete lenses of organic stained clay soils may still exist within the natural soils beneath lot areas. We do not consider that liquefaction and/or settlement due to discrete lenses of organically stained clay soils are a significant geotechnical risk for development or future residential dwellings built in general accordance with NZS3604.

5.3. Land Stability and Erosion Control

Building and landscape designers must ensure that all runoff from solid surfaces is directed into the stormwater system. It is also important that care is paid to the disposal of stormwater during construction so that concentrated discharges (e.g. from unconnected spouting) are not directed towards steep ground.

Depths of mulch and topsoil applied to sloping areas should be limited to less than 150mm to minimise the risks of saturation leading to localised slumping on batter face. Wherever practical on such land, existing vegetation and grass cover should be well maintained. Any vegetation cleared beyond the immediate area of building platforms for temporary construction purposes should be replanted or replaced as soon as possible. The roots of an established vegetation cover can serve to bind the surface soils while the foliage can reduce rain infiltration and soil saturation, resulting in better resistance to erosion and shallow slumping.

5.4. Retaining Walls

Cantilever pole retaining walls and segmental block walls have been constructed in the locations shown on the appended Cato Bolam Limited As-built Plan. These walls reach a maximum height of

approximately 2.0 metres and were designed by CMW Geosciences, approved under BCO10090856, and the construction was observed by this consultancy. Copies of the Producer Statements - Construction Review are provided in Appendix E.

Descriptions of the building and earthworks restrictions within the vicinity of these walls (Specific Design Zones – retaining) are contained in the Suitability Statement in Appendix A. Lots containing these zones are 108 to 130 inclusive.

5.5. Fill Induced Settlement

On the basis of the relatively minor magnitude of fill depths on this site, together with the elapsed time since it was placed, we consider that remaining post-construction settlements will be within code limits.

5.6. Service Line Trenches

As part of the civil works, sanitary sewer and stormwater services were trenched throughout the development as shown on the appended Cato Bolam Limited Stormwater and Sanitary Sewer As-built Plans.

As is normal on all subdivisions, building developments involving foundations within a 45 degree zone of influence from pipe inverts will require engineering input. The Auckland Council drawing referenced SW22 provided in Appendix B extracted from Chapter 4 of the Auckland Council Code of Practice for Land development and Subdivision depicts their requirements for stormwater pipes. Details for water and wastewater pipes are available in the Watercare COP1 - General Requirements and Procedures. The majority of lots are known to have service trenches within the lots as shown on the appended stormwater and wastewater as-built plans. The resulting restrictions are presented in the Suitability Statement below.

5.7. Stormwater Detention Device

A stormwater detention device has been constructed as part of this stage of the subdivision. This device is formed as a series of vegetated swales connected by stormwater pipes and rock armouring surrounding the inlets and outlets of the pipes, with the device becoming broader within drainage reserve lot 1000.

The device was formed mostly in fill within the southern portion of the swale and within cut natural ground within the northern portion of the swale and in broader areas of lot 1000. Ground conditions were inspected by CMW during construction of the swale to confirm the soils comprised plastic clays for the lining of the device.

Permeability of the device liner was confirmed via triaxial cell permeability tests of the in-situ soils, with a hydraulic conductivity (k) in the order of 10^{-10} m/s.

On the basis of the construction observations undertaken during the subdivision formation we are satisfied that the stormwater detention device has been constructed in accordance with the design and is suitable for its intended use.

5.8. Road Subgrades

Penetration resistance testing was carried out on the road subgrades during construction and the results of this testing were forwarded to Cato Bolam Limited for pavement remedial design. Where soft ground with low equivalent CBR values was identified it was generally undercut and replaced with engineered clay fill or hardfill. All road subgrade areas were subsequently lime stabilised to achieve appropriate CBR values.

Benkelman Beam testing of the subgrade and base course was carried out by Road Test Limited on each road and those results were also forwarded to Cato Bolam Limited.

5.9. Design of Shallow Foundations

5.9.1. Bearing Capacity

Once bulk earthworks and top-soiling of the building platforms had been completed, our staff drilled hand auger boreholes on platforms in natural ground to determine representative finished ground conditions and hence evaluate likely foundation options for future building development. Our assessments of bearing capacity for the design of shallow foundations on each building platform are contained in the appended Suitability Statement.

At current subgrade levels lots 93 to 105, 111 to 116, and 121 to 130 inclusive have been assessed as having a geotechnical ultimate bearing capacity of 300 kPa within the influence of conventional shallow residential building foundation loads. However on account of the presence of lower strength natural sub soils, a geotechnical ultimate bearing capacity of 240 kPa has been assessed for lots 106 to 110 and 117 to 120 inclusive.

If higher geotechnical ultimate bearing capacities are required, further specific site investigation and design of foundations should be carried out prior to Building Consent application.

5.9.2. Foundation Settlements

At the bearing pressures specified above and subject to the design requirements for soil expansiveness provided below, differential settlement of shallow foundations for buildings designed in accordance with NZS 3604 (including the 600mm subfloor fill depth limit) should be within code limits.

5.9.3. Soil Expansiveness Classification

3 sets of soil tests were carried out on samples taken from likely foundation level on lots within this stage of the development.

Testing was carried out in accordance with NZS 4402, "Methods of Testing Soils for Civil Engineering Purposes" test 2.2 and 2.6 and were used in conjunction with visual-tactile assessment of the site soils to determine expansive site Classes as defined in AS 2870, "Residential Slabs and Footings – Construction". All test results are appended.

On this basis we have assessed the AS 2870 Site Class for all lots these stages of the development to be H1 (high). Details of foundation options for this Class are contained in the appended Suitability Statement.

In recent years in Auckland, there have been examples of concrete floors and/ or foundations that have been poured on dry, desiccated subgrades in summer months on expansive soils and have undergone heaving and cracking once the soil moisture contents have returned to higher levels. Foundation contractors need to be made aware of this issue and the need to maintain appropriate moisture contents in the footings and building platform subgrade between the time of excavation and the pouring of concrete.

Remedial actions that may be appropriate include platform protection with a hard fill layer, pouring of a blinding layer of concrete in footing bases and soaking of the building platform with sprinklers for an extended period.

Home owners need to be aware that the planting of high water demand plants where their roots may extend close to footings can also cause settlement damage.

5.10. Topsoil Depths

Topsoil depths have been checked by the drilling of a borehole in the approximate centre of the building platform on each lot. The results are considered indicative for each lot, but may be subject to variations. Topsoil depths are between 150 and 300mm on this stage of the development.

Site specific findings are contained in the appended Suitability Statement Summary (Appendix A). However, it is possible that further levelling works have been undertaken since our investigations and accordingly, we strongly recommend that lot purchasers complete their own checks of topsoil depths.

6. CLOSURE

The appended Statement of Professional Opinion is provided to the Auckland Council and Cabra Developments Limited for their purposes alone on the express condition that it will not be relied upon by any other person. It is important that prospective purchasers satisfy themselves as to any specific conditions pertaining to their particular land interest.

Although regular site visits have been undertaken for observation, for providing guidance and instruction and for testing purposes, the geotechnical services scope did not include full time site presence. To this end, our appended Suitability Statement also relies on the Contractors' work practices and assumes that when we have not been present to observe the work, it has been completed to high standards and in accordance with the drawings, instructions and consent conditions provided to them.

Similarly it assumes that all as-built information and other details provided to the Client and/or CMW by other members of the project team are accurate and correct in all respects.

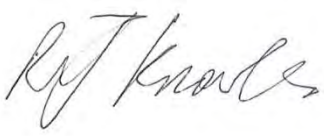
For and on behalf of CMW Geosciences

Prepared by:

Jack Mynett - Johnson

Engineering Geologist

Reviewed and Approved by:



Richard Knowles

Principal Geotechnical Engineer, CPEng

Appendix A

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

STATEMENT OF PROFESSIONAL OPINION AS TO THE SUITABILITY OF LAND FOR BUILDING DEVELOPMENT

I, Richard Knowles, of CMW Geosciences, Auckland, hereby confirm that:

1. As a Chartered Professional Engineer experienced in the field of geotechnical engineering, I am a Geo-professional as defined in section 1.2.2 of NZS 4404 and was retained by the Developer as the Geotechnical Engineer on Stage 1C of the Huapai Triangle Sub Precinct A development.

2. The extent of preliminary investigations carried out to date are described in the CMW Geosciences (NZ) Limited Geotechnical Investigation Report referenced 2015_1029AB Rev. 0, dated 24 November 2014. The conclusions and recommendations of those documents have been re-evaluated in the preparation of this report. The results of all tests carried out are also appended.

3. In my professional opinion, not to be construed as a guarantee, I consider that:

   (a) The earth fills shown on the appended Cato Bolam Cut/Fill As-built Plans have been placed in compliance with NZS 4431, the Legacy Rodney District Council Plans and related documents.

   (b) The completed earthworks give due regard to land slope and foundation stability considerations on the building platform areas, but as shown on the appended building restriction zones plans, areas on all lots have gradients steeper than 1(v) in 4 (h) or are adjacent to land having such gradients. Accordingly, restrictions incorporating Specific Design Zones (Slope) have been applied as depicted on the as-built plans as follows:

      - **Specific Design Zone (Slope) areas** have been applied on Lots 93 to 95 and 102 inclusive. No building construction and no earthworks (i.e. cut or fills of any depth) should take place within the designated **Specific Design Zone (Slope) areas** unless endorsed by a Chartered Professional Engineer experienced in geomechanics and familiar with the contents of this report. The endorsement will need to consider the implications of the proposals on both global stability conditions and soil creep on the buildings, the interaction with service pipes and associated trench backfills, control of surface water, construction sequencing, timing and temporary support requirements construction of all earthworks, foundations and retaining walls and if necessary, comment on what aspects require engineering inspections and certification.

        This limitation also applies to long term landscaping works, including any proposed minor cuts either on or near batter toes to be retained by new landscaping walls that might not normally require engineering, and to landscaping fills on or immediately above the batter slopes.

   (c) **Specific Design Zone (Retaining Walls) areas** have been applied on Lots 108 to 130 inclusive for the protection of the function of the retaining walls. The retaining walls on this stage of the development were designed for a maximum of 12kPa surcharge load and 5° toe slope. No building construction and no earthworks (i.e. cut or fills) should take place that exceed these design limits on the walls unless endorsed by a Chartered Professional Engineer experienced in geomechanics and familiar with the contents of this report.

   (d) A geotechnical ultimate bearing capacity of 300 kPa may be assumed for shallow foundation design on the building platforms of Lots 93 to 105, 111 to 116, and 121 to 130 inclusive.

Due to the presence of softer natural subsoils on the building platforms of Lots 106 to 110 and 117 to 120 inclusive a geotechnical ultimate bearing capacity of 240 kPa may be assumed for shallow foundation design on these lots.

If for any reason higher geotechnical bearing capacities are required, further specific site investigation and design of foundations should be carried out prior to Building Consent application.

(e) The expansive site Class for all lots has been assessed as AS2870 Class H1 (High). We recommend that building designers note on the Building Consent drawings the need to maintain appropriate moisture levels across building subgrades and in footing excavations (as described in Section 5.9.3 of the Geotechnical Completion Report) for reference by foundation contractors.

(f) The backfilling and compaction of the storm water and sanitary sewer trenches on this subdivision has been carried out to appropriate standards having regard for the prevailing ground conditions and associated compaction induced pipe loadings.

However, no building development should take place within the 45 degree zone of influence of drain inverts unless endorsed by specific design 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 trench backfill. A copy of drawing SW22 extracted from Chapter 4 of the Auckland Council Code of Practice for Land development and Subdivision this document is provided in Appendix B for clarification. Details for water and wastewater pipes are available in the Watercare COP1 - General Requirements and Procedures.

(g) Subject to the geotechnical limitations, restrictions and recommendations contained in clauses 3(b), 3(c), 3(d), 3(e), and 3(f) above:

(i) The filled and natural ground is generally suitable for residential buildings constructed in accordance with NZS 3604 and the requirements of AS2870 for the appropriate expansive soil class.

(ii) Where shallow foundations are appropriate, design may be carried out in accordance with AS 2870 (Class H1) or alternately, a specific foundation and structural design may be undertaken by a Chartered Professional Engineer.

4. Road subgrades have been formed with appropriate regard for slope stability and settlement risks.
5. The permanent storm water treatment device in Lot 1000 has been formed to standards appropriate for its intended use.

The following table summarises the conditions on each of each residential lots.

For and on behalf of
CMW Geosciences (NZ) Limited

Richard Knowles

Principal Geotechnical Engineer, CPEng

GCR Summary Table

Condition	Specific Design Zone (slope)	Specific Design Zone (retaining)	Geotechnical Ultimate Bearing Capacity (kPa)	AS2870 Expansive Class	Service Lines Restrictions	Indicative Topsoil Depth (mm)
GCR SOPO Clause	**3(b)**	**3(c)**	**3(d)**	**3(e)**	**3(f)**	
Lot number						
93	●		300	H1	●	300
94	●		300	H1	●	250
95	●		300	H1	●	300
96			300	H1	●	250
97			300	H1	●	200
98			300	H1	●	300
99			300	H1	●	300
100			300	H1	●	150
101			300	H1	●	300
102	●		300	H1	●	250
103			300	H1	●	250
104			300	H1	●	300
105			300	H1	●	300
106			240	H1	●	300
107			240	H1	●	250
108		●	240	H1	●	300
109		●	240	H1	●	300
110		●	240	H1	●	300
111		●	300	H1	●	250

Condition	Specific Design Zone (slope)	Specific Design Zone (retaining)	Geotechnical Ultimate Bearing Capacity (kPa)	AS2870 Expansive Class	Service Lines Restrictions	Indicative Topsoil Depth (mm)
112		●	300	H1	●	300
113		●	300	H1	●	300
114		●	300	H1		300
115		●	300	H1		300
116		●	300	H1		250
117		●	240	H1	●	300
118		●	240	H1	●	150
119		●	240	H1	●	300
120		●	240	H1	●	300
121		●	300	H1	●	300
122		●	300	H1	●	300
123		●	300	H1	●	300
124		●	300	H1	●	300
125		●	300	H1	●	300
126		●	300	H1	●	300
127		●	300	H1	●	300
128		●	300	H1	●	300
129		●	300	H1	●	300
130		●	300	H1	●	300

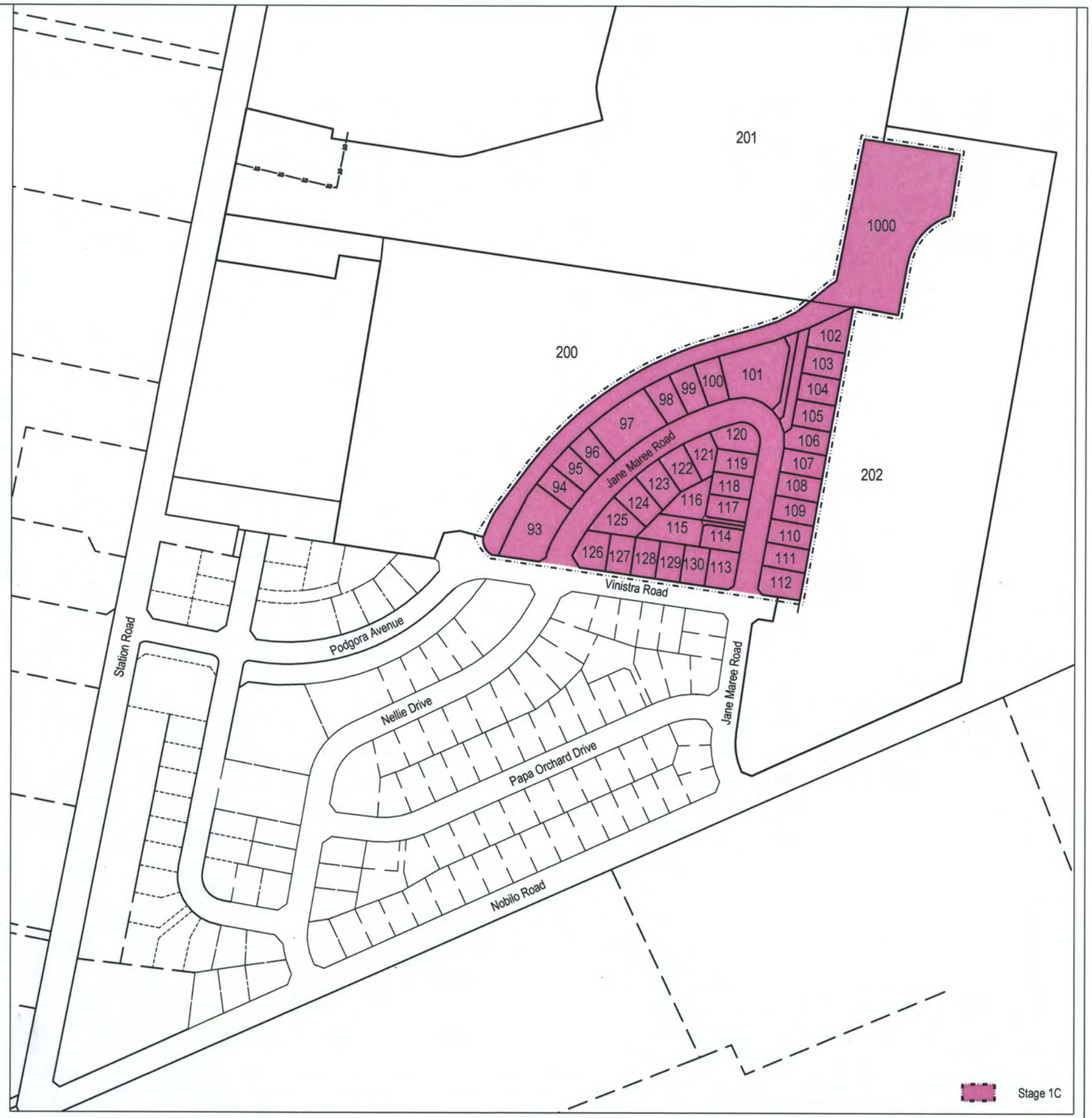
Appendix B

Drawings

Title	Reference No.	Date	Revision
Cato Bolam Consultants Final Contours and Retaining Walls As-built Plans	34745 E600-603	July 2017	-
Cato Bolam Consultants Cut Fill As-built Plans	34745 E604-607	July 2017	-
Cato Bolam Consultants Undercut As-built Plans	34745 E608-610	July 2017	-
Cato Bolam Consultants Roading As-built Plans	34745 E611-613	July 2017	-
Cato Bolam Consultants Wastewater Reticulation As-built Plans	34745 E614-616	July 2017	-
Cato Bolam Consultants Stormwater As-built Plans	34745 E617-621	July 2017	-
Cato Bolam Consultants Water Reticulation As-built Plans	34745 E622-624	July 2017	-
Cato Bolam Consultants Retaining Wall Specific Design Zone Plan As-built Plans	34745 E625	July 2017	-
Cato Bolam Consultants Drainage Zone of Influence As-built Plans	34745 E626	July 2017	-
Cato Bolam Consultants Slope Specific Design Plan	34745 E627	July 2017	-
Cato Bolam Consultants Telecom As-built Plans	34745 E629-631	July 2017	-
Auckland Council Stormwater Pipe and Manhole Construction Clearance Requirements	ACSD SW22	Sept 2013	1

Cabra Developments Ltd
Huapai Triangle
Sub Precinct A
Stage 1C Asbuilt Plans

As Built Plan Set



LOCATION DIAGRAM

CATO BOLAM CONSULTANTS

SURVEYORS PLANNERS ENGINEERS

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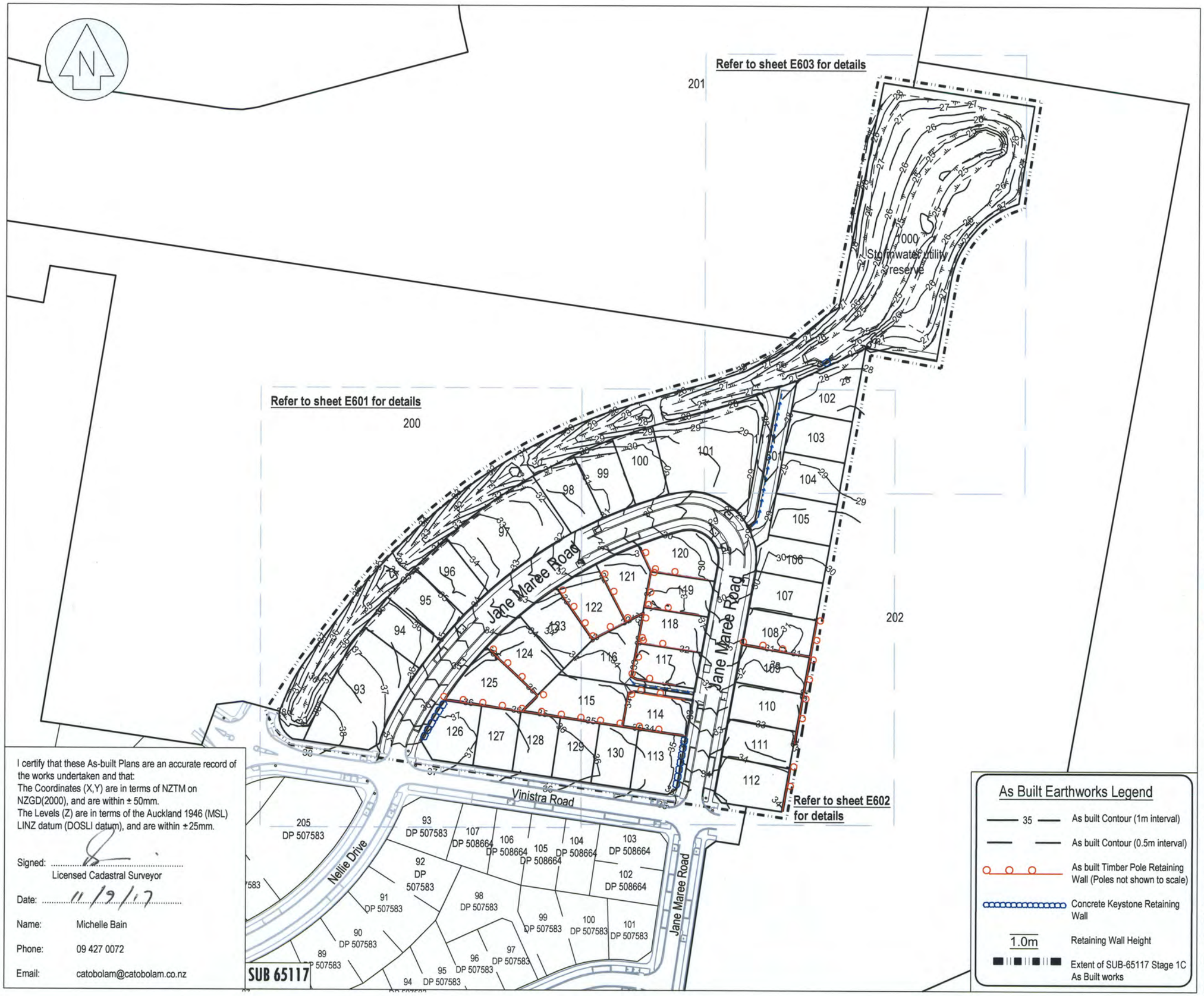
phone 09-427 0072
fax 09-426 7331
email catobolam@catobolam.co.nz

As Built Plans - August 2017



I certify that these As-built 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 ±25mm.

Signed: .....
Licensed Cadastral Surveyor

Date: 11/9/17

Name: Michelle Bain

Phone: 09 427 0072

Email: catobolam@catobolam.co.nz

As Built Earthworks Legend

- 35 — As built Contour (1m interval)
- As built Contour (0.5m interval)
- As built Timber Pole Retaining Wall (Poles not shown to scale)
- Concrete Keystone Retaining Wall
- 1.0m — Retaining Wall Height
- Extent of SUB-65117 Stage 1C As Built works

NOTES

1. Contours are finished ground levels as surveyed at 21/07/2017. Contour interval of 0.5m
2. Levels are in terms of LINZ Datum 1946.
3. Coordinates are in terms of NZTM.
4. All retaining walls over 1.0m high have a pool style fence above the wall.
5. Retaining walls approved and constructed under ABA BC10090856

REVISION (DESCRIPTIONS)	NAME	DATE

	NAME	DATE
SURVEYED	BJ	07/2017
DESIGNED		
DRAWN	BJ	07/2017
CHECKED	BM	07/2017
APPROVED	TL	07/2017

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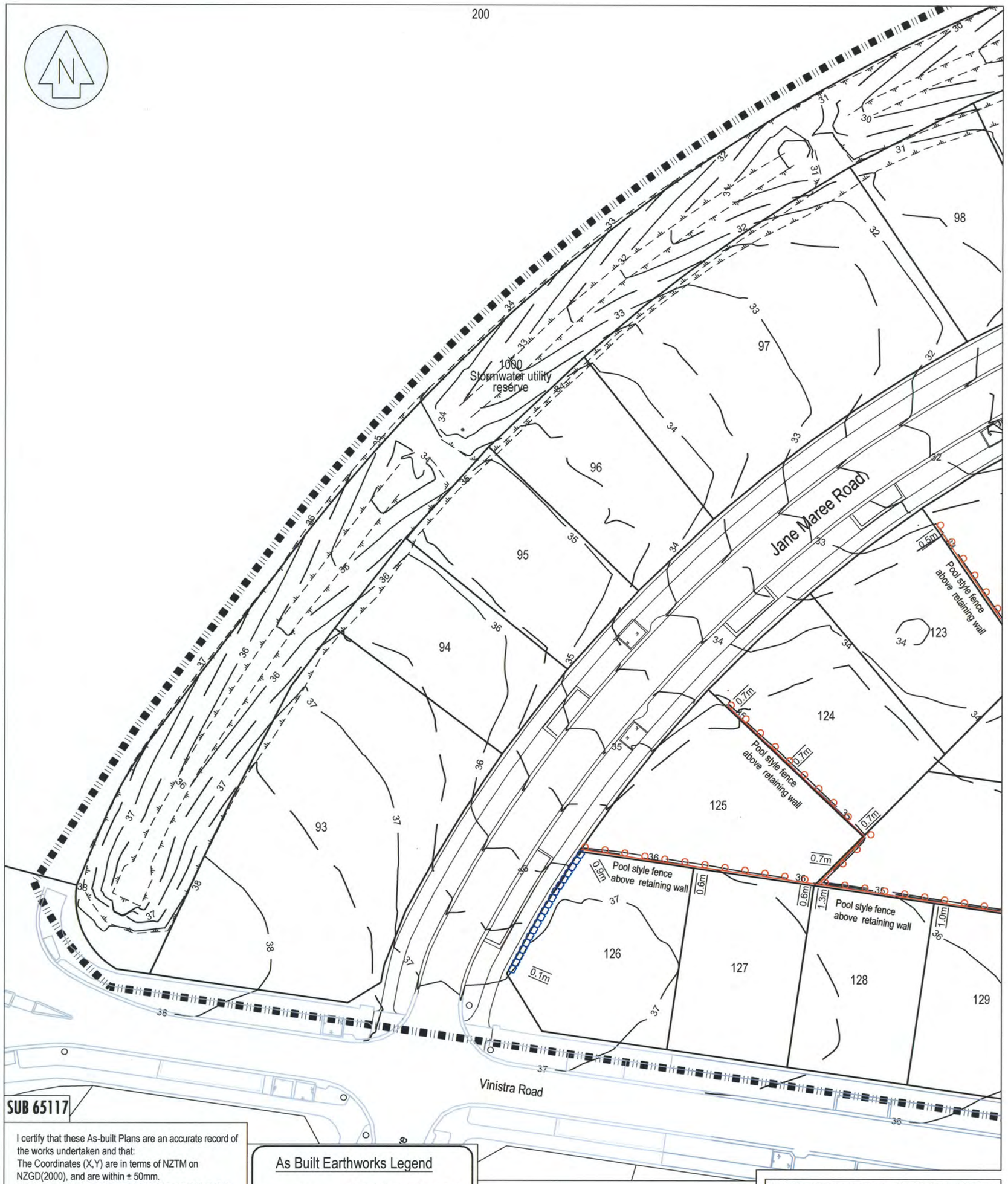
CLIENT
Cabra Developments Ltd
Huapai Triangle Sub Precinct A
Stage 1C
Station Road, Huapai

DRAWING TITLE
Final Contour & Retaining Wall As Built Plan
Sheet 1 of 4

ORIGINAL SCALE 1:1500	ORIGINAL SIZE A3	REVISION NO
DATE 21/07/17	CAD REFERENCE 34745 E600 - E603	SHEET NO E600
DIRECTORY Z:\34745\ACAD\As Builts\Stage 1C		JOB NO 34745

200



SUB 65117

I certify that these As-built 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 ± 25mm.

Signed: .....
Licensed Cadastral Surveyor

Date: 11/9/17

Name: Michelle Bain

Phone: 09 427 0072

Email: catobolam@catobolam.co.nz

As Built Earthworks Legend

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REVISION (DESCRIPTIONS)	NAME	DATE
	NAME	DATE
SURVEYED	BJ	07/2017
DESIGNED		
DRAWN	BJ	07/2017
CHECKED	BM	07/2017
APPROVED	TL	07/2017

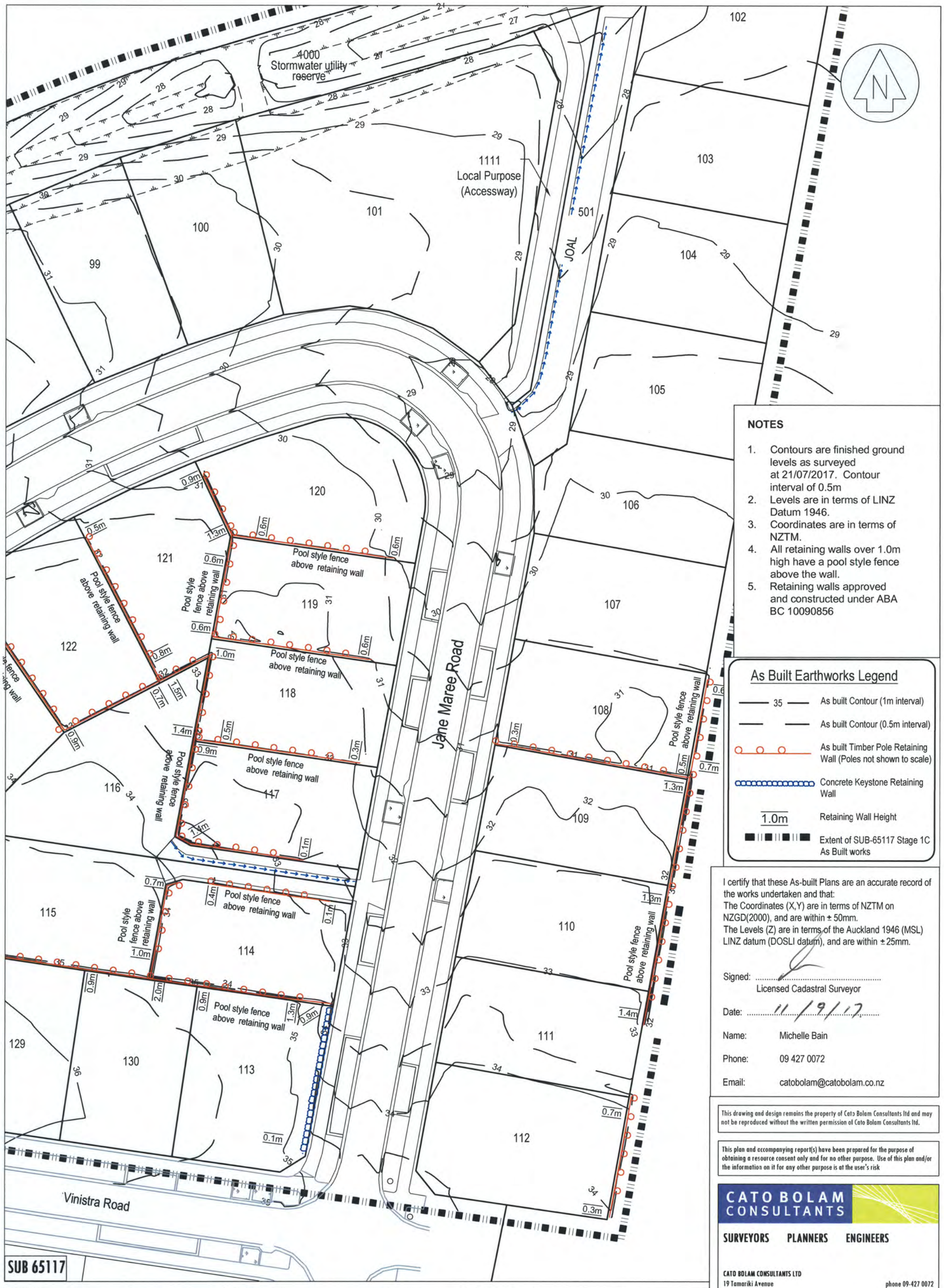
CLIENT

Cabra Developments Ltd
Huapai Triangle Sub Precinct A
Stage 1C
Station Road, Huapai

DRAWING TITLE

Final Contour & Retaining Wall
As Built Plan
Sheet 2 of 4

ORIGINAL SCALE 1:500	ORIGINAL SIZE A3	REVISION NO
DATE 21/07/2017	CAD REFERENCE 34745 E600 - E603 Final Cont	SHEET NO E601
DIRECTORY Z:\34745\ACAD\As Builts\Stage 1C		JOB NO 34745



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5. Retaining walls approved and constructed under ABA BC 10090856

As Built Earthworks Legend

- 35 — As built Contour (1m interval)
- As built Contour (0.5m interval)
- As built Timber Pole Retaining Wall (Poles not shown to scale)
- Concrete Keystone Retaining Wall
- 1.0m — Retaining Wall Height
- Extent of SUB-65117 Stage 1C As Built works

I certify that these As-built 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 ± 25mm.

Signed: .....
Licensed Cadastral Surveyor

Date: 11/9/17

Name: Michelle Bain

Phone: 09 427 0072

Email: catobolam@catobolam.co.nz

CATO BOLAM CONSULTANTS

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19 Tamariki Avenue
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fax 09-426 7331
email catobolam@catobolam.co.nz

REVISION (DESCRIPTIONS)	NAME	DATE
	NAME	DATE
SURVEYED	BJ	07/2017
DESIGNED		
DRAWN	BJ	07/2017
CHECKED	BM	07/2017
APPROVED	TL	07/2017

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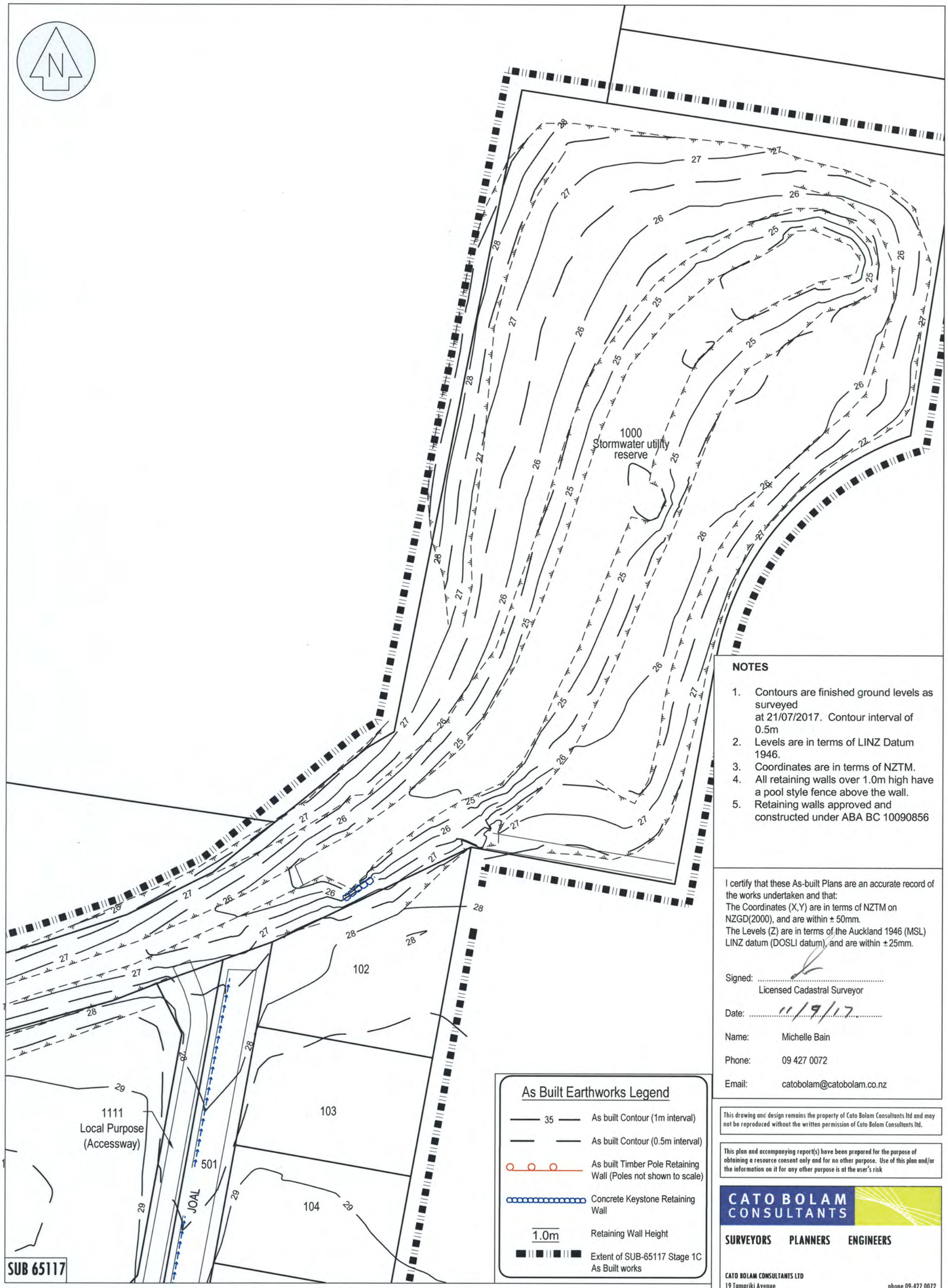
Cabrab Developments Ltd
Huapai Triangle Sub Precinct A
Stage 1C
Station Road, Huapai

DRAWING TITLE

Final Contour & Retaining Wall As Built Plan
Sheet 3 of 4

ORIGINAL SCALE	ORIGINAL SIZE	REVISION NO
1:500	A3	
DATE	CAD REFERENCE	SHEET NO
21/07/2017	34745 E600 - E603 Final Cont	E602
DIRECTORY		JOB NO
Z:\34745\ACAD\As Builts\Stage 1C		34745



NOTES

1. Contours are finished ground levels as surveyed at 21/07/2017. Contour interval of 0.5m
2. Levels are in terms of LINZ Datum 1946.
3. Coordinates are in terms of NZTM.
4. All retaining walls over 1.0m high have a pool style fence above the wall.
5. Retaining walls approved and constructed under ABA BC 10090856

I certify that these As-built 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 ±25mm.

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Licensed Cadastral Surveyor

Date: 11/9/17

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As Built Earthworks Legend

- 35 — As built Contour (1m interval)
- As built Contour (0.5m interval)
- As built Timber Pole Retaining Wall (Poles not shown to scale)
- Concrete Keystone Retaining Wall
- 1.0m — Retaining Wall Height
- Extent of SUB-65117 Stage 1C As Built works

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	NAME	DATE
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DESIGNED		
DRAWN	BJ	17/2017
CHECKED	BM	17/2017
APPROVED	TL	17/2017

CLIENT

Cabra Developments Ltd
Huapai Triangle Sub Precinct A
Stage 1C
Station Road, Huapai

DRAWING TITLE

Final Contour & Retaining Wall
As Built Plan
Sheet 4 of 4

ORIGINAL SCALE	ORIGINAL SIZE	REVISION NO
1:500	A3	
DATE	CAD REFERENCE	SHEET NO
21/07/2017	34745 E600 - E603 Final Cont	E603
DIRECTORY		JOB NO
Z:\34745\ACAD\As Builts\Stage 1C		34745

Cut to Fill Legend

- 0 — 0 Contour
- 1.0 — Cut Contours & Area
- 1.0 — Fill Contours & Area
- Extent of Earthworks
- As built Timber Retaining Wall
- Concrete Key Stone Retaining Wall
- 5.2 S 5.5 — Subsoil Drainage & depth (m)

REVISION (DESCRIPTIONS)	NAME	DATE

	NAME	DATE
SURVEYED	BJ	07/2017
DESIGNED		
DRAWN	BJ	07/2017
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CLIENT Cabra Developments Ltd

Huapai Triangle Sub Precinct A
Stage 1C
Station Road, Huapai

DRAWING TITLE

Cut Fill As Built Plan

Sheet 1 of 4

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Signed: .....
Licensed Cadastral Surveyor

Date: 11/9/17

Name: Michelle Bain

Phone: 09 427 0072

Email: catobolam@catobolam.co.nz

NOTES

GENERAL

1. Levels are in terms of LINZ Datum 1946.
2. Coordinates are in terms of NZTM.
3. All infrastructure is public unless otherwise shown.
4. Cut/fill contours are from the original ground level, to finished ground level as surveyed on 21/07/2017. Excludes undercuts which are shown on plans E608 - E610

ORIGINAL SCALE 1:1500	ORIGINAL SIZE A3	REVISION NO
DATE 21/07/17	CAD REFERENCE 34745 E600 - E603	SHEET NO E604
DIRECTORY Z:\34745\ACAD\As Builts\Stage 1C		JOB NO 34745

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The Levels (Z) are in terms of the Auckland 1946 (MSL) LINZ datum (DOSLI datum), and are within ± 25mm.

Signed: .....
Licensed Cadastral Surveyor

Date: 11/9/2017.

Name: Michelle Bain

Phone: 09 427 0072

Email: catobolam@catobolam.co.nz

Jane Maree Road

Vinistra Road

SUB 65117

93
507583

107
DP 508664

Cut to Fill Legend

- 0 — 0 Contour
- -1.0 — Cut Contours & Area
- 1.0 — Fill Contours & Area
- Extent of Earthworks
- As built Timber Retaining Wall
- Concrete Key Stone Retaining Wall
- 5.2 S 5.5 — Subsoil Drainage & depth (m)

NOTES

GENERAL

1. Levels are in terms of LINZ Datum 1946.
2. Coordinates are in terms of NZTM.
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4. Cut/fill contours are from the original ground level, to finished ground level as surveyed on 21/07/2017. Excludes undercuts which are shown on plans E608 - E610

REVISION (DESCRIPTIONS)	NAME	DATE
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CLIENT

Cabra Developments Ltd
Huapai Triangle Sub Precinct A
Stage 1C
Station Road, Huapai

DRAWING TITLE

Cut Fill
As Built Plan
Sheet 2 of 4

CATO BOLAM CONSULTANTS

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ORIGINAL SCALE 1:500	ORIGINAL SIZE A3	REVISION NO
DATE 21/07/2017	CAD REFERENCE 34745 E604 - E607 Cut Fill	SHEET NO E605
DIRECTORY Z:\34745\ACAD\As Builts\Stage 1C		JOB NO 34745

I certify that these As-built 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 ± 25mm.

Signed: .....
Licensed Cadastral Surveyor

Date: 11/9/17

Name: Michelle Bain

Phone: 09 427 0072

Email: catobolam@catobolam.co.nz

202

Cut to Fill Legend

- 0 — 0 Contour
- -1.0 — Cut Contours & Area
- 1.0 — Fill Contours & Area
- Extent of Earthworks
- As built Timber Retaining Wall
- Concrete Key Stone Retaining Wall
- 5.2 S 5.5 — Subsoil Drainage & depth (m)

NOTES

GENERAL

1. Levels are in terms of LINZ Datum 1946.
2. Coordinates are in terms of NZTM.
3. All infrastructure is public unless otherwise shown.
4. Cut/fill contours are from the original ground level, to finished ground level as surveyed on 21/07/2017. Excludes undercuts which are shown on plans E608 - E610

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APPROVED	TL	07/2017

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Cabra Developments Ltd
Huapai Triangle Sub Precinct A
Stage 1C
Station Road, Huapai

DRAWING TITLE

Cut Fill
As Built Plan
Sheet 3 of 4

ORIGINAL SCALE 1:500	ORIGINAL SIZE A3	REVISION NO
DATE 21/07/2017	CAD REFERENCE 34745 E604 - E607 Cut Fill	SHEET NO E606
DIRECTORY Z:\34745\ACAD\As Builts\Stage 1C		JOB NO 34745

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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 ±25mm.

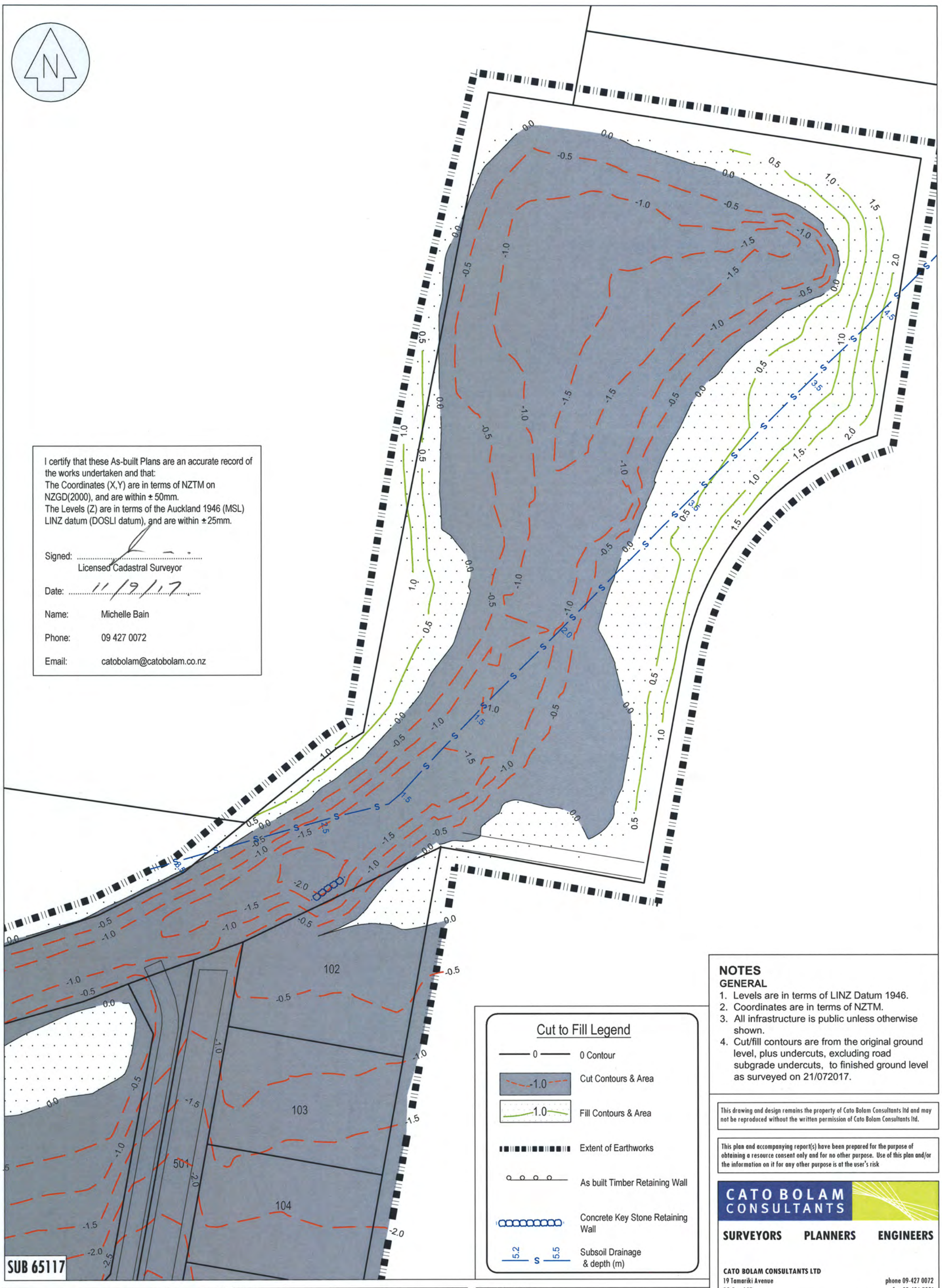
Signed: .....
Licensed Cadastral Surveyor

Date: 11/9/17

Name: Michelle Bain

Phone: 09 427 0072

Email: catobolam@catobolam.co.nz



Cut to Fill Legend

- 0 — 0 Contour
- -1.0 — Cut Contours & Area
- 1.0 — Fill Contours & Area
- Extent of Earthworks
- As built Timber Retaining Wall
- Concrete Key Stone Retaining Wall
- 5.2 S 5.5 — Subsoil Drainage & depth (m)

NOTES

GENERAL

1. Levels are in terms of LINZ Datum 1946.
2. Coordinates are in terms of NZTM.
3. All infrastructure is public unless otherwise shown.
4. Cut/fill contours are from the original ground level, plus undercuts, excluding road subgrade undercuts, to finished ground level as surveyed on 21/072017.

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CHECKED	BM	17/2017
APPROVED	TL	17/2017

CLIENT

Cabra Developments Ltd
Huapai Triangle Sub Precinct A
Stage 1C
Station Road, Huapai

DRAWING TITLE

Cut Fill
As Built Plan
Sheet 4 of 4

ORIGINAL SCALE 1:500	ORIGINAL SIZE A3	REVISION NO
DATE 21/07/2017	CAD REFERENCE 34745 E604 - E607 Cut Fill	SHEET NO E607
DIRECTORY Z:\34745\ACAD\As Builts\Stage 1C		JOB NO 34745

This plan and accompanying report(s) have been prepared for the purpose of obtaining a resource consent only and for no other purpose. Use of this plan and/or the information on it for any other purpose is at the user's risk

Cut to Fill Legend

- 0 — 0 Contour
- 1.0 — Fill Contours from undercut surface to finished ground level.
- Extent of Earthworks
- As built Timber Retaining Wall
- Concrete Key Stone Retaining Wall
- 5.2 S 5.5 — Subsoil Drainage & depth (m)

REVISION (DESCRIPTIONS)	NAME	DATE

	NAME	DATE
SURVEYED	BJ	08/2017
DESIGNED		
DRAWN	BJ	08/2017
CHECKED	BM	08/2017
APPROVED	TL	08/2017

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CLIENT
Cabra Developments Ltd
Huapai Triangle Sub Precinct A
Stage 1C
Station Road, Huapai

DRAWING TITLE
Lots 94-97, 108,109, 118-120,1000 & Road Undercut Areas
Sheet 1 of 3

I certify that these As-built 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 ± 25mm.

Signed: .....
Licensed Cadastral Surveyor

Date: 11/9/17

Name: Michelle Bain

Phone: 09 427 0072

Email: catobolam@catobolam.co.nz

NOTES
GENERAL
1. Levels are in terms of LINZ Datum 1946.
2. Coordinates are in terms of NZTM.
3. All infrastructure is public unless otherwise shown.
4. Cut/fill contours are from the contractors undercut surface, to finished ground level as surveyed on 21/072017.

ORIGINAL SCALE 1:1500	ORIGINAL SIZE A3	REVISION NO
DATE 02/08/17	CAD REFERENCE 34745 E608- E610 UC	SHEET NO E608
DIRECTORY Z:\34745\ACAD\As Builts\Stage 1C		JOB NO 34745

I certify that these As-built 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 ± 25mm.

Signed: .....
Licensed Cadastral Surveyor

Date: 11/9/17

Name: Michelle Bain

Phone: 09 427 0072

Email: catobolam@catobolam.co.nz

Cut to Fill Legend

- 0 Contour
- 1.0 Fill Contours from undercut surface to finished ground level.
- Extent of Earthworks
- As built Timber Retaining Wall
- Concrete Key Stone Retaining Wall
- 5.2 S 5.5 Subsoil Drainage & depth (m)

NOTES

GENERAL

1. Levels are in terms of LINZ Datum 1946.
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3. All infrastructure is public unless otherwise shown.
4. Cut/fill contours are from the contractors undercut surface, to finished ground level as surveyed on 21/072017.

SUB 65117

REVISION (DESCRIPTIONS)	NAME	DATE
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APPROVED	TL	08/2017

CLIENT

Cabra Developments Ltd
Huapai Triangle Sub Precinct A
Stage 1C
Station Road, Huapai

DRAWING TITLE

Lots 94-97, 108,109, 118-120,1000
& Road Undercut Areas
Sheet 2 of 3

CATO BOLAM CONSULTANTS

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ORIGINAL SCALE 1:500	ORIGINAL SIZE A3	REVISION NO
DATE 02/08/17	CAD REFERENCE 34745 E608- E610 UC	SHEET NO E609
DIRECTORY Z:\34745\ACAD\As Builts\Stage 1C		JOB NO 34745

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Signed: .....
Licensed Cadastral Surveyor

Date: 11/9/17

Name: Michelle Bain

Phone: 09 427 0072

Email: catobolam@catobolam.co.nz

Cut to Fill Legend

- 0 Contour
- 1.0 Fill Contours from undercut surface to finished ground level.
- Extent of Earthworks
- As built Timber Retaining Wall
- Concrete Key Stone Retaining Wall
- 5.2 S 5.5 Subsoil Drainage & depth (m)

NOTES

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APPROVED	TL	08/17

CLIENT

Cabra Developments Ltd
Huapai Triangle Sub Precinct A
Stage 1C
Station Road, Huapai

DRAWING TITLE

Lots 94-97, 108,109, 118-120,1000 & Road Undercut Areas

Sheet 3 of 3

ORIGINAL SCALE	ORIGINAL SIZE	REVISION NO
1:500	A3	
DATE	CAD REFERENCE	SHEET NO
02/08/17	34745 E608- E610 UC	E610
DIRECTORY		JOB NO
Z:\34745\ACAD\As Builts\Stage 1C		34745

NOTES

GENERAL

1. Levels are in terms of LINZ Datum 1946.
2. Coordinates are in terms of NZTM.
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Pavement Formation

Road
Subgrade - Stabilised with 14kg/m² lime to a depth of 250mm
Subbase - 250mm GAP65
Basecourse - 100mm TNZ AP40
Seal - 30mm DG10 hotmix on grade 4 chipseal membrane

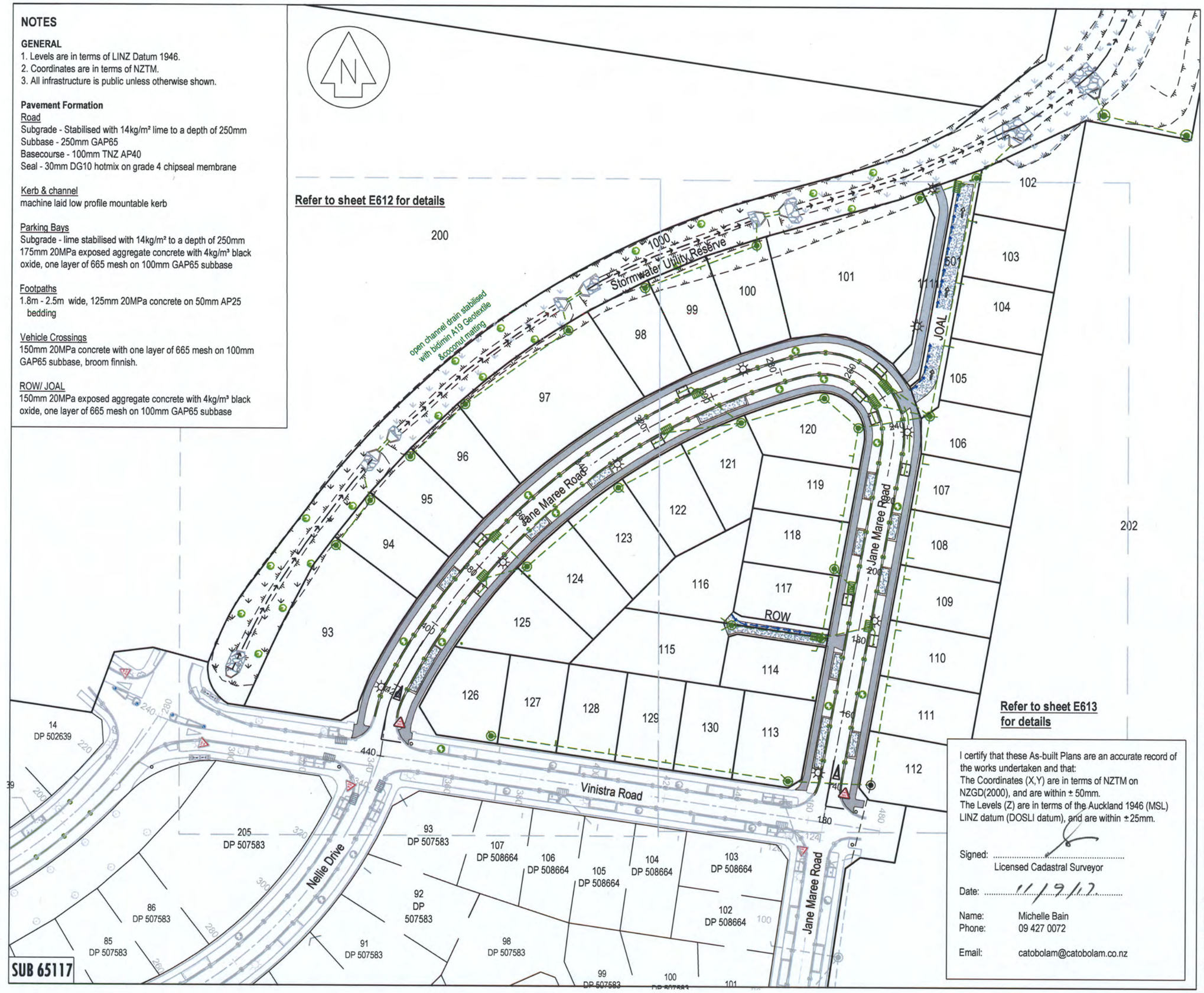
Kerb & channel
machine laid low profile mountable kerb

Parking Bays
Subgrade - lime stabilised with 14kg/m² to a depth of 250mm
175mm 20MPa exposed aggregate concrete with 4kg/m³ black oxide, one layer of 665 mesh on 100mm GAP65 subbase

Footpaths
1.8m - 2.5m wide, 125mm 20MPa concrete on 50mm AP25 bedding

Vehicle Crossings
150mm 20MPa concrete with one layer of 665 mesh on 100mm GAP65 subbase, broom finnish.

ROW/ JOAL
150mm 20MPa exposed aggregate concrete with 4kg/m³ black oxide, one layer of 665 mesh on 100mm GAP65 subbase



Roading As Built Legend

- Jane Maree Road — Street Lights Cree XSP1 IP66 T3ME 29W system 4000K on vicpole round tapered 8m pole and 1m arm 0 degree tilt. (700mm setback) (G=80 Candela=282)
- Lot 1111 Pedestrian Access Way — Street lights Cree XSP1 IP66 T210 22W system 4000k on Vicpole round tapered 5m pole and no arm degree tilt (set back behind footpath) (G=80 Candela=317)
- Pukatea (Green finger reserve)
- Spire Ash (Jane Maree Road)
- Concrete Footpath / Vehicle Crossing
- Cesspits (Semi recessed)
- Exposed Concrete Parking Bay
- Rain Garden (RG)
- S — Under channel drains
- Overland Flowpath

REVISION (DESCRIPTIONS)	NAME	DATE
	NAME	DATE
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APPROVED	TL	08/17

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Signed: .....
Licensed Cadastral Surveyor

Date: 11/9/17

Name: Michelle Bain
Phone: 09 427 0072

Email: catobolam@catobolam.co.nz

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CLIENT
Cabra Development Ltd
Huapai Triangle Sub Precinct A
Stage 1C
Station Road Huapai

DRAWING TITLE
Road
As Built Plan
Sheet 1 of 3

ORIGINAL SCALE	ORIGINAL SIZE	REVISION NO
1:1000	A3	
DATE	CAD REFERENCE	SHEET NO
03/08/2017	34745 E611-E613 Roading	E611
DIRECTORY		JOB NO
Z:\34745\ACAD\As Builts\Stage 1C		34745

Roading As Built Legend

Jane Maree Road
Street Lights Cree XSP1 IP66 T3ME 29W system 4000K on vicpole round tapered 8m pole and 1m arm 0 degree tilt. (700mm setback) (G=80 Candela=282)

Lot 1111 Pedestrian Access Way
Street lights Cree XSP1 IP66 T210 22W system 4000k on Vicpole round tapered 5m pole and no arm degree tilt (set back behind footpath) (G=80 Candela=317)

Pukatea (Green finger reserve)

Spire Ash (Jane Maree Road)

Concrete Footpath / Vehicle Crossing

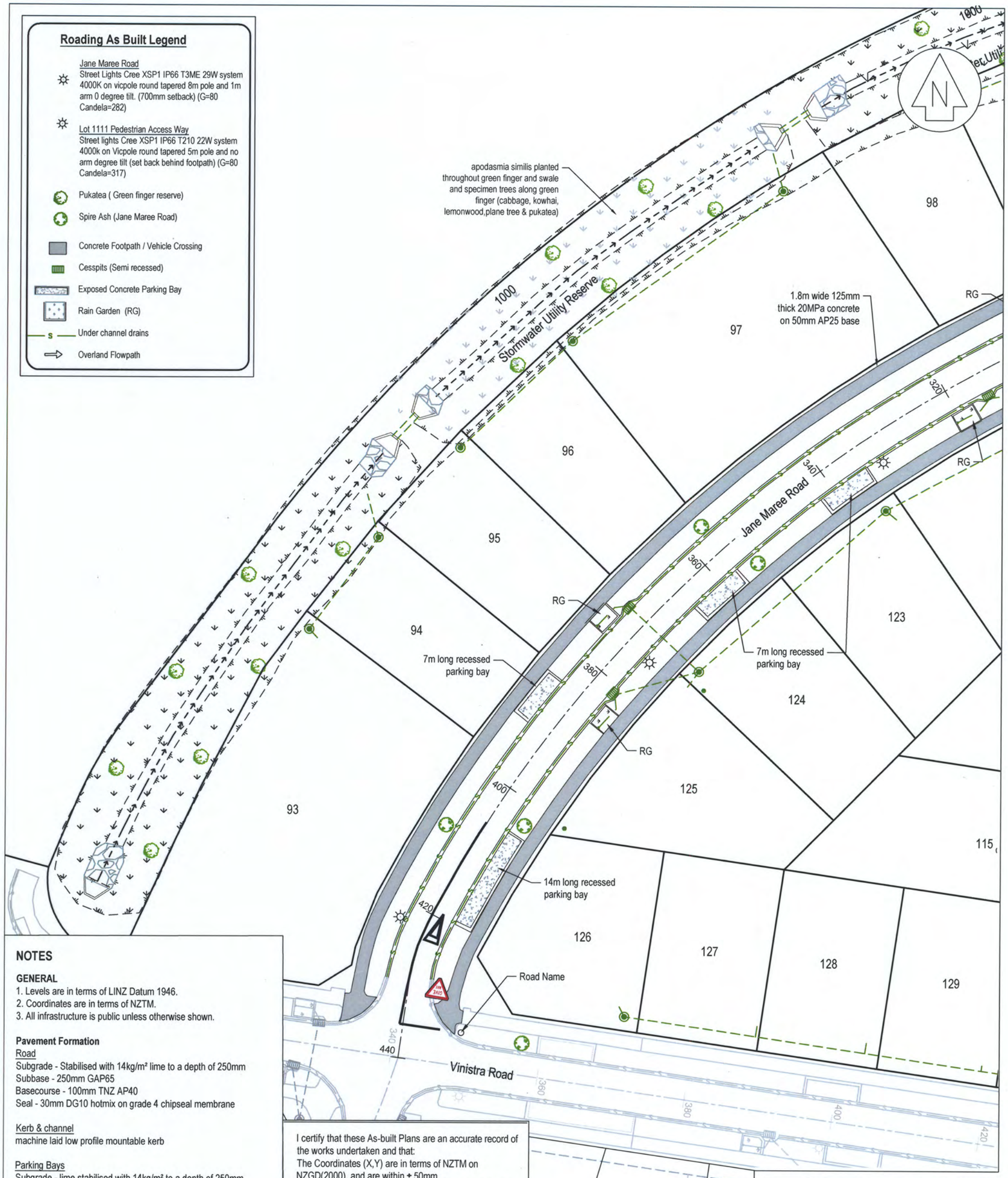
Cesspits (Semi recessed)

Exposed Concrete Parking Bay

Rain Garden (RG)

S — Under channel drains

Overland Flowpath



NOTES

GENERAL
1. Levels are in terms of LINZ Datum 1946.
2. Coordinates are in terms of NZTM.
3. All infrastructure is public unless otherwise shown.

Pavement Formation

Road
Subgrade - Stabilised with 14kg/m² lime to a depth of 250mm
Subbase - 250mm GAP65
Basecourse - 100mm TNZ AP40
Seal - 30mm DG10 hotmix on grade 4 chipseal membrane

Kerb & channel
machine laid low profile mountable kerb

Parking Bays
Subgrade - lime stabilised with 14kg/m² to a depth of 250mm
175mm 20MPa exposed aggregate concrete with 4kg/m³ black oxide, one layer of 665 mesh on 100mm GAP65 subbase

Footpaths
1.8m - 2.5m wide, 125mm 20MPa concrete on 50mm AP25 bedding

Vehicle Crossings
150mm 20MPa concrete with one layer of 665 mesh on 100mm GAP65 subbase, broom finnish.

ROW/ JOAL
150mm 20MPa exposed aggregate concrete with 4kg/m³ black oxide, one layer of 665 mesh on 100mm GAP65 subbase

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The Levels (Z) are in terms of the Auckland 1946 (MSL) LINZ datum (DOSLI datum), and are within ± 25mm.

Signed: .....
Licensed Cadastral Surveyor

Date: 1/9/17

Name: Michelle Bain
Phone: 09 427 0072

Email: catobolam@catobolam.co.nz

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APPROVED	TL	08/17

CLIENT

Cabra Developments Ltd
Huapai Triangle Sub Precinct A
Stage 1C
Station Road, Huapai

DRAWING TITLE

Road
As Built Plan
Sheet 2 of 3

CATO BOLAM CONSULTANTS

SURVEYORS PLANNERS ENGINEERS

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ORIGINAL SCALE 1:500	ORIGINAL SIZE A3	REVISION NO	
DATE 3/08/2017	CAD REFERENCE 34745 E611-E613 Roading	SHEET NO	E612
DIRECTORY Z:\34745\ACAD\As Builts\Stage 1C		JOB NO	34745

NOTES

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Pavement Formation

Road
Subgrade - Stabilised with 14kg/m² lime to a depth of 250mm
Subbase - 250mm GAP65
Basecourse - 100mm TNZ AP40
Seal - 30mm DG10 hotmix on grade 4 chipseal membrane

Kerb & channel
machine laid low profile mountable kerb

Parking Bays
Subgrade - lime stabilised with 14kg/m² to a depth of 250mm
175mm 20MPa exposed aggregate concrete with 4kg/m³ black oxide, one layer of 665 mesh on 100mm GAP65 subbase

Footpaths
1.8m - 2.5m wide, 125mm 20MPa concrete on 50mm AP25 bedding

Vehicle Crossings
150mm 20MPa concrete with one layer of 665 mesh on 100mm GAP65 subbase, broom finnish.

ROW/ JOAL
150mm 20MPa exposed aggregate concrete with 4kg/m³ black oxide, one layer of 665 mesh on 100mm GAP65 subbase

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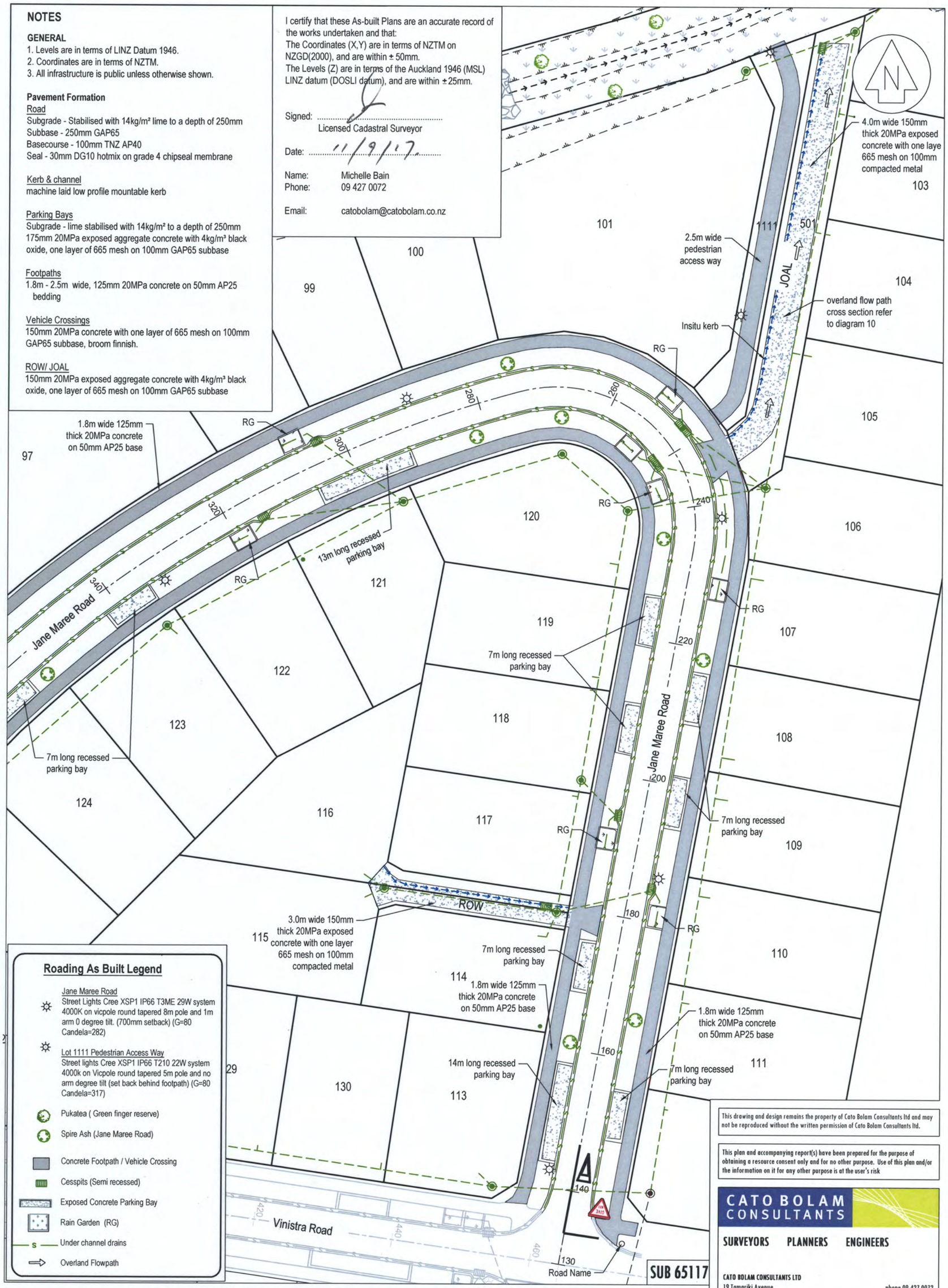
The Levels (Z) are in terms of the Auckland 1946 (MSL) LINZ datum (DOSLI datum), and are within ± 25mm.

Signed: .....
Licensed Cadastral Surveyor

Date: 11/9/17

Name: Michelle Bain
Phone: 09 427 0072

Email: catobolam@catobolam.co.nz



Roading As Built Legend

Jane Maree Road
Street Lights Cree XSP1 IP66 T3ME 29W system 4000K on vicpole round tapered 8m pole and 1m arm 0 degree tilt. (700mm setback) (G=80 Candela=282)

Lot 1111 Pedestrian Access Way
Street lights Cree XSP1 IP66 T210 22W system 4000k on Vicpole round tapered 5m pole and no arm degree tilt (set back behind footpath) (G=80 Candela=317)

Pukatea (Green finger reserve)
Spire Ash (Jane Maree Road)
Concrete Footpath / Vehicle Crossing
Cesspits (Semi recessed)
Exposed Concrete Parking Bay
Rain Garden (RG)
S — Under channel drains
Overland Flowpath

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REVISION (DESCRIPTIONS)	NAME	DATE
	NAME	DATE
SURVEYED	BJ	08/17
DESIGNED		
DRAWN	BJ	08/17
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APPROVED	TL	08/17

CLIENT
Cabra Developments Ltd
Huapai Triangle Sub Precinct A
Stage 1C
Station Road, Huapai

DRAWING TITLE
Road
As Built Plan
Sheet 3 of 3

SUB 65117

ORIGINAL SCALE 1:500	ORIGINAL SIZE A3	REVISION NO
DATE 03/08/2017	CAD REFERENCE 34745 E611-E613 Roading	SHEET NO E613
DIRECTORY Z:\34745\ACAD\As Builts\Stage 1C		JOB NO 34745

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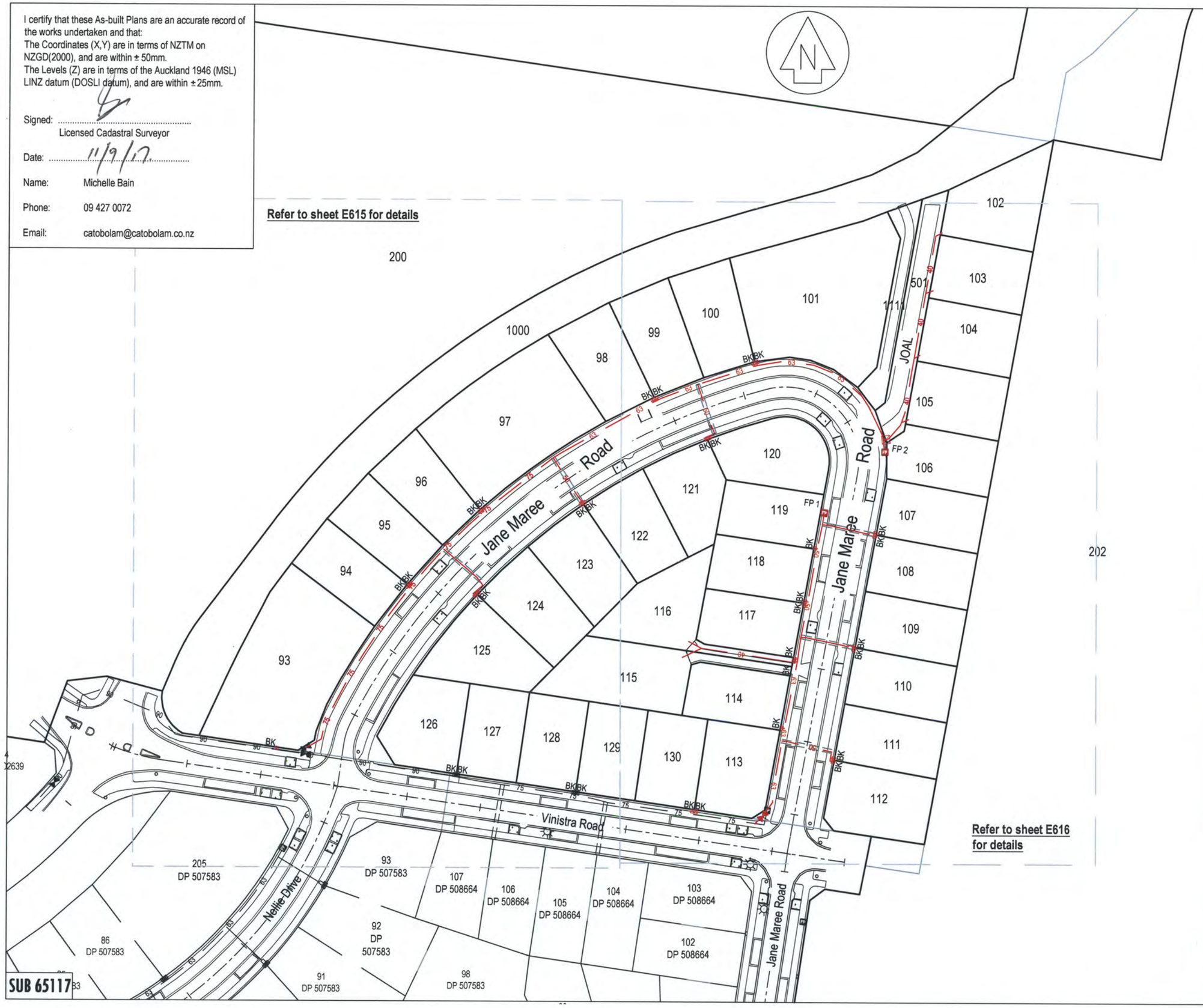

Asbuilt Legend

Existing	New - Constructed under SUB 65117 Stage 1C
75 / 110	PWC Sewer (40,50,63,90,110 outside diameter) — 50, 63, 90, 110
	Isolation Valve
FP	Flushing Point
☒	Boundary Kit BK ☒

NOTE

1. Levels are in terms of LINZ Datum.
2. Coordinates are in terms of NZTM.
3. All pipework is PE100 PN16 with SAP7 bedding.
4. Depth of lines are approximately 0.6m below finished ground level and berms. 0.9m under carriageways.

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CLIENT
Cabra Development Ltd
Huapai Triangle Sub Precinct A
Stage 1C
Station Road, Huapai

DRAWING TITLE
Wastewater Reticulation
As Built Plan
Sheet 1 of 3

ORIGINAL SCALE 1:1000	ORIGINAL SIZE A3	REVISION NO
DATE 04/07/2017	CAD REFERENCE 34745 E614 - E616 LPS	SHEET NO E614
DIRECTORY Z:\34745\ACAD\As Builts\Stage 1C		JOB NO 34745

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Licensed Cadastral Surveyor

Date: 11/7/17

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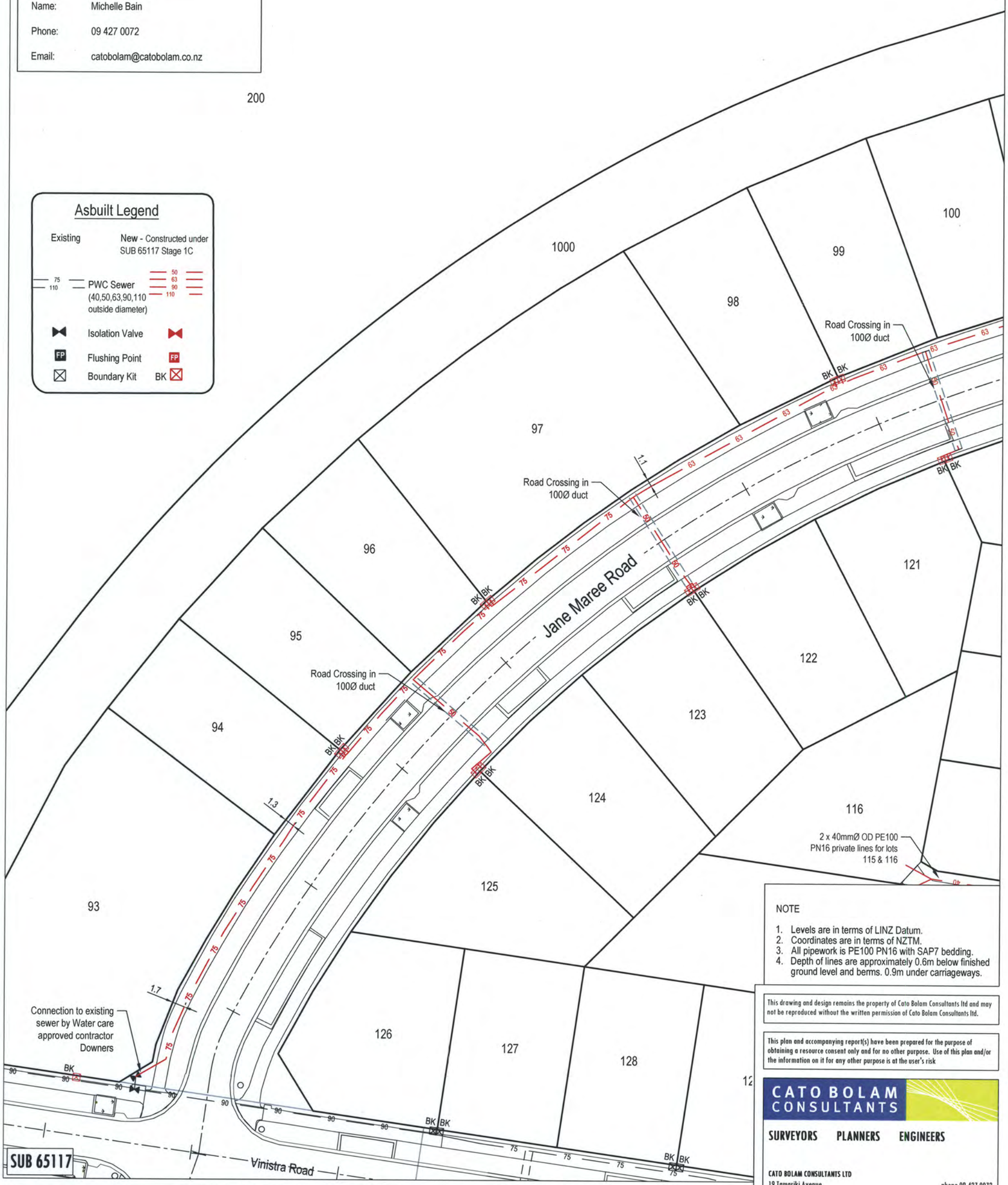
Email: catobolam@catobolam.co.nz

200

Asbuilt Legend

Existing	New - Constructed under SUB 65117 Stage 1C
75 / 110 PWC Sewer (40,50,63,90,110 outside diameter)	50 / 63 / 90 / 110
Isolation Valve	
FP Flushing Point	FP
Boundary Kit	BK



NOTE

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Cabra Developments Ltd
Huapai Triangle Sub Precinct A
Stage 1C
Station Road, Huapai

DRAWING TITLE

Wastewater Reticulation
As Built Plan
Sheet 2 of 3

ORIGINAL SCALE 1:500	ORIGINAL SIZE A3	REVISION NO
DATE 04/08/2017	CAD REFERENCE 34745 E614 - E616 LPS	SHEET NO E615
DIRECTORY Z:\34745\ACAD\As Builts\Stage 1C		JOB NO 34745

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Licensed Cadastral Surveyor

Date: 11/9/17

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Phone: 09 427 0072

Email: catobolam@catobolam.co.nz

N

Asbuilt Legend

Existing	New - Constructed under SUB 65117 Stage 1C
PWC Sewer (40,50,63,90,110 outside diameter)	
Isolation Valve	
Flushing Point	FP
Boundary Kit	BK

Jane Maree Road

JOAL

Vinistra Road

1000 99 100 101 1111 501 103 104 105 106 107 108 109 110 97 98 120 121 122 123 124 116 117 118 119 115 114 127 128 129 130 113

Road Crossing in 100Ø duct

Road Crossing in 100Ø duct

Road Crossing in 100Ø duct

Road Crossing in 100Ø duct

4 x 40mmØ OD PE100 PN16 private lines for lots 102 - 105

2 x 40mmØ OD PE100 PN16 private lines for lots 115 & 116

Boundary kit bank for lots 102 -105

FP
5928743.32 mN
1737539.47 mE

FP
5928727.14 mN
1737522.25 mE

Existing flushing pit removed

IV
5928645.82 mN
1737504.63 mE

Connection to existing sewer by Water care approved contractor Downers

SUB 65117

NOTE

1. Levels are in terms of LINZ Datum.
2. Coordinates are in terms of NZTM.
3. All pipework is PE100 PN16 with SAP7 bedding.
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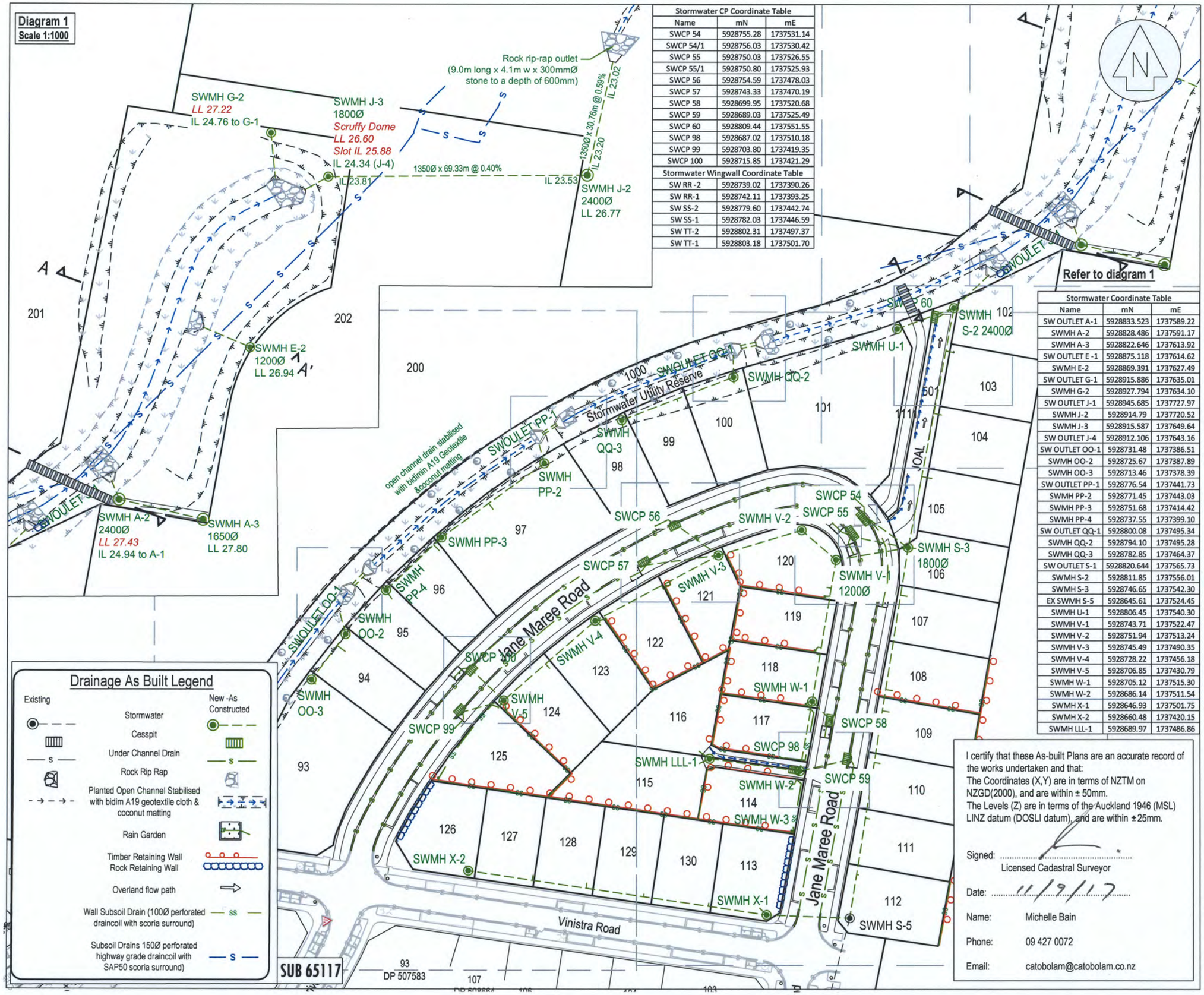
Cabra Developments Ltd
Huapai Triangle Sub Precinct A
Stage 1C
Station Road, Huapai

DRAWING TITLE

Wastewater Reticulation
As Built Plan
Sheet 3 of 3

ORIGINAL SCALE 1:500	ORIGINAL SIZE A3	REVISION NO
DATE 04/08/2017	CAD REFERENCE 34745 E614 - E616 LPS	SHEET NO E616
DIRECTORY Z:\34745\ACAD\As Builts\Stage 1C		JOB NO 34745



Stormwater CP Coordinate Table		
Name	mN	mE
SWCP 54	5928755.28	1737531.14
SWCP 54/1	5928756.03	1737530.42
SWCP 55	5928750.03	1737526.55
SWCP 55/1	5928750.80	1737525.93
SWCP 56	5928754.59	1737478.03
SWCP 57	5928743.33	1737470.19
SWCP 58	5928699.95	1737520.68
SWCP 59	5928689.03	1737525.49
SWCP 60	5928809.44	1737551.55
SWCP 98	5928687.02	1737510.18
SWCP 99	5928703.80	1737419.35
SWCP 100	5928715.85	1737421.29
Stormwater Wingwall Coordinate Table		
SW RR -2	5928739.02	1737390.26
SW RR-1	5928742.11	1737393.25
SW SS-2	5928779.60	1737442.74
SW SS-1	5928782.03	1737446.59
SW TT-2	5928802.31	1737497.37
SW TT-1	5928803.18	1737501.70

Stormwater Coordinate Table		
Name	mN	mE
SW OUTLET A-1	5928833.523	1737589.22
SWMH A-2	5928828.486	1737591.17
SWMH A-3	5928822.646	1737613.92
SW OUTLET E -1	5928875.118	1737614.62
SWMH E-2	5928869.391	1737627.49
SW OUTLET G-1	5928915.886	1737635.01
SWMH G-2	5928927.794	1737634.10
SW OUTLET J-1	5928945.685	1737727.97
SWMH J-2	5928914.79	1737720.52
SWMH J-3	5928915.587	1737649.64
SW OUTLET J-4	5928912.106	1737643.16
SW OUTLET OO-1	5928731.48	1737386.51
SWMH OO-2	5928725.67	1737387.89
SWMH OO-3	5928713.46	1737378.39
SW OUTLET PP-1	5928776.54	1737441.73
SWMH PP-2	5928771.45	1737443.03
SWMH PP-3	5928751.68	1737414.42
SWMH PP-4	5928737.55	1737399.10
SW OUTLET QQ-1	5928800.08	1737495.34
SWMH QQ-2	5928794.10	1737495.28
SWMH QQ-3	5928782.85	1737464.37
SW OUTLET S-1	5928820.644	1737565.73
SWMH S-2	5928811.85	1737556.01
SWMH S-3	5928746.65	1737542.30
EX SWMH S-5	5928645.61	1737524.45
SWMH U-1	5928806.45	1737540.30
SWMH V-1	5928743.71	1737522.47
SWMH V-2	5928751.94	1737513.24
SWMH V-3	5928745.49	1737490.35
SWMH V-4	5928728.22	1737456.18
SWMH V-5	5928706.85	1737430.79
SWMH W-1	5928705.12	1737515.30
SWMH W-2	5928686.14	1737511.54
SWMH X-1	5928646.93	1737501.75
SWMH X-2	5928660.48	1737420.15
SWMH LLL-1	5928689.97	1737486.86

Drainage As Built Legend

Existing		New -As Constructed
	Stormwater	
	Cesspit	
S	Under Channel Drain	S
	Rock Rip Rap	
	Planted Open Channel Stabilised with bidim A19 geotextile cloth & coconut matting	
	Rain Garden	
	Timber Retaining Wall / Rock Retaining Wall	
	Overland flow path	
	Wall Subsoil Drain (100Ø perforated draincoil with scoria surround)	SS
	Subsoil Drains 150Ø perforated highway grade draincoil with SAP50 scoria surround)	S

NOTES

GENERAL

1. Levels are in terms of LINZ Datum 1946.
2. Coordinates are in terms of NZTM.
3. All infrastructure is public unless otherwise shown.

STORMWATER

1. All pipes are Class 4 reinforced concrete rubber ring jointed (RCRRJ), unless otherwise shown.
2. All manholes are 1050mmØ concrete flange base and riser, unless otherwise shown.
2. Bedding is H2 type unless otherwise stated.
3. All catchpits are 675mm x 450mm steel grate lids semi recessed unless otherwise shown.
4. All lot connections are 100Ø uPVC SN16 unless otherwise stated.
5. All 100Ø - 150Ø pipes are uPVC SN16.
6. Wall drain cesspits and outlet pipes are private.
7. Information shown in red italics are design levels and subject to change

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CLIENT
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Huapai Triangle Sub Precinct A
Stage 1C
Station Road, Huapai

DRAWING TITLE
Stormwater Reticulation
As Built Plan
Sheet 1 of 4

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Licensed Cadastral Surveyor

Date: 11/9/17

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ORIGINAL SCALE 1:1000	ORIGINAL SIZE A3	REVISION NO
DATE 04/07/17	CAD REFERENCE 34745 E617-E621 SW RETIC	SHEET NO E617
DIRECTORY Z:\34745\ACAD\As Builts\Stage 1C		JOB NO 34745

Diagram 1
Scale 1:250

precast wingwall
375Ø Class 2 x 4.4m@ 7.05%
375Ø Class 2 x 4.3m @ 7.21%
IL 33.92
IL 33.91
IL 33.61
IL 33.60
IL 33.25
SWMH PP-4
LL 35.16
95
96

Diagram 3

precast wingwall
525Ø Class 2 x 4.5m @ 1.11%
525Ø Class 2 x 4.4m @ 1.14%
IL 27.26
IL 27.25
IL 27.21
IL 27.20
Scale 1:250
101

Diagram 2
Scale 1:250

precast wingwall
375Ø Class 2 x 4.5m @ 4.67%
375Ø Class 2 x 4.6m @ 3.91%
IL 30.38
IL 30.35
IL 30.17
IL 30.17
97
98

Refer to diagram 1
Refer to diagram 2
Refer to diagram 3
Refer to diagram 4
Refer to diagram 5 sheet E608
Refer to diagram 6 sheet E608
Refer to diagram 11

apodasmia similis planted throughout green finger and swale and specimen trees along green finger (cabbage, kowhai, lemonwood,plane tree & pukatea)

Stormwater Utility Reserve
Jane Maree Road
JOAL

SW RR-1
SW RR-2
SWMH PP-4
LL 35.16
IL 33.25
2250Ø x 19.8m @ 5.25%
conn @ 2.9m
SWMH OO-1
IL 34.36
100Ø Class 2 x 5.5m @ 0.18%
open channel drain stabilised with coconut matting
SWMH OO-2
LL 36.06
IL 34.37 (OO-1)
IL 34.41 (OO-3)
SWMH OO-3
LL 36.59
IL 34.50 (OO-2)
300Ø Class 2 x 14.5m @ 0.62%
conn @ 3.8m
conn
96
95
94

SW SS-1
SW SS-2
SWOUTLET PP-1
IL 30.51
SWMH PP-2
LL 32.11
IL 30.56 (PP-1)
IL 30.57
2250Ø x 4.8m @ 1.04%
2250Ø x 33.8m @ 4.79%
conn @ 18.7m
SWMH PP-3
LL 33.96
IL 32.19
IL 32.21
97
98

SW TT-1
SW TT-2
SWMH QQ-1
LL 27.43
IL 27.62
1225Ø x 5.5m @ 2.91%
SWMH QQ-2
LL 29.12
IL 27.59 (QQ-1)
SWMH QQ-3
LL 30.80
IL 29.50
conn
2250Ø x 31.9m @ 5.89%
conn @ 16.7m
1000
99
100
101

Overland flow path
overland flow path cross section refer to diagram 10
9000 x 65.6m @
104
105
106
107
conn @ 46.8m
conn @ 13.1m
IL 26.06
IL 26.19

SWCP 56
LL 30.66
SWCP 57
LL 31.22
100Ø outlet from RG
300Ø Class 3 x 22.8m @ 2.68%
IL 28.50
IL 28.59
SWMH V-3
LL 30.71
SWMH V-2
LL 29.70
IL 27.89
IL 27.73
IL 27.26
SWCP 54/1
SWCP 54
SWCP 55/1
SWCP 55
450Ø x 19.0m @ 2.26%
conn
SWMH S-3 1800Ø
LL 29.22
IL 26.55 (V-1)
IL 27.38 (CP 54)
IL 27.14 (CP 55)
SWMH V-1 1200Ø
LL 29.38
IL 26.98 (S-3)
IL 27.27
120

100Ø outlet from RG
2250Ø x 37.3m @ 7.02%
SWCP (private)
conn @ 18.0m
conn @ 15.3m
100Ø drain coil behind wall
100Ø draincoil behind wall
IL 31.21
IL 31.35
SWMH V-4
LL 32.83
conn
121
122
123
124

conn @ 7.8m
SWCP (private)
100Ø draincoil behind wall
119
2250Ø x 38.2m @ 5.71%
conn @ 24.4m
SWCP (private)
conn @ 26.3m
100Ø draincoil behind wall
118
100Ø non perforated private drain coil
SWMH W-1
LL 31.57
IL 29.72 (CP 58)
SWCP (private)
conn @ 2.5m
IL 29.45
2250Ø @ 6.3%
IL 29.61
117
116
18.4m @ 3.3%

100Ø outlet from RG
SWCP 100
LL 34.02
SWCP 99
LL 34.55
IL 33.25
IL 32.94
2250Ø x 12.3m @ 1.54%
IL 32.75
IL 32.37
IL 32.80
SWMH V-5
LL 34.31
SWCP (private)
2250Ø x 11.2m @ 4.02%
Diagram 4
Scale 1:250

SUB 65117

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Refer to E617 for legend & notes

CLIENT
Cabra Development Ltd
Huapai Triangle Sub Precinct A
Stage 1C
Station Road, Huapai

DRAWING TITLE
Stormwater Reticulation
As Built Plan
Sheet 2 of 4

ORIGINAL SCALE 1:500	ORIGINAL SIZE A3	REVISION NO
DATE 04/04/17	CAD REFERENCE 34745 E617-E621 SW RETIC	SHEET NO E618
DIRECTORY Z:\34745\ACAD\As Builts\Stage 1C		JOB NO 34745

Diagram 5

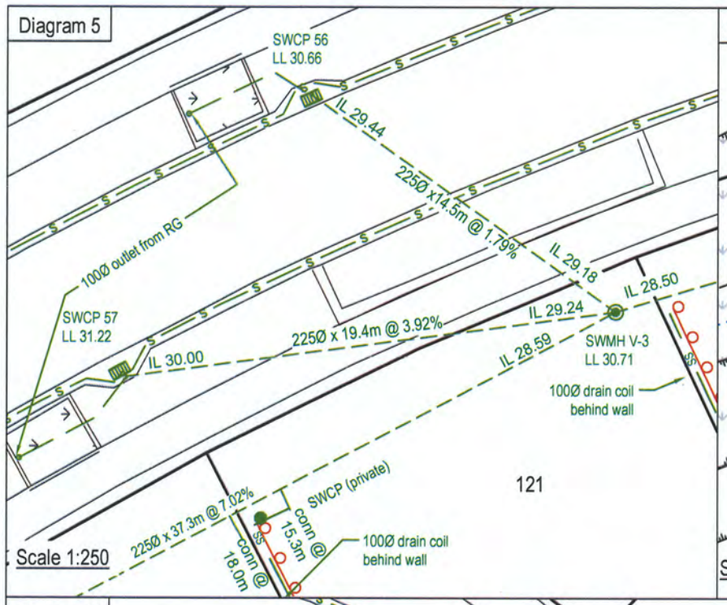
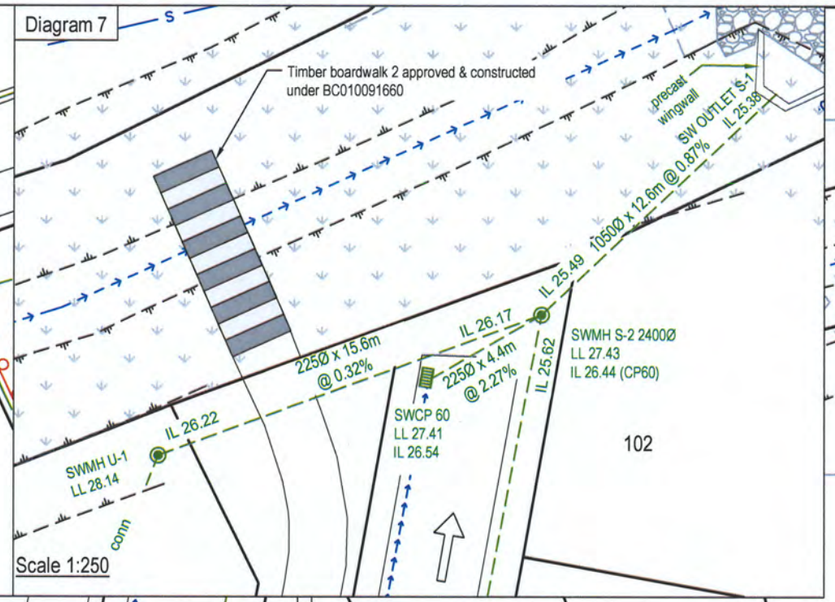


Diagram 7



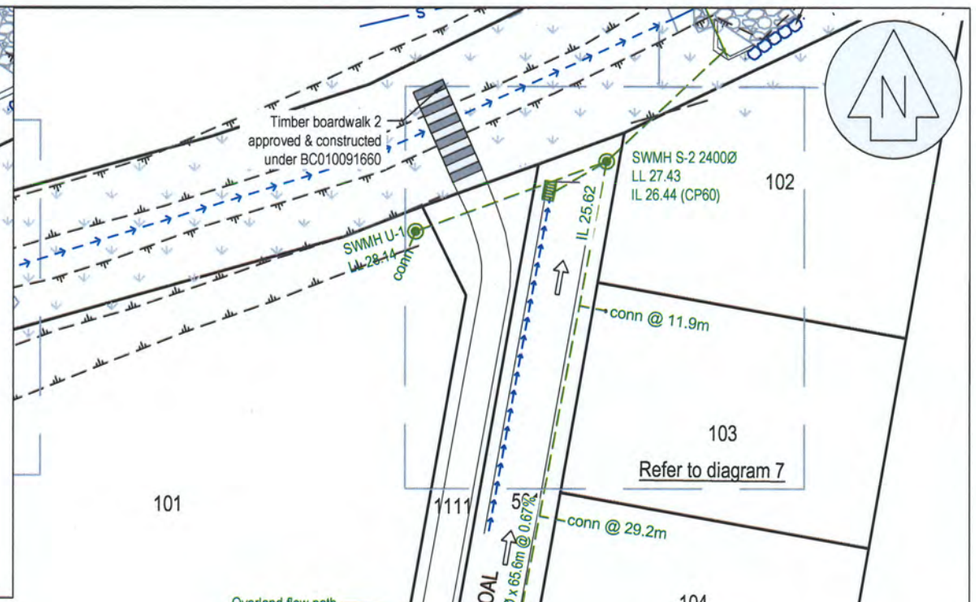
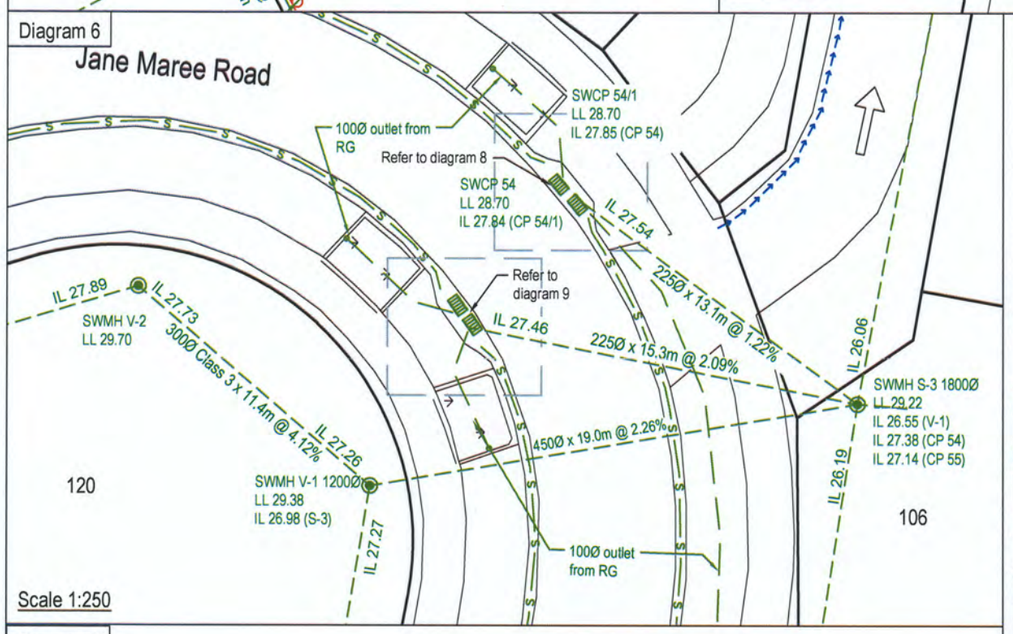


Diagram 6



Refer to diagram 5

Refer to diagram 6

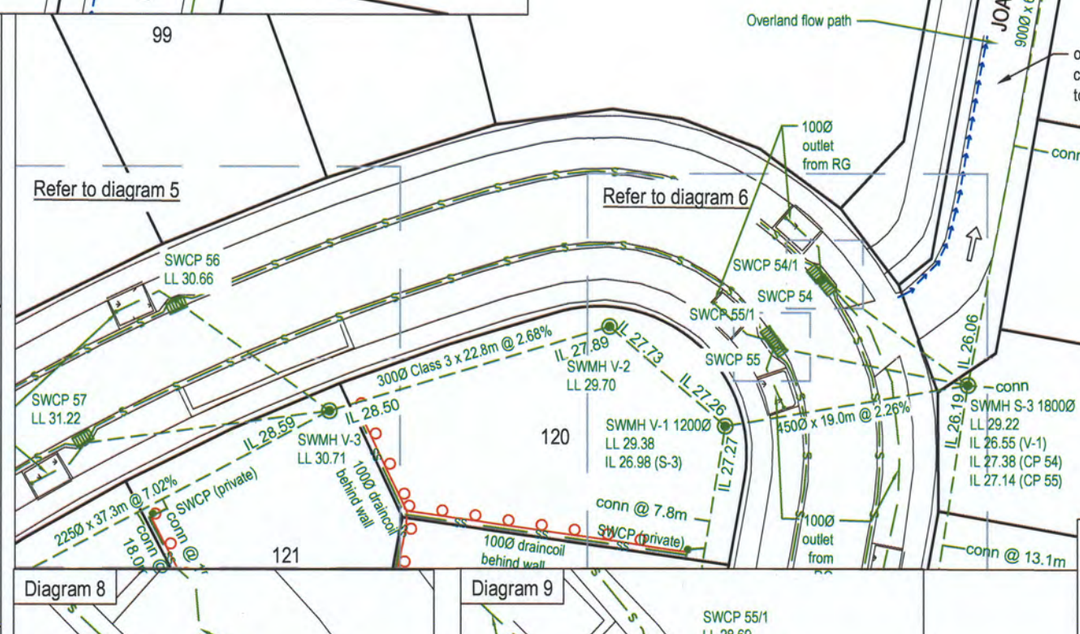


Diagram 8

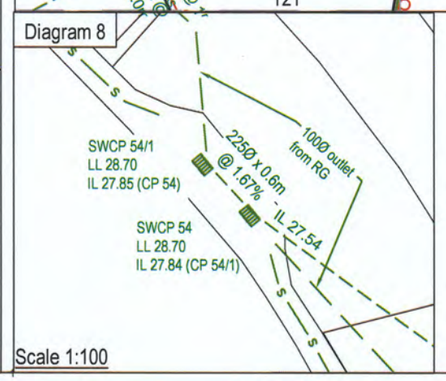


Diagram 9

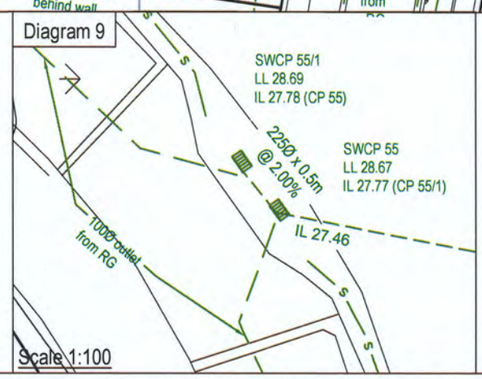
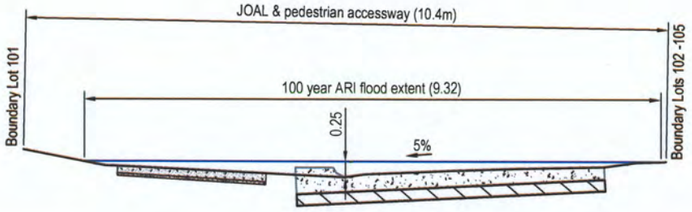


Diagram 10



SUB 65117

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The Levels (Z) are in terms of the Auckland 1946 (MSL) LINZ datum (DOSLI datum), and are within ± 25mm.

Signed: .....
Licensed Cadastral Surveyor

Date: 11/9/17

Name: Michelle Bain

Phone: 09 427 0072

Email: catobolam@catobolam.co.nz

CATO BOLAM CONSULTANTS

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REVISION (DESCRIPTIONS)	NAME	DATE

	NAME	DATE
SURVEYED	BJ	07/17
DESIGNED	KM	08/16
DRAWN	BJ	07/17
CHECKED	BM	07/17
APPROVED	TL	07/17

Refer to E617 for legend and notes

CLIENT

Cabra Development Ltd
Huapai Triangle Sub Precinct A
Stage 1C
Station Road, Huapai

DRAWING TITLE

Stormwater Reticulation
As Built Plan
Sheet 3 of 4

ORIGINAL SCALE	ORIGINAL SIZE	REVISION NO
1:500	A3	
DATE	CAD REFERENCE	SHEET NO
04/07/17	34745 E617-E621 SW RETIC	E619
DIRECTORY		JOB NO
Z:\34745\ACAD\As Builts\Stage 1C		34745

Diagram 11

Scale 1:100

NOTES

GENERAL

1. Levels are in terms of LINZ Datum 1946.
2. Coordinates are in terms of NZTM.
3. All infrastructure is public unless otherwise shown.

STORMWATER

1. All pipes are Class 4 reinforced concrete rubber ring jointed (RCRRJ), unless otherwise shown.
2. All manholes are 1050mmØ concrete flange base and riser, unless otherwise shown.
2. Bedding is H2 type unless otherwise stated.
3. All catchpits are 675mm x 450mm steel grate lids semi recessed unless otherwise shown.
4. All lot connections are 100Ø uPVC SN16 unless otherwise stated.
5. All 100Ø - 150Ø pipes are uPVC SN16.
6. Wall drain cesspits and outlet pipes are private.

Refer to diagram 5

Refer to diagram 6

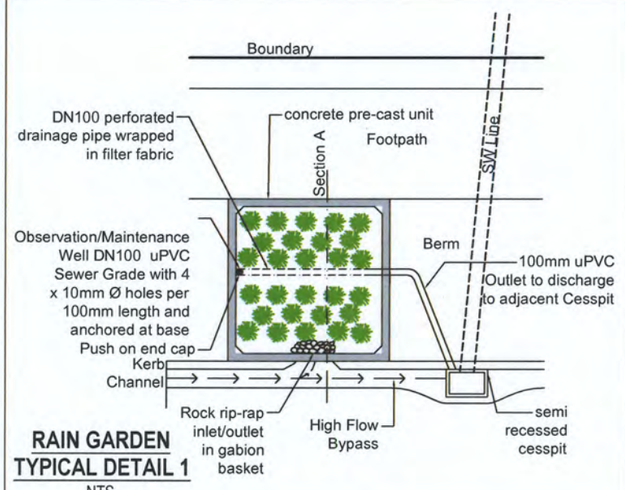
Refer to diagram 11

Jane Maree Road

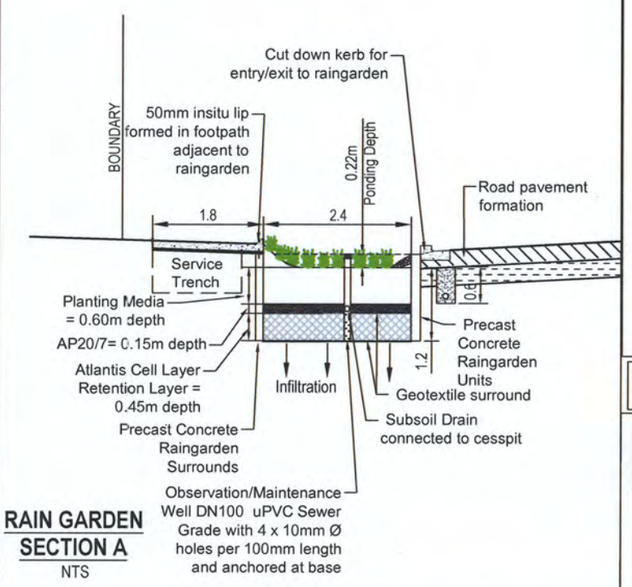
Vinistra Road

SUB 65117

Refer to E617 for Legend



RAIN GARDEN TYPICAL DETAIL 1
NTS



RAIN GARDEN SECTION A
NTS

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Licensed Cadastral Surveyor

Date: 11/9/17

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Cabra Development Ltd
Huapai Triangle Sub Precinct A
Stage 1C
Station Road, Huapai

DRAWING TITLE

Stormwater Reticulation
As Built Plan
Sheet 4 of 4

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ORIGINAL SCALE 1:500	ORIGINAL SIZE A3	REVISION NO
DATE 04/07/17	CAD REFERENCE 34745 E617-E621 SW RETIC	SHEET NO E620
DIRECTORY Z:\34745\ACAD\As Builts\Stage 1C		JOB NO 34745

Outlet Detail
Not to Scale

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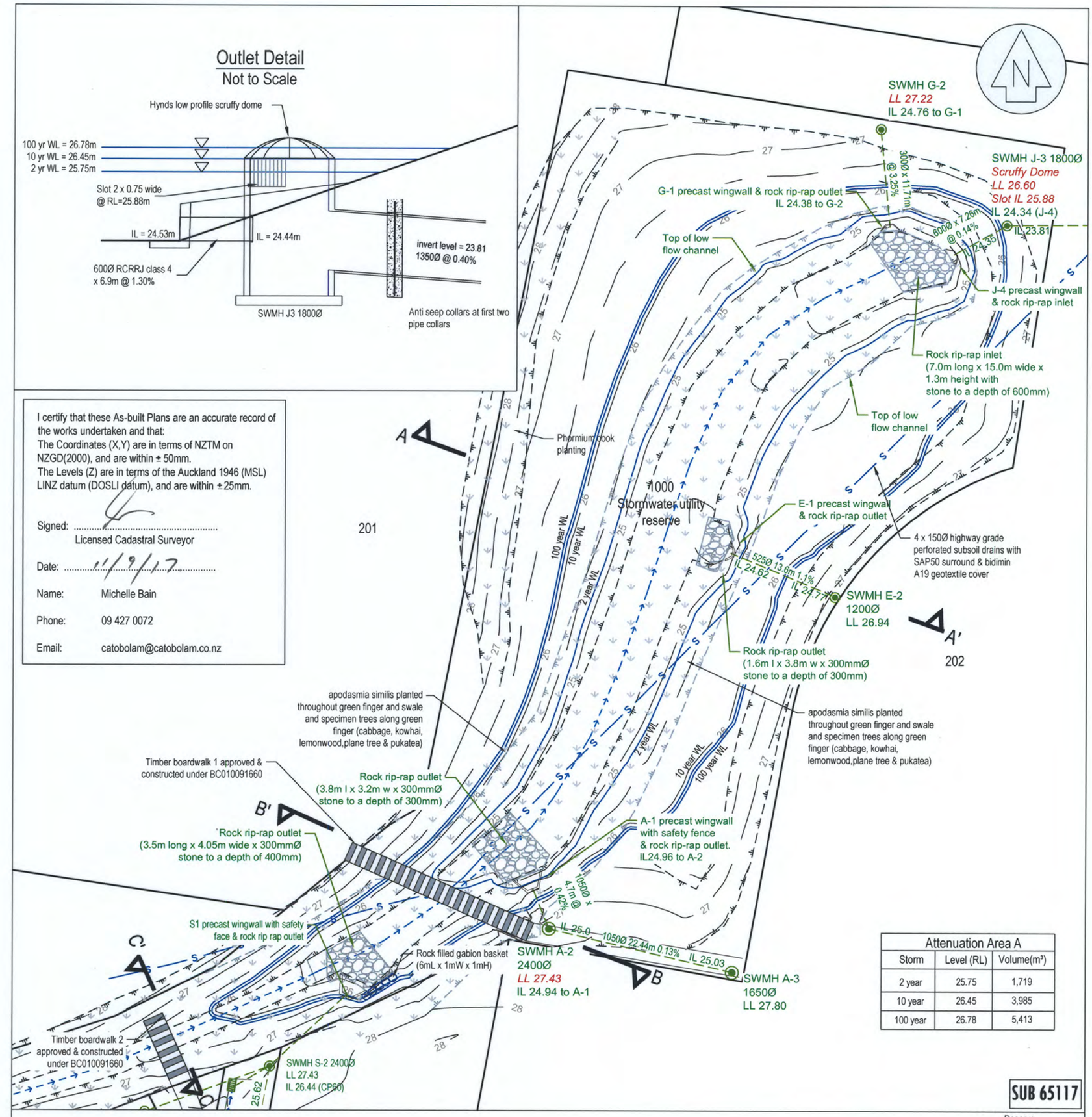
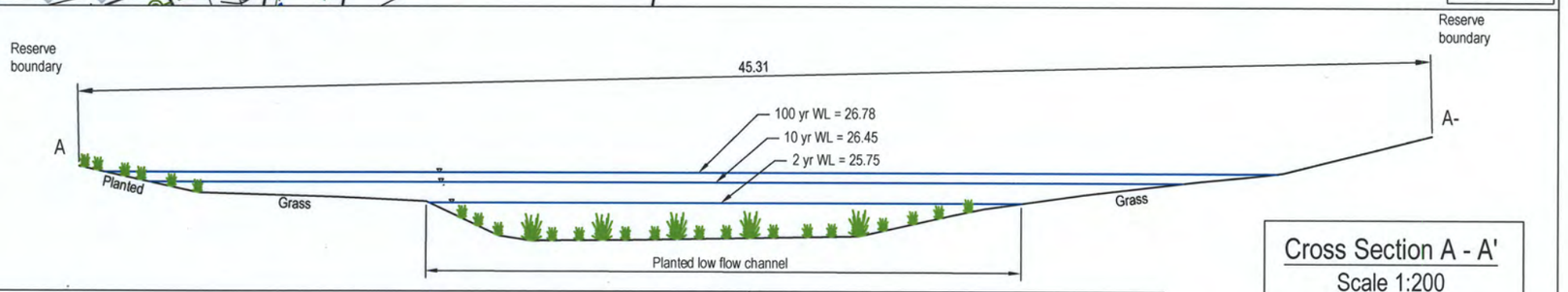
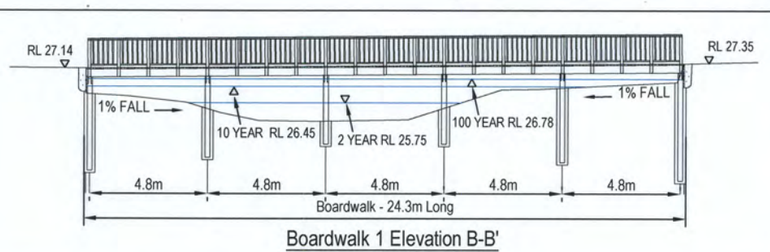


Attenuation Area A		
Storm	Level (RL)	Volume(m³)
2 year	25.75	1,719
10 year	26.45	3,985
100 year	26.78	5,413

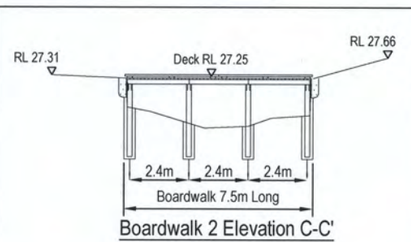
SUB 65117



Cross Section A - A'
Scale 1:200



Boardwalk 1 Elevation B-B'
Scale 1:250



Boardwalk 2 Elevation C-C'
Scale 1:250

REVISION (DESCRIPTIONS)	NAME	DATE
	NAME	DATE
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Cabra Development Ltd
Stage 1C
45 Station Road Huapai

DRAWING TITLE

Stormwater Attenuation Area A
As Built Plan

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ORIGINAL SCALE 1:500	ORIGINAL SIZE A3	REVISION NO
DATE 04/07/17	CAD REFERENCE 34745 E617-E621 SW RETIC	SHEET NO E621
DIRECTORY Z:\34745\ACAD\As Builts\Stage 1C		JOB NO 34745

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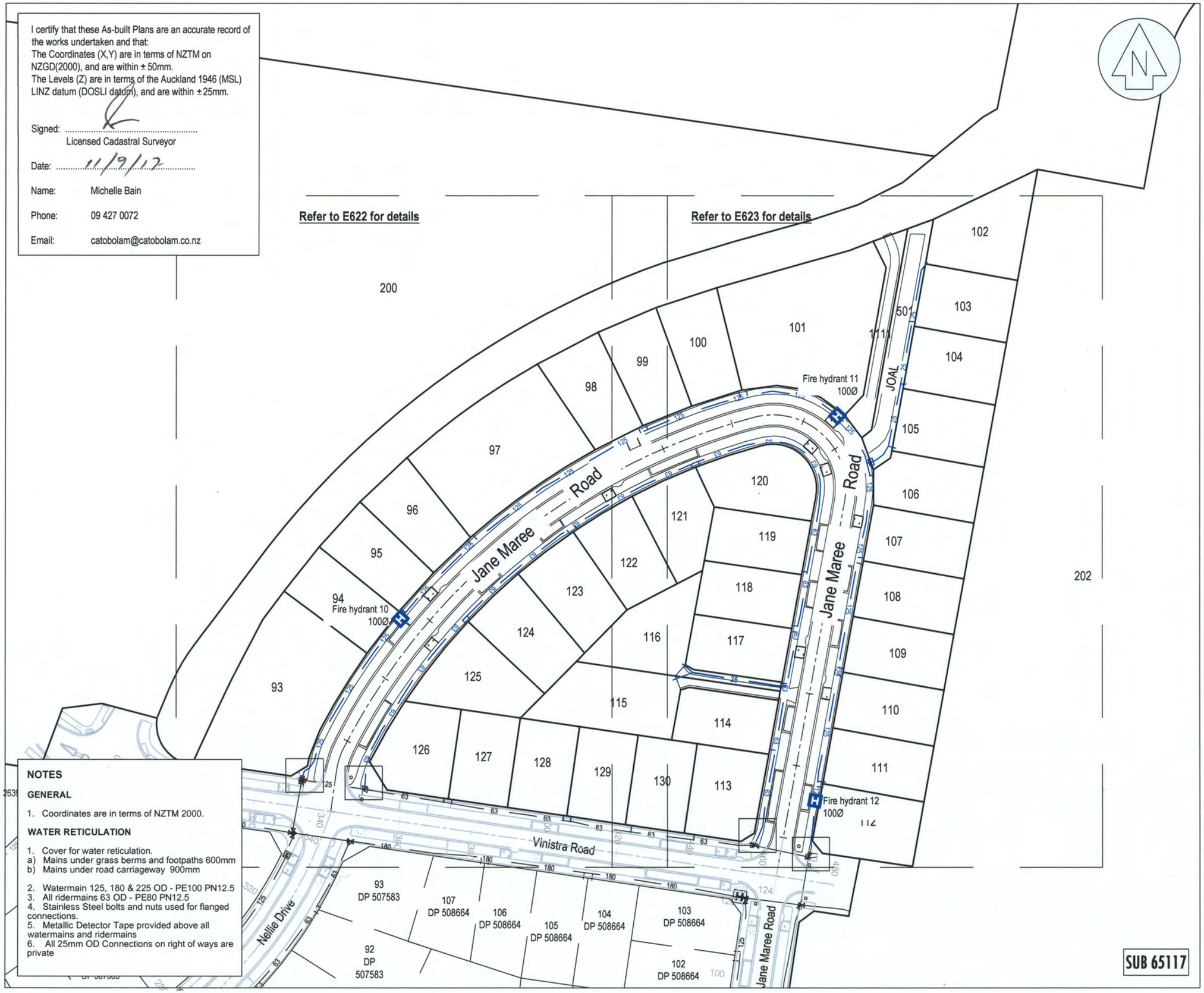

Water Reticulation Legend

Existing		New - constructed under SUB 65117
32 / 63 / 125	Watermain (OD Ø)	32 / 63 / 125
	Sluice Valve	
	Peet Valve	
	Tapping bands for lot connections	
H	Fire Hydrant	H

NOTES

GENERAL

1. Coordinates are in terms of NZTM 2000.

WATER RETICULATION

1. Cover for water reticulation.
a) Mains under grass berms and footpaths 600mm
b) Mains under road carriageway 900mm

2. Watermain 125, 180 & 225 OD - PE100 PN12.5
3. All ridermains 63 OD - PE80 PN12.5
4. Stainless Steel bolts and nuts used for flanged connections.
5. Metallic Detector Tape provided above all watermains and ridermains
6. All 25mm OD Connections on right of ways are private

REVISION (DESCRIPTIONS)	NAME	DATE

	NAME	DATE
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CLIENT
Cabra Developments Ltd
Huapai Triangle Sub Precinct A
Stage 1C
Station Road, Huapai

DRAWING TITLE
Water Reticulation As Built Plan
Sheet 1of 3

ORIGINAL SCALE 1:1000	ORIGINAL SIZE A3	REVISION NO
DATE 10/07/2017	CAD REFERENCE 34745 E622-E624 Water ASB	SHEET NO E622
DIRECTORY Z:\34745\ACAD\As Builts\Stage 1C		JOB NO 34745

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Licensed Cadastral Surveyor

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Email: catobolam@catobolam.co.nz

200

N

Diagram 1

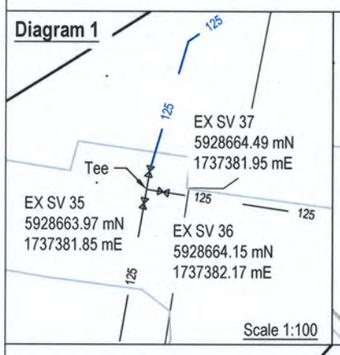
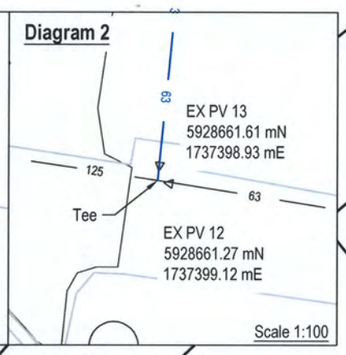


Diagram 2



Jane Maree Road

Vinistra Road

Lot connections lots 96 & 97

Lot connections lots 122 & 123

Lot connections lots 94 & 95

Fire Hydrant 10 100Ø
1737409.81 mN
5928707.78 mE

Lot connections lots 124 & 125

Lot connections lots 98 & 99

Lot connections lots 126 & 127

Lot connections lots 128 & 129

Lot connection lot 116

Lot connection lot 115

Lot connection lot 130

Connection to existing watermain completed by Watercare approved contractor Downers

Refer to Diagram 1 for details

Connection to existing watermain completed by Watercare approved contractor Downers

Refer to Diagram 2 for details

1.41

1.22

1.14

1.16

93
DP 507583

107
DP 508664

SUB 65117

Water Reticulation Legend

Existing		New - constructed under SUB 65117
32 / 63 / 125	Watermain (OD Ø)	32 / 63 / 125
⋈	Sluice Valve	⋈
△	Peet Valve	▲
	Tapping bands for lot connections	
H	Fire Hydrant	H

NOTES

GENERAL

1. Coordinates are in terms of NZTM 2000.

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APPROVED	TL	07/17

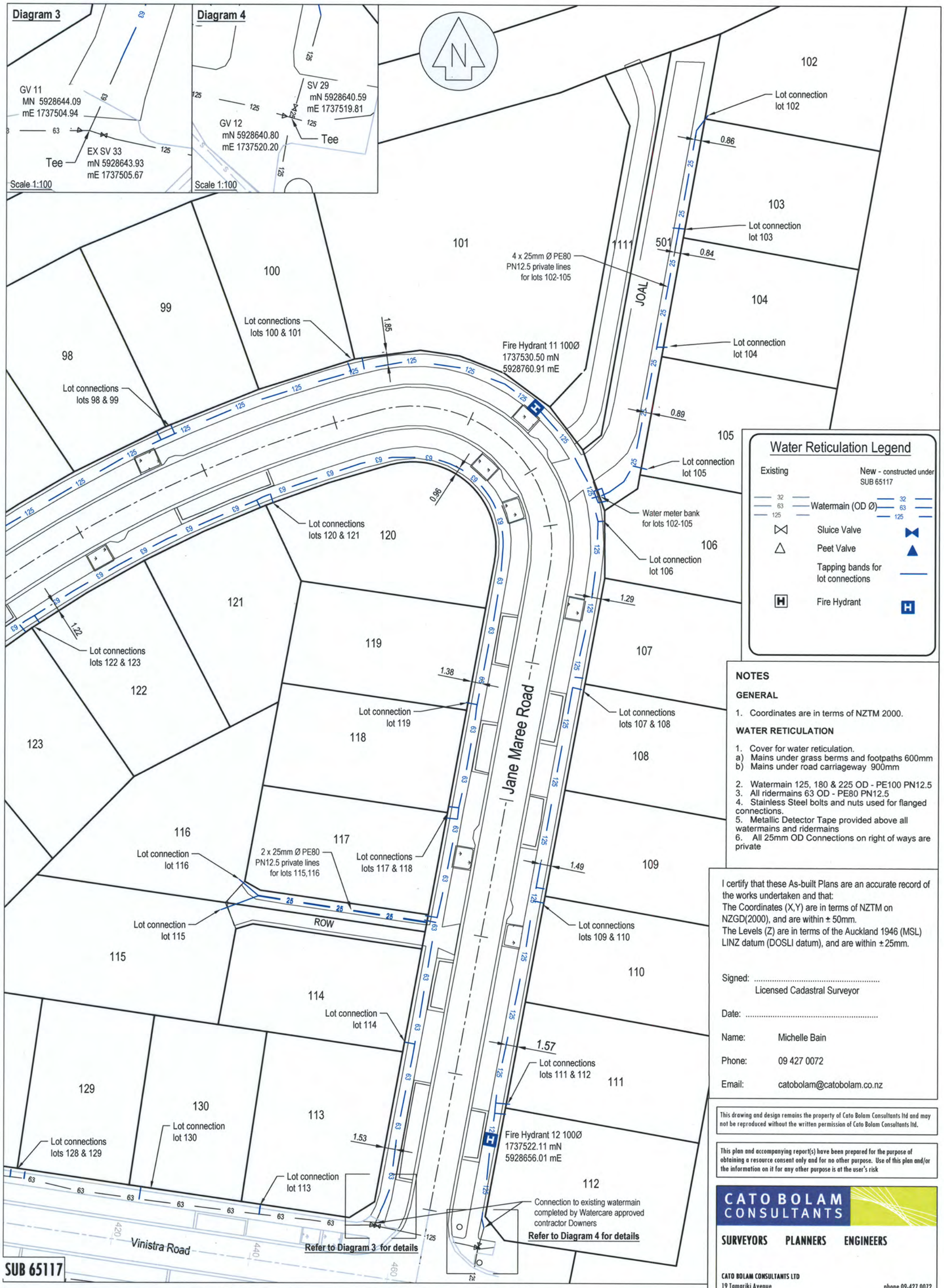
CLIENT

Cabra Developments Ltd
Stage 1C
45 Station Road Huapai

DRAWING TITLE

Water Reticulation
As Built Plan
Sheet 2 of 3

ORIGINAL SCALE 1:500	ORIGINAL SIZE A3	REVISION NO
DATE 10/07/2017	CAD REFERENCE 34745 E622-E624 Water ASB	SHEET NO E623
DIRECTORY Z:\34745\ACAD\As Builts\Stage 1C		JOB NO 34745



Water Reticulation Legend

	Existing	New - constructed under SUB 65117
Watermain (OD Ø)	32, 63, 125	32, 63, 125
Sluice Valve	⋈	⋈
Peet Valve	△	▲
Tapping bands for lot connections		
Fire Hydrant	H	H

NOTES

GENERAL

1. Coordinates are in terms of NZTM 2000.

WATER RETICULATION

1. Cover for water reticulation.
   a) Mains under grass berms and footpaths 600mm
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Date: .....

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Email: catobolam@catobolam.co.nz

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Cabra Developments Ltd
Stage 1C
45 Station Road Huapai

DRAWING TITLE

Water Reticulation
As Built Plan
Sheet 3 of 3

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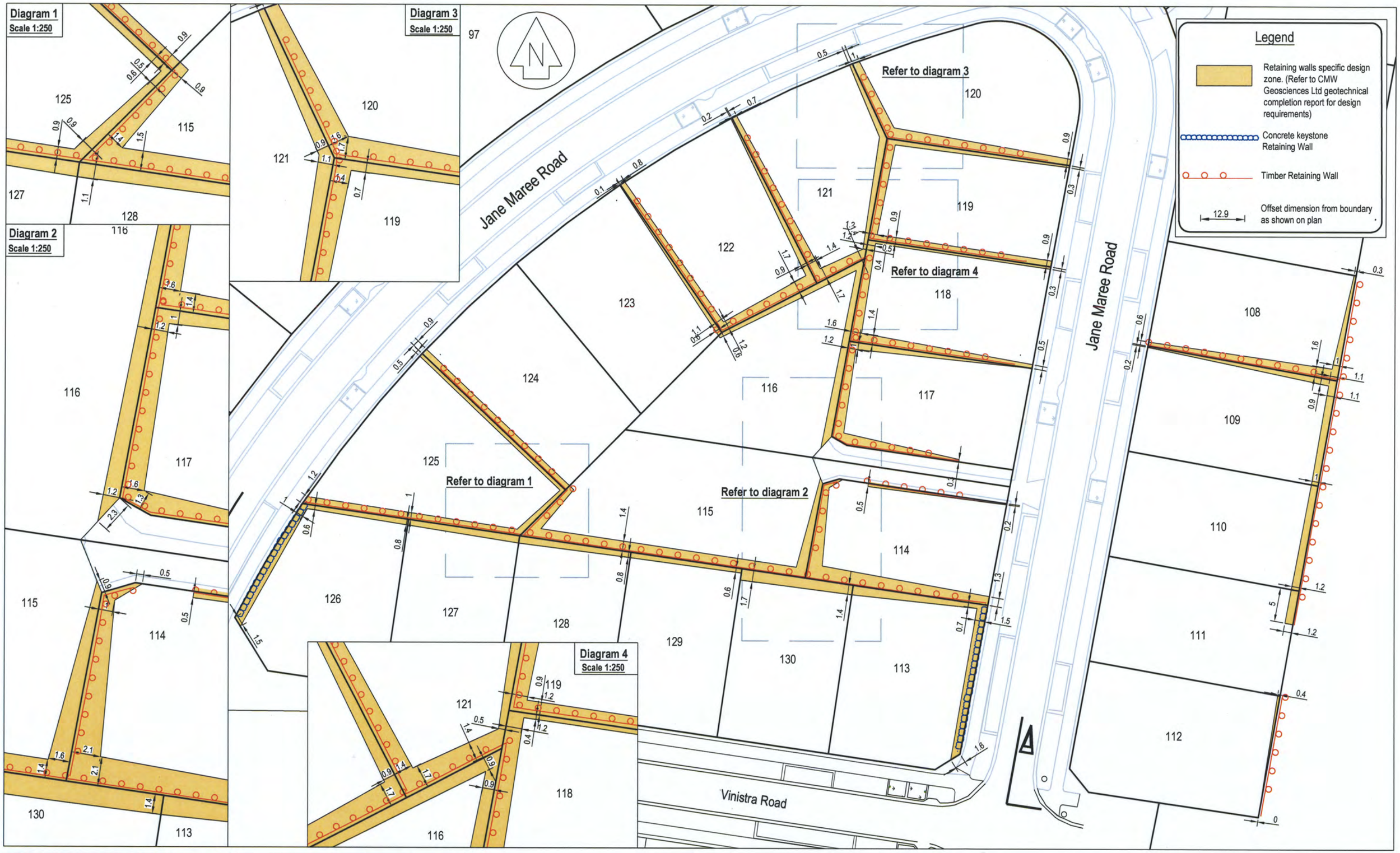
ORIGINAL SCALE	ORIGINAL SIZE	REVISION NO
1:500	A3	
DATE	CAD REFERENCE	SHEET NO
10/07/2017	34745 E622-E624 Water ASB	E624
DIRECTORY		JOB NO
Z:\34745\ACAD\As Builts\Stage 1C		34745



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This plan and accompanying report(s) have been prepared for the purpose of obtaining a resource consent only and for no other purpose. Use of this plan and/or the information on it for any other purpose is at the user's risk

CLIENT

Cabra Developments Ltd
Huapai Triangle Sub Precinct A
Stage 1C
Station Road, Huapai

DRAWING TITLE

Retaining Wall Specific Design Plan

ORIGINAL SCALE	ORIGINAL SIZE	REVISION NO
1:500	A3	
DATE	CAD REFERENCE	SHEET NO
04/08/2017	34745 E625 Specific Design	E625
DIRECTORY		JOB NO
Z:\34745\ACAD\As Builts\Stage 1C		34745

As Built Earthworks Legend

- Pipeline 45° Zone of Influence Area from invert
- Catchpits
- Stormwater
- 12.9 — Offset dimension from boundary as shown on plan

Lot 101 area around manhole added	BJ	09/17
REVISION (DESCRIPTIONS)	NAME	DATE

	NAME	DATE
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DRAWN	BJ	08/17
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Cabra Development Ltd

Huapai Triangle Sub Precinct A
Stage 1C
Station Road, Huapai

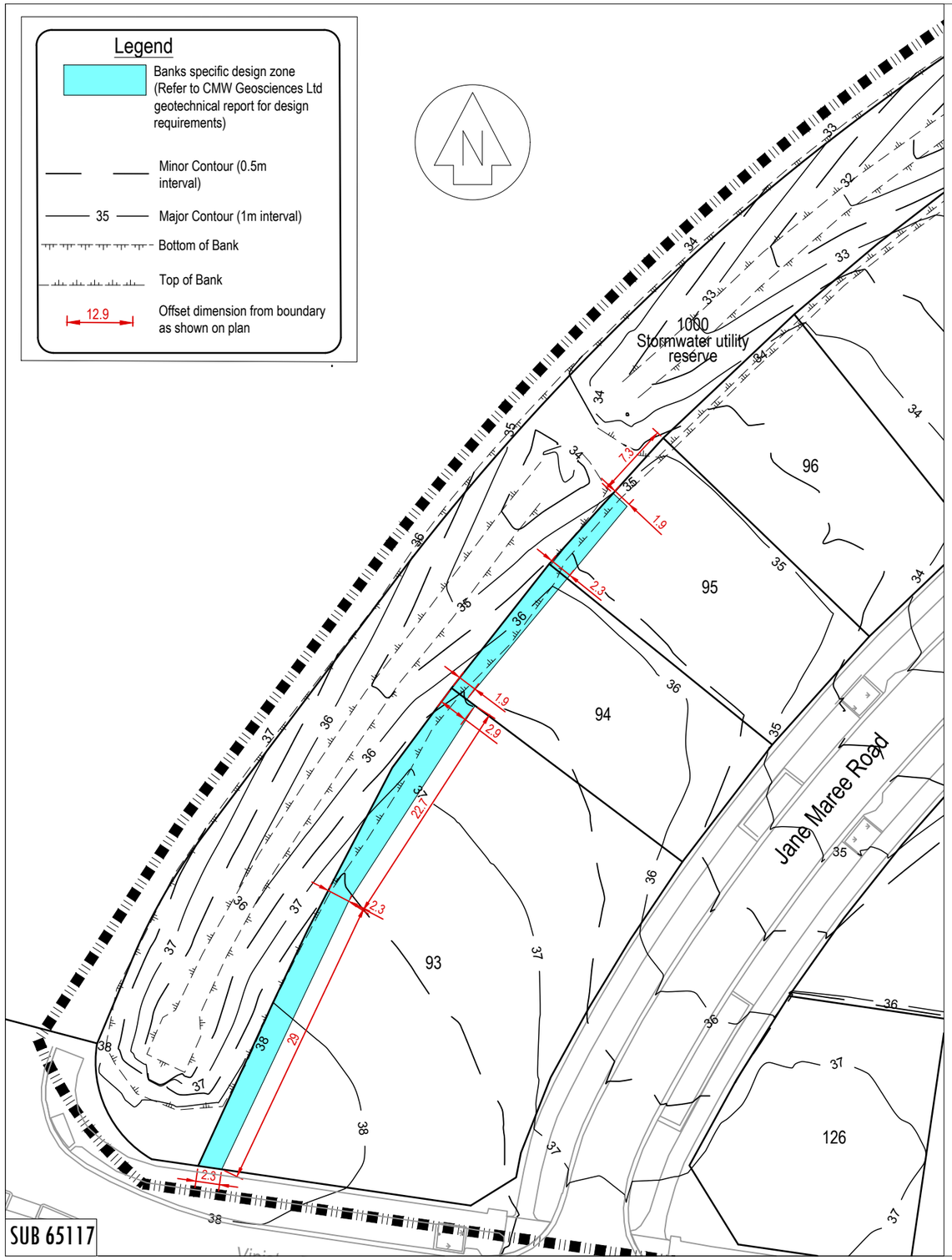
DRAWING TITLE

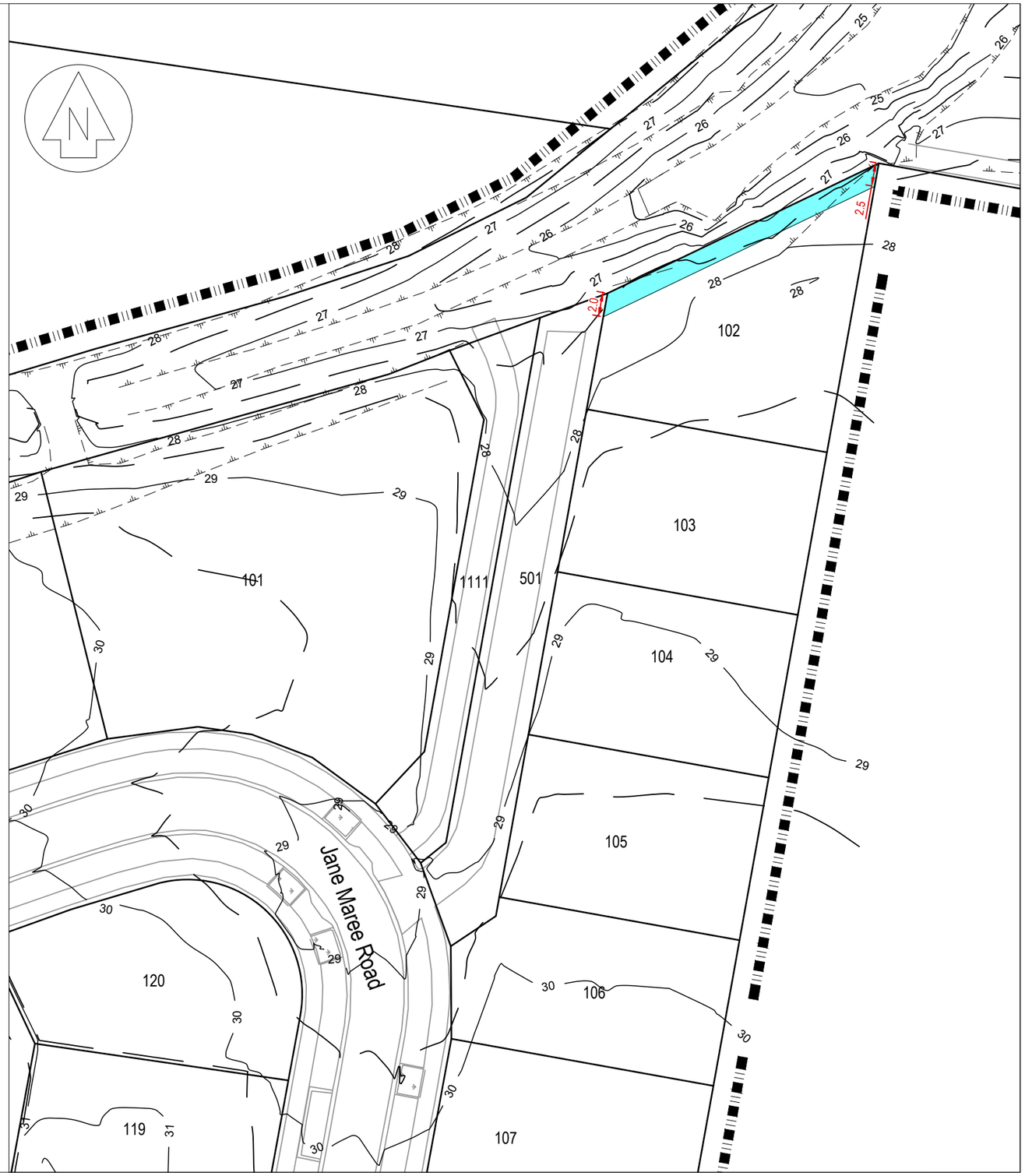
Drainage Zone of Influence Plan

ORIGINAL SCALE 1:1000	ORIGINAL SIZE A3	REVISION NO R1
DATE 04/08/17	CAD REFERENCE 34745 E626 SW ZONE	SHEET NO E626
DIRECTORY Z:\34745\Acad\As builts		JOB NO 34745

Legend

- Banks specific design zone (Refer to CMW Geosciences Ltd geotechnical report for design requirements)
- Minor Contour (0.5m interval)
- 35 — Major Contour (1m interval)
- Bottom of Bank
- Top of Bank
- 12.9 — Offset dimension from boundary as shown on plan





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APPROVED	TL	09/17

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Cabra Developments Ltd
Huapai Triangle Sub Precinct A
Stage 1C
Station Road, Huapai

DRAWING TITLE

Slope Specific Design Plan

ORIGINAL SCALE	ORIGINAL SIZE	REVISION NO
1:500	A3	
DATE	CAD REFERENCE	SHEET NO
04/08/2017	34745 E627 Slope SD	E627
DIRECTORY		JOB NO
Z:\34745\ACAD\As Builts\Stage 1C		34745

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Signed: .....
Licensed Cadastral Surveyor

Date: 11/9/17.

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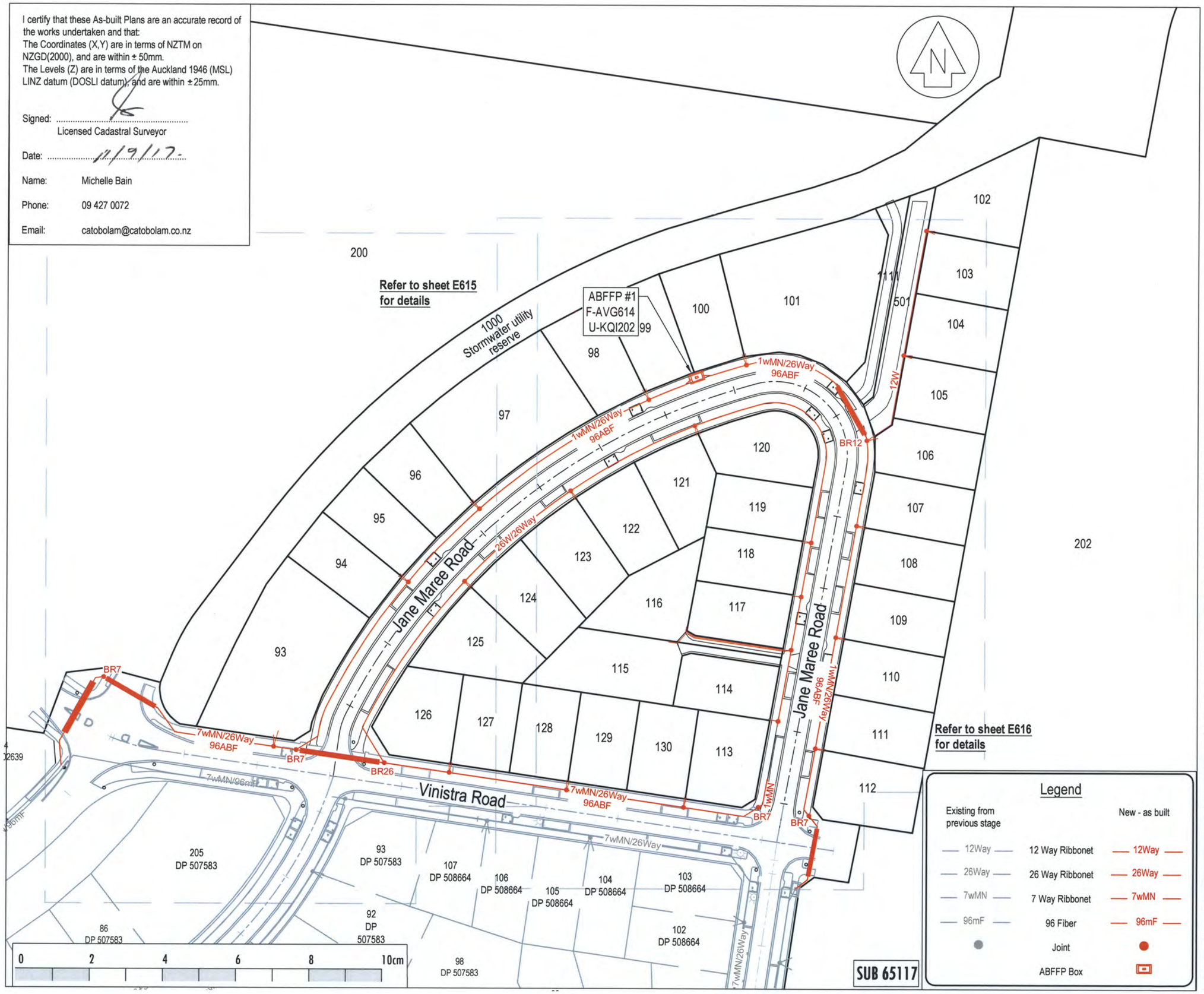

Legend

Existing from previous stage		New - as built
12Way	12 Way Ribbonet	12Way
26Way	26 Way Ribbonet	26Way
7wMN	7 Way Ribbonet	7wMN
96mF	96 Fiber	96mF
	Joint	
	ABFFP Box	

REVISION (DESCRIPTIONS)	NAME	DATE

	NAME	DATE
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CLIENT
Cabra Development Ltd
Huapai Triangle Sub Precinct A
Stage 1C
Station Road, Huapai

DRAWING TITLE
Telecom
As Built Plan
Sheet 1 of 3

ORIGINAL SCALE 1:1000	ORIGINAL SIZE A3	REVISION NO
DATE 04/07/2017	CAD REFERENCE 34745 E626 telecom	SHEET NO E629
DIRECTORY Z:\34745\ACAD\As Builts\Stage 1C		JOB NO 34745

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Signed: .....
Licensed Cadastral Surveyor

Date: 1/9/17

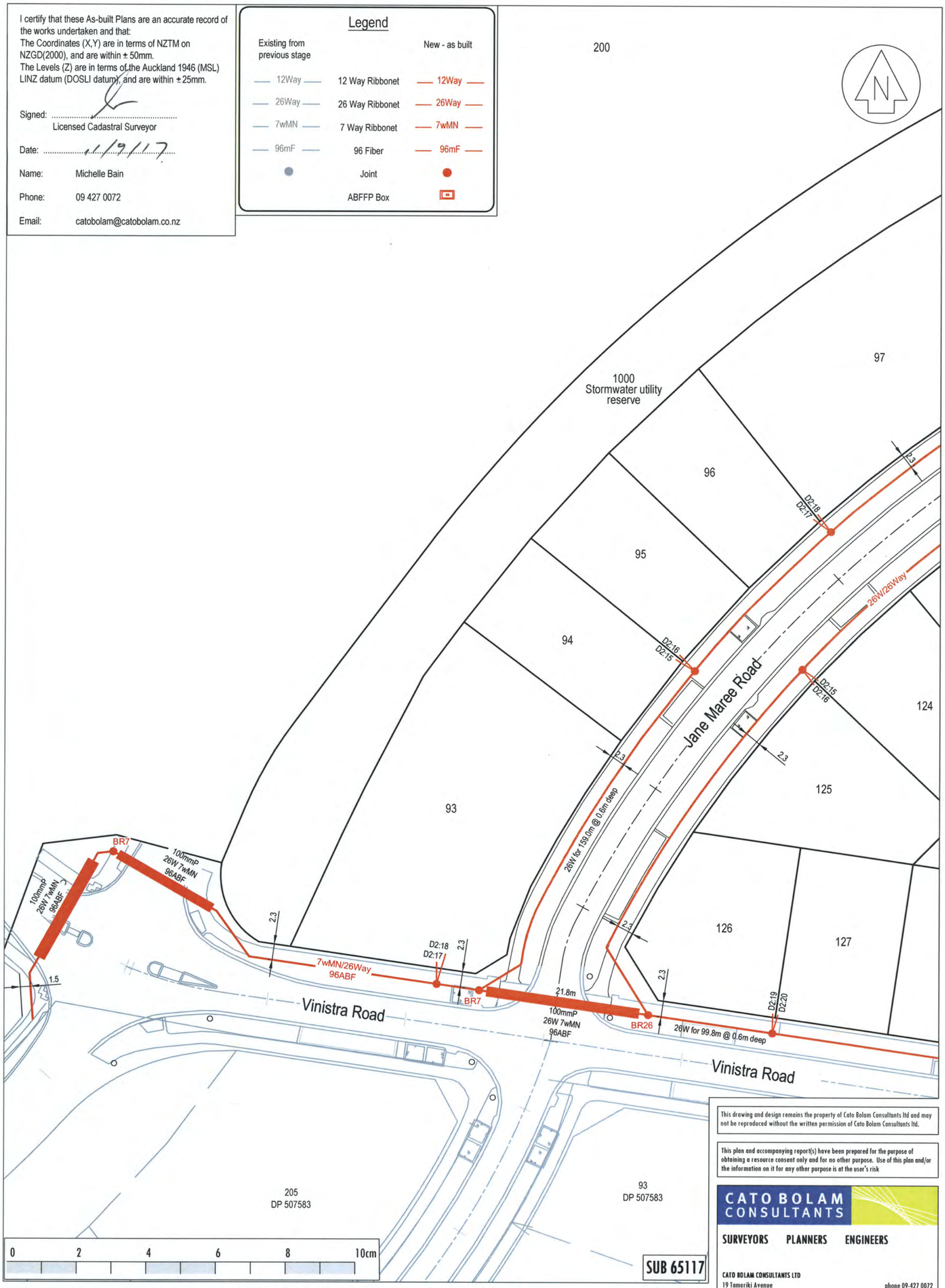
Name: Michelle Bain

Phone: 09 427 0072

Email: catobolam@catobolam.co.nz

Legend

Existing from previous stage		New - as built
12Way	12 Way Ribbonet	12Way
26Way	26 Way Ribbonet	26Way
7wMN	7 Way Ribbonet	7wMN
96mF	96 Fiber	96mF
●	Joint	●
	ABFFP Box	



CATO BOLAM CONSULTANTS

SURVEYORS PLANNERS ENGINEERS

CATO BOLAM CONSULTANTS LTD
19 Tamariki Avenue
PO Box 157
Orewa 0946
phone 09-427 0072
fax 09-426 7331
email catobolam@catobolam.co.nz

REVISION (DESCRIPTIONS)	NAME	DATE

	NAME	DATE
SURVEYED	BJ	07/2017
DESIGNED		
DRAWN	BJ	08/2017
CHECKED	BM	08/2017
APPROVED	TL	08/2017

CLIENT

Cabra Developments Ltd
Huapai Triangle Sub Precinct A
Stage 1C
Station Road, Huapai

DRAWING TITLE

Telecom
As Built Plan
Sheet 2 of 3

ORIGINAL SCALE	ORIGINAL SIZE	REVISION NO
1:500	A3	
DATE	CAD REFERENCE	SHEET NO
04/08/2017	34745 E626 telecom	E630
DIRECTORY		JOB NO
Z:\34745\ACAD\As Builts\Stage 1C		34745

I certify that these As-built 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 ± 25mm.

Signed: .....
Licensed Cadastral Surveyor

Date: 11/9/17

Name: Michelle Bain

Phone: 09 427 0072

Email: catobolam@catobolam.co.nz

1000
Stormwater utility reserve

Jane Maree Road

Vinistra Road

1wMN/26Way 96ABF

7wMN/26Way 96ABF

26W/26Way

12W for 27.5m @ 0.6m deep

26W for 99.8m @ 0.6m deep

26W for 260.0m @ 0.6m deep

26W for 110.0m @ 0.6m deep

12W for 65.0m @ 0.6m deep

100mmP 26W 7wMN 96ABF

30.0m 100mmP 26W 7wMN 96ABF

17.0m 100mmP 26W 7wMN 96ABF

BR12

BR7

SUB 65117

Legend

Existing from previous stage		New - as built
12Way	12 Way Ribbonet	12Way
26Way	26 Way Ribbonet	26Way
7wMN	7 Way Ribbonet	7wMN
96mF	96 Fiber	96mF
	Joint	
	ABFFP Box	

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REVISION (DESCRIPTIONS)	NAME	DATE
	NAME	DATE
SURVEYED	BJ	07/2017
DESIGNED		
DRAWN	BJ	08/2017
CHECKED	BM	08/2017
APPROVED	TL	08/2017

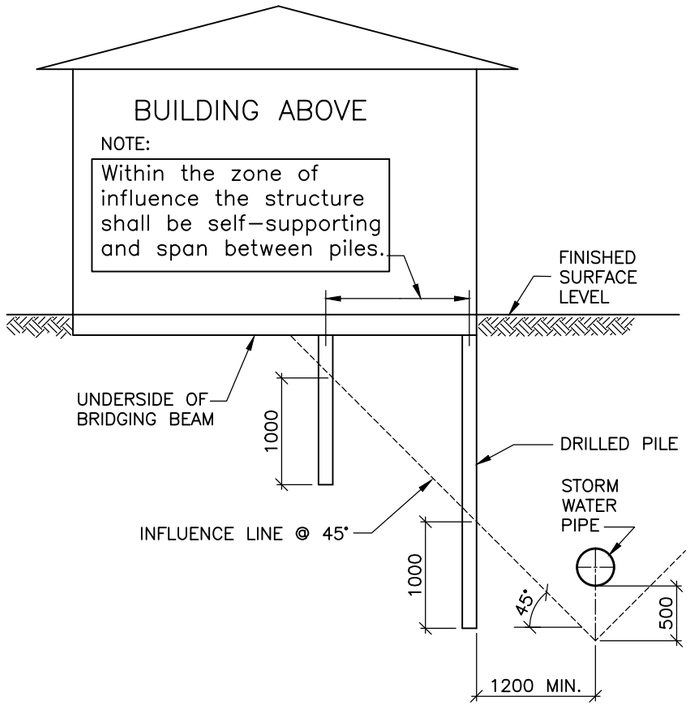
CLIENT

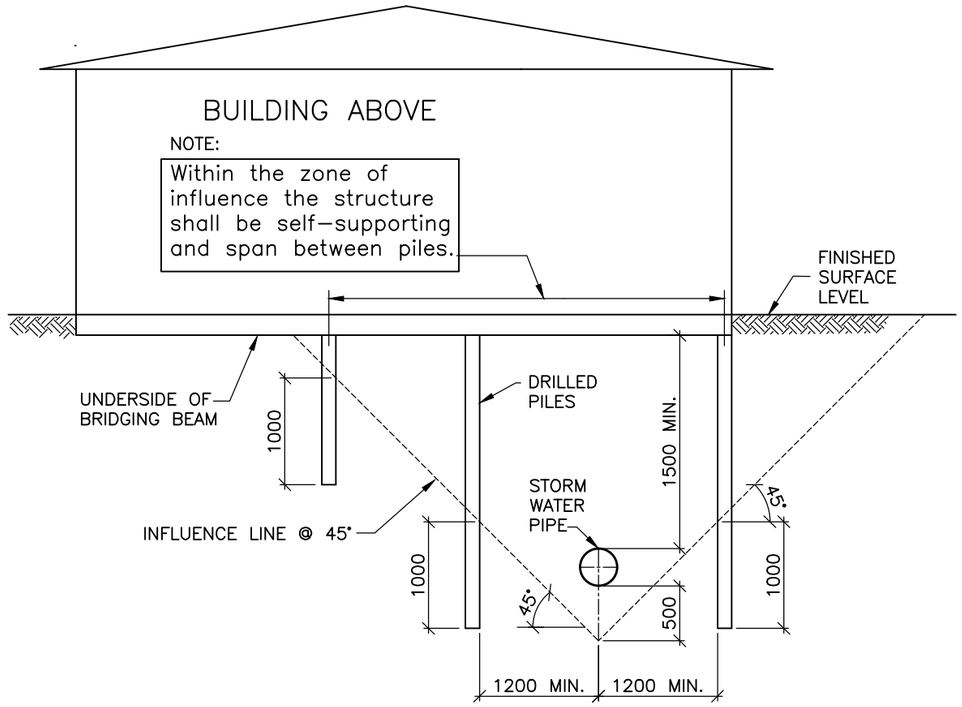
Cabra Developments Ltd
Huapai Triangle Sub Precinct A
Stage 1C
Station Road, Huapai

DRAWING TITLE

Telecom
As Built Plan
Sheet 3 of 3

ORIGINAL SCALE 1:500	ORIGINAL SIZE A3	REVISION NO
DATE 04/08/2017	CAD REFERENCE 34745 E626 telecom	SHEET NO E631
DIRECTORY Z:\34745\ACAD\As Builts\Stage 1C		JOB NO 34745





NOTES

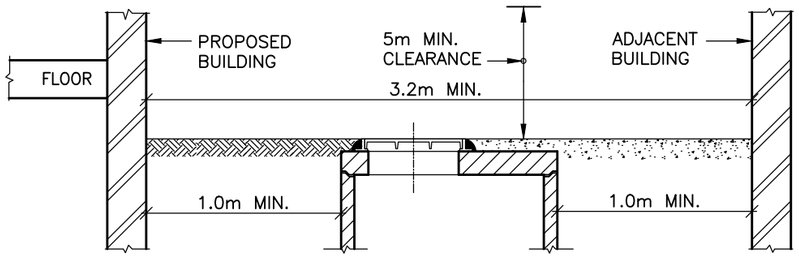
1. The information on this page is intended to show examples of typical scenarios and should be used for general guidance purposes only. Significant variations on a site by site basis are to be expected and it is in no way implied that meeting any of the above will guarantee approval.
2. Requirements for foundation design etc apply to both sides of pipe.
3. No driven piles are permitted within 10m of brick Stormwater Structures, or within 5m of all other Stormwater Structures.
4. Specific approval is required from Auckland Council for driven piles in partially drilled holes, within the 5m/10m zone.
5. Piles that may be required to resist horizontal forces will require specific design.
6. Pile/Footing location point must be below 45° "Zone of Influence".
7. All Manholes shall have 24 hours unobstructed access.
8. Manholes in basements, or where sufficient clearance is unavailable, are not permitted.
9. All pipe buildovers will require approval by Auckland Council.
10. Refer to section 4.3.21 for pipe buildover requirements.

"BUILD CLOSE" NOTES:

1. Specific approval is required from Auckland Council if building adjacent to pipes, larger than 375mm internal diameter, or greater than 3.0m of depth.
2. Building to be outside all overland flow paths and floodplains.
3. Pile constructed to a depth of 1.0m below influence line.
4. Outside zone of influence, normal foundation requirements apply.

"BUILD OVER" NOTES:

1. Applies to stormwater pipes 375mm nominal diameter or less.
2. Bridging over pipes larger than 375mm nominal diameter is NOT allowed under any circumstances.
3. Pile constructed to a depth of 1.0m below influence line.
4. Outside zone of influence, normal foundation requirements apply.
5. Bridging is NOT allowed over pipes where clear vertical seperation distance from top of pipe to underside of bridging beam is less than 1.5m



MANHOLE CONSTRUCTION CLEARANCE

STORMWATER ENGINEERING STANDARD DETAILS ISSUE/REVISION: 1 DATE: 30 September 2013 CAD FILE: AC–STD–SW22	AUCKLAND COUNCIL STORMWATER PIPE AND MANHOLE CONSTRUCTION CLEARANCE REQUIREMENTS MANHOLES NEAR BUILDINGS AND BUILDING CLOSE OR OVER PIPES	ENVIRONMENTAL–SW	ORIGINAL SCALE: AS NOTED	
		Auckland Council	Sht 1 OF 1 Shts	DRAWING No. ACSD SW22 / REV A3

Appendix C

Laboratory Test Data

CONSTANT HEAD PERMEABILITY TEST REPORT

OPUS

Project :	**57 Nobilo Road**
Location :	**57 Nobilo Road**
Client :	**CMW Geosciences(NZ) Ltd**
Contractor :	**Not Stated**
Sampled by :	**Not Stated**
Date sampled :	**07/12/16**
Sampling Method:	***Pushtube**
Sample Description:	**Fill**
Sample Condition:	**As Recived**
Sample Ref / Depth:	**Sample 1 / Not Stated**

Project No :	**1-LA051.16**
Lab No :	**AL854/1**
Client Project No :	**AKL2016_0331**
Purchase Order No:	**AKL830**

SOIL PROPERTIES

Sample Reference		Sample 1
Depth(m)		Not Stated
Specimen length	(mm)	120.1
Specimen diameter	(mm)	60.3
Specimen mass	(g)	635.0
Pre test water content	(%)	30.4
Wet density	(t/m^3)	1.852
Dry density	(t/m^3)	1.420
Post test water content	(%)	31.8

PERMEABILITY TEST RESULT

See Notes below

Cell Pressure	550
Saturation Backpressure	450
Effective confining pressure	100

Head (kPa)	Permeability (m/s)
20	3.65×10^{-10}
40	2.80×10^{-10}
60	2.34×10^{-10}

Test Method		Notes
Permeability Test Based on :	BS 1377 1990 Part 6	-Sample was tested using the triaxial test apparatus to enable back pressure saturation of the test specimens.
Water Content :	NZS 4402 : 1986 Test 2.1	

Date tested : 08-17/12/16

***Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.**

This report may only be reproduced in full

Date reported : 22/12/16

IANZ Approved Signatory : *Thirushen Pillay*

Designation : *Senior Civil Engineering Technician*

Date : 22/12/2016

IANZ ACCREDITED LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

LHF 2504 (9/00)

Opus International Consultants Limited
Auckland Laboratory
Quality Management Systems Certified to ISO 9001

Unit A, 7 Ride Way, Nth Harbour Industrial Estate
Private Bag 10-1982, N.S.M.C., North Shore City
Auckland, New Zealand

Telephone +64 9 415 4660
Facsimile +64 9 415 4661
Website www.opus.co.nz

CONSTANT HEAD PERMEABILITY TEST REPORT

OPUS

Project :	**57 Nobilo Road**
Location :	**57 Nobilo Road**
Client :	**CMW Geosciences(NZ) Ltd**
Contractor :	**Not Stated**
Sampled by :	**Not Stated**
Date sampled :	**07/12/16**
Sampling Method:	***Pushtube**
Sample Description:	**Fill**
Sample Condition:	**As Recived**
Sample Ref / Depth:	**Sample 2 / Not Stated**

Project No :	**1-LA051.16**
Lab No :	**AL854/2**
Client Project No :	**AKL2016_0331**
Purchase Order No:	**AKL830**

SOIL PROPERTIES

Sample Reference		**Sample 2**
Depth(m)		**Not Stated**
Specimen length	(mm)	119.9
Specimen diameter	(mm)	60.5
Specimen mass	(g)	633.8
Pre test water content	(%)	30.9
Wet density	(t/m^3)	1.839
Dry density	(t/m^3)	1.405
Post test water content	(%)	31.0

PERMEABILITY TEST RESULT

See Notes below

Cell Pressure	650
Saturation Backpressure	550
Effective confining pressure	100

Head (kPa)	Permeability (m/s)
20	4.14×10^{-10}
40	5.67×10^{-10}
60	1.17×10^{-10}

Test Method		Notes
Permeability Test Based on :	BS 1377 1990 Part 6	-Sample was tested using the triaxial test apparatus to enable back pressure saturation of the test specimens.
Water Content :	NZS 4402 : 1986 Test 2.1	

Date tested : 08-17/12/16

Date reported : 22/12/16

***Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.**

This report may only be reproduced in full

IANZ Approved Signatory : *Thirushen Pillay*

Designation : *Senior Civil Engineering Technician*

Date : 22/12/2016

IANZ ACCREDITED LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

LHF 2504 (9/00)

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ROADTEST LTD

Revision: 1

Report No: 17 0145 00
Page: 1 of 1

DETERMINATION OF THE LIQUID LIMIT & LINEAR SHRINKAGE
TEST METHOD NZS 4402 : 1986 TEST 2.2 & 2.6

Job:	**45 Station Road**		
Date of order:	31.05.17	Sample Origin:	-
Sample method:	-	Sample Description:	-
Sample By:	Client	Date:	30.5.17

Test Details :

Test performed on : Whole Sample
History : Natural

Sample No.	Location	Depth (m)	Liquid Limit	Linear Shrinkage	Natural Water Content (%)
342F	Lot 103	-	102	21	54.5
343F	Lot 124	-	96	23	41.6
344F	Lot 120	-	100	25	34.5

Comments :

Tested By:	EC	Date :	9.6.17
Calculated By :	EC	Date :	12.6.17
Checked By :	EC	Date :	13.6.17

Appendix D

Field Test Data

LF11 Rev 4 Soil Field Density NDM Direct Transmission with VSS Report

Auckland Laboratory
CMW Geosciences (NZ) Limited
Building C, 9 Piermark Drive, Rosedale, NZ 0632
PO Box 300206, Albany, Auckland, NZ 0752
Phone: +64 (09) 4144 632

Project:	45 Station Road, Huapai
Project No:	AKL2016_0634
Location:	Huapai
Report No:	AKL2016_0634LAD Rev.0
Report Date:	15/02/2017
Client:	Cabra Developments Limited
Client Address:	
Client Reference:	

Test Methods:
NZS 4402.2.1:1986
NZS 4407.4.2.2:2015
NZGS:August 2001

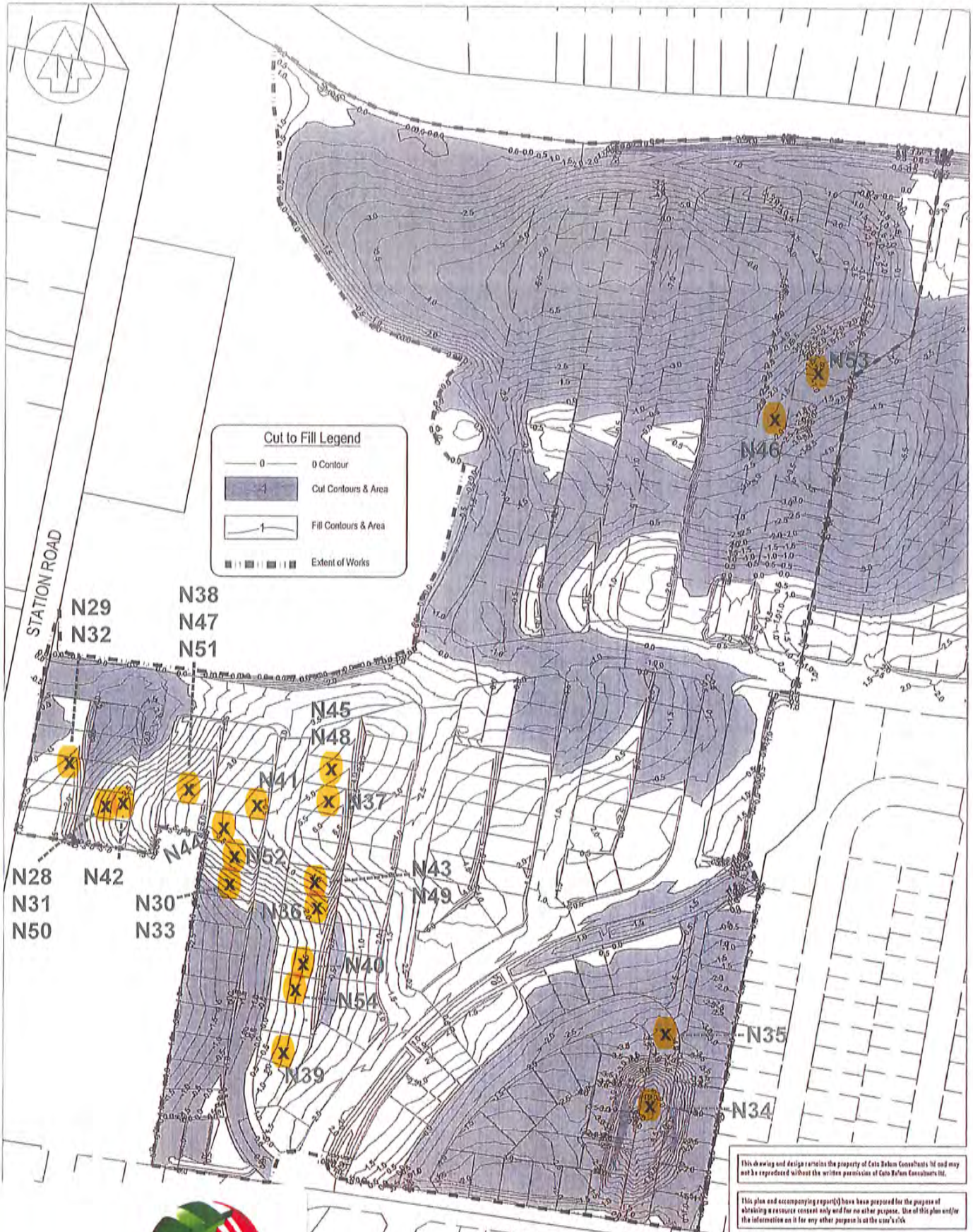
Notes:
Solid Density: Assumed
Testing Locations Selected By: CMW Field Staff

IANZ ACCREDITED LABORATORY — Tests indicated as not accredited are outside the scope of the laboratory's accreditation

Measurements marked * are not accredited and are outside the scope of the laboratories accreditation

Date Sampled	Sample No.	Test Location	Soil Description	In-situ Vane Shear Strengths					Field and Laboratory Testing Data									Comments
				Test 1 (kPa)	Test 2 (kPa)	Test 3 (kPa)	Test 4 (kPa)	Ave.	Gauge Wet Density (t/m^3)	Gauge Dry Density (t/m^3)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth	Oven Water Content (%)	Solid Density (t/m^3) *	Oven Dry Density (t/m^3)	Calculated Air Voids (%) *	
12/01/2017	N28	Lot 9	CLAY	97	124	138	135	124	1.7523	1.2313	42.3	2.18	300	35.5	2.7	1.30	6.2	Failed
	N29	Lot 3	CLAY	167	189	>189	>189	>184	1.7401	1.2240	42.2	2.94	300	39.0	2.7	1.26	4.8	
	N30	Lot 20	CLAY	138	132	167	140	144										Failed
13/01/2017	N31	Lot 9	CLAY	189	189	>189	>189	>189	1.7241	1.2262	40.6	4.68	300	41.6	2.7	1.22	4.3	Re-test of N28
	N32	Lot 3	CLAY	>189	>189	189	189	>189	1.7342	1.2154	42.7	2.99	300	50.0	2.7	1.16	-0.6	
	N33	Lot 20	CLAY	178	170	189	183	180	1.7505	1.2899	35.7	6.07	300	36.1	2.7	1.28	5.9	Re-test of N30
16/01/2017	N34	Refer to site plan	CLAY	189	189	>189	>189	>189	1.8756	1.4034	33.6	0.70	300	32.9	2.7	1.42	1.3	
	N35	Refer to site plan	CLAY	178	175	189	189	183	1.7740	1.3549	30.9	7.82	300	32.3	2.7	1.34	7.0	
	N36	Lot 39	CLAY	UTP	UTP	UTP	UTP	UTP	1.7281	1.2764	35.4	7.46	300	30.7	2.7	1.32	10.0	
	N37	Lot 43	CLAY	UTP	UTP	UTP	UTP	UTP	1.7351	1.2784	35.7	6.88	300	37.1	2.7	1.26	6.2	
	N38	Lot 12	CLAY	UTP	UTP	UTP	UTP	UTP	1.8507	1.3499	37.1	-0.19	300	43.6	2.7	1.28	-3.9	
18/01/2017	N39	Lot 37	CLAY	UTP	UTP	UTP	UTP	UTP	1.8490	1.4097	31.2	3.76	300	31.1	2.7	1.42	3.9	
	N40	Lot 34	CLAY	183	189	189	>189	>188	1.7472	1.2828	36.2	5.95	300	34.9	2.7	1.30	6.9	
	N41	Lot 17	CLAY	127	140	119	121	127	1.6636	1.1636	44.0	5.64	300	35.0	2.7	1.24	11.0	Failed
	N42	Lot 9	CLAY	>189	>189	>189	>189	>189	1.7471	1.2521	39.5	4.01	300	46.0	2.7	1.20	0.6	
25/01/2017	N43	Lot 40	CLAY	>189	>189	UTP	UTP	>189	1.7865	1.3862	28.9	8.54	300	26.7	2.7	1.40	10.0	
	N44	Lot 18	CLAY	186	189	>189	>189	>188	1.8318	1.3358	37.1	0.81	300	38.8	2.7	1.32	-0.1	Re-test of N41
	N45	Lot 44	CLAY	173	178	189	>189	>182	1.7411	1.2510	39.2	4.55	300	37.3	2.7	1.26	5.8	
27/01/2017	N46	Refer to site plan	CLAY	178	146	151	165	160	1.7280	1.2275	40.8	4.38	200	45.5	2.7	1.18	2.0	
31/01/2017	N47	Lot 12	CLAY	UTP	UTP	UTP	UTP	UTP	1.7523	1.2719	37.8	4.74	300	39.3	2.7	1.26	3.9	
	N48	Lot 44	CLAY	UTP	UTP	UTP	UTP	UTP	1.7986	1.4142	27.2	9.10	300	34.6	2.7	1.34	4.3	
	N49	Lot 40	CLAY	UTP	UTP	UTP	UTP	UTP	1.7970	1.3901	29.3	7.74	300	35.3	2.7	1.32	3.9	
7/02/2017	N50	Lot 9	CLAY	UTP	UTP	UTP	UTP	UTP	1.7613	1.2824	37.3	4.50	300	44.4	2.7	1.22	0.7	
	N51	Lot 12	CLAY	UTP	UTP	UTP	UTP	UTP	1.7743	1.2653	40.2	2.12	300	52.4	2.7	1.16	-4.1	
	N52	Lot 19	CLAY	UTP	UTP	UTP	UTP	UTP	1.7893	1.3263	34.9	4.48	300	33.2	2.7	1.34	5.6	
	N53	Refer to site plan	CLAY	UTP	UTP	UTP	UTP	UTP	1.7614	1.2984	35.7	5.51	300	34.4	2.7	1.32	6.4	
13/02/2017	N54	Lot 36	CLAY	189	189	181	>189	>187	1.7475	1.2313	41.9	2.66	300	46.5	2.7	1.20	0.4	

Created By: TG Date: 13/01/2017
Checked By: TG Date: 15/02/2017
Authorised Signatory: Date: 15/2/2017



CMW Geosciences

CATO BOLAM CONSULTANTS
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CATO BOLAM CONSULTANTS LTD
39 Tamariki Avenue
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REVISION (DESCRIPTIONS)	NAME	DATE
R1 REVISED FOR AMENDED DESIGN	KM	05/12/2016
	NAME	DATE
SURVEYED		
DESIGNED	KM	15/11/2016
DRAWN	KM	15/11/2016
CHECKED		
APPROVED		

CABRA DEVELOPMENTS LTD
45 STATION ROAD,
HUAPAI

DRAWING TITLE

CUT AND FILL DEPTH CONTOURS PLAN

ORIGINAL SCALE 1 : 2000	ORIGINAL SIZE A3	REVISION NO R1
DATE 15/11/2016	CAD REFERENCE 34745 E112 Cut/Fill.p	SHEET NO E112
DIRECTORY Z:\34745\CAD\		JOB NO 34745

LF14 Rev.7 Dynamic Cone Penetration (DCP) Test Report

NZS 4402: Test 6.5.2: 1988

Report No:	AKL2016_0634LAC Rev.0
Project Name:	45 Station Road
Project Location:	Huapai
Project Number:	AKL2016_0634
Test Date:	11/01/2016
Tested By:	RHD/KP
Client:	Cabra Developments Limited
Client Address:	
Client Reference:	

Auckland Laboratory
CMW Geosciences (NZ) Limited
Building C, 9 Piermark Drive, Rosedale, NZ 0632
PO Box 300206, Albany, Auckland, NZ 0752
Phone: +64 (09) 4144 632

Testing Locations Selected By: CMW Field Staff

IANZ ACCREDITED LABORATORY ACCREDITATION Nº: 1131

Equivalent CBR Values are not accredited and are outside the scope of the laboratory's accreditation

Test No.	1		2		3		4		5	
Test Location	Road 12		Road 12		Road 12		Road 12		Road 12	
Chainage & Offset	CH20 Left		CH30 Right		CH40 Left		CH50 Right		CH60 Left	
Material & Layer:	CLAY/ Subgrade +130mm		CLAY/ Subgrade +130mm		CLAY/ Subgrade +130mm		CLAY/ Subgrade +130mm		CLAY/ Subgrade +130mm	
Depth (mm)	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*
0 - 100	6	13	5	10	4	8	6	13	4	8
100 - 200	4	8	4	8	1	2	4	8	4	8
200 - 300	5	10	3	6	1	2	3	6	3	6
300 - 400	3	6	4	8	2	4	3	6	4	8
400 - 500	4	8	4	8	3	6	3	6	3	6
500 - 600	3	6	5	10	3	6	3	6	3	6
600 - 700	4	8	5	10	4	8	4	8	4	8
700 - 800	5	10	5	10	5	10	5	10	6	13
800 - 900	4	8	6	13	5	10	5	10	7	15
900 - 1000										

Test No.	6		7		8		9		10	
Test Location	Road 12		Road 12		Road 12		Road 12		Road 12	
Chainage & Offset	CH70 Right		CH80 Left		CH90 Right		CH100 Left		CH110 Right	
Material & Layer:	CLAY/ Subgrade +130mm		CLAY/ Subgrade +130mm		CLAY/ Subgrade +130mm		CLAY/ Subgrade +130mm		CLAY/ Subgrade +130mm	
Depth	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*
0 - 100	4	8	7	15	5	10	5	10	4	8
100 - 200	2	4	5	10	4	8	4	8	4	8
200 - 300	2	4	4	8	5	10	4	8	4	8
300 - 400	2	4	4	8	2	4	4	8	2	4
400 - 500	1	2	3	6	2	4	4	8	3	6
500 - 600	3	6	3	6	4	8	5	10	3	6
600 - 700	3	6	3	6	6	13	7	15	2	4
700 - 800	2	4	3	6	7	15	10	20+	2	4
800 - 900	3	6	3	6	9	20	10	20+	2	4
900 - 1000										

Prepared by: CS Date: 12/01/2017

Checked by: TG Date: 12/01/2017

Authorised Signatory: Date: 12/1/2017

*Equivalent CBR values calculated using AUSTROADS (2010) Guide to Pavement Technology Part 2, Figure 5.3, For Fine Grained Cohesive Soils, and are relevant to fine grained cohesive soils only.

LF14 Rev.7 Dynamic Cone Penetration (DCP) Test Report

NZS 4402: Test 6.5.2: 1988

Report No:	AKL2016_0634LAC Rev.0
Project Name:	45 Station Road
Project Location:	Huapai
Project Number:	AKL2016_0634
Test Date:	11/01/2016
Tested By:	RHD/KP
Client:	Cabra Developments Limited
Client Address:	
Client Reference:	

Auckland Laboratory
CMW Geosciences (NZ) Limited
Building C, 9 Piermark Drive, Rosedale, NZ 0632
PO Box 300206, Albany, Auckland, NZ 0752
Phone: +64 (09) 4144 632

Testing Locations Selected By: CMW Field Staff

IANZ ACCREDITED LABORATORY ACCREDITATION Nº: 1131

Equivalent CBR Values are not accredited and are outside the scope of the laboratory's accreditation

Test No.	11		12		13		14		15	
Test Location	Road 12		Road 12		Road 12		Road 12		Road 12	
Chainage & Offset	CH120 Left		CH130 Right		CH140 Left		CH150 Right		CH160 Left	
Material & Layer:	CLAY/ Subgrade +130mm		CLAY/ Subgrade +130mm		CLAY/ Subgrade +130mm		CLAY/ Subgrade +130mm		CLAY/ Subgrade +130mm	
Depth (mm)	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*
0 - 100	8	18	2	4	3	6	4	8	4	8
100 - 200	6	13	3	6	1	2	1	2	3	6
200 - 300	3	6	3	6	1	2	1	2	4	8
300 - 400	2	4	3	6	1	2	1	2	6	13
400 - 500	2	4	4	8	1	2	2	4	6	13
500 - 600	2	4	5	10	1	2	1	2	8	18
600 - 700	2	4	5	10	2	4	1	2	8	18
700 - 800	2	4	6	13	2	4	1	2	9	20
800 - 900	2	4	5	10	2	4	2	4	9	20
900 - 1000										

Test No.	16		17		18		19		20	
Test Location	Road 12		Road 12		Road 12		Road 12		Road 12	
Chainage & Offset	CH170 Right		CH220 Left		CH230 Right		CH240 Left		CH250 Right	
Material & Layer:	CLAY/ Subgrade +130mm		CLAY/ Subgrade +130mm		CLAY/ Subgrade +130mm		CLAY/ Subgrade +130mm		CLAY/ Subgrade +130mm	
Depth	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*
0 - 100	11	20+	1	2	1	2	0	0	0	0
100 - 200	6	13	2	4	1	2	2	4	2	4
200 - 300	7	15	2	4	2	4	2	4	2	4
300 - 400	6	13	4	8	2	4	2	4	2	4
400 - 500	5	10	4	8	4	8	4	8	2	4
500 - 600	5	10	6	13	4	8	4	8	2	4
600 - 700	5	10	9	20	5	10	5	10	6	13
700 - 800	5	10	6	13	6	13	6	13	4	8
800 - 900	5	10	10	20+	6	13	6	13	4	8
900 - 1000										

Prepared by: CS Date: 12/01/2017

Checked by: TG Date: 12/01/2017

Authorised Signatory: Date: 12/1/2017

*Equivalent CBR values calculated using AUSTROADS (2010) Guide to Pavement Technology Part 2, Figure 5.3, For Fine Grained Cohesive Soils, and are relevant to fine grained cohesive soils only.

LF14 Rev.7 Dynamic Cone Penetration (DCP) Test Report

NZS 4402: Test 6.5.2: 1988

Report No:	AKL2016_0634LAC Rev.0
Project Name:	45 Station Road
Project Location:	Huapai
Project Number:	AKL2016_0634
Test Date:	11/01/2016
Tested By:	RHD/KP
Client:	Cabra Developments Limited
Client Address:	
Client Reference:	

Auckland Laboratory
CMW Geosciences (NZ) Limited
Building C, 9 Piermark Drive, Rosedale, NZ 0632
PO Box 300206, Albany, Auckland, NZ 0752
Phone: +64 (09) 4144 632

Testing Locations Selected By: CMW Field Staff

IANZ ACCREDITED LABORATORY ACCREDITATION Nº: 1131

Equivalent CBR Values are not accredited and are outside the scope of the laboratory's accreditation

Test No.	21		22		23		24		25	
Test Location	Road 12		Road 12		Road 12		Road 12		Road 12	
Chainage & Offset	CH260 Left		CH270 Right		CH280 Left		CH290 Right		CH300 Left	
Material & Layer:	CLAY/ Subgrade +130mm		CLAY/ Subgrade +130mm		CLAY/ Subgrade +130mm		CLAY/ Subgrade +130mm		CLAY/ Subgrade +130mm	
Depth (mm)	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*
0 - 100	0	0	0	0	1	2	3	6	2	4
100 - 200	1	2	2	4	4	8	4	8	5	10
200 - 300	0	0	2	4	4	8	2	4	4	8
300 - 400	1	2	2	4	5	10	3	6	3	6
400 - 500	2	4	2	4	3	6	2	4	5	10
500 - 600	2	4	4	8	3	6	3	6	6	13
600 - 700	2	4	3	6	3	6	4	8	6	13
700 - 800	3	6	5	10	3	6	4	8	5	10
800 - 900	4	8	6	13	4	8	4	8	8	18
900 - 1000										

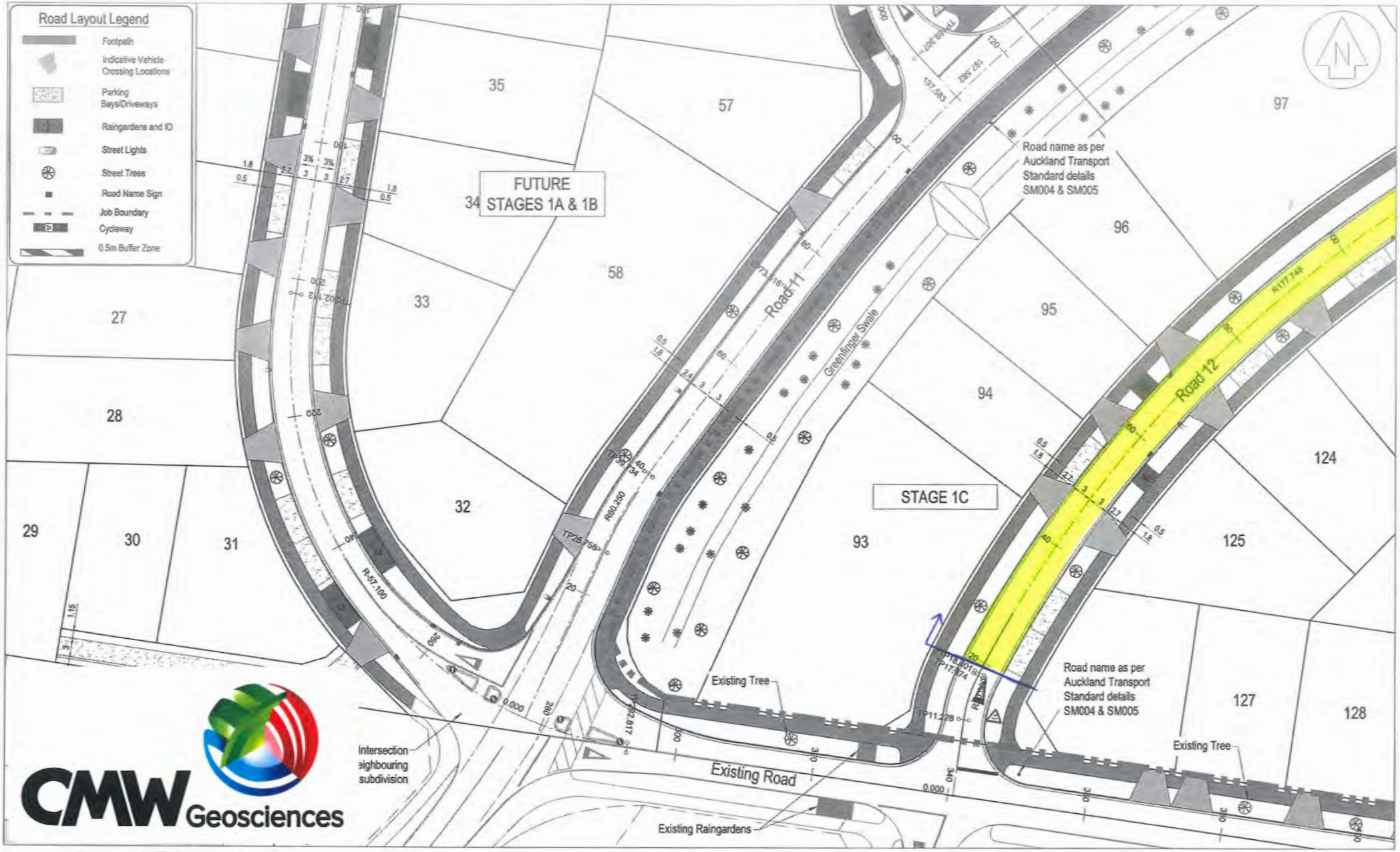
Test No.										
Test Location										
Chainage & Offset										
Material & Layer:										
Depth	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*
0 - 100										
100 - 200										
200 - 300										
300 - 400										
400 - 500										
500 - 600										
600 - 700										
700 - 800										
800 - 900										
900 - 1000										

Prepared by: CS Date: 12/01/2017

Checked by: CS Date: 12/01/2017

Authorised Signatory: Date: 12/1/2017

*Equivalent CBR values calculated using AUSTROADS (2010) Guide to Pavement Technology Part 2, Figure 5.3, For Fine Grained Cohesive Soils, and are relevant to fine grained cohesive soils only.



CMW Geosciences

CATO BOLAM CONSULTANTS
SURVEYORS PLANNERS ENGINEERS
CATO BOLAM CONSULTANTS LTD
19 Tamariki Avenue
PO Box 157
Orewa 0946
phone 09-427 0072
fax 09-426 7331
email catobolam@xtra.co.nz

REVISION/DESCRIPTIONS	NAME	DATE

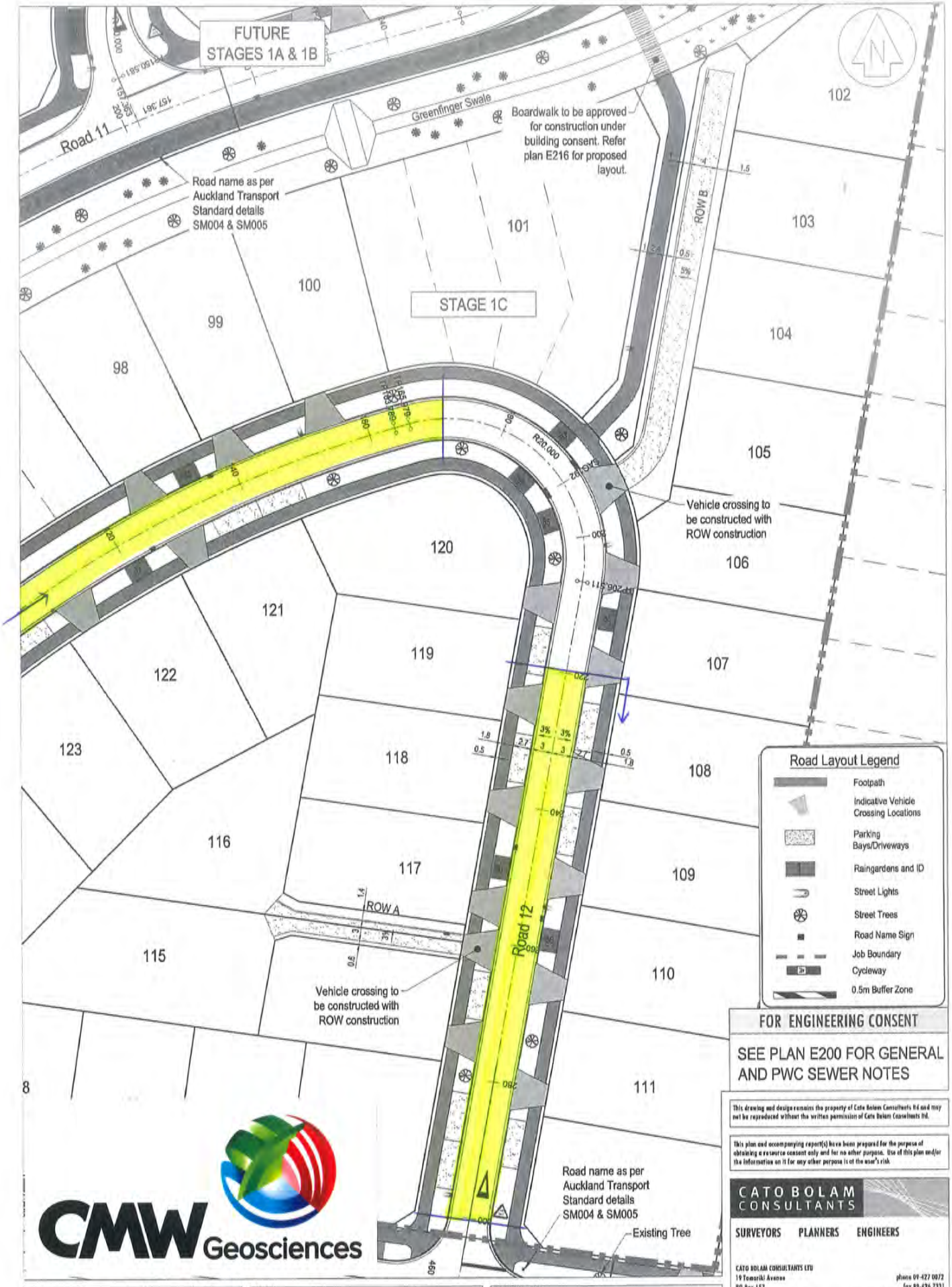
	NAME	DATE
SURVEYED		
DESIGNED	KM	09/16
DRAWN	SL	09/16
CHECKED		
APPROVED		

This plan and accompanying report(s) have been prepared for the purpose of obtaining a resource consent only and for no other purpose. Use of this plan and/or the information on it for any other purpose is at the user's risk.

CLIENT
CABRA DEVELOPMENTS LTD
45 STATION ROAD,
HUAPAI

DRAWING TITLE
ROADING LAYOUT
SHEET 6 OF 7
STAGE 1C

ORIGINAL SCALE 1:500	ORIGINAL SIZE A3	REVISION NO
DATE 5/09/2016	CAD REFERENCE 34745 E200 ROAD LAYOUT	SHEET NO E205
DIRECTORY J:\34745\ACAD	IMAGE FILE	JOB NO 34745



CMW Geosciences

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CATO BOLAM CONSULTANTS LTD
19 Tamariki Avenue
PO Box 157
Orewa 0946
phone 09-427 0072
fax 09-426 7331
email catobolam@catobolam.co.nz

REVISION (DESCRIPTIONS)	NAME	DATE
	NAME	DATE
SURVEYED		
DESIGNED	KM	09/16
DRAWN	SL	09/16
CHECKED		
APPROVED		

CLIENT
CABRA DEVELOPMENTS LTD
45 STATION ROAD,
HUAPAI

DRAWING TITLE
ROADING LAYOUT
SHEET 7 OF 7
STAGE 1C

ORIGINAL SCALE 1:500	ORIGINAL SIZE A3	REVISION NO
DATE 5/09/2016	CAD REFERENCE 34745 1200 ROAD LAYOUT	SHEET NO E206
DIRECTORY 2/34745/ACAD		JOB NO 34745

LF11 Rev 4 Soil Field Density NDM Direct Transmission with VSS Report

Auckland Laboratory
CMW Geosciences (NZ) Limited
Building C, 9 Piermark Drive, Rosedale, NZ 0632
PO Box 300206, Albany, Auckland, NZ 0752
Phone: +64 (09) 4144 632

Project:	45 Station Road, Huapai
Project No:	AKL2016_0634
Location:	Huapai
Report No:	AKL2016_0634LAA Rev.0
Report Date:	25/01/2017
Client:	Cabra Developments Limited
Client Address:	
Client Reference:	

Test Methods:
NZS 4402.2.1:1986
NZS 4407.4.2.2:2015
NZGS:August 2001

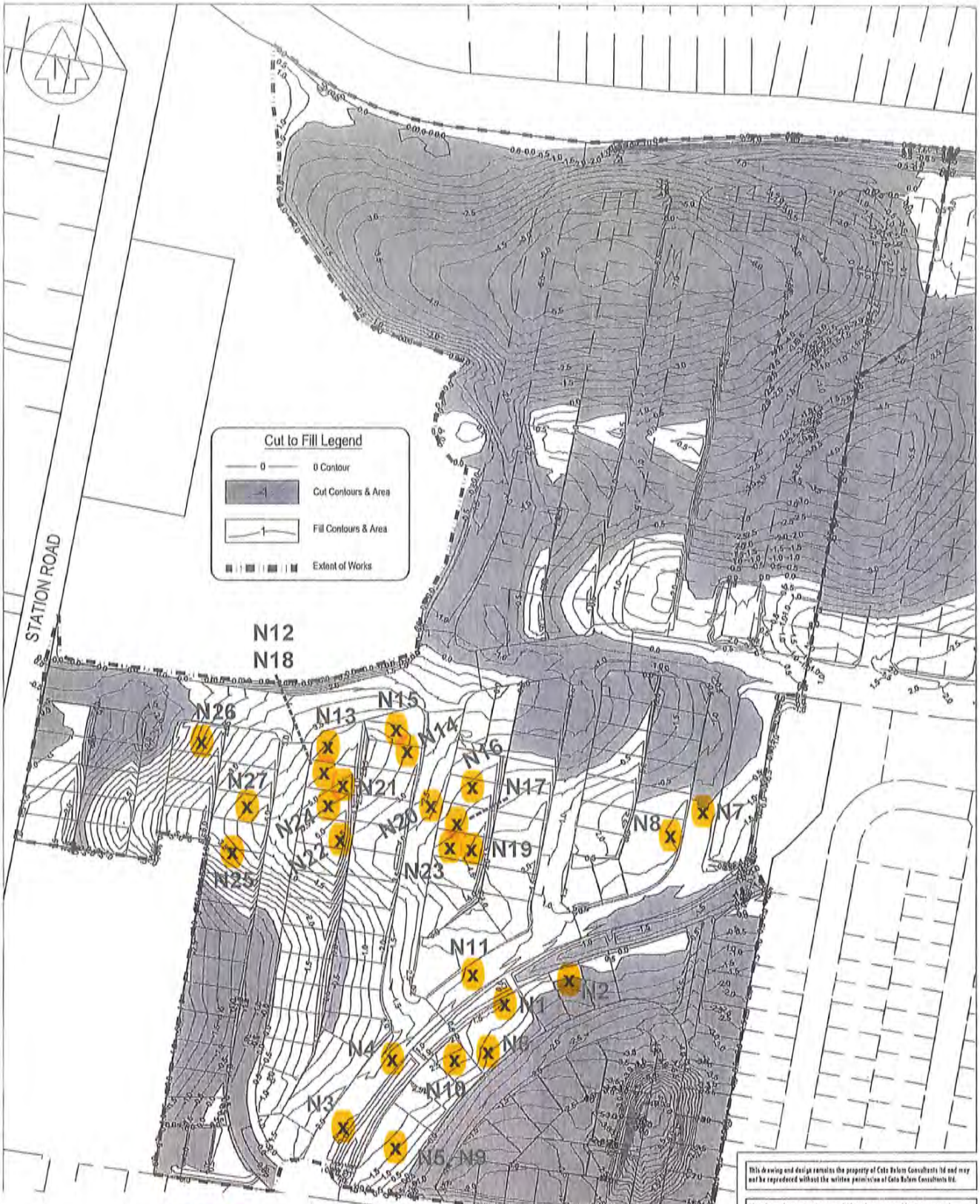
Notes:
Solid Density: Assumed
Testing Locations Selected By: CMW Field Staff

IANZ ACCREDITED LABORATORY — Tests indicated as not accredited are outside the scope of the laboratory's accreditation

Measurements marked * are not accredited and are outside the scope of the laboratories accreditation

Date Sampled	Sample No.	Test Location	Soil Description	In-situ Vane Shear Strengths					Field and Laboratory Testing Data									Comments
				Test 1 (kPa)	Test 2 (kPa)	Test 3 (kPa)	Test 4 (kPa)	Ave.	Gauge Wet Density (t/m^3)	Gauge Dry Density (t/m^3)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth	Oven Water Content (%)	Solid Density (t/m^3) *	Oven Dry Density (t/m^3)	Calculated Air Voids (%) *	
7/12/2016	N1	Lot 97	CLAY	189	189	>189	>189	>189	1.8543	1.3865	33.7	1.76	300	29.3	2.7	1.44	4.9	
	N2	Lot 99	CLAY	>189	>189	>189	>189	>189	1.8482	1.3592	36.0	0.65	300	37.4	2.7	1.34	-0.1	
14/12/2016	N3	Refer to site plan	CLAY	UTP	UTP	UTP	UTP	UTP	1.7574	1.3213	33.0	7.35	300	29.6	2.7	1.36	9.6	
	N4	Refer to site plan	CLAY	173	178	189	189	182	1.8379	1.3691	34.2	2.31	300	35.0	2.7	1.36	1.9	
16/12/2016	N5	Lot 93	CLAY	175	173	189	189	182	1.7953	1.2722	41.1	0.45	250	31.0	2.7	1.38	6.8	
	N6	Lot 97	CLAY	UTP	UTP	UTP	UTP	UTP	1.7946	1.3099	37.0	2.91	300	33.4	2.7	1.34	5.2	
	N7	Refer to site plan	CLAY	>189	>189	UTP	UTP	>189	1.8157	1.3169	37.9	1.24	250	30.8	2.7	1.38	5.9	
	N8	Lot 86	CLAY	UTP	UTP	UTP	UTP	UTP	1.8583	1.3689	35.7	0.25	300	38.6	2.7	1.34	-1.4	
20/12/2016	N9	Lot 93	CLAY	UTP	UTP	>189	>189	>189	1.8210	1.3141	38.6	0.52	300	34.9	2.7	1.34	2.9	
	N10	Lot 95	CLAY	UTP	UTP	>189	>189	>189	1.8331	1.3237	38.5	-0.08	300	33.5	2.7	1.38	3.2	
22/12/2016	N11	Road	CLAY	189	186	183	159	179	1.7840	1.3012	37.7	2.30	300	36.3	2.7	1.30	4.0	
30/12/2016	N12	Lot 44	Silty CLAY	>194	>194	193	141	>181	1.7770	1.2843	38.4	3.05	300	48.3	2.7	1.20	-2.2	Failed
	N13	Lot 45	Clayey SILT	UTP	151	158	148	>162	1.7915	1.3219	35.5	3.98	300	38.7	2.7	1.30	2.2	
	N14	Lot 47	Silty CLAY	>194	>194	>194	>194	>194	1.8021	1.3070	37.9	1.97	300	39.5	2.7	1.30	1.1	
	N15	Lot 46	Silty CLAY	>194	>194	>194	>194	>194	1.7969	1.3130	36.8	2.88	300	40.3	2.7	1.28	1.0	
4/01/2017	N16	Lot 62	Silty CLAY	UTP	UTP	UTP	UTP	UTP	1.8617	1.3590	37.0	-0.72	300	31.6	2.7	1.42	2.9	
	N17	Lot 63	Silty CLAY	UTP	UTP	UTP	UTP	UTP	1.8246	1.3219	38.0	0.66	300	36.7	2.7	1.34	1.6	
	N18	Lot 44	Silty CLAY	UTP	UTP	UTP	UTP	UTP	1.8530	1.3908	33.2	2.17	300	37.4	2.7	1.34	-0.4	Retest of N12
5/01/2017	N19	Lot 64	Silty CLAY	188	151	154	157	163	1.7956	1.2963	38.5	1.95	300	54.4	2.7	1.16	-6.3	Failed
	N20	Road	Silty CLAY	>194	>194	>194	148	>182	1.7699	1.2558	40.9	1.96	300	28.7	2.7	1.38	9.6	
6/01/2017	N21	Lot 44	CLAY	UTP	UTP	UTP	UTP	UTP	1.8059	1.3199	36.8	2.44	300	44.8	2.7	1.24	-2.0	
	N22	Lot 42	CLAY	>194	>194	191	>194	>193	1.8125	1.3097	38.7	1.09	300	32.9	2.7	1.36	4.6	
	N23	Lot 64	CLAY	UTP	UTP	UTP	UTP	UTP	1.8148	1.3314	36.3	2.25	300	43.2	2.7	1.26	-1.7	Retest of N19
10/01/2017	N24	Lot 43	CLAY	189	189	>189	>189	>189	1.7905	1.3118	36.5	3.44	300	36.3	2.7	1.32	3.6	
	N25	Lot 19	CLAY	178	189	189	>189	>186	1.7855	1.2864	38.8	2.33	300	38.5	2.7	1.28	2.6	
12/01/2017	N26	Lot 14	CLAY	>189	>189	UTP	UTP	>189	1.7964	1.2794	40.4	0.80	300	41.3	2.7	1.28	0.4	
	N27	Lot 17	CLAY	>189	>189	UTP	UTP	>189	1.7357	1.2292	41.2	3.71	300	36.9	2.7	1.26	6.3	

Created By: TG Date: 8/12/2016
Checked By: TG Date: 25/01/2017
Authorised Signatory: Date: 25/01/2017



CMW Geosciences

CATO BOLAM CONSULTANTS

SURVEYORS PLANNERS ENGINEERS

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19 Tennyson Avenue
PO Box 137
Orewa 0946
phone 09-427 0072
fax 09-426 7331
email catobolam@catobolam.co.nz

REVISION (DESCRIPTIONS)	NAME	DATE
R1 REVISED FOR AMENDED DESIGN	KM	05/12/2016
	NAME	DATE
SURVEYED		
DESIGNED	KM	15/11/2016
DRAWN	KM	15/11/2016
CHECKED		
APPROVED		

CABRA DEVELOPMENTS LTD
45 STATION ROAD,
HUAPAI

DRAWING TITLE

CUT AND FILL DEPTH CONTOURS PLAN

ORIGINAL SCALE 1 : 2000	ORIGINAL SIZE A3	REVISION NO	R1
DATE 15/11/2016	CAD REFERENCE 34745 E112 Cut/Fill.p	SHEET NO	E112
DIRECTORY Z:\34745\ACAD\		JOB NO	34745

Appendix E

Producer Statement

13 September 2017 Ref: AKL2016-0634AF Rev. 0

Cabra Developments Limited
PO Box 197, Orewa 0946
Auckland, New Zealand

Attention: Duncan Unsworth

Dear Duncan

RE: CERTIFICATION OF SITEWORKS FOR THE CONSTRUCTION OF TIMBER POLE RETAINING WALLS AND KEYSTONE WALLS AT 45 STATION ROAD – BCO10090856

CMW Geosciences have visited the site at 45 Station Road, Huapai, legally described as Lot 119 DP 508664 on several occasions during January to March to observe the construction of timber pole and keystone retaining walls.

Our work has included review of the following documents and drawings:

- Conditions of Auckland Council Building Consent referenced BCO10090856, issued 23 March 2017;
- Consented construction drawings, prepared by CMW Geosciences (NZ) Limited, referenced AKL2016_0634AC Rev. 0 Figures 100 to 105 inclusive, and dated 20 January 2017;
- Geotechnical report for Huapai Development Stage 1 prepared by CMW Geosciences, referenced 2015_1029AB Rev. 0, dated 24 November 2014.

The site works observed and/or tested by CMW staff incorporated:

- Timber pole retaining walls
    - Assessment of soil strengths in the exposed pile foundations excavations;
    - Pile size, depth, spacing and diameter;
    - Timber pole size, treatment and placement;
    - Lagging dimensions and placement;
    - Drainage material and installation.
- Keystone retaining walls
    - Assessment of soil strengths in the exposed foundations excavations;
    - Foundation dimensions;
    - Geogrid reinforcement placement (type, length, vertical spacing);
    - Hardfill compaction;
    - Drainage material and installation.

Construction aspects of the timber pole and keystone retaining walls were checked for the aforementioned hold points over several visits.

Hardfill compaction of the reinforced hardfill was both checked by proof rolling on site to observe deflection under compaction plant and tested using an impact hammer to check levels of compaction.

Ground conditions were tested using a handheld shear vane at the base and sides of the pile excavation. The retained soil was also tested as part of the observations.

When water was observed in the pile excavations the contractor was advised to either tremie the concrete to the base of the excavation or remove the water immediately prior to pouring concrete. CMW were not present at the time of concrete pouring.

CMW did not observe the retaining wall drainage being connected to the reticulated stormwater system.

On the basis of our observations and testing, we consider that the site works have been undertaken in accordance with the approved Building Consent and related approved documentation described above and are in accordance with the requirements and/or recommendations of the geotechnical report.

For and on behalf of
CMW Geosciences NZ Ltd

Richard Knowles

Principal Geotechnical Engineer, CPEng

Attachments: Producer Statement - Construction Review

IPENZ ENGINEERS NEW ZEALAND | NEW ZEALAND INSTITUTE OF ARCHITECTS INCORPORATED | ACENZ

Building Code Clause(s).....B1.....

PRODUCER STATEMENT – PS4 – CONSTRUCTION REVIEW

(Guidance notes on the use of this form are printed on page 2)

ISSUED BY: ...CMW GEOSCIENCES.....
(Construction Review Firm)

TO: ...CABRA DEVELOPMENTS LIMITED.....
(Owner/Developer)

TO BE SUPPLIED TO: ...AUCKLAND COUNCIL.....
(Building Consent Authority)

IN RESPECT OF: ...CONSTRUCTION OF TIMBER POLED RETAINING WALLS AND KEYSTONE WALLS.....
(Description of Building Work)

AT: ...45 STATION ROAD, HUAPAI.....
(Address)
..... **LOT**.....119..... **DP** ...508664... **SO** .....

...CMW GEOSCIENCES.....has been engaged by...CABRA DEVELOPMENTS LIMITED.....
(Construction Review Firm)
To provide☐CM1☐CM2☐CM3☐CM4☐CM5*(Engineering Categories)* or ☐ observation as per agreement with owner/developer

or ☒other ...REFER TO DOCUMENT AKL2016-0634AF REV 0 DATED 13 SEPTEMBER 2017..services
(Extent of Engagement)
in respect of clause(s) .....B1..... of the Building Code for the building work described in documents relating to Building Consent No. ...BCO10090856..... and those relating to Building Consent Amendment(s) Nos. .....issued during the course of the works. We have sighted these Building Consents and the conditions of attached to them.

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

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

I, ...RICHARD J KNOWLES...(AC AUTHOR 2342).....am: ☒CPEng No. ...160049.....
(Name of Construction Review Professional)
☐Reg Arch No. .....

I am a Member of : ☒IPENZ ☐NZIA and hold the following qualifications: ...BE(CIVIL), CPEng.....

The Construction Review Firm issuing this statement holds a current policy of Professional Indemnity Insurance no less than $200,000*.
The Construction Review Firm is a member of ACENZ : ☐

SIGNED BY ...RICHARD J KNOWLES..... **ON BEHALF OF** ...CMW GEOSCIENCES.....

Date:... 18/7/17 ..... Signature:.....

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

This form is to accompany **Forms 6 or 8 of the Building (Form) Regulations 2004** for the issue of a Code Compliance Certificate.

13 September 2017 Ref: AKL2016_0634AG Rev. 0

Cabra Developments Limited
PO Box 197, Orewa 0946
Auckland

Attention: Duncan Unsworth

Dear Duncan

RE: CERTIFICATION OF SITEWORKS FOR THE CONSTRUCTION OF TWO TIMBER BOARDWALKS AT 53 STATION ROAD – BCO10091660

CMW Geosciences (CMW) have visited the site at 53 Station Road, Huapai legally described as Lot 1 DP 502602 on several occasions during August 2017 to observe the site works for the construction of two timber boardwalks.

Our work has included review of the following documents and drawings:

- Conditions of Auckland Council Building Consent referenced BCO10091660, issued 18 April 2017;
- Consented construction drawings, prepared by Hutchinson Consulting Engineers Limited, referenced 19870 S01-S08, dated Feb 2017;
- Geotechnical report for Huapai Development Stage 1 prepared by CMW Geosciences, referenced 2015_1029AB Rev. 0, dated 24 November 2014.

The site works observed and/or tested by CMW staff incorporated:

- assessment of soil strengths in the exposed foundation excavations;
- pile size, depth and diameter.

Our testing demonstrated vane shear strengths in excess of the 50kPa design specification for alluvial soils, in excess of the 100kPa design specification for engineered fill and in excess of the 200kPa design specifications for rock. Pile holes were observed as having been imbedded a minimum of 300mm into the rock.

On the basis of our observations and testing, we consider that the site works have been undertaken in accordance with the approved Building Consent and related approved documentation described above and are in accordance with the requirements and/or recommendations of the geotechnical report.

For and on behalf of CMW Geosciences

Richard Knowles

Principal Geotechnical Engineer, CPEng

Attachments: Producer Statement - Construction Review

Building Code Clause(s).....B1.....

PRODUCER STATEMENT – PS4 – CONSTRUCTION REVIEW

(Guidance notes on the use of this form are printed on page 2)

ISSUED BY: ...CMW GEOSCIENCES.....
(Construction Review Firm)

TO: ...CABRA DEVELOPMENTS LIMITED.....
(Owner/Developer)

TO BE SUPPLIED TO: ...AUCKLAND COUNCIL.....
(Building Consent Authority)

IN RESPECT OF: ...SITEWORKS FOR THE CONSTRUCTION OF TWO TIMBER BOARDWALKS.....
(Description of Building Work)

AT: ...53 STATION ROAD, HUAPAI.....
(Address)
..... **LOT**.....1..... **DP** ...502602... **SO** .....

...CMW GEOSCIENCES.....has been engaged by...CABRA DEVELOPMENTS LIMITED.....
(Construction Review Firm)
To provide☐CM1☐CM2☐CM3☐CM4☐CM5*(Engineering Categories)* or ☐ observation as per agreement with owner/developer

or ☒other ...REFER TO ATTACHED DOCUMENT AKL2016_0634AG REV. 0 DATED 13 SEPTEMBER 2017..services
(Extent of Engagement)
in respect of clause(s) .....B1..... of the Building Code for the building work described in documents relating to Building Consent No. ...BCO10091660..... and those relating to Building Consent Amendment(s) Nos. .....issued during the course of the works. We have sighted these Building Consents and the conditions of attached to them.

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

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

I, ...RICHARD J KNOWLES (AC AUTHOR #2342).....am: ☒CPEng No. ...160049.....
(Name of Construction Review Professional)
☐Reg Arch No. .....

I am a Member of : ☒IPENZ ☐NZIA and hold the following qualifications: ...BE(CIVIL), CPEng.....

The Construction Review Firm issuing this statement holds a current policy of Professional Indemnity Insurance no less than $200,000*.
The Construction Review Firm is a member of ACENZ : ☐

SIGNED BY ...RICHARD J KNOWLES..... **ON BEHALF OF** ...CMW GEOSCIENCES.....

Date:... 18/9/17 ..... Signature:.....

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

This form is to accompany **Forms 6 or 8 of the Building (Form) Regulations 2004** for the issue of a Code Compliance Certificate.