

15 March 2022

73 NOBILO ROAD

HUAPAI

GEOTECHNICAL COMPLETION REPORT

Cabra Developments Limited

AKL2020-0328AA Rev.0

AKL2020-0328AA		
Date	Revision	Comments
4 March 2022	A	Initial draft for internal review
15 March 2022	0	Final issue to client


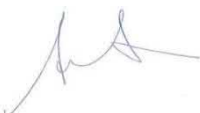
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1. INTRODUCTION

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 the 73 Nobilo Road, Huapai development. Construction of this residential subdivision has been undertaken in accordance with the Auckland Council Resource Consent number SUB60036097-A and ENG60317653.

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

This report covers the construction period March 2017 to February 2022 and is intended to be used for certification purposes for new lots (listed below) created from existing Lot 602, DP 514952 as follows:

- 30 new residential lots numbered 200 to 229 and 8 new Superlots numbered 304 to 309, 700 and 701;
- 5 new roads numbered Lots 401 and 402 and named Babina Avenue, Cara Avenue, Babos Avenue, Resnik Crescent and Kartolina Crescent;
- An extension to the existing Vintry Road;
- 2 Greenfingers numbered Lots 501 and 502.

The 73 Nobilo Road, Huapai Development is located off Schoolside Road, Huapai. As can be seen from the as-built plans, 17 of the lots have been affected by filling as part of the earthworks operations to a maximum depth of approximately 5 metres.

2. PROJECT BACKGROUND

The geotechnical investigations and design were undertaken by CMW Geosciences as presented in the following reports:

- Geotechnical Investigation Report for 73 Nobilo Road, Huapai, referenced AKL2016_0403AB Rev.0, dated 11 July 2016;
- Earthworks Completion Report for 73 Nobilo Road, Stormwater Pond, referenced AKL2017_0051AE Rev.0, dated 1 December 2017

3. DESCRIPTION OF EARTHWORKS

Earthworks for this subdivision began in March 2017 and were undertaken periodically until final completion in January 2022. In March 2017 the construction of the Stormwater Pond (just outside the northern boundary of the subject site) began with the installation of silt and erosion controls. In mid-April 2017 the muck out of an existing gully at the roundabout intersection of the existing Schoolside Avenue and the subdivisions Road 6 (now Vintry Road) was also undertaken. Once this was complete the excavations were benched, and filling commenced.

The Stormwater Pond, including the pedestrian bridge crossing, was completed in mid-October 2017. This closed out this area and saw the beginning of the bulk earthworks for the wider 73 Nobilo subdivision as part of the construction of Road 6. In late November 2017 the location of the existing underfill drains were surveyed to ensure the future subsoil drainage of the site was able to be connected into them. These subsoils are a continuation of the drainage that has been installed in the gullies within the wider site, extending down from The Country Club Huapai.

In December 2017 an undercut of soft materials, including organics, was completed in the northern fill area of the site. Subsoil drains were installed here and outlet into the future green finger denoted Lot 502 along the northern boundary of the site.

Early January 2018 saw the installation of the subsoil drains within the southern portion of the site, extending up through the middle and out to the east. These were also an extension to the existing underfill drains from the finished subdivision to the west. The northern boundary Greenfinger was constructed in early March 2018, and following this the Greenfinger which runs parallel to Resnik Crescent. Bulk earthworks operations were being completed at the same time as the construction of the Greenfinger and these ceased in mid-April 2018 at the conclusion of the earthworks season. The end of the 2018 season saw the mulching of the majority of the site, the completion of the Greenfingers and the gulleting and formation of Road 6. The silt pond within Lot 701 remained for use when the site was reopened.

Due to priorities in other areas of the wider Huapai Triangle development the subject subdivision was put on hold until December 2020. Mid-December then saw the muck out of half the existing silt pond which was then back filled in late December 2020 and early January 2021. The installation of services and the excavation of road gulleys began in February 2021 and were ongoing until the subdivision completion in January 2022. Minor cuts and fills were undertaken across the site to bring the lots to the final design levels, and these were inspected from mid-March 2021 to late November 2021. The backfilling of the remaining half of the silt pond was completed in early November 2021 and the mulching and topsoiling of the lots was completed in December 2021 and January 2022, which saw the close out of the subdivision.

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;
- Installation of subsoil drains including underfill drains but excluding road under-channel drains;
- Backfilling of subsoil drains;
- Excavation and backfilling of sewer and stormwater trenches;
- Construction of 2 Greenfingers;
- Placement and compaction of engineered fills.

4.2. Compaction Control

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

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 occasions that the contractor was struggling to achieve the required compaction standards with the prevailing site and soil conditions, but to the best of our knowledge, all 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 a series 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 71(3) of the Building 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 (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 each of these zones are presented in the Suitability Statement (Appendix A). Additional information is also provided in some of the following sections.

5.2. Land Stability and Erosion Control

The subdivision scheme layout includes generally near level contours to form building platforms, however batter slopes have been formed within the Greenfingers (Lots 501 and 502) and are of particular note along the western and northern edges of Lots 306 to 308 where they border the Lot 501 Greenfinger. This area has a maximum gradient of 1(v) in 2.5(h) as depicted on the as-built drawings.

Design of the works to provide appropriate stability conditions that meet regulatory requirements for the land within this development, including the batters, has led to the installation of deep subsoil drainage.

Stability conditions for finished ground profiles have been assessed under a range of groundwater conditions which satisfy ultimate limit state design criteria. The soil parameters for the analyses were selected from extensive investigation undertaken at the site and from experience in this terrain. We consider that the stability results are satisfactory for all building platform areas and we are therefore satisfied that these areas are not subject to the natural stability hazards described in the Building Act.

On all steep land, including on engineered batter slopes, surface stability can be compromised by indiscriminate disposal of stormwater onto the ground surface and/ or by removal of vegetation.

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 faces. Wherever practical on such land, and particularly on steep batters, 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.

5.3. 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.

5.4. 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 Consultants PWC Sewer 41201-DR-SU-9200 to 9205 and Stormwater 41201-DR-SU-9300 to 9305 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 them, as shown on the appended stormwater as-built plans. The resulting restrictions are presented in the Suitability Statement below.

5.5. Subsoil Drains

The appended Cato Bolam Consultants Cut to Fill 41201-DR-SU-9010 to 9015 as-built plan shows the positions and depths from finished ground surface of subsoil drains which were constructed in the natural ground during the earthwork's operations. The drains were installed to help control groundwater levels and either connect into existing subsoil drainage in the neighbouring subdivision to the east, or outlet within the Lot 502 Greenfinger. The ongoing operation of these drains is important to the overall stability conditions of the site.

Typical trench excavations were between 0.1 to 5.0 metres deep in the natural ground beneath the filling. Accordingly, they are predominantly beyond the depths of anticipated foundations.

Descriptions of the restrictions are contained in the appended Suitability Statement.

5.6. 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 as appropriate.

5.7. Design of Shallow Foundations

5.7.1. 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 200 to 229 inclusive, 304 to 309 inclusive and 700 and 701 have been assessed as having a geotechnical ultimate bearing capacity of 300 kPa within the influence of conventional shallow residential building foundation loads.

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.

5.7.2. 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.

5.7.3. Soil Expansiveness Classification

Seasonal shrinking and swelling results in vertical surface ground movement which can cause significant cracking of floor slabs and walls. NZS 3604:2011¹ excludes from the definition of 'good ground', soils with a liquid limit of more than 50% and a linear shrinkage of more than 15% due to their potential to shrink and

¹ Standards New Zealand (2011) Timber-framed buildings, NZS 3604:2011, NZ Standard

swell as a result of seasonal fluctuations in water content. For soils exceeding these limits, NZS 3604 has historically referenced AS 2870² for foundation design advice. However, the November 2019 update of Acceptable Solution B1/AS1³ provides amendments to NZS 3604 that define a method for testing and classifying the soils and provides foundation designs for specific, simple house configurations across the range of expansive soil conditions.

Nevertheless, there is evidence⁴ indicating that the use of the B1/AS1 method of assessment of expansiveness may be inaccurate.

22 sets of soil tests were carried out on samples taken from likely foundation level on lots within this development / 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 and BRANZ Report SR120A⁵ to determine expansive site Classes as defined in AS 2870, "Residential Slabs and Footings – Construction". All test results are appended.

The expansive soil hazard is addressed by a combination of appropriate foundation design, careful site preparation and diligent maintenance of plantings near the foundations.

Foundation Design

We have assessed the AS 2870 Site Class for lots on this stage of the development to be as detailed below:

- **M (medium)** – Lots 210 to 229 inclusive, Lots 304 to 308 inclusive and Lot 701;
- **H1 (high)** – Lot 309;
- **H2 (high)** – Lots 200 to 209 inclusive.

Details of foundation options for these Classes are contained in the appended Suitability Statement.

It should be noted that due to the large area size of Lots 304 to 309, 700 and 701, the expansive class is only indicative based on the small number of tests completed within each lot, and further expansive testing may be required once final development plans for these lots have been completed.

Site Preparation

There have been instances 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 requiring extensive repairs or re-building once the soil moisture contents have returned to higher levels. In some instances, perimeter foundations have been appropriately treated but floor slabs have been poured on dry ground. Infiltration of moisture via pipe bedding has then occurred.

Foundation contractors need to be made aware of the extreme damage potentially caused by these circumstances 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.

² Standards Australia Limited (2011) *Residential slabs and footings*, AS 2870-2011, Australian Standard, NSW

³ Ministry of Business, Innovation and Employment (2019) *Acceptable Solutions and Verification Methods for NZ Building Code Clause B1 Structure*, B1/AS1, Amendment 19

⁴ Rogers, N., McDougall, N., Twose, G., Teal, J. & Smith, T. (2020) The Shrink Swell Test: A Critical Analysis, *NZ Geomechanics News*, Issue 99, pages 66-80.

⁵ Fraser Thomas Limited (2008) - Addendum Study Report (BRANZ SR120A), Soil Expansivity in the Auckland Region – Final Report

Site Maintenance

Landowners must be mindful that either the planting or removal of high-water demand plants where their roots may extend close to footings (i.e. within a lateral distance of 1.5 times the mature tree height) can cause settlement or heave damage.

5.7.4. Minimum Floor Levels

Minimum floor levels have been set for Superlots 304, 306 to 308 inclusive and Superlot 701. This is due to these lots being within the vicinity of the Greenfinger swale (Lot 501) and hence these minimum floor levels have been set based on 100-year flood levels. The set floor levels for these lots are outlined on the appended Cato Bolam Consultants Final Contours Asbuilt Plan 41201-DR-SU-9000 Rev.1.

5.8. Topsoil Depths

Topsoil depths have been checked by the drilling of a borehole in the approximate centre of each lot. The results are considered indicative for each lot, but may be subject to variations. Topsoil depths are between 200 and 300mm on this 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.

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, Andrew Linton, of CMW Geosciences (NZ) Limited Partnership, 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 of the 73 Nobile Road, Huapai Development.
2. The extent of preliminary investigations carried out to date are described in the Geotechnical Investigation Report prepared by CMW Geosciences referenced AKL2016_0403AB Rev.0, dated 11 July 2016. 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 Consultant Cut to Fill As-built Plans, referenced 41201-DR-SU-9010 to 9015, have been placed in compliance with NZS 4431, the Auckland Council Unitary Plan 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 Final Contours as-built plan, 41201-DR-SU-9005, Lot 306 is adjacent to land which has gradients steeper than 1(v) in 4 (h) (and generally up to 1(v) in 2.5(h)). Accordingly, restrictions incorporating a Specific Design Zone (Slope) have been applied as depicted on the as-built plans as follows:
 - **Specific Design Zone (Slope) areas** have been applied on Lot 306 only. 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 building 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) The function of the subsoil drains installed beneath Lots 210, 304 to 307, 700 and 701 must not be impaired by any building development or landscaping works. Any bored or driven piles must be positioned to avoid damaging the draincoils. Where any subsoil drain is intercepted by building works, it must be reinstated under the direction of a Chartered Professional Engineer to ensure the integrity of the subsoil drainage system.
 - (d) A geotechnical ultimate bearing capacity of 300 kPa may be assumed for shallow foundation design on the building platforms of Lots 200 to 229 inclusive, 304 to 309 inclusive and 700 and 701.

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 lots in this development has been assessed as the following from AS2870:

- **M (medium)** – Lots 210 to 229 inclusive, Lots 304 to 308 inclusive and Lot 701;
- **H1 (high)** – Lot 309 ;
- **H2 (high)** – Lots 200 to 209 inclusive.

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 5.7.3 of the Geotechnical Completion Report) for reference by foundation contractors.

- (f) The backfilling and compaction of the stormwater 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) Minimum floor levels have been set for Superlots 304, 306 to 308 inclusive and Superlot 701. This is due to these lots being within the vicinity of the Greenfinger swale (Lot 501) and hence these minimum floor levels have been set based on 100-year flood levels. They are identified on the Cato Bolam Consultants Final Contours Asbuilt Plan 41201-DR-SU-9000 Rev.1 in Appendix B, and in the table below.
- (h) Subject to the geotechnical limitations, restrictions and recommendations contained in clauses 3(a), 3(b), 3(c), 3(d), 3(e), 3(f) and 3(g), 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 (soil classifications for lots within this stage are detailed in clause (e) above) 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.

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

For and on behalf of CMW Geosciences



Andrew Linton

Principal Geotechnical Engineer CEngNZ, CPEng

Table 1: GCR SUMMARY TABLE							
Condition	Specific Design Zone (slope)	Subsoil Drains Present	Geotechnical Ultimate Bearing Capacity (kPa)	AS2870 Expansive Class	Service Lines Restrictions	Minimum Floor Level (m)	Indicative Topsoil Depth (mm)
GCR SOPO Clause	3(b)	3(c)	3(d)	3(e)	3(f)	3(g)	
Lot number							
200			300	H2	●		300
201			300	H2	●		200
202			300	H2	●		300
203			300	H2	●		200
204			300	H2	●		200
205			300	H2	●		300
206			300	H2	●		200
207			300	H2	●		200
208			300	H2	●		200
209			300	H2	●		200
210		●	300	M	●		300
211			300	M	●		300
212			300	M	●		300
213			300	M	●		200
214			300	M	●		300
215			300	M	●		200
216			300	M	●		300
217			300	M	●		300
218			300	M	●		300

Table 1: GCR SUMMARY TABLE							
Condition	Specific Design Zone (slope)	Subsoil Drains Present	Geotechnical Ultimate Bearing Capacity (kPa)	AS2870 Expansive Class	Service Lines Restrictions	Minimum Floor Level (m)	Indicative Topsoil Depth (mm)
GCR SOPO Clause	3(b)	3(c)	3(d)	3(e)	3(f)	3(g)	
219			300	M	●		200
220			300	M	●		300
221			300	M	●		300
222			300	M	●		300
223			300	M	●		300
224			300	M	●		300
225			300	M	●		250
226			300	M	●		250
227			300	M	●		300
228			300	M	●		300
229			300	M	●		200
304		●	300	M	●	●	300
305		●	300	M	●		300
306	●	●	300	M	●	●	200
307		●	300	M	●	●	300
308			300	M	●	●	200
309			300	H1	●		300
700		●	300	M	●		200
701		●	300	M	●	●	300

Appendix B: Drawings

Title	Reference No.	Date	Revision
Cato Bolam Consultants Final Contours As-Built Plan – Sheets 1 to 6	41201-DR-SU-9000 to 9005	February 2022	1
Cato Bolam Consultants Cut to Fill As-Built Plan – Sheets 1 to 6	41201-DR-SU-9010 to 9015	March 2022	3
Cato Bolam Consultants PWC Sewer As-Built Plan – Sheets 1 to 6	41201-DR-SU-9200 to 9205	February 2022	2
Cato Bolam Consultants Stormwater As-Built Plan – Sheets 1 to 6	41201-DR-SU-9300 to 9305	February 2022	2
Cato Bolam Consultants Water Reticulation As-Built Plan – Sheets 1 to 6	41201-DR-SU-9400 to 9405	February 2022	2
Cato Bolam Consultants Stormwater Zone of Influence As-Built Plan – Sheets 1 to 6	41201-DR-SU-9801 to 9805	February 2022	2
Auckland Council Stormwater Pipe and Manhole Construction Clearance Requirements – Sheets 1 of 1	SW22	November 2015	2

41201 - Cabra Developments Limited 73 Nobilo Road, Huapai

For Completion



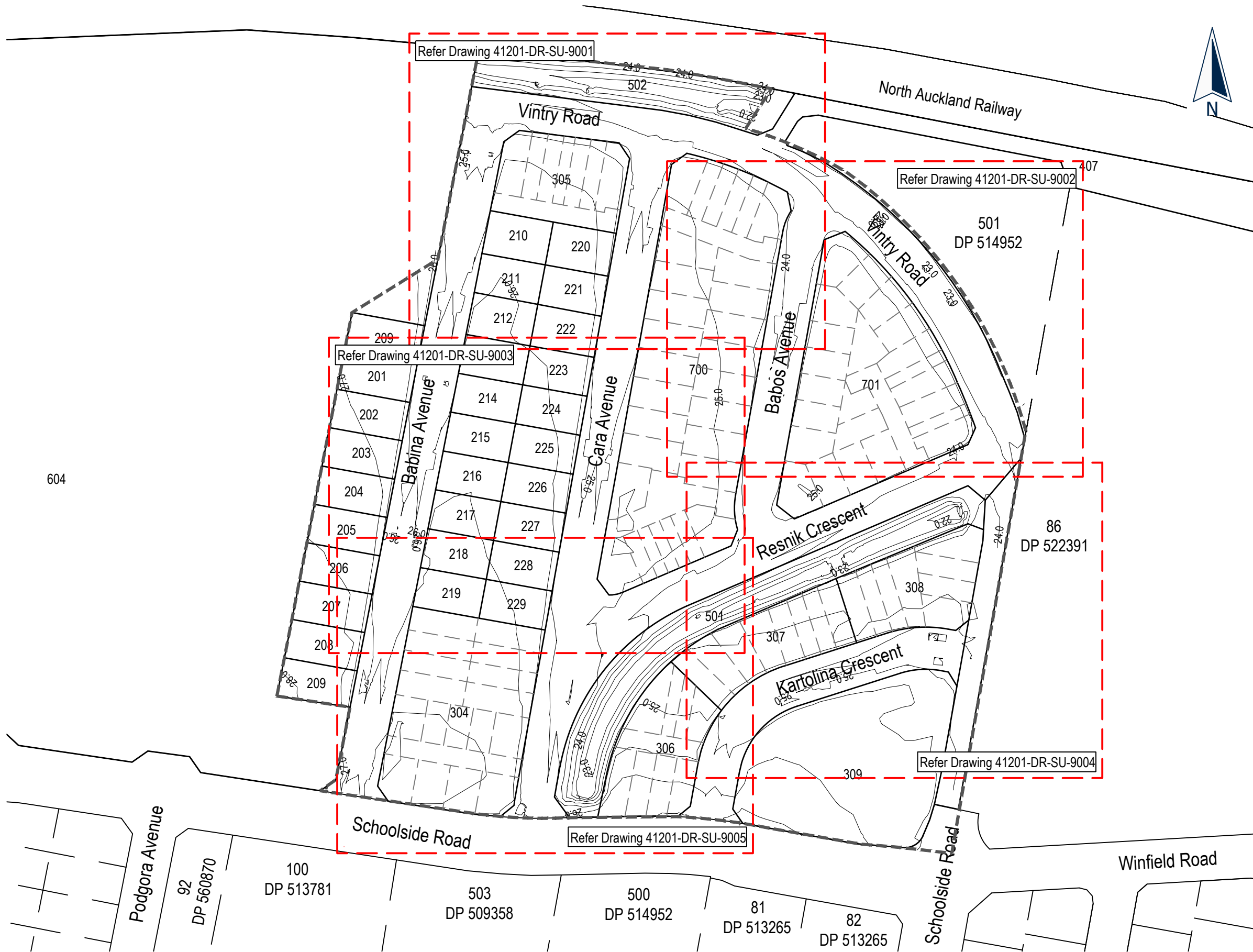
creating great places

PLANNERS | SURVEYORS | ENGINEERS
ARCHITECTS | ENVIRONMENTAL



LOCATION DIAGRAM
Scale 1:5000

Plan No	Rev	Plan Title			
9000	1	Final Contours As Built Plan Sheet 1	9350	1	Stormwater Lot Connections As Built Plan
9001	1	Final Contours As Built Plan Sheet 2	9400	2	Water Reticulation As Built Sheet 1
9002	1	Final Contours As Built Plan Sheet 3	9401	2	Water Reticulation As Built Sheet 2
9003	1	Final Contours As Built Plan Sheet 4	9402	2	Water Reticulation As Built Sheet 3
9004	1	Final Contours As Built Plan Sheet 5	9403	2	Water Reticulation As Built Sheet 4
9005	2	Final Contours As Built Plan Sheet 6	9404	2	Water Reticulation As Built Sheet 5
9010	3	Cut to Fill As Built Plan Sheet 1	9405	2	Water Reticulation As Built Sheet 6
9011	3	Cut to Fill As Built Plan Sheet 2	9800	2	Stormwater Zone of Influence As Built Plan Sheet 1
9012	3	Cut to Fill As Built Plan Sheet 3	9801	2	Stormwater Zone of Influence As Built Plan Sheet 2
9013	3	Cut to Fill As Built Plan Sheet 4	9802	2	Stormwater Zone of Influence As Built Plan Sheet 3
9014	3	Cut to Fill As Built Plan Sheet 5	9803	2	Stormwater Zone of Influence As Built Plan Sheet 4
9015	3	Cut to Fill As Built Plan Sheet 6	9804	2	Stormwater Zone of Influence As Built Plan Sheet 5
9100	2	Road As Built Plan Sheet 1	9805	2	Stormwater Zone of Influence As Built Plan Sheet 6
9101	2	Road As Built Plan Sheet 2			
9102	2	Road As Built Plan Sheet 3			
9103	2	Road As Built Plan Sheet 4			
9104	2	Road As Built Plan Sheet 5			
9105	2	Road As Built Plan Sheet 6			
9200	2	PWC Sewer As Built Plan Sheet 1			
9201	2	PWC Sewer As Built Plan Sheet 2			
9202	2	PWC Sewer As Built Plan Sheet 3			
9203	2	PWC Sewer As Built Plan Sheet 4			
9204	2	PWC Sewer As Built Plan Sheet 5			
9205	2	PWC Sewer As Built Plan Sheet 6			
9300	2	Stormwater As Built Plan Sheet 1			
9301	2	Stormwater As Built Plan Sheet 2			
9302	2	Stormwater As Built Plan Sheet 3			
9303	2	Stormwater As Built Plan Sheet 4			
9304	2	Stormwater As Built Plan Sheet 5			
9305	2	Stormwater As Built Plan Sheet 6			




Final Contours Legend

- 38.0 As built Contour (1m interval)
- As built Contour (0.5m interval)
- Extent of Works

Lot Number	Minimum Floor Level (m)
Lot 304 (Lots with frontage to Schoolside Road)	Highest level of kerb on Schoolside Road adjacent to individual lot + 0.66m
Lot 306	24.50
Lot 307	24.50
Lot 308	24.50
Lot 701 (Lots with frontage to Vintry Drive)	22.75
Lot 701 (Lots with frontage to Resnik Crescent)	24.50m

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 ± 10mm.

Signed:  Registered Professional Surveyor

Date: 28/02/2022

Name: Kerry McPherson
Phone : (09) 427 0072
Email : kerrym@catobolam.co.nz

ENG60317653 / SUB60036097-A



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ARCHITECTS | ENVIRONMENTAL



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Cabra Developments Limited
73 Nobile Road,
Huapai

Final Contours
As Built Plan
Sheet 1

No.	REVISION (DESCRIPTIONS)	NAME	DATE
0	Issued For Completion	K.McPherson	02/02/2022
1	General Drawing Amendments	K.McPherson	28/02/2022

FOR COMPLETION

		NAME	DATE
SURVEYED		H.Baker	18/01/2022
DESIGNED		D. Lupton	01/01/2018
DRAWN		G.Brown	24/01/2022
DATE	ORIGINAL SCALE	ORIGINAL SIZE	
24/01/2022	1:1500	A3	
DRAWING NO.			REVISION
41201-DR-SU-9000			1

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Final Contours Legend

- 38.0 As built Contour (1m interval)
- As built Contour (0.5m interval)
- Extent of Works

Lot Number	Minimum Floor Level (m)
Lot 304 (Lots with frontage to Schoolside Road)	Highest level of kerb on Schoolside Road adjacent to individual lot + 0.66m
Lot 306	24.50
Lot 307	24.50
Lot 308	24.50
Lot 701 (Lots with frontage to Vintry Drive)	22.75
Lot 701 (Lots with frontage to Resnik Crescent)	24.50m

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Signed: 
Registered Professional Surveyor

Date: 28/02/2022

Name: Kerry McPherson
Phone : (09) 427 0072
Email : kerrym@catobolam.co.nz

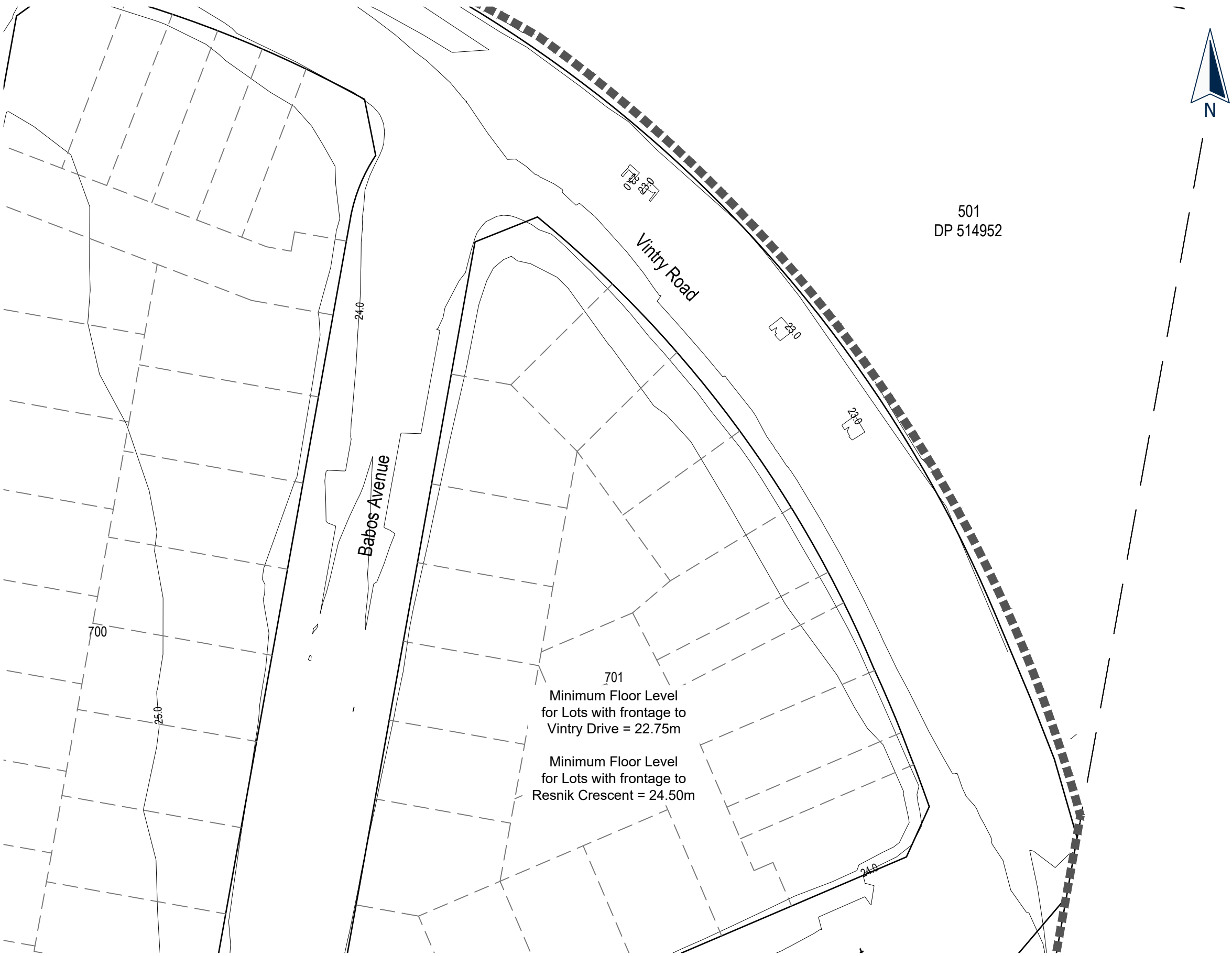
ENG60317653 / SUB60036097-A

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No.	REVISION (DESCRIPTIONS)	NAME	DATE
0	Issued For Completion	K.McPherson	02/02/2022
1	General Drawing Amendments	K.McPherson	28/02/2022

FOR COMPLETION

		NAME	DATE
SURVEYED		H.Baker	18/01/2022
DESIGNED		D. Luton	01/01/2018
DRAWN		G.Brown	24/01/2022
DATE	ORIGINAL SCALE	ORIGINAL SIZE	
24/01/2022	1:500	A3	
DRAWING NO.			REVISION
41201-DR-SU-9001			1



Final Contours Legend

38.0

As built Contour (1m interval)

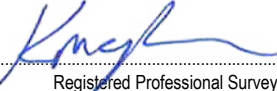
As built Contour (0.5m interval)

Extent of Works

Lot Number	Minimum Floor Level (m)
Lot 304 (Lots with frontage to Schoolside Road)	Highest level of kerb on Schoolside Road adjacent to individual lot + 0.66m
Lot 306	24.50
Lot 307	24.50
Lot 308	24.50
Lot 701 (Lots with frontage to Vintry Drive)	22.75
Lot 701 (Lots with frontage to Resnik Crescent)	24.50m

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- * The levels (Z) are in terms of the Auckland 1946 (MSL) LINZ datum (DOSLI datum), and are within ± 10mm.

Signed: 

Registered Professional Surveyor

Date: 28/02/2022

Name: Kerryn McPherson
Phone : (09) 427 0072
Email : kerrynm@catobolam.co.nz

ENG60317653 / SUB60036097-A

C:\12d\Synergy\Workspacedata\CATOAPP\141201 - Cabra 73 Nobile Road - Phase 2_21499\Drawgs\As-builts\41201-DR-SU-9000-9005 - Final Contours As Built

No.	REVISION (DESCRIPTIONS)	NAME	DATE
0	Issued For Completion	K.McPherson	02/02/2022
1	General Drawing Amendments	K.McPherson	28/02/2022

FOR COMPLETION

		NAME	DATE
SURVEYED		H.Baker	18/01/2022
DESIGNED		D. Luton	01/01/2018
DRAWN		G.Brown	24/01/2022
DATE	ORIGINAL SCALE	ORIGINAL SIZE	
24/01/2022	1:500	A3	
DRAWING NO.			REVISION
41201-DR-SU-9002			1



Final Contours Legend

- 38.0 As built Contour (1m interval)
- As built Contour (0.5m interval)
- Extent of Works

Lot Number	Minimum Floor Level (m)
Lot 304 (Lots with frontage to Schoolside Road)	Highest level of kerb on Schoolside Road adjacent to individual lot + 0.66m
Lot 306	24.50
Lot 307	24.50
Lot 308	24.50
Lot 701 (Lots with frontage to Vintry Drive)	22.75
Lot 701 (Lots with frontage to Resnik Crescent)	24.50m

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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 ± 10mm.

Signed: _____
Registered Professional Surveyor

Date: 28/02/2022

Name: Kerryn McPherson
Phone : (09) 427 0072
Email : kerrynm@catobolam.co.nz

ENG60317653 / SUB60036097-A

C:\12d\Synergy\Workspace\data\CATOAPP141201 - Cabra 73 Nobile Road - Phase 2_21499\Drawgs\As-builts\41201-DR-SU-9000-9005 - Final Contours As Built

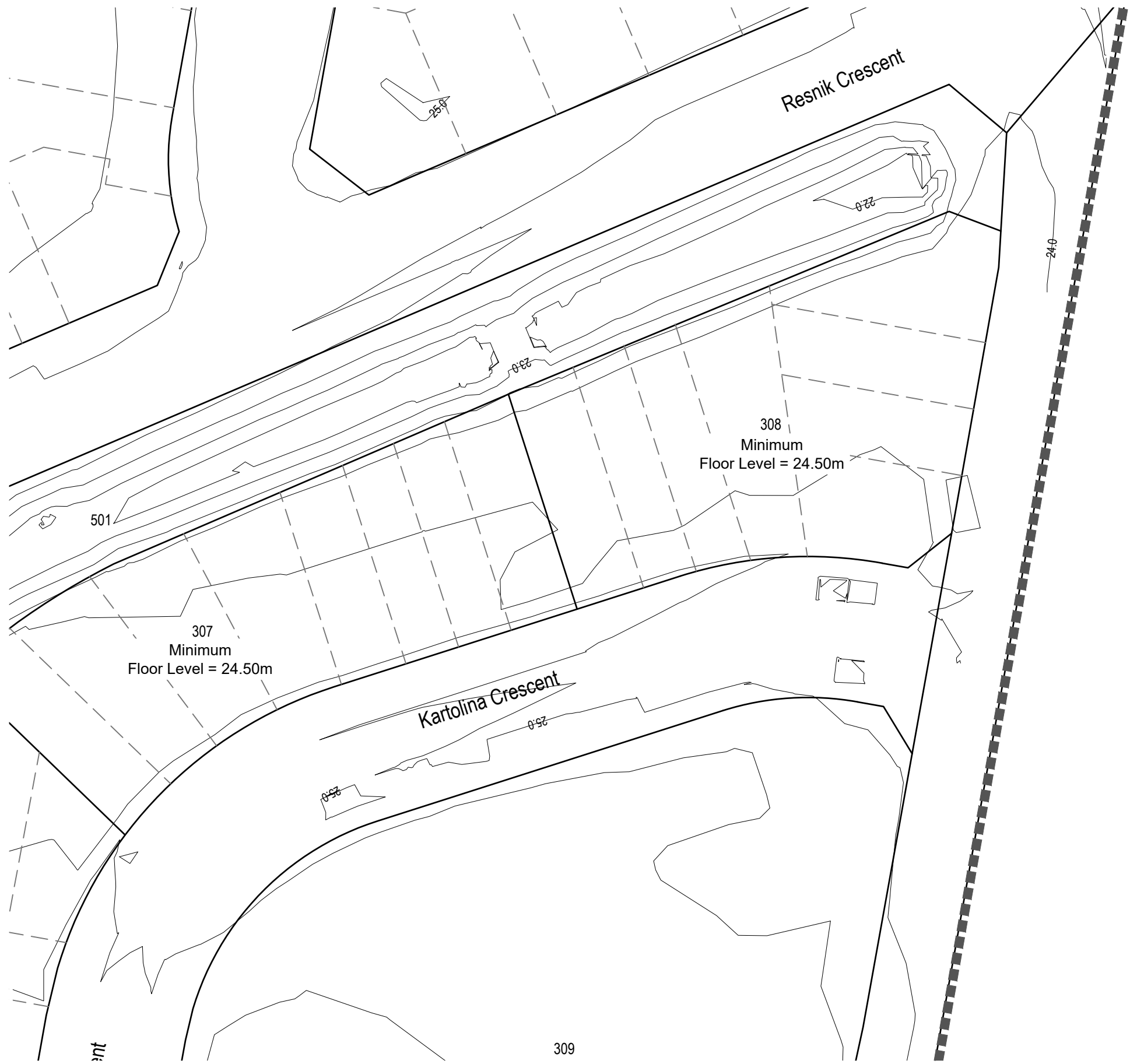
No.	REVISION (DESCRIPTIONS)	NAME	DATE
0	Issued For Completion	K.McPherson	02/02/2022
1	General Drawing Amendments	K.McPherson	28/02/2022

FOR COMPLETION

	NAME	DATE
SURVEYED	H.Baker	18/01/2022
DESIGNED	D. Luton	01/01/2018
DRAWN	G.Brown	24/01/2022

DATE	ORIGINAL SCALE	ORIGINAL SIZE
24/01/2022	1:500	A3

DRAWING NO.	REVISION
41201-DR-SU-9003	1



86
DP 522391



Final Contours Legend	
	As built Contour (1m interval)
	As built Contour (0.5m interval)
	Extent of Works

Lot Number	Minimum Floor Level (m)
Lot 304 (Lots with frontage to Schoolside Road)	Highest level of kerb on Schoolside Road adjacent to individual lot + 0.66m
Lot 306	24.50
Lot 307	24.50
Lot 308	24.50
Lot 701 (Lots with frontage to Vintry Drive)	22.75
Lot 701 (Lots with frontage to Resnik Crescent)	24.50m

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 or NZGD(2000), and are within ± 50mm.
* The levels (Z) are in terms of the Auckland 1946 (MSL) LINZ datum (DOSLI datum), and are within ± 10mm.

Signed:
Registered Professional Surveyor

Date: 28/02/2022

Name: Kerry McPherson
Phone : (09) 427 0072
Email : kerrym@catobolam.co.nz

ENG60317653 / SUB60036097-A

C:\12d\Synergy\Workspace\data\CATOAPP141201 - Cabra 73 Nobile Road - Phase 2 21499\Drawgs\As-builts\41201-DR-SU-9000-9005 - Final Contours As Built

No.	REVISION (DESCRIPTIONS)	NAME	DATE
0	Issued For Completion	K.McPherson	02/02/2022
1	General Drawing Amendments	K.McPherson	28/02/2022

FOR COMPLETION

		NAME	DATE
SURVEYED		H.Baker	18/01/2022
DESIGNED		D. Luton	01/01/2018
DRAWN		G.Brown	24/01/2022
DATE	ORIGINAL SCALE	ORIGINAL SIZE	
24/01/2022	1:500	A3	
DRAWING NO.			REVISION
41201-DR-SU-9004			1



Final Contours Legend	
	38.0 As built Contour (1m interval)
	As built Contour (0.5m interval)
	Extent of Works
	Specific Design Zone (Slope)

Lot Number	Minimum Floor Level (m)
Lot 304 (Lots with frontage to Schoolside Road)	Highest level of kerb on Schoolside Road adjacent to individual lot + 0.66m
Lot 306	24.50
Lot 307	24.50
Lot 308	24.50
Lot 701 (Lots with frontage to Vintry Drive)	22.75
Lot 701 (Lots with frontage to Resnik Crescent)	24.50m

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 ± 10mm.

Signed: Registered Professional Surveyor

Date: 02/03/2022

Name: Kerry McPherson
Phone : (09) 427 0072
Email : kerrym@catobolam.co.nz

ENG60317653 / SUB60036097-A

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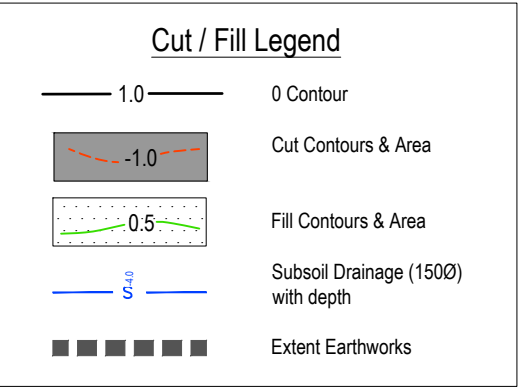
No.	REVISION (DESCRIPTIONS)	NAME	DATE
0	Issued For Completion	K.McPherson	02/02/2022
1	General Drawing Amendments	K.McPherson	28/02/2022
2	Added Specific Design Zone (Slope)	K.Middeldorp	02/03/2022

FOR COMPLETION

	NAME	DATE
SURVEYED	H.Baker	18/01/2022
DESIGNED	D. Luton	01/01/2018
DRAWN	G.Brown	24/01/2022

DATE	ORIGINAL SCALE	ORIGINAL SIZE
24/01/2022	1:500	A3

DRAWING NO.	REVISION
41201-DR-SU-9005	2



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 ± 10mm.

Signed:  Registered Professional Surveyor

Date: 01/03/2022

Name: Kerry McPherson
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Email : kerrym@catobolam.co.nz

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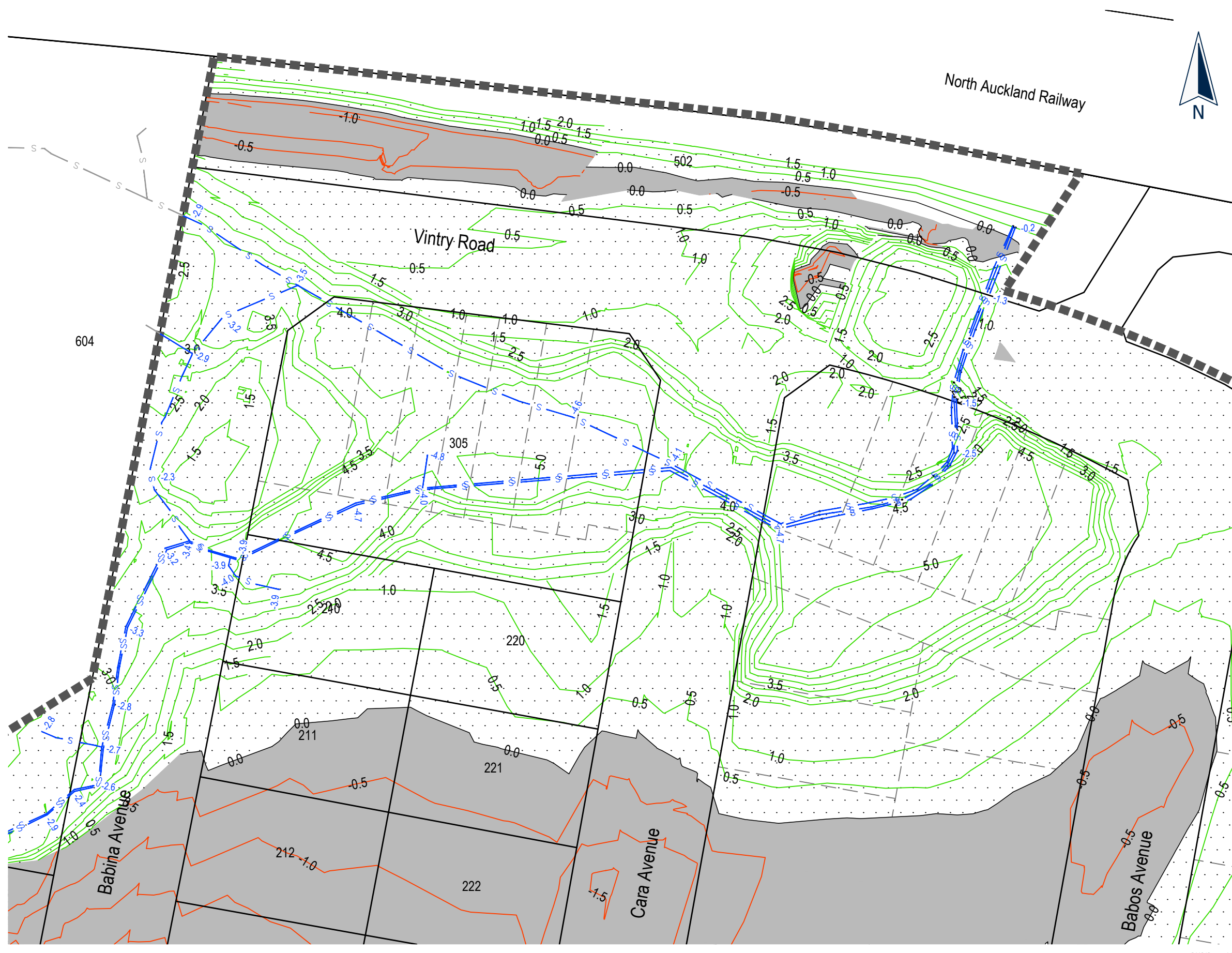
No.	REVISION (DESCRIPTIONS)	NAME	DATE
0	Issued For Completion	K.McPherson	02/02/2022
1	General Plan Amendments	K.McPherson	18/02/2022
2	Cut to Fill Contours Updated	K.McPherson	28/02/2022
3	Added Subsoil Drainage Depths	K.McPherson	01/03/2022

FOR COMPLETION

	NAME	DATE
SURVEYED	H.Baker	18/01/2022
DESIGNED	D. Luton	01/01/2018
DRAWN	B.Nel	24/01/2022

DATE	ORIGINAL SCALE	ORIGINAL SIZE
24/01/2022	1:1500	A3

DRAWING NO.	REVISION
41201-DR-SU-9010	3



Cut / Fill Legend

1.0

0 Contour

-1.0

Cut Contours & Area

0.5

Fill Contours & Area

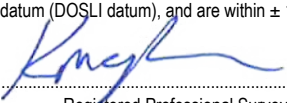
0.40

Subsoil Drainage (1500)
with depth

Extent Earthworks

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 ± 10mm.

Signed: 
Registered Professional Surveyor

Date: 01/03/2022

Name: Kerry McPherson
Phone : (09) 427 0072
Email : kerrym@catoBolam.co.nz

ENG60317653 / SUB60036097-A

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Land & Property Development

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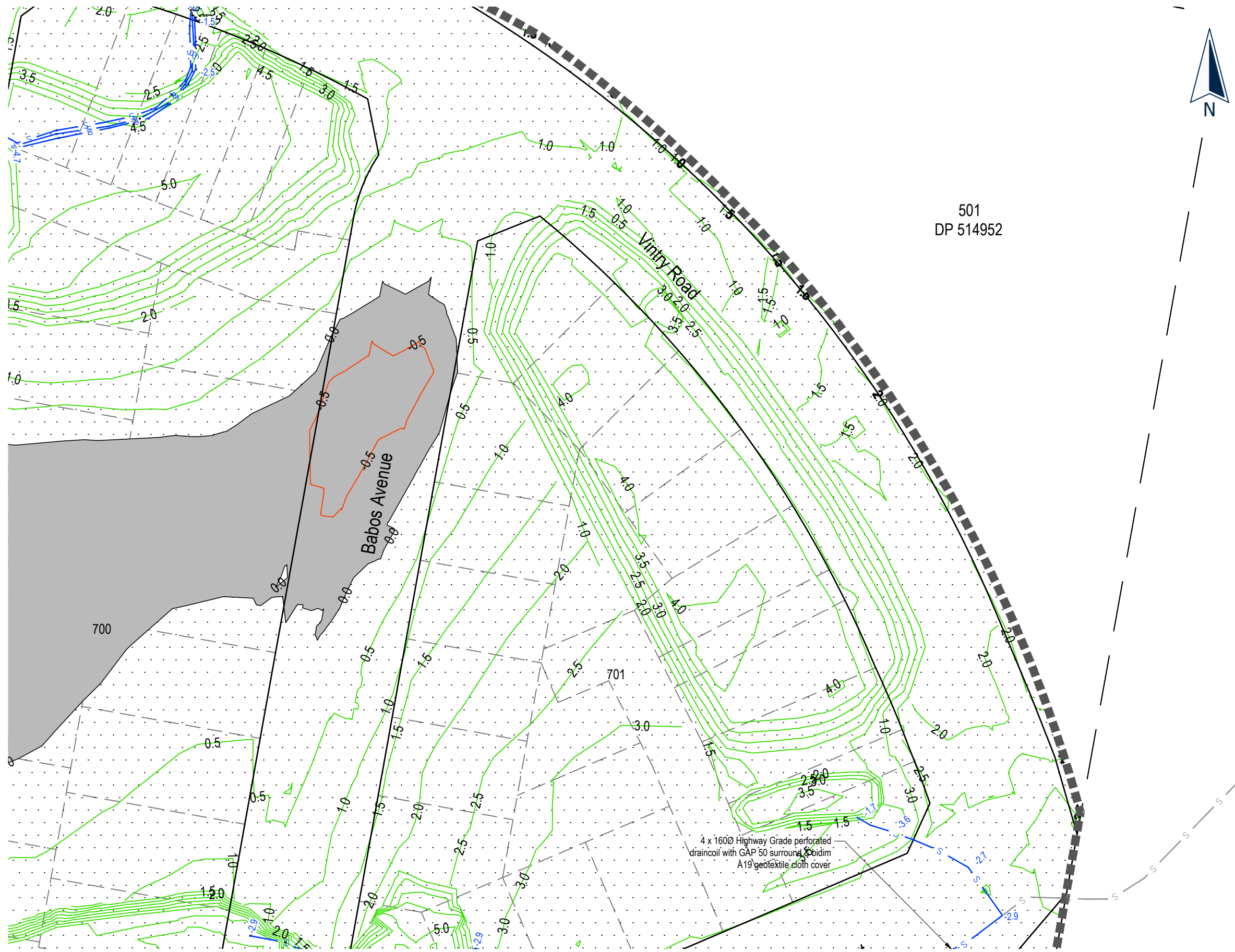
Cabra Developments Limited
73 Nobile Road,
Huapai

Cut to Fill
As Built Plan
Sheet 2

No.	REVISION (DESCRIPTIONS)	NAME	DATE
0	Issued For Completion	K.McPherson	02/02/2022
1	General Plan Amendments	K.McPherson	18/02/2022
2	Cut to Fill Contours Updated	K.McPherson	28/02/2022
3	Added Subsoil Drainage Depths	K.McPherson	01/03/2022

FOR COMPLETION

		NAME	DATE
SURVEYED		H.Baker	18/01/2022
DESIGNED		D. Luton	01/01/2018
DRAWN		B.Nel	24/01/2022
DATE	ORIGINAL SCALE	ORIGINAL SIZE	
24/01/2022	1:500	A3	
DRAWING NO.			REVISION
41201-DR-SU-9011			3



Cut / Fill Legend

1.0

0 Contour

-1.0

Cut Contours & Area

0.5

Fill Contours & Area


0.40

Subsoil Drainage (1500) with depth

Extent Earthworks

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Date: 01/03/2022

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ENG60317653 / SUB60036097-A

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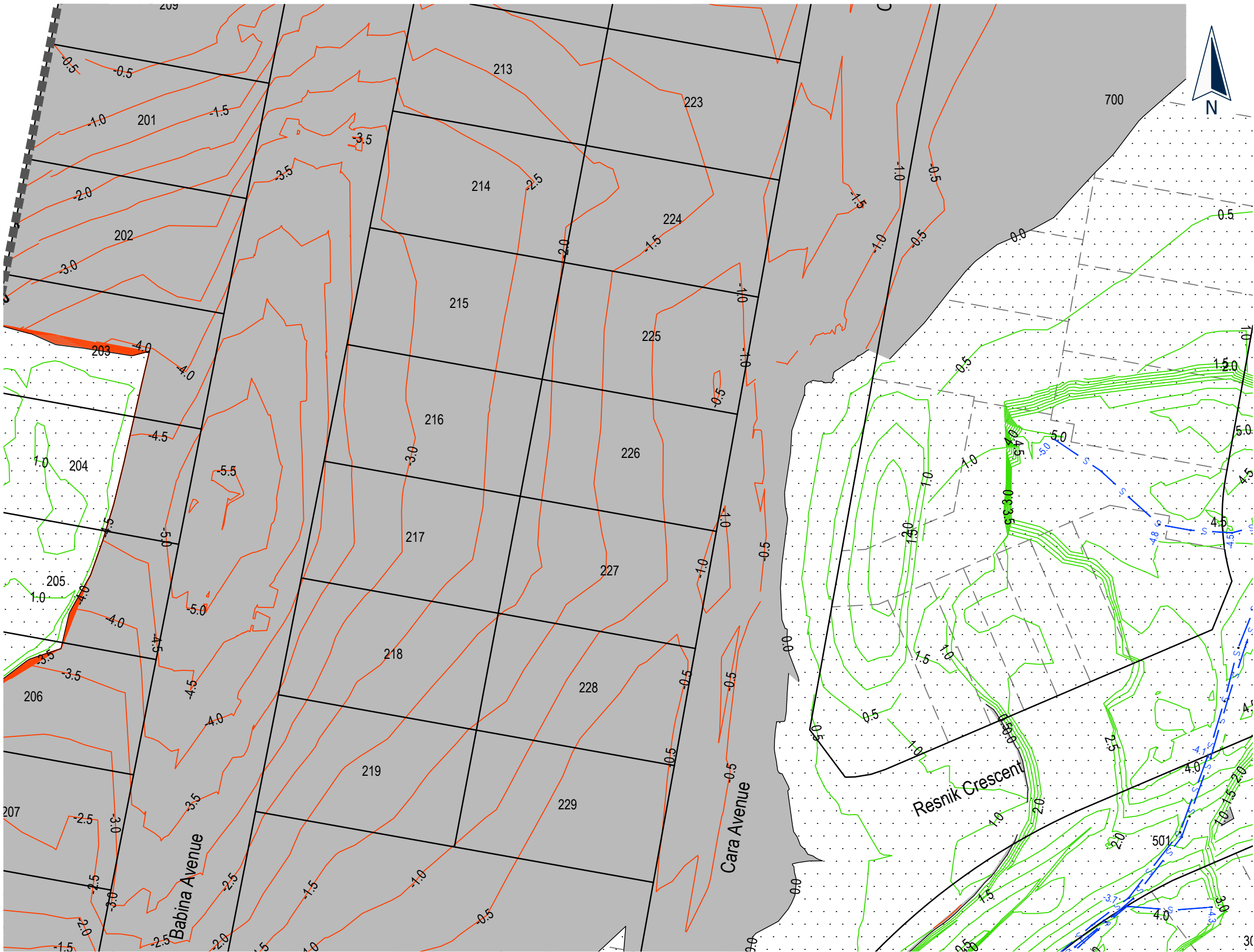
Cabra Developments Limited
73 Nobile Road,
Huapai

Cut to Fill
As Built Plan
Sheet 3

No.	REVISION (DESCRIPTIONS)	NAME	DATE
0	Issued For Completion	K.McPherson	02/02/2022
1	General Plan Amendments	K.McPherson	18/02/2022
2	Cut to Fill Contours Updated	K.McPherson	28/02/2022
3	Added Subsoil Drainage Depths	K.McPherson	01/03/2022

FOR COMPLETION

		NAME	DATE
SURVEYED		H.Baker	18/01/2022
DESIGNED		D. Luton	01/01/2018
DRAWN		B.Nel	24/01/2022
DATE	ORIGINAL SCALE	ORIGINAL SIZE	
24/01/2022	1:500	A3	
DRAWING NO.			REVISION
41201-DR-SU-9012			3



Cut / Fill Legend

1.0

0 Contour

-1.0

Cut Contours & Area

0.5

Fill Contours & Area

0.40

Subsoil Drainage (1500)
with depth

Extent Earthworks

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Date: 01/03/2022

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Email : kerrynm@catobolam.co.nz

ENG60317653 / SUB60036097-A

C:\12d\Synergy\data\CATOAPP\141201 - Cabra 73 Nobile Road - Phase 2_21498\Drawgs\As-builts\41201-DR-SU-9010-9015 - Cut to Fill As Built

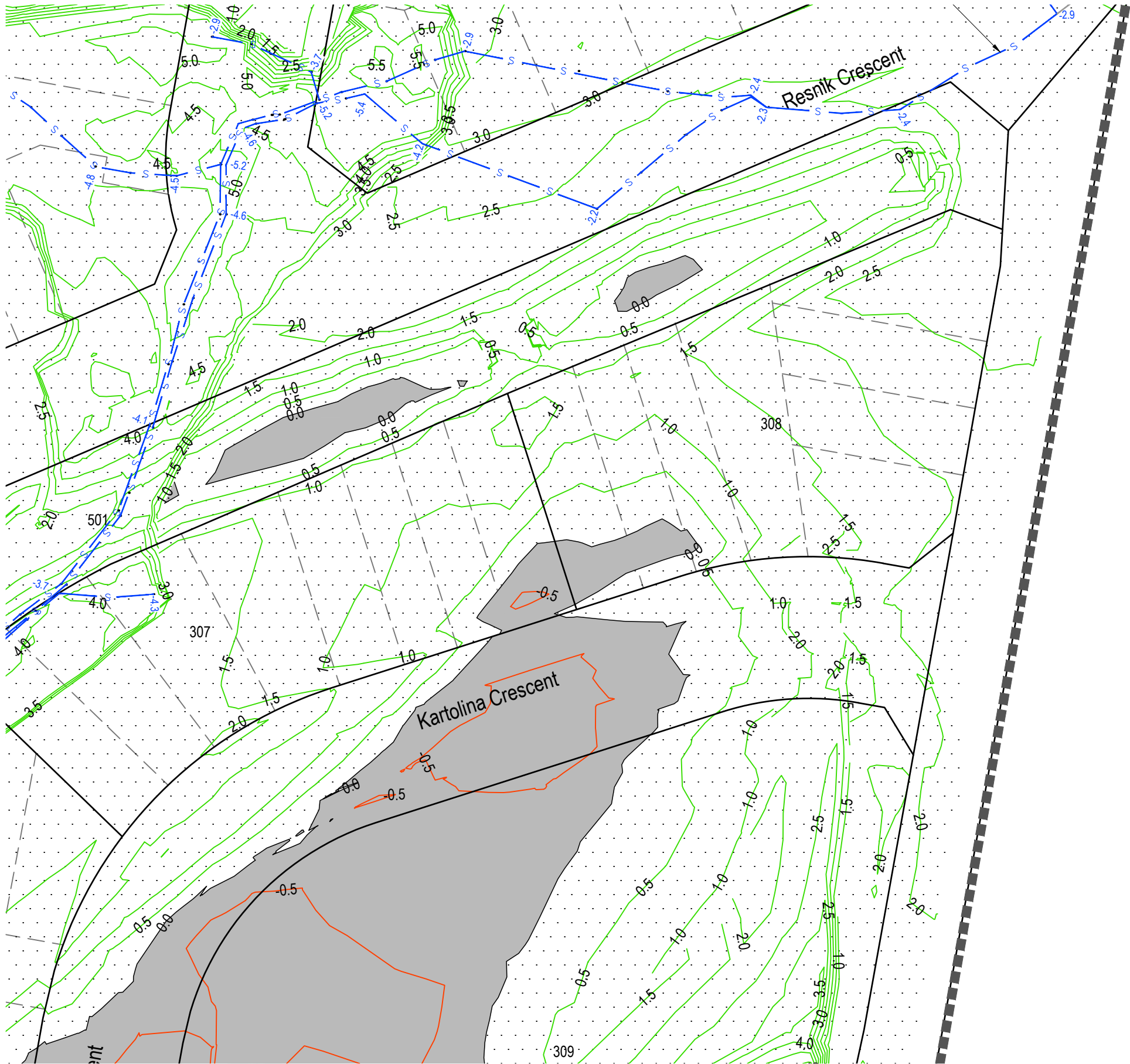
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0	Issued For Completion	K.McPherson	02/02/2022
1	General Plan Amendments	K.McPherson	18/02/2022
2	Cut to Fill Contours Updated	K.McPherson	28/02/2022
3	Added Subsoil Drainage Depths	K.McPherson	01/03/2022

FOR COMPLETION

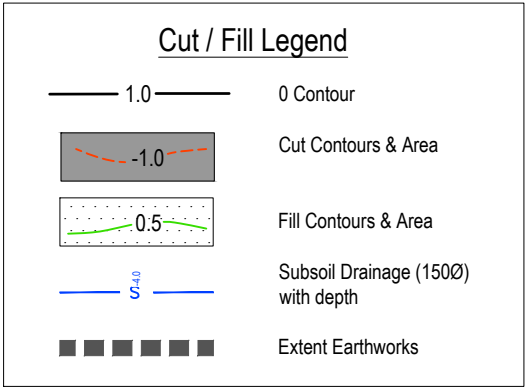
		NAME	DATE
SURVEYED		H.Baker	18/01/2022
DESIGNED		D. Luton	01/01/2018
DRAWN		B.Nel	24/01/2022

DATE	ORIGINAL SCALE	ORIGINAL SIZE
24/01/2022	1:500	A3

DRAWING NO.	REVISION
41201-DR-SU-9013	3




86
DP 522391



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- * The levels (Z) are in terms of the Auckland 1946 (MSL) LINZ datum (DOSLI datum), and are within $\pm 10\text{mm}$.

Signed: 
Registered Professional Surveyor

Date: 01/03/2022

Name: Kerryn McPherson
Phone : (09) 427 0072
Email : kerrynm@catobolam.co.nz

ENG60317653 / SUB60036097-A

C:\12d\Synergy\data\CATOAPP\141201 - Cabra 73 Nobile Road - Phase 2_21498\Drawgs\As-built\41201-DR-SU-9010-9015 - Cut to Fill As Built

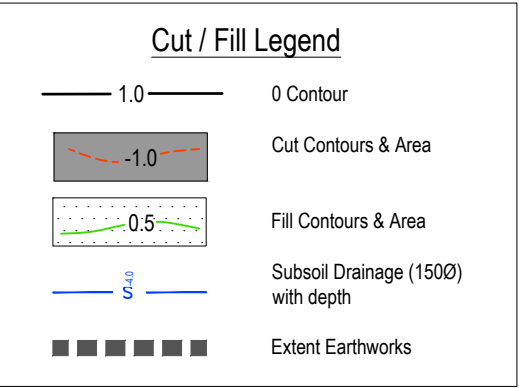
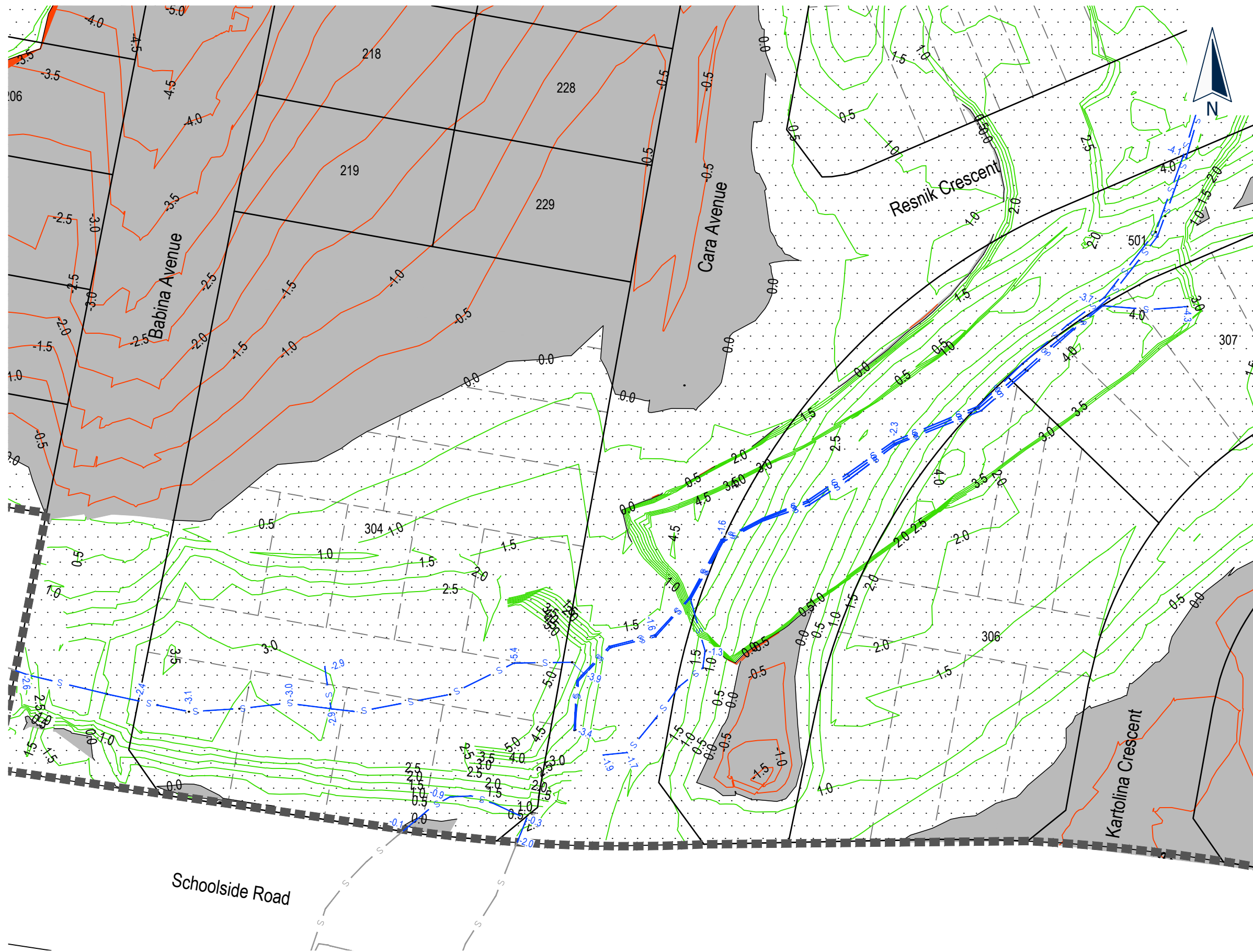
No.	REVISION (DESCRIPTIONS)	NAME	DATE
0	Issued For Completion	K.McPherson	02/02/2022
1	General Plan Amendments	K.McPherson	18/02/2022
2	Cut to Fill Contours Updated	K.McPherson	28/02/2022
3	Added Subsoil Drainage Depths	K.McPherson	01/03/2022

FOR COMPLETION

	NAME	DATE
SURVEYED	H.Baker	18/01/2022
DESIGNED	D. Luton	01/01/2018
DRAWN	B.Nel	24/01/2022

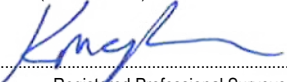
DATE	ORIGINAL SCALE	ORIGINAL SIZE
24/01/2022	1:500	A3

DRAWING NO.	REVISION
41201-DR-SU-9014	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 $\pm 50\text{mm}$.
- * The levels (Z) are in terms of the Auckland 1946 (MSL) LINZ datum (DOSLI datum), and are within $\pm 10\text{mm}$.

Signed: 
Registered Professional Surveyor

Date: 01/03/2022

Name: Kerryn McPherson
Phone : (09) 427 0072
Email : kerrynm@catobolam.co.nz

ENG60317653 / SUB60036097-A

C:\12d\Synergy\data\CATOAPP\141201 - Cabra 73 Nobile Road - Phase 2_21498\Drawgs\As-builts\41201-DR-SU-9010-9015 - Cut to Fill As Built

No.	REVISION (DESCRIPTIONS)	NAME	DATE
0	Issued For Completion	K.McPherson	02/02/2022
1	General Plan Amendments	K.McPherson	18/02/2022
2	Cut to Fill Contours Updated	K.McPherson	28/02/2022
3	Added Subsoil Drainage Depths	K.McPherson	01/03/2022

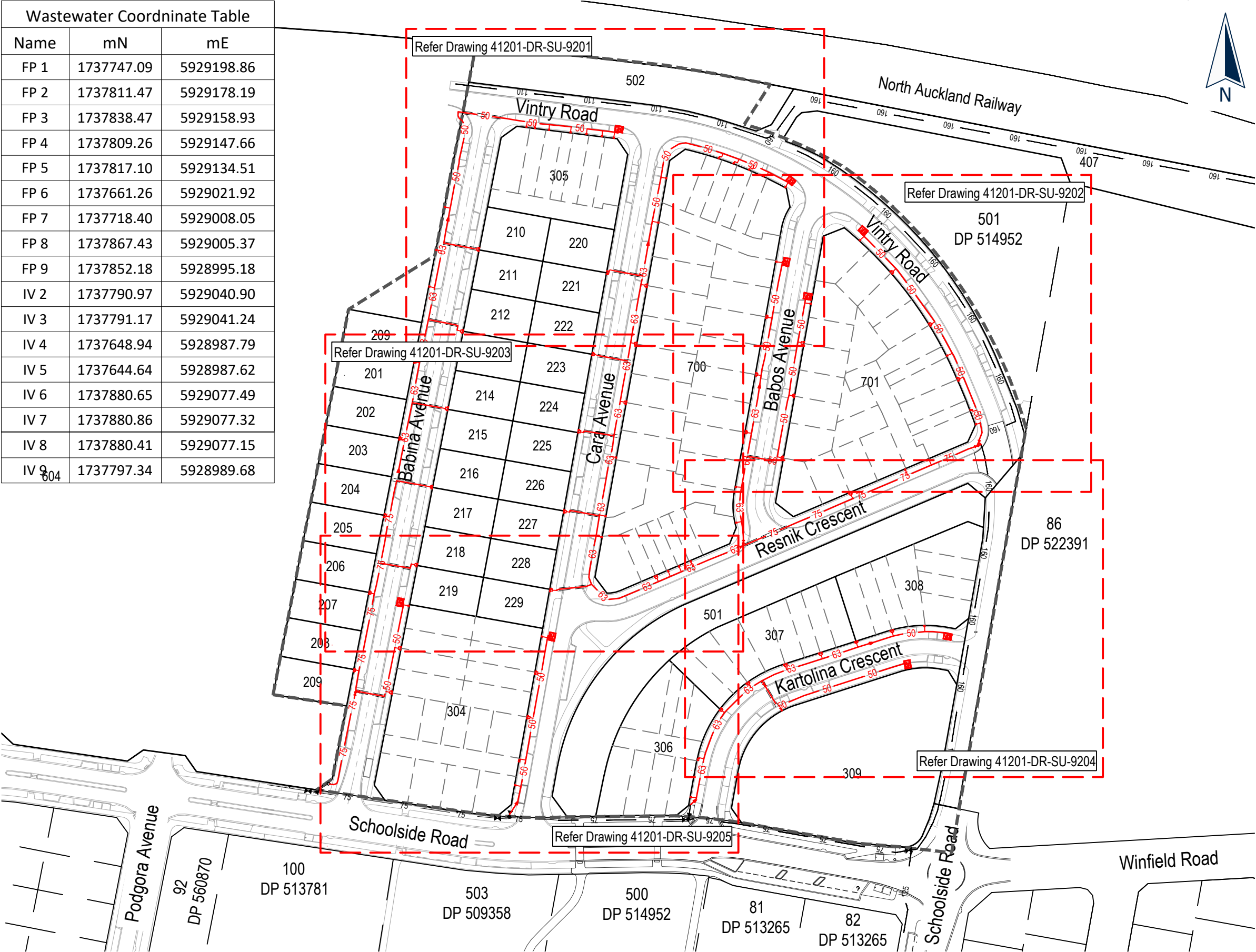
FOR COMPLETION

	NAME	DATE
SURVEYED	H.Baker	18/01/2022
DESIGNED	D. Luton	01/01/2018
DRAWN	B.Nel	24/01/2022

DATE	ORIGINAL SCALE	ORIGINAL SIZE
24/01/2022	1:500	A3

DRAWING NO.	REVISION
41201-DR-SU-9015	3

Wastewater Coordinate Table		
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FP 2	1737811.47	5929178.19
FP 3	1737838.47	5929158.93
FP 4	1737809.26	5929147.66
FP 5	1737817.10	5929134.51
FP 6	1737661.26	5929021.92
FP 7	1737718.40	5929008.05
FP 8	1737867.43	5929005.37
FP 9	1737852.18	5928995.18
IV 2	1737790.97	5929040.90
IV 3	1737791.17	5929041.24
IV 4	1737648.94	5928987.79
IV 5	1737644.64	5928987.62
IV 6	1737880.65	5929077.49
IV 7	1737880.86	5929077.32
IV 8	1737880.41	5929077.15
IV 9	1737797.34	5928989.68



Legend - Wastewater As Built

Existing

New - Constructed under Stage 1B

90

110

PWC Sewer

40

50

63

Isolation Valve

Reducer

Flushing Pit

Boundary Kit

Extent of Works

Isolation Valve

Reducer

Flushing Pit

Boundary Kit

Extent of Works

NOTES
GENERAL

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

WASTEWATER RETICULATION

- Cover for wastewater reticulation.
 - Mains under grass berms and footpaths 600mm
 - Mains under road carriageway 900mm
- Wastewatermain 75, 63, 50 & 400D - PE100 PN16
- Stainless Steel bolts and nuts used for flanged connections.
- Metallic Detector Tape provided above all wastewatermains and ridermains

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 ± 10mm.

Signed:  Registered Professional Surveyor

Date: 28/02/2022

Name: Kerryn McPherson
Phone : (09) 427 0072
Email : kerrynm@catobolam.co.nz

ENG60317653 / SUB60036097-A

C:\12d\Synergy\Workspace\data\CATOAPP\141201 - Cabra 73 Nobile Road - Phase 2_21499\Drawgs\As-builts\41201-DR-SU-9200-9205 - Wastewater As Built

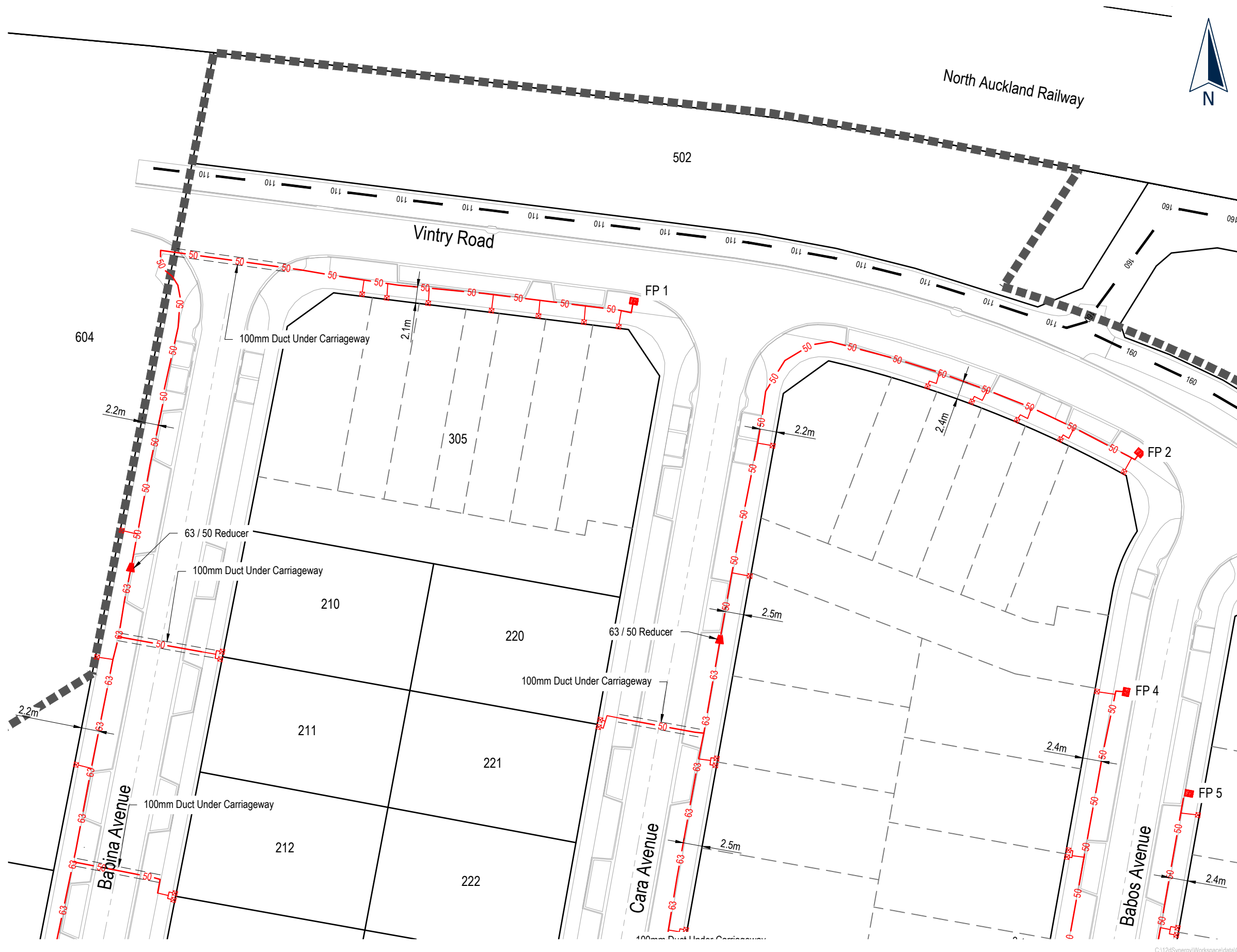
No.	REVISION (DESCRIPTIONS)	NAME	DATE
0	Issued For Completion	K.McPherson	02/02/2022
1	General Plan Amendments	K.McPherson	18/02/2022
2	Updated - Issued For Completion	K.McPherson	28/02/2022

FOR COMPLETION

	NAME	DATE
SURVEYED	H.Baker	18/01/2022
DESIGNED	D.Luton	01/01/2018
DRAWN	B.Nel	24/01/2022

DATE	ORIGINAL SCALE	ORIGINAL SIZE
24/01/2022	1:1500	A3

DRAWING NO.	REVISION
41201-DR-SU-9200	2



Legend - Wastewater As Built

Existing	New - Constructed under Stage 1B
90 110	PWC Sewer 40 50 63
	Isolation Valve
	Reducer
	Flushing Pit
	Boundary Kit
	Extent of Works

NOTES

Refer Drawing 41201-DR-SU-9200 For Wastewater Coordinate Table

NOTES

GENERAL

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

WASTEWATER RETICULATION

- Cover for wastewater reticulation.
 - Mains under grass berms and footpaths 600mm
 - Mains under road carriageway 900mm
- Wastewatermain 75, 63, 50 & 400D - PE100 PN16
- Stainless Steel bolts and nuts used for flanged connections.
- Metallic Detector Tape provided above all wastewatermains and ridermains

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Signed: Registered Professional Surveyor

Date: 28/02/2022

Name: Kerryn McPherson
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Email : kerrynm@catoBolam.co.nz

ENG60317653 / SUB60036097-A

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Cabra Developments Limited
73 Nobile Road,
Huapai

PWC Sewer
As Built Plan
Sheet 2

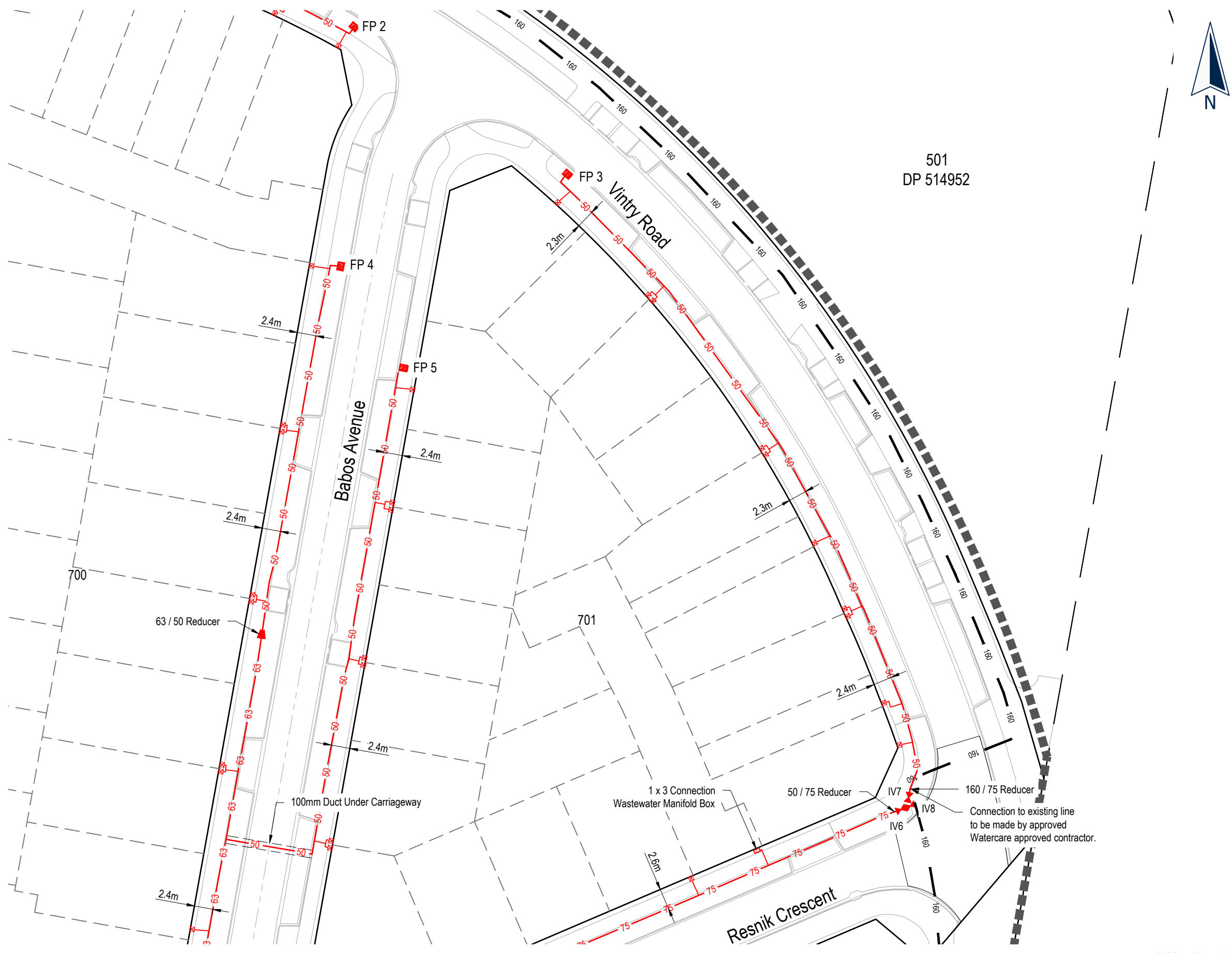
No.	REVISION (DESCRIPTIONS)	NAME	DATE
0	Issued For Completion	K.McPherson	02/02/2022
1	General Plan Amendments	K.McPherson	18/02/2022
2	Updated - Issued For Completion	K.McPherson	28/02/2022

FOR COMPLETION

	NAME	DATE
SURVEYED	H.Baker	18/01/2022
DESIGNED	D.Luton	01/01/2018
DRAWN	B.Nel	24/01/2022

DATE	ORIGINAL SCALE	ORIGINAL SIZE
24/01/2022	1:500	A3

DRAWING NO.	REVISION
41201-DR-SU-9201	2



Legend - Wastewater As Built

Existing

New - Constructed under Stage 1B

90

110

PWC Sewer

40

50

63

IV

Isolation Valve

R

Reducer

FP

Flushing Pit

BK

Boundary Kit

EW

Extent of Works

IV

Isolation Valve

R

Reducer

FP

Flushing Pit

BK

Boundary Kit

NOTES

Refer Drawing 41201-DR-SU-9200 For Wastewater Coordinate Table

- 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.

- WASTEWATER RETICULATION
1.

Cover for wastewater reticulation.
- a.

Mains under grass berms and footpaths 600mm
- b.

Mains under road carriageway 900mm
2.

Wastewatermain 75, 63, 50 & 400D - PE100 PN16
3.

Stainless Steel bolts and nuts used for flanged connections.
4.

Metallic Detector Tape provided above all wastewatermains and ridermains

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 ± 10mm.

Signed: _____

Registered Professional Surveyor

Date: 28/02/2022

Name: Kerryn McPherson

Phone : (09) 427 0072

Email : kerrynm@catobolam.co.nz

ENG60317653 / SUB60036097-A

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Cabra Developments Limited

73 Nobile Road,
Huapai

PWC Sewer

As Built Plan

Sheet 3

No.	REVISION (DESCRIPTIONS)	NAME	DATE
0	Issued For Completion	K.McPherson	02/02/2022
1	General Plan Amendments	K.McPherson	18/02/2022
2	Updated - Issued For Completion	K.McPherson	28/02/2022

FOR COMPLETION

		NAME	DATE
SURVEYED		H.Baker	18/01/2022
DESIGNED		D.Luton	01/01/2018
DRAWN		B.Nel	24/01/2022
DATE	ORIGINAL SCALE	ORIGINAL SIZE	
24/01/2022	1:500	A3	
DRAWING NO.			REVISION
41201-DR-SU-9202			2



Legend - Wastewater As Built

Existing

New - Constructed under Stage 1B

90

110

PWC Sewer

40

50

63

Isolation Valve

Reducer

Flushing Pit

Boundary Kit

Extent of Works

NOTES

Refer Drawing 41201-DR-SU-9200 For Wastewater Coordinate Table

- NOTES
- GENERAL
- Levels are in terms of LINZ Datum 1946.
 - Coordinates are in terms of NZTM.
 - All infrastructure is public unless otherwise shown.

- WASTEWATER RETICULATION
- Cover for wastewater reticulation.
 - Mains under grass berms and footpaths 600mm
 - Mains under road carriageway 900mm
 - Wastewatermain 75, 63, 50 & 400D - PE100 PN16
 - Stainless Steel bolts and nuts used for flanged connections.
 - Metallic Detector Tape provided above all wastewatermains and ridermains

I certify that these As-Built Plans are an accurate record of the works undertaken and that:

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- The levels (Z) are in terms of the Auckland 1946 (MSL) LINZ datum (DOSLI datum), and are within ± 10mm.

Signed: 
Registered Professional Surveyor

Date: 28/02/2022

Name: Kerryn McPherson
Phone : (09) 427 0072
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ENG60317653 / SUB60036097-A



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Cabra Developments Limited
73 Nobile Road,
Huapai

PWC Sewer
As Built Plan
Sheet 4

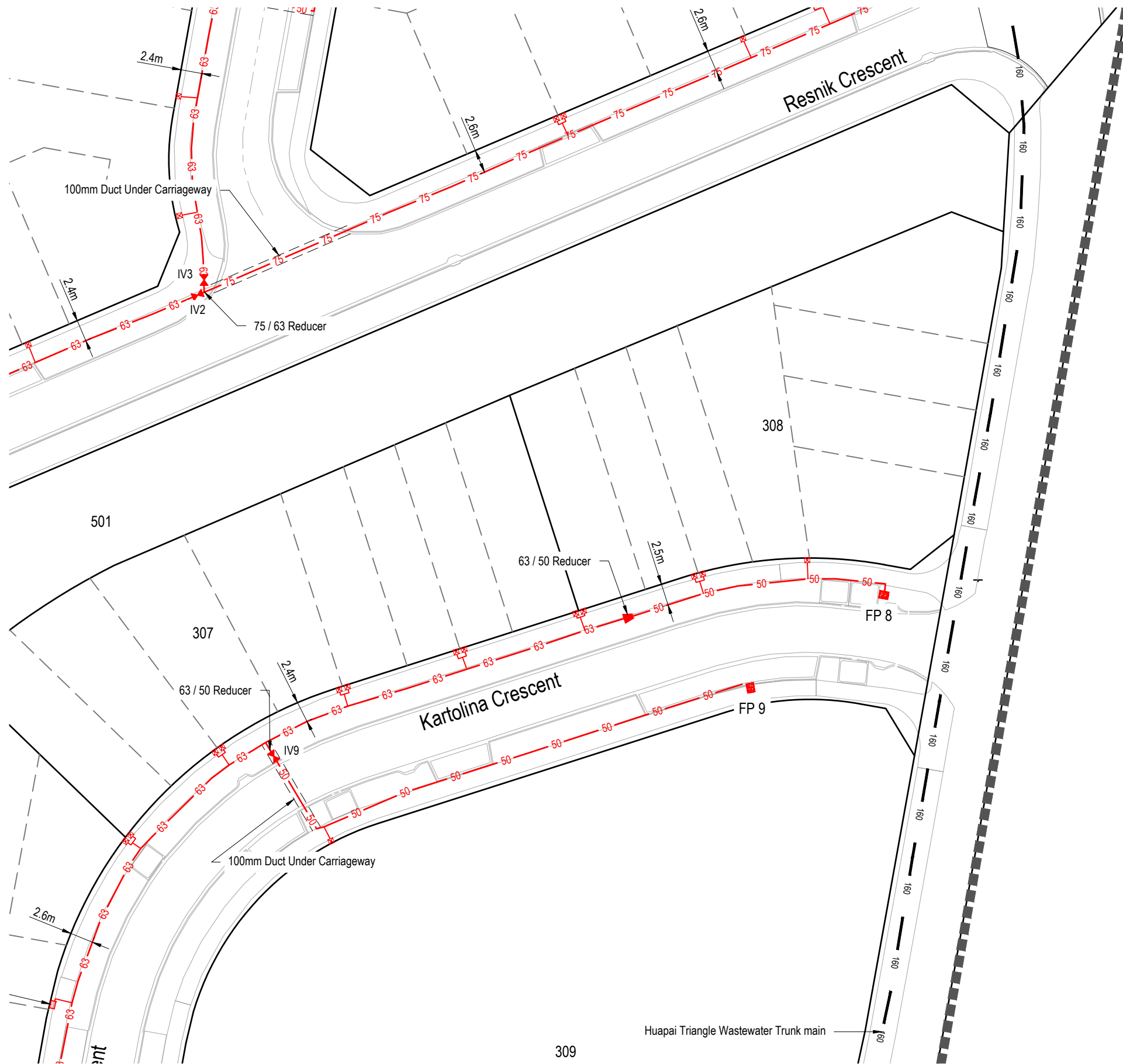
No.	REVISION (DESCRIPTIONS)	NAME	DATE
0	Issued For Completion	K.McPherson	02/02/2022
1	General Plan Amendments	K.McPherson	18/02/2022
2	Updated - Issued For Completion	K.McPherson	28/02/2022

FOR COMPLETION

	NAME	DATE
SURVEYED	H.Baker	18/01/2022
DESIGNED	D.Luton	01/01/2018
DRAWN	B.Nel	24/01/2022

DATE	ORIGINAL SCALE	ORIGINAL SIZE
24/01/2022	1:500	A3

DRAWING NO.	REVISION
41201-DR-SU-9203	2



86
DP 522391



Legend - Wastewater As Built

Existing	New - Constructed under Stage 1B
90	PWC Sewer
110	40
	50
	63
FP	FP
	Extent of Works

NOTES

Refer Drawing 41201-DR-SU-9200 For Wastewater Coordinate Table

NOTES GENERAL

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

WASTEWATER RETICULATION

- Cover for wastewater reticulation.
 - Mains under grass berms and footpaths 600mm
 - Mains under road carriageway 900mm
- Wastewatermain 75, 63, 50 & 400D - PE100 PN16
- Stainless Steel bolts and nuts used for flanged connections.
- Metallic Detector Tape provided above all wastewatermains and ridermains

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Date: 28/02/2022

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Cabra Developments Limited
73 Nobile Road,
Huapai

PWC Sewer
As Built Plan
Sheet 5

No.	REVISION (DESCRIPTIONS)	NAME	DATE
0	Issued For Completion	K.McPherson	02/02/2022
1	General Plan Amendments	K.McPherson	18/02/2022
2	Updated - Issued For Completion	K.McPherson	28/02/2022

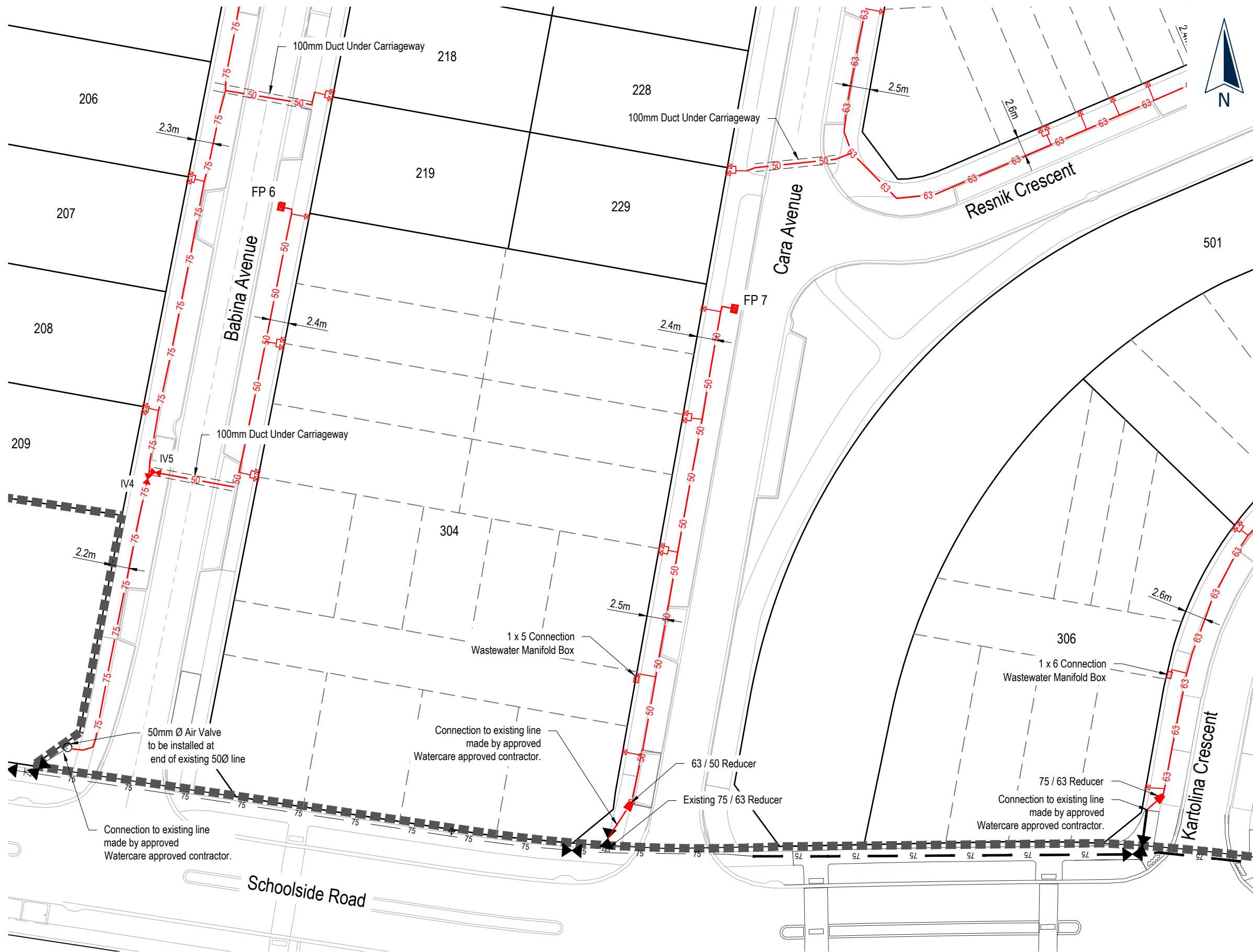
FOR COMPLETION

	NAME	DATE
SURVEYED	H.Baker	18/01/2022
DESIGNED	D.Luton	01/01/2018
DRAWN	B.Nel	24/01/2022

DATE	ORIGINAL SCALE	ORIGINAL SIZE
24/01/2022	1:500	A3

DRAWING NO.	REVISION
41201-DR-SU-9204	2

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Legend - Wastewater As Built

Existing

New - Constructed under Stage 1B

90

110

PWC Sewer

40

50

63

IV

Isolation Valve

R

Reducer

FP

Flushing Pit

BK

Boundary Kit

EW

Extent of Works

IV

Isolation Valve

R

Reducer

FP

Flushing Pit

BK

Boundary Kit

NOTES

Refer Drawing 41201-DR-SU-9200 For Wastewater Coordinate Table

- 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.
- WASTEWATER RETICULATION
1.

Cover for wastewater reticulation.
- a.

Mains under grass berms and footpaths 600mm
- b.

Mains under road carriageway 900mm
2.

Wastewatermain 75, 63, 50 & 400D - PE100 PN16
3.

Stainless Steel bolts and nuts used for flanged connections.
4.

Metallic Detector Tape provided above all wastewatermains and ridermains
- 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.
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Signed: _____

Registered Professional Surveyor

Date: 28/02/2022

Name: Kerryn McPherson

Phone : (09) 427 0072

Email : kerrynm@catoBolam.co.nz

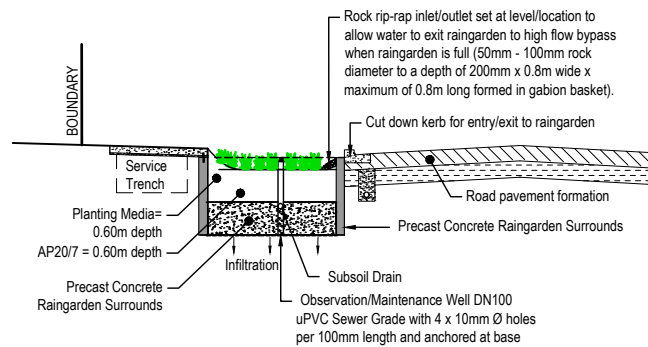
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No.	REVISION (DESCRIPTIONS)	NAME	DATE
0	Issued For Completion	K.McPherson	02/02/2022
1	General Plan Amendments	K.McPherson	18/02/2022
2	Updated - Issued For Completion	K.McPherson	28/02/2022

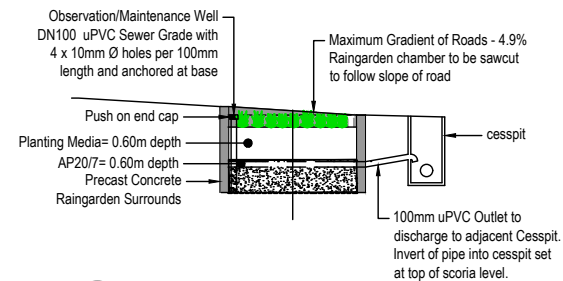
FOR COMPLETION

SURVEYED	NAME	DATE
DESIGNED	H.Baker	18/01/2022
DRAWN	D.Luton	01/01/2018
DATE	B.Nel	24/01/2022
24/01/2022	ORIGINAL SCALE	ORIGINAL SIZE
	1:500	A3
DRAWING NO.	41201-DR-SU-9205	REVISION
		2



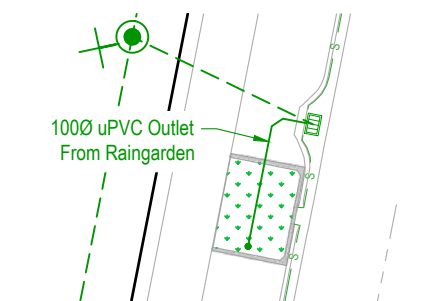
1 Raingarden Cross Section

N.T.S



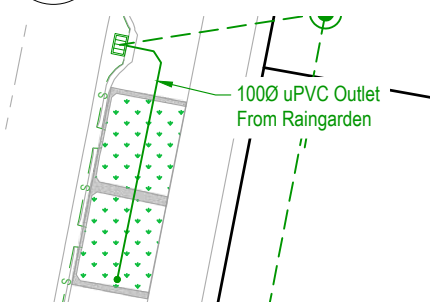
2 Raingarden Long Section

N.T.S



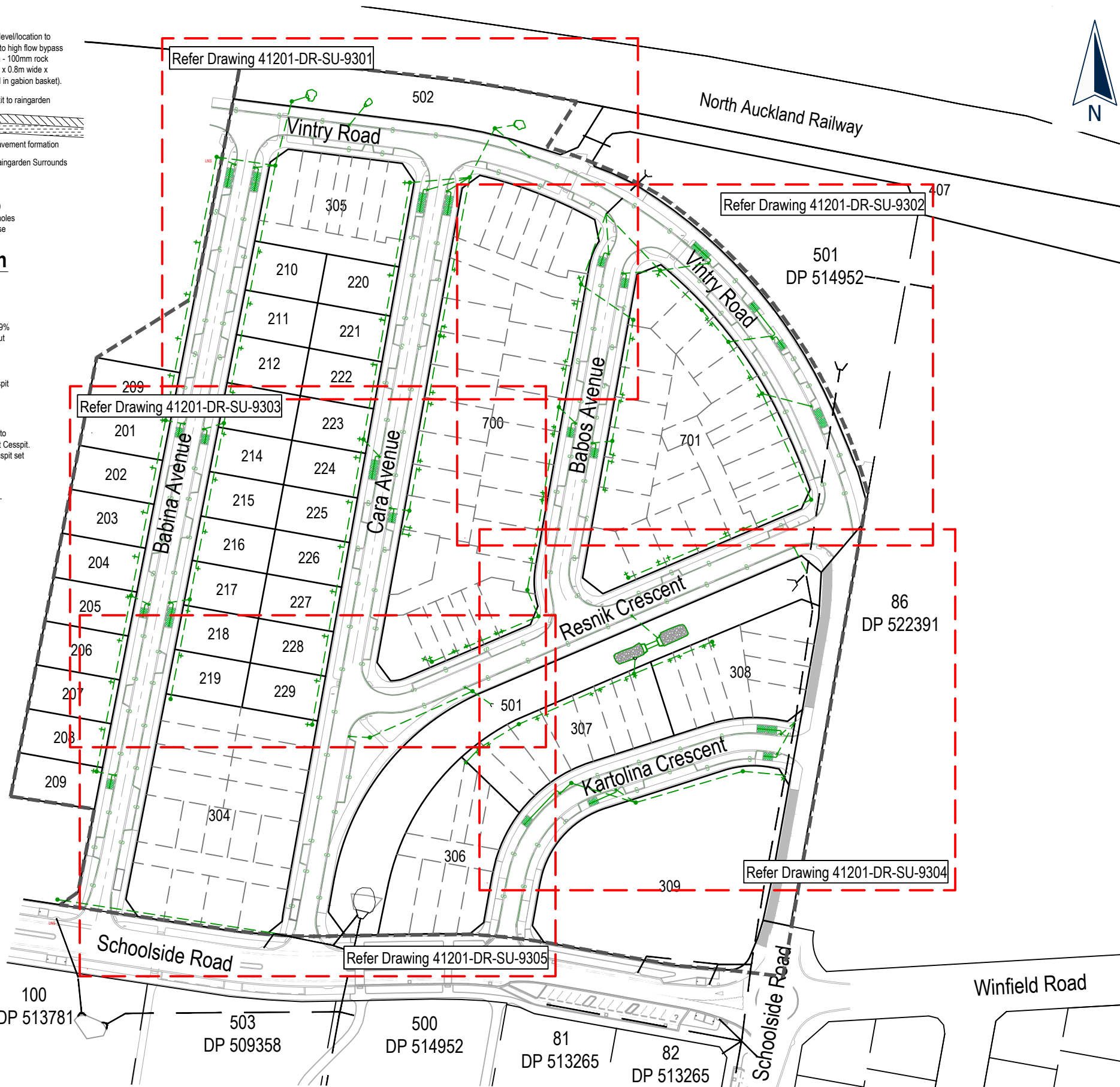
3 RG Connection (Single)

Scale 1:250



4 RG Connection (Double)

Scale 1:250



Drainage As Built Legend

Existing	New -As Constructed

NOTES

GENERAL

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

STORMWATER

- All pipes are Class 4 reinforced concrete rubber ring jointed (RCRRJ), unless otherwise shown.
- All manholes are 1050mmØ concrete flange base and riser, unless otherwise shown.
- Bedding is H2 type unless otherwise stated.
- All catchpits are 675mm x 450mm cycle friendly grate lids semi recessed unless otherwise shown.
- For house connection boundary offsets, see Sheet 9303.
- House connections 100Ø uPVC SN16
- All Private retaining wall outlets are 100uPVC SN16 unless otherwise shown.

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 ± 10mm.

Signed: Registered Professional Surveyor

Date: 28/02/2022

Name: Kerry McPherson
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Email : kerrym@catobolam.co.nz

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Cabra Developments Limited
73 Nobile Road,
Huapai

Stormwater
As Built Plan
Sheet 1

No.	REVISION (DESCRIPTIONS)	NAME	DATE
0	Issued For Completion	K.McPherson	02/02/2022
1	Stormwater Rip Raps Updated	K.McPherson	11/02/2022
2	Updated - Issued For Completion	K.McPherson	28/02/2022

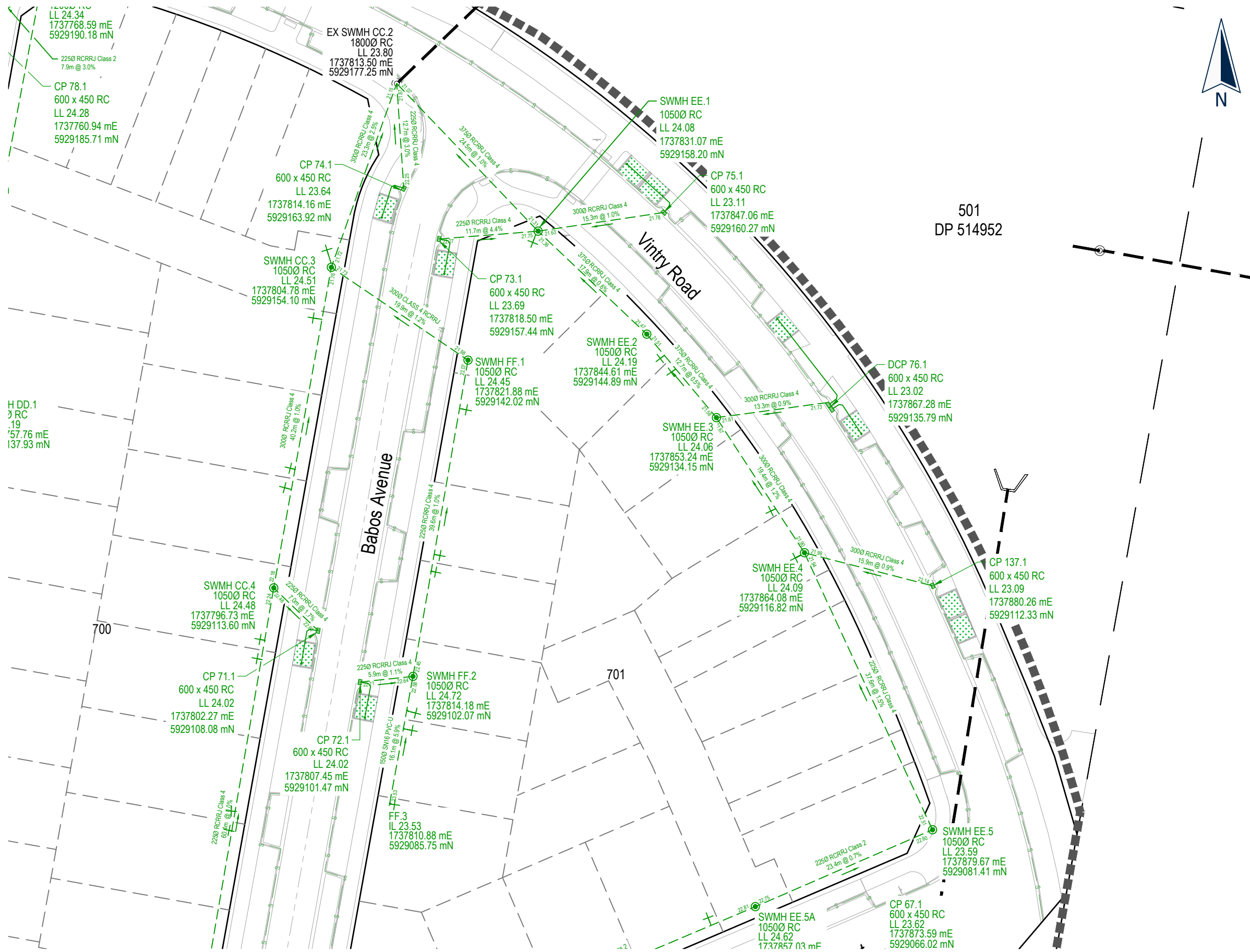
FOR COMPLETION

NAME	DATE
H.Baker	18/01/2022
D.Luton	01/01/2018
B.Nel	24/01/2022

DATE	ORIGINAL SCALE	ORIGINAL SIZE
24/01/2022	1:1500	A3

DRAWING NO.	REVISION
41201-DR-SU-9300	2

C:\12d\Synergy\Workspace\data\CATOAPP\41201 - Cabra 73 Nobile Road - Phase 2_21499\Drawgs\As-builts\41201-DR-SU-9300-9305 - Stormwater As Built



Drainage As Built Legend

Existing

New -As Constructed

Stormwater (Public)

Cesspit (Public)

Under Channel Drain

Rock Rip Rap

Rain Garden

Private 2700mm uPVC Syphoned catchpit with 1000 uPVC pipe

Lot connections 1000 uPVC unless otherwise shown

Extent of Works

Stormwater (Public)

Cesspit (Public)

Under Channel Drain

Rock Rip Rap

Rain Garden

Private 2700mm uPVC Syphoned catchpit with 1000 uPVC pipe

Lot connections 1000 uPVC unless otherwise shown

Extent of Works

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.

3.

Bedding is H2 type unless otherwise stated.

4.

All catchpits are 675mm x 450mm cycle friendly grate lids semi recessed unless otherwise shown.

5.

For house connection boundary offsets, see Sheet 9303.

6.

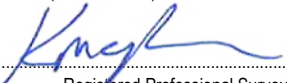
House connections 1000 uPVC SN16

7.

All Private retaining wall outlets are 100uPVC SN16 unless otherwise shown.

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 ± 10mm.

Signed: 
Registered Professional Surveyor

Date: 28/02/2022

Name: Kerryn McPherson
Phone : (09) 427 0072
Email : kerrynm@catobolam.co.nz

ENG60317653 / SUB60036097-A

C:\12d\Synergy\Workspace\data\CATOAPP\141201 - Cabra 73 Nobile Road - Phase 2_21499\Drawgs\As-builts\141201-DR-SU-9300-9305 - Stormwater As Built

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Cabra Developments Limited
73 Nobile Road,
Huapai

Stormwater
As Built Plan
Sheet 3

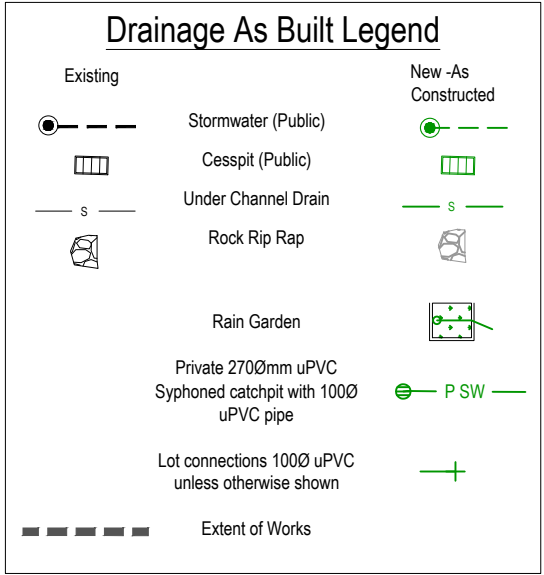
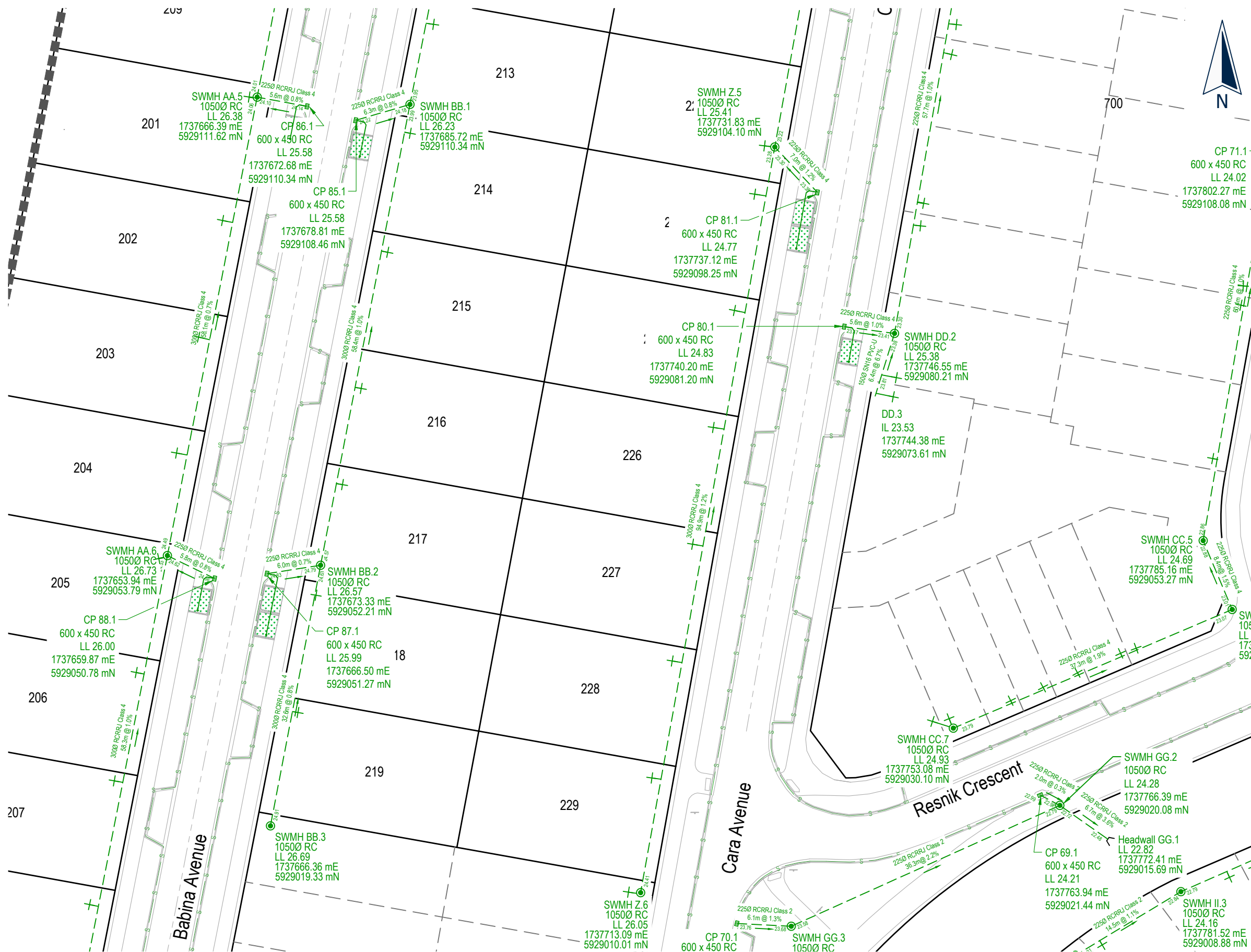
No.	REVISION (DESCRIPTIONS)	NAME	DATE
0	Issued For Completion	K.McPherson	02/02/2022
1	Stormwater Rip Raps Updated	K.McPherson	11/02/2022
2	Updated - Issued For Completion	K.McPherson	28/02/2022

FOR COMPLETION

	NAME	DATE
SURVEYED	H.Baker	18/01/2022
DESIGNED	D.Luton	01/01/2018
DRAWN	B.Nel	24/01/2022

DATE	ORIGINAL SCALE	ORIGINAL SIZE
24/01/2022	1:500	A3

DRAWING NO.	REVISION
41201-DR-SU-9302	1



- 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.
 3. Bedding is H2 type unless otherwise stated.
 4. All catchpits are 675mm x 450mm cycle friendly grate lids semi recessed unless otherwise shown.
 5. For house connection boundary offsets, see Sheet 9303.
 6. House connections 100Ø uPVC SN16
 7. All Private retaining wall outlets are 100uPVC SN16 unless otherwise shown.

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 ± 10mm.

Signed: 
Registered Professional Surveyor

Date: 28/02/2022

Name: Kerry McPherson
Phone : (09) 427 0072
Email : kerrym@catobolam.co.nz

ENG60317653 / SUB60036097-A

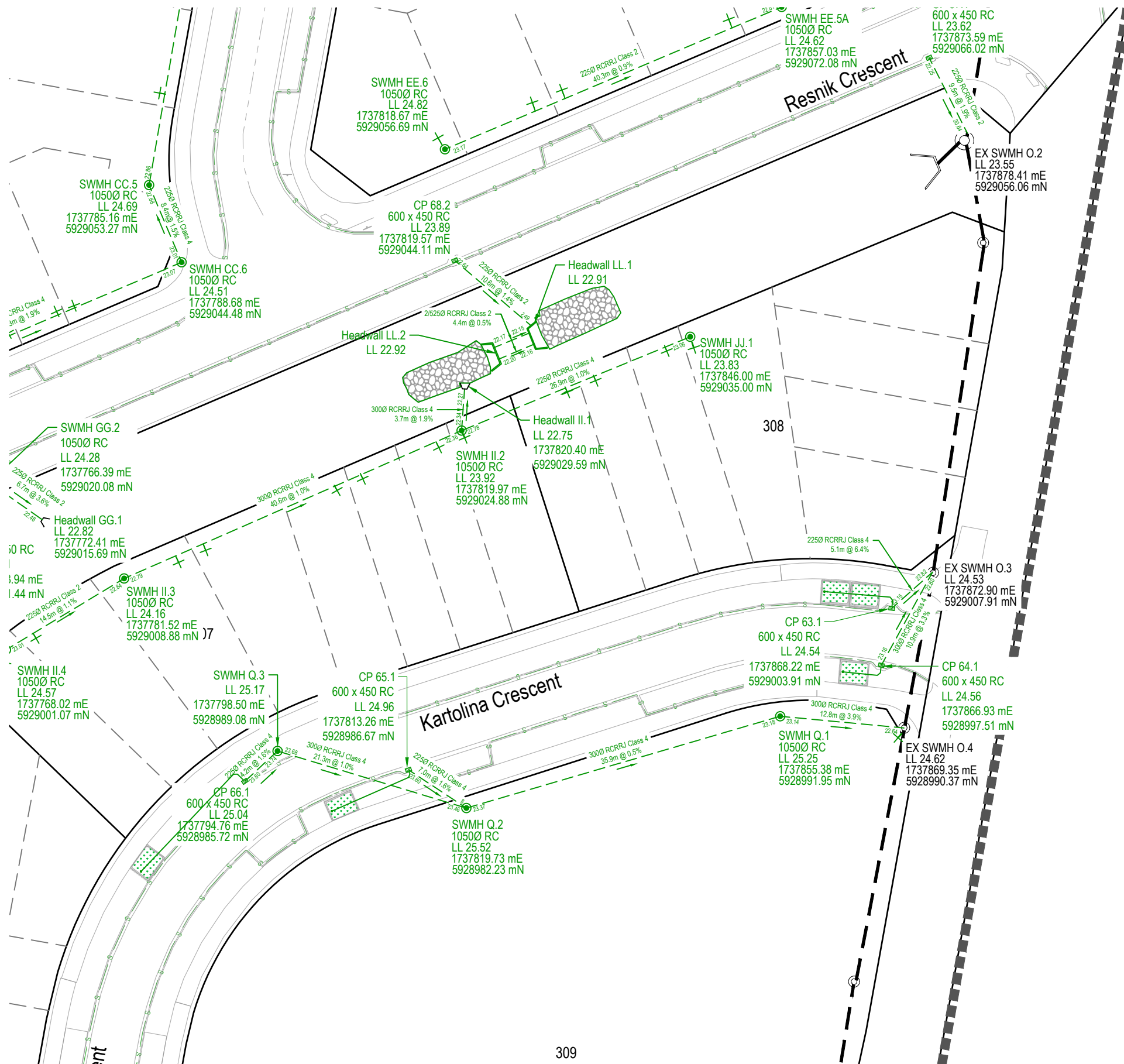
No.	REVISION (DESCRIPTIONS)	NAME	DATE
0	Issued For Completion	K.McPherson	02/02/2022
1	Stormwater Rip Raps Updated	K.McPherson	11/02/2022
2	Updated - Issued For Completion	K.McPherson	28/02/2022

FOR COMPLETION

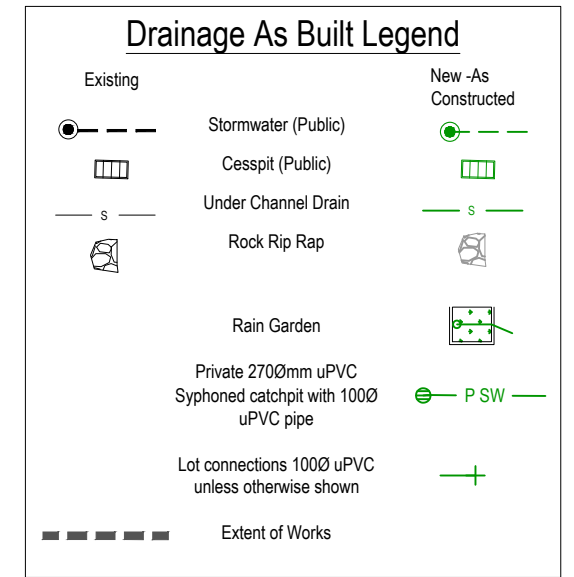
	NAME	DATE
SURVEYED	H.Baker	18/01/2022
DESIGNED	D.Luton	01/01/2018
DRAWN	B.Nel	24/01/2022

DATE	ORIGINAL SCALE	ORIGINAL SIZE
24/01/2022	1:500	A3

DRAWING NO.	REVISION
41201-DR-SU-9303	2



86
DP 522391



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.
3. Bedding is H2 type unless otherwise stated.
4. All catchpits are 675mm x 450mm cycle friendly grate lids semi recessed unless otherwise shown.
5. For house connection boundary offsets, see Sheet 9303.
6. House connections 100Ø uPVC SN16
7. All Private retaining wall outlets are 100uPVC SN16 unless otherwise shown.

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 ± 10mm.

Signed: Registered Professional Surveyor

Date: 28/02/2022

Name: Kerryn McPherson
Phone : (09) 427 0072
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Huapai

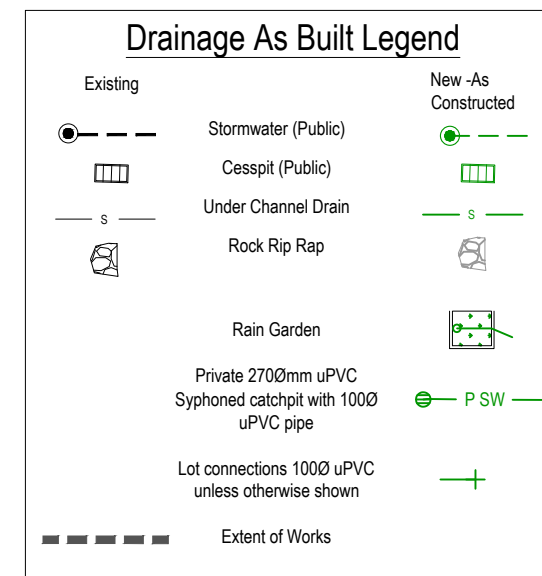
Stormwater
As Built Plan
Sheet 5

No.	REVISION (DESCRIPTIONS)	NAME	DATE
0	Issued For Completion	K.McPherson	02/02/2022
1	Stormwater Rip Raps Updated	K.McPherson	11/02/2022
2	Updated - Issued For Completion	K.McPherson	28/02/2022

FOR COMPLETION

		NAME	DATE
SURVEYED		H.Baker	18/01/2022
DESIGNED		D.Luton	01/01/2018
DRAWN		B.Nel	24/01/2022
DATE	ORIGINAL SCALE	ORIGINAL SIZE	
24/01/2022	1:500	A3	
DRAWING NO.			REVISION
41201-DR-SU-9304			2

C:\12d\Synergy\Workspace\data\CATOAPP\141201 - Cabra 73 Nobile Road - Phase 2_21499\Drawgs\As-builts\141201-DR-SU-9300-9305 - Stormwater As Built



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.
3. Bedding is H2 type unless otherwise stated.
4. All catchpits are 675mm x 450mm cycle friendly grate lids semi recessed unless otherwise shown.
5. For house connection boundary offsets, see Sheet 9303.
6. House connections 100Ø uPVC SN16
7. All Private retaining wall outlets are 100uPVC SN16 unless otherwise shown.

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- * The levels (Z) are in terms of the Auckland 1946 (MSL) LINZ datum (DOSLI datum), and are within $\pm 10\text{mm}$.

Signed: _____
Registered Professional Surveyor

Date: 28/02/2022

Name: Kerryn McPherson
Phone : (09) 427 0072
Email : kerrynm@catobolam.co.nz

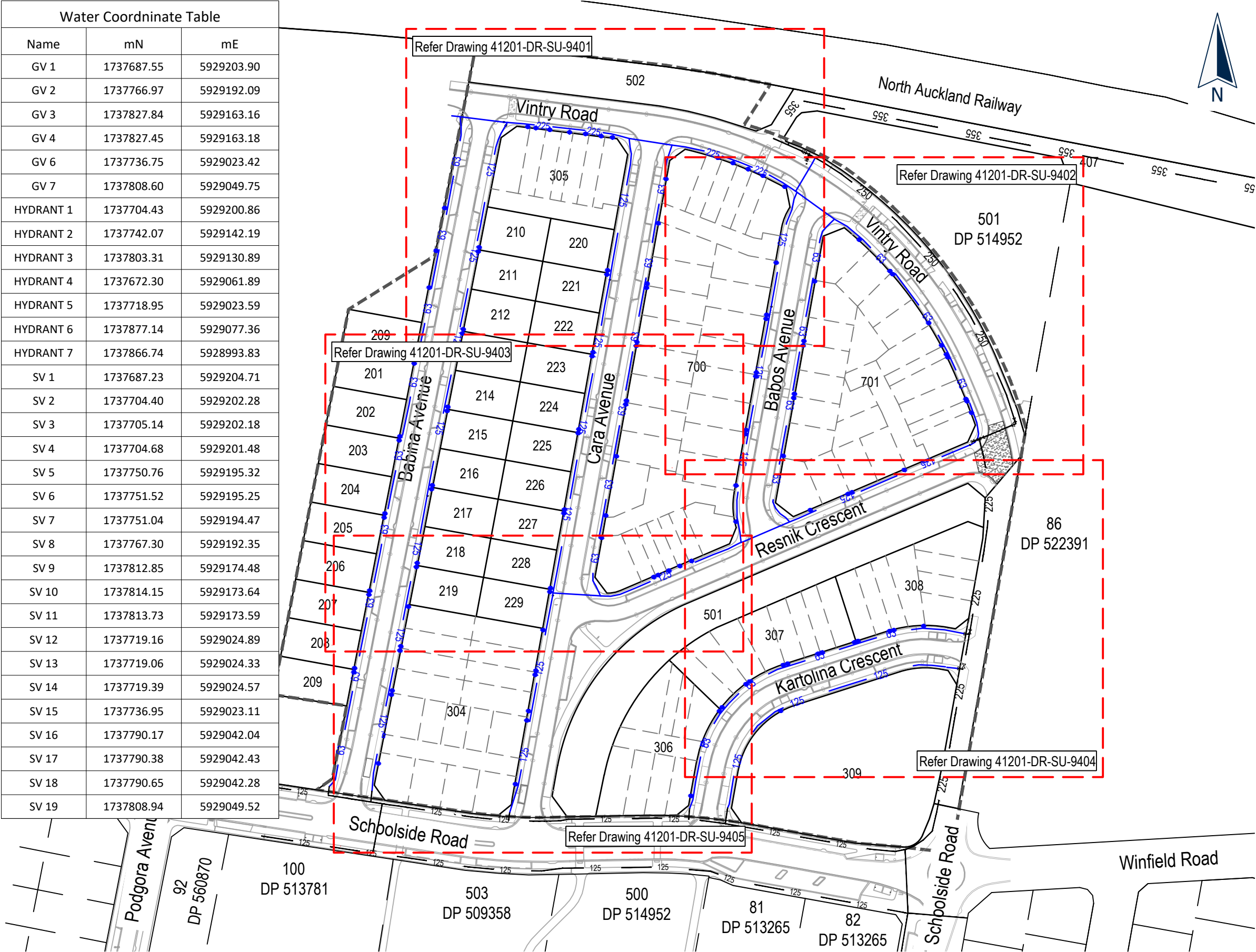
ENG60317653 / SUB60036097-A

No.	REVISION (DESCRIPTIONS)	NAME	DATE
0	Issued For Completion	K.McPherson	02/02/2017
1	Updated - Issued For Completion	K.McPherson	28/02/2017

FOR COMPLETION

		NAME	DATE
SURVEYED		H.Baker	18/01/2022
DESIGNED		D.Luton	01/01/2018
DRAWN		B.Nel	24/01/2022
DATE	ORIGINAL SCALE	ORIGINAL SIZE	
24/01/2022	1:1000	A3	
DRAWING NO.			REVISION
41201-DR-SU-9350			1

Water Coordinate Table		
Name	mN	mE
GV 1	1737687.55	5929203.90
GV 2	1737766.97	5929192.09
GV 3	1737827.84	5929163.16
GV 4	1737827.45	5929163.18
GV 6	1737736.75	5929023.42
GV 7	1737808.60	5929049.75
HYDRANT 1	1737704.43	5929200.86
HYDRANT 2	1737742.07	5929142.19
HYDRANT 3	1737803.31	5929130.89
HYDRANT 4	1737672.30	5929061.89
HYDRANT 5	1737718.95	5929023.59
HYDRANT 6	1737877.14	5929077.36
HYDRANT 7	1737866.74	5928993.83
SV 1	1737687.23	5929204.71
SV 2	1737704.40	5929202.28
SV 3	1737705.14	5929202.18
SV 4	1737704.68	5929201.48
SV 5	1737750.76	5929195.32
SV 6	1737751.52	5929195.25
SV 7	1737751.04	5929194.47
SV 8	1737767.30	5929192.35
SV 9	1737812.85	5929174.48
SV 10	1737814.15	5929173.64
SV 11	1737813.73	5929173.59
SV 12	1737719.16	5929024.89
SV 13	1737719.06	5929024.33
SV 14	1737719.39	5929024.57
SV 15	1737736.95	5929023.11
SV 16	1737790.17	5929042.04
SV 17	1737790.38	5929042.43
SV 18	1737790.65	5929042.28
SV 19	1737808.94	5929049.52




Water Reticulation Legend		
Existing		New
125	Watermain (Ø)	63
280		125
		225
Blank Cap		Blank Cap
Sluice Valve		Sluice Valve
Gate Valve		Gate Valve
25Ø house connection		25Ø house connection
Fire Hydrant		Fire Hydrant
Manifold		Manifold

- NOTES
- GENERAL
- Coordinates are in terms of NZTM 2000.
- WATER RETICULATION
- Cover for water reticulation.
a) Mains under grass berms and footpaths 600mm
b) Mains under road carriageway 900mm
 - Watermain 125, 180 & 225 OD - PE100 PN12.5
 - All rider mains 63 OD - PE80 PN12.5
 - Stainless Steel bolts and nuts used for flanged connections.
 - Metallic Detector Tape provided above all water mains and rider mains

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- * The levels (Z) are in terms of the Auckland 1946 (MSL) LINZ datum (DOSLI datum), and are within ± 10mm.

Signed:  Registered Professional Surveyor

Date: 28/02/2022

Name: Kerry McPherson
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Email : kerrym@catobolam.co.nz

ENG60317653 / SUB60036097-A

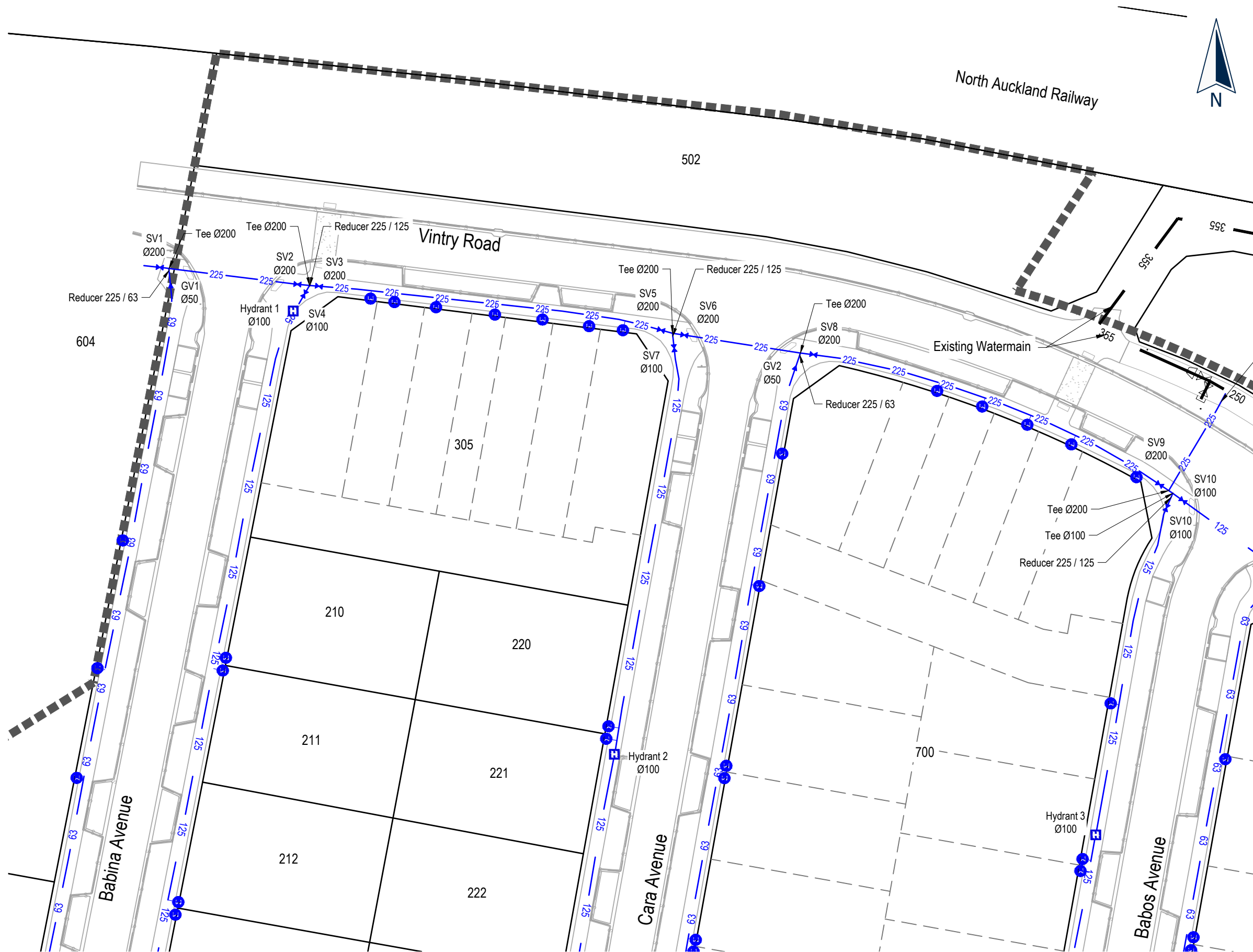
No.	REVISION (DESCRIPTIONS)	NAME	DATE
0	Issued For Completion	K.McPherson	02/02/2022
1	General Plan Amendments	K.McPherson	18/02/2022
2	Updated - Issued For Completion	K.McPherson	28/02/2022

FOR COMPLETION

	NAME	DATE
SURVEYED	H.Baker	18/01/2022
DESIGNED	D. Luton	01/01/2018
DRAWN	B.Nel	24/01/2022

DATE	ORIGINAL SCALE	ORIGINAL SIZE
24/01/2022	1:1500	A3

DRAWING NO.	REVISION
41201-DR-SU-9400	2



Water Reticulation Legend			
Existing		New	
	125		63
	280		125
			225
	Blank Cap		
	Sluice Valve		
	Gate Valve		
	250 house connection		
	Fire Hydrant		
	Manifold		

NOTES
Refer Drawing 41201-DR-SU-9400 For Water Coordinate Table

- NOTES
- GENERAL
- Coordinates are in terms of NZTM 2000.
- WATER RETICULATION
- Cover for water reticulation.
a) Mains under grass berms and footpaths 600mm
b) Mains under road carriageway 900mm
 - Watermain 125, 180 & 225 OD - PE100 PN12.5
 - All ridermains 63 OD - PE80 PN12.5
 - Stainless Steel bolts and nuts used for flanged connections.
 - Metallic Detector Tape provided above all watermains and ridermains

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Huapai

Water Reticulation
As-Built
Sheet 2

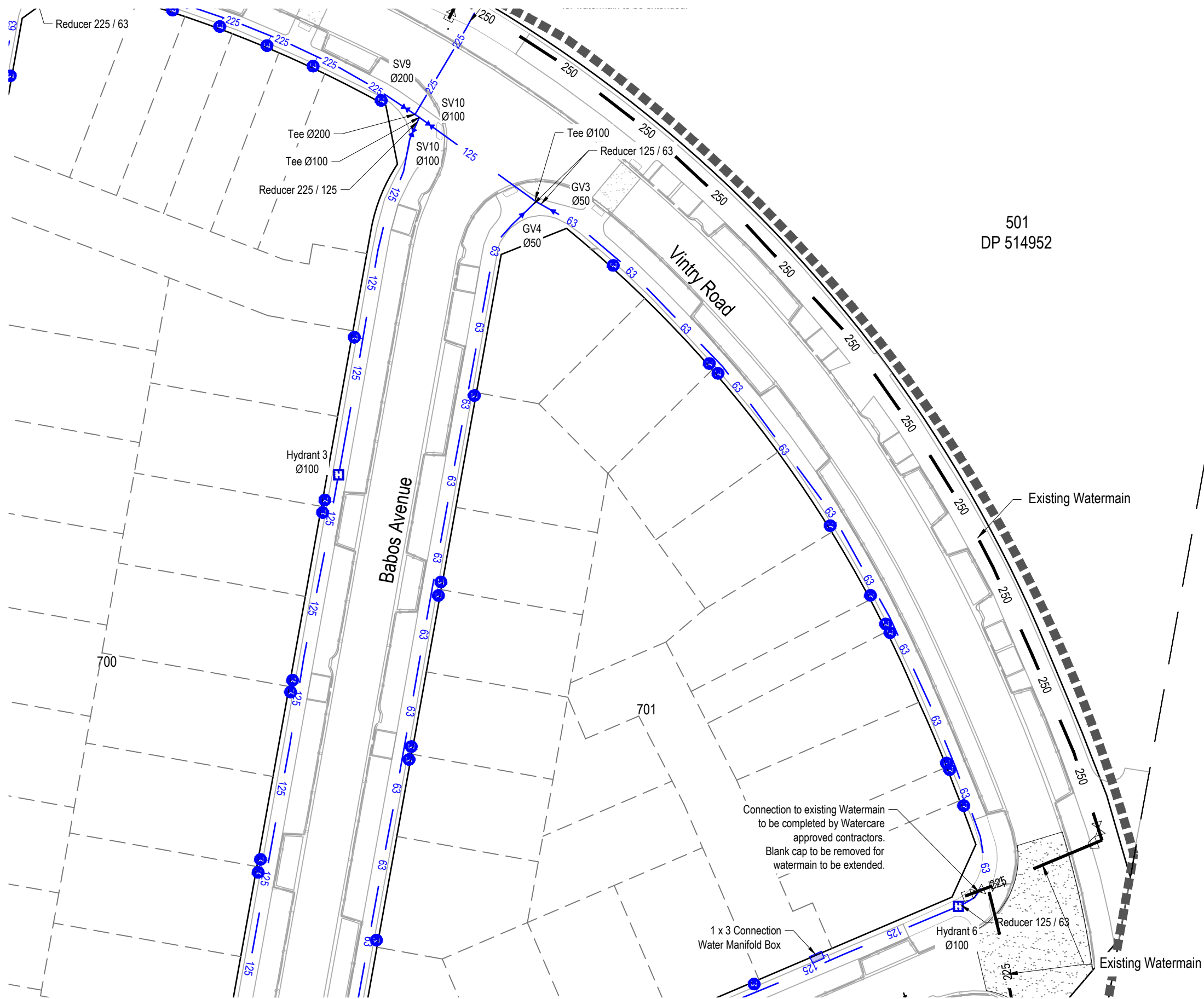
No.	REVISION (DESCRIPTIONS)	NAME	DATE
A	Issued For Completion	K.McPherson	02/02/2022
1	General Plan Amendments	K.McPherson	18/02/2022
2	Updated - Issued For Completion	K.McPherson	28/02/2022

FOR COMPLETION

	NAME	DATE
SURVEYED	H.Baker	18/01/2022
DESIGNED	D. Luton	01/01/2018
DRAWN	B.Nel	24/01/2022

DATE	ORIGINAL SCALE	ORIGINAL SIZE
24/01/2022	1:500	A3

DRAWING NO.	REVISION
41201-DR-SU-9401	2



Water Reticulation Legend			
Existing		New	
	125		63
	280		125
			225
	Blank Cap		
	Sluice Valve		
	Gate Valve		
	250 house connection		
	Fire Hydrant		
	Manifold		

NOTES

Refer Drawing 41201-DR-SU-9400 For Water Coordinate Table

NOTES

GENERAL

- Coordinates are in terms of NZTM 2000.

WATER RETICULATION

- Cover for water reticulation.
 - Mains under grass berms and footpaths 600mm
 - Mains under road carriageway 900mm
- Watermain 125, 180 & 225 OD - PE100 PN12.5
- All rider mains 63 OD - PE80 PN12.5
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ENG60317653 / SUB60036097-A

No.	REVISION (DESCRIPTIONS)	NAME	DATE
0	Issued For Completion	K.McPherson	02/02/2022
1	General Plan Amendments	K.McPherson	18/02/2022
2	Updated - Issued For Completion	K.McPherson	28/02/2022

FOR COMPLETION

	NAME	DATE
SURVEYED	H.Baker	18/01/2022
DESIGNED	D. Luton	01/01/2018
DRAWN	B.Nel	24/01/2022

DATE	ORIGINAL SCALE	ORIGINAL SIZE
24/01/2022	1:500	A3

DRAWING NO.	REVISION
41201-DR-SU-9402	2



Existing

New

125

280

Watermain (Ø)

63

125

225

Blank Cap

Sluice Valve

Gate Valve

25Ø house connection

Fire Hydrant

Manifold

Blank Cap

Sluice Valve

Gate Valve

25Ø house connection

Fire Hydrant

Manifold

NOTES
Refer Drawing 41201-DR-SU-9400 For Water Coordinate Table

- 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

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ENG60317653 / SUB60036097-A

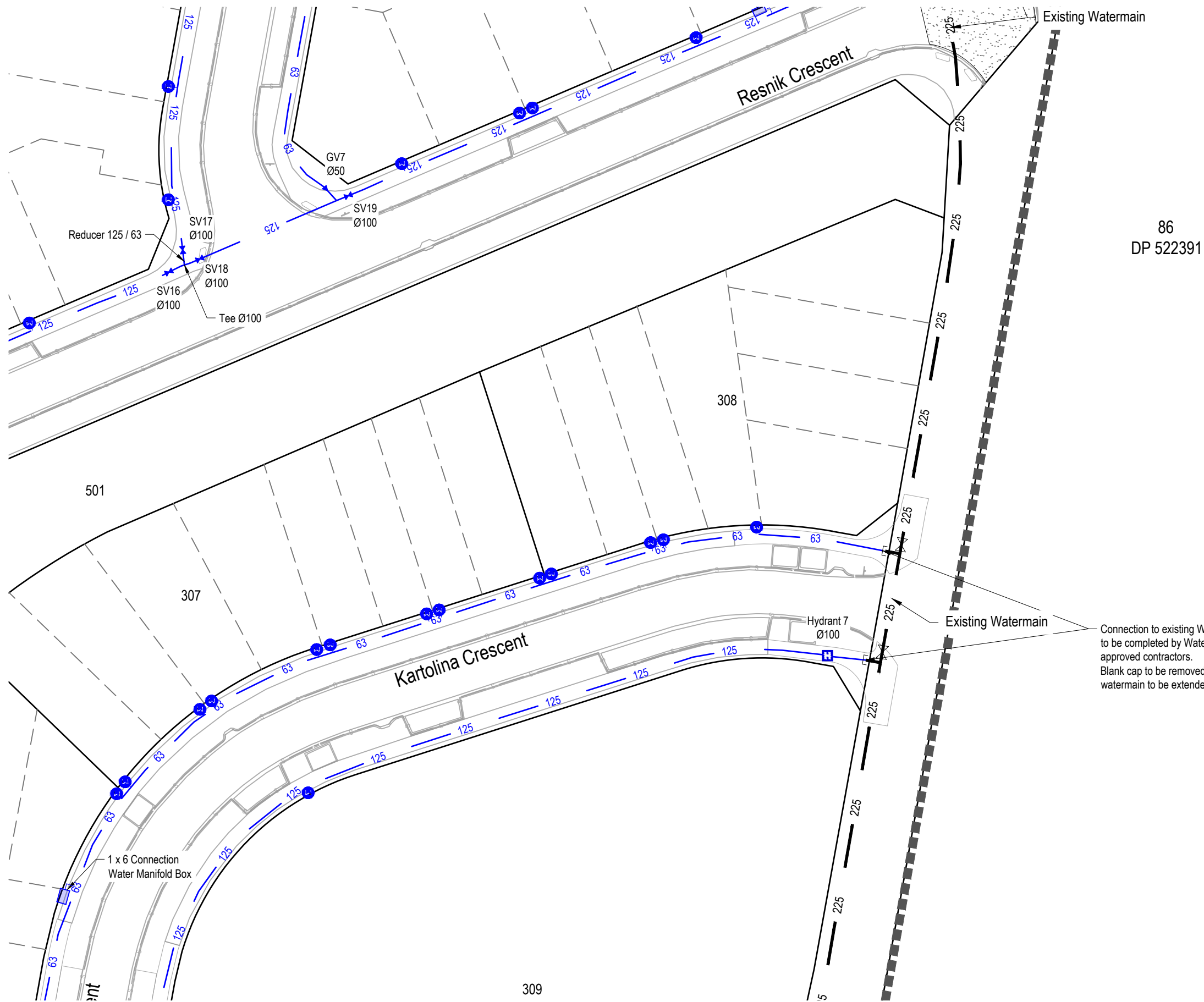
No.	REVISION (DESCRIPTIONS)	NAME	DATE
0	Issued For Completion	K.McPherson	02/02/2022
1	General Plan Amendments	K.McPherson	18/02/2022
2	Updated - Issued For Completion	K.McPherson	28/02/2022

FOR COMPLETION

	NAME	DATE
SURVEYED	H.Baker	18/01/2022
DESIGNED	D. Luton	01/01/2018
DRAWN	B.Nel	24/01/2022

DATE	ORIGINAL SCALE	ORIGINAL SIZE
24/01/2022	1:500	A3

DRAWING NO.	REVISION
41201-DR-SU-9403	2



Water Reticulation Legend			
Existing		New	
	125		Watermain (Ø)
	280		63
			125
			225
			Blank Cap
			Sluice Valve
			Gate Valve
			25Ø house connection
			Fire Hydrant
			Manifold

NOTES
Refer Drawing 41201-DR-SU-9400 For Water Coordinate Table

- NOTES
- GENERAL
- Coordinates are in terms of NZTM 2000.
- WATER RETICULATION
- Cover for water reticulation.
a) Mains under grass berms and footpaths 600mm
b) Mains under road carriageway 900mm
 - Watermain 125, 180 & 225 OD - PE100 PN12.5
 - All rider mains 63 OD - PE80 PN12.5
 - Stainless Steel bolts and nuts used for flanged connections.
 - Metallic Detector Tape provided above all water mains and rider mains

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Date: 28/02/2022

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73 Nobile Road,
Huapai

Water Reticulation
As-Built
Sheet 5

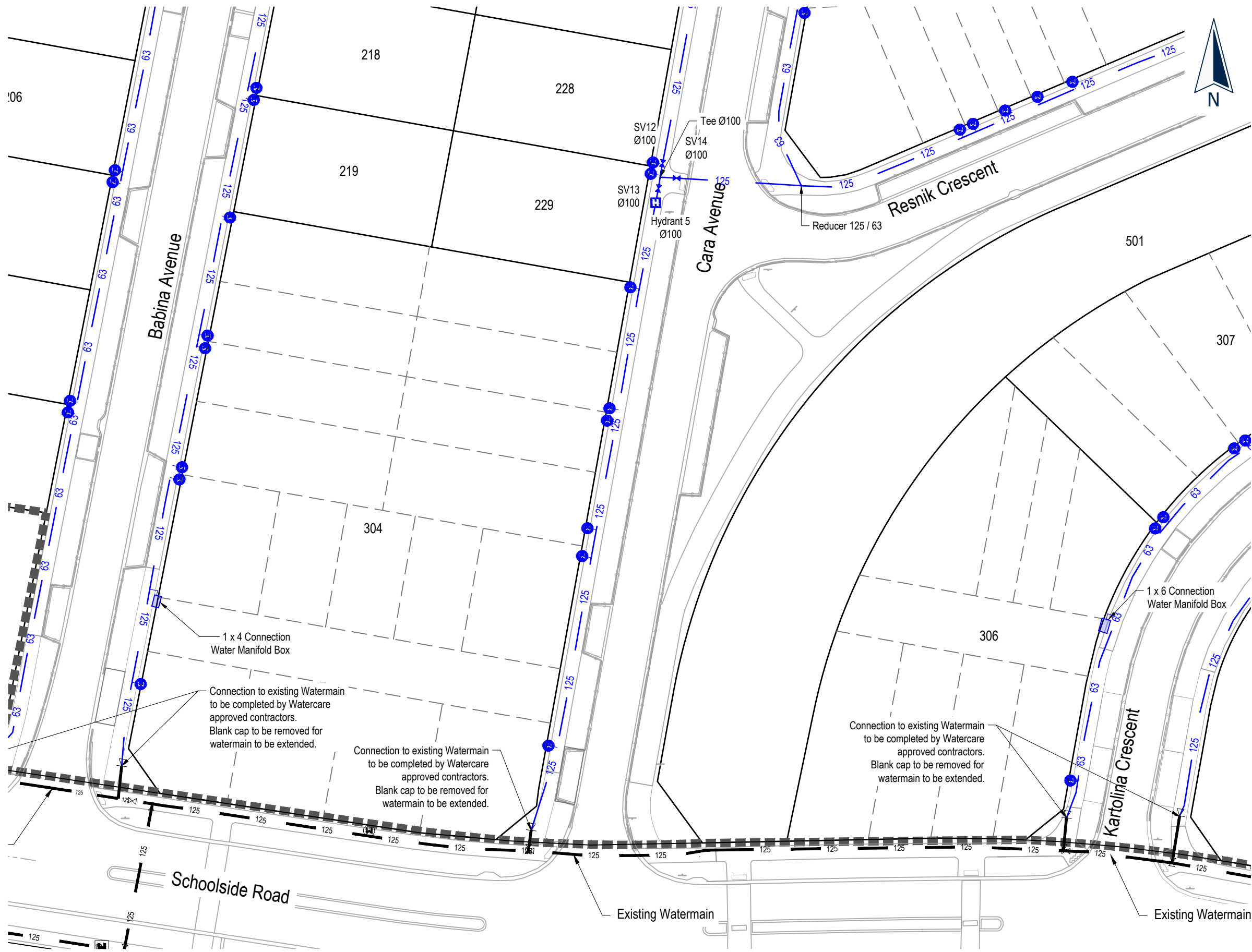
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0	Issued For Completion	K.McPherson	02/02/2022
1	General Plan Amendments	K.McPherson	18/02/2022
2	Updated - Issued For Completion	K.McPherson	28/02/2022

FOR COMPLETION

	NAME	DATE
SURVEYED	H.Baker	18/01/2022
DESIGNED	D. Luton	01/01/2018
DRAWN	B.Nel	24/01/2022

DATE	ORIGINAL SCALE	ORIGINAL SIZE
24/01/2022	1:500	A3

DRAWING NO.	REVISION
41201-DR-SU-9404	2



Water Reticulation Legend			
Existing		New	
	125 Watermain (Ø)		63
	280		125
	Blank Cap		225
	Sluice Valve		Blank Cap
	Gate Valve		Sluice Valve
	250 house connection		Gate Valve
	Fire Hydrant		250 house connection
	Manifold		Fire Hydrant
			Manifold

NOTES
Refer Drawing 41201-DR-SU-9400 For Water Coordinate Table

- NOTES
- GENERAL
- Coordinates are in terms of NZTM 2000.
- WATER RETICULATION
- Cover for water reticulation.
a) Mains under grass berms and footpaths 600mm
b) Mains under road carriageway 900mm
 - Watermain 125, 180 & 225 OD - PE100 PN12.5
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 - Metallic Detector Tape provided above all watermains and ridermains

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ENG60317653 / SUB60036097-A

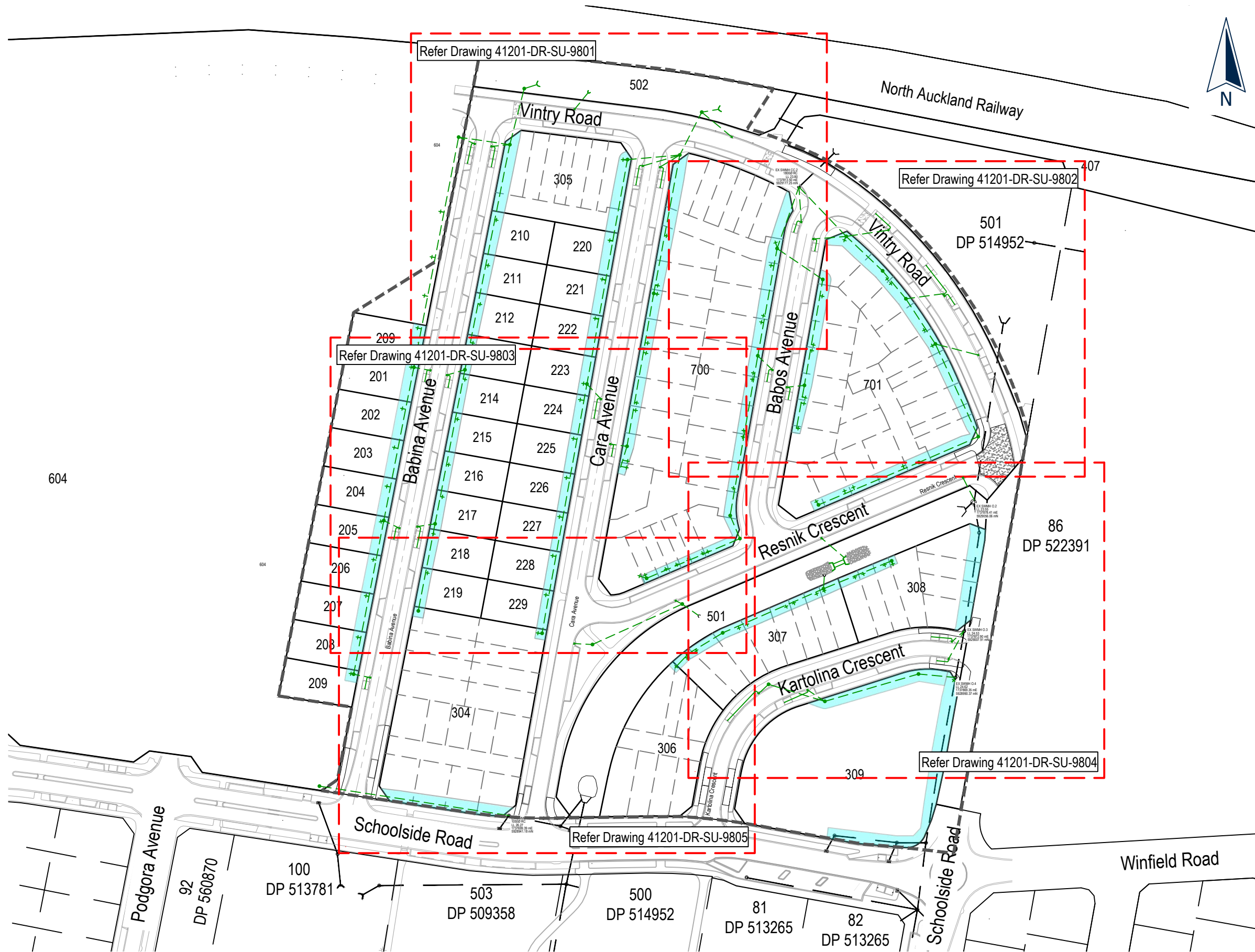
No.	REVISION (DESCRIPTIONS)	NAME	DATE
0	Issued For Completion	K.McPherson	02/02/2022
1	General Plan Amendments	K.McPherson	18/02/2022
2	Updated - Issued For Completion	K.McPherson	28/02/2022

FOR COMPLETION

	NAME	DATE
SURVEYED	H.Baker	18/01/2022
DESIGNED	D. Luton	01/01/2018
DRAWN	B.Nel	24/01/2022

DATE	ORIGINAL SCALE	ORIGINAL SIZE
24/01/2022	1:500	A3

DRAWING NO.	REVISION
41201-DR-SU-9405	2



Stormwater Zone of Influence Legend



Pipeline 45° Stormwater Zone of Influence is from 500mm below invert of Drainage Pipes.

Drainage As Built Legend

Existing



Stormwater (Public)

New -As Constructed

Stormwater (Public)



NOTES

GENERAL

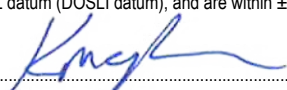
1. Levels are in terms of LINZ Datum 1946.
2. Coordinates are in terms of NZTM 2000.
3. All infrastructure is public unless otherwise shown.

STORMWATER

1. All pipes are uPVC SN16, unless otherwise shown.
2. All manholes are 1050mmØ concrete flange base and riser, unless otherwise shown.
3. Bedding is H2 type unless otherwise stated.
4. All catchpits are 675mm x 450mm cycle friendly grate lids semi recessed unless otherwise shown.
5. House connections 100Ø uPVC SN16
6. All Private retaining wall outlets are 100uPVC SN16 unless otherwise shown.

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73 Nobile Road,
Huapai

Stormwater Zone of Influence
As Built Plan
Sheet 1

No.	REVISION (DESCRIPTIONS)	NAME	DATE
0	Issued For Completion	K.McPherson	02/02/2022
1	Updated - Issued For Completion	K.McPherson	17/02/2022
2	Updated - Issued For Completion	K.McPherson	28/02/2022

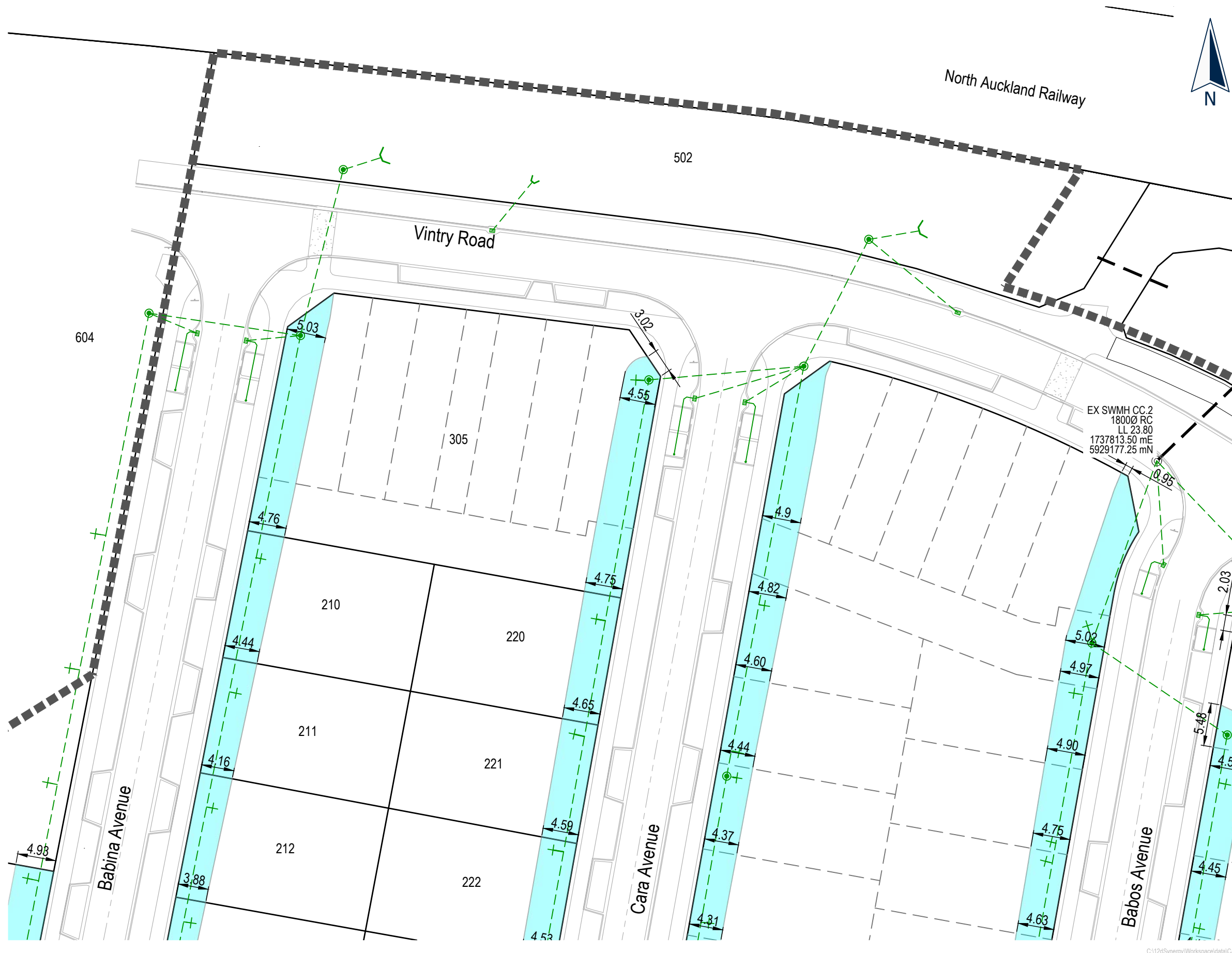
FOR COMPLETION

NAME	DATE
H.Baker	18/01/2022
D.Luton	01/01/2018
B.Nel	24/01/2022

DATE	ORIGINAL SCALE	ORIGINAL SIZE
24/01/2022	1:1500	A3

DRAWING NO.	REVISION
41201-DR-SU-9800	2

C:\112d\Synergy\Workspace\data\CATOAPP\141201 - Cabra 73 Nobile Road - Phase 2_21499\Drawgs\As-builts\41201-DR-SU-9800-9805 - Stormwater ZOI As Built



Stormwater Zone of Influence Legend

Pipeline 45° Stormwater Zone of Influence is from 500mm below invert of Drainage Pipes.

Drainage As Built Legend

Existing

Stormwater (Public)

New -As Constructed

- NOTES
- GENERAL
1. Levels are in terms of LINZ Datum 1946.

2. Coordinates are in terms of NZTM 2000.

3. All infrastructure is public unless otherwise shown.
- STORMWATER
1. All pipes are uPVC SN16, unless otherwise shown.

2. All manholes are 1050mmØ concrete flange base and riser, unless otherwise shown.

3. Bedding is H2 type unless otherwise stated.

4. All catchpits are 675mm x 450mm cycle friendly grate lids semi recessed unless otherwise shown.

5. House connections 100Ø uPVC SN16

6. All Private retaining wall outlets are 100uPVC SN16 unless otherwise shown.

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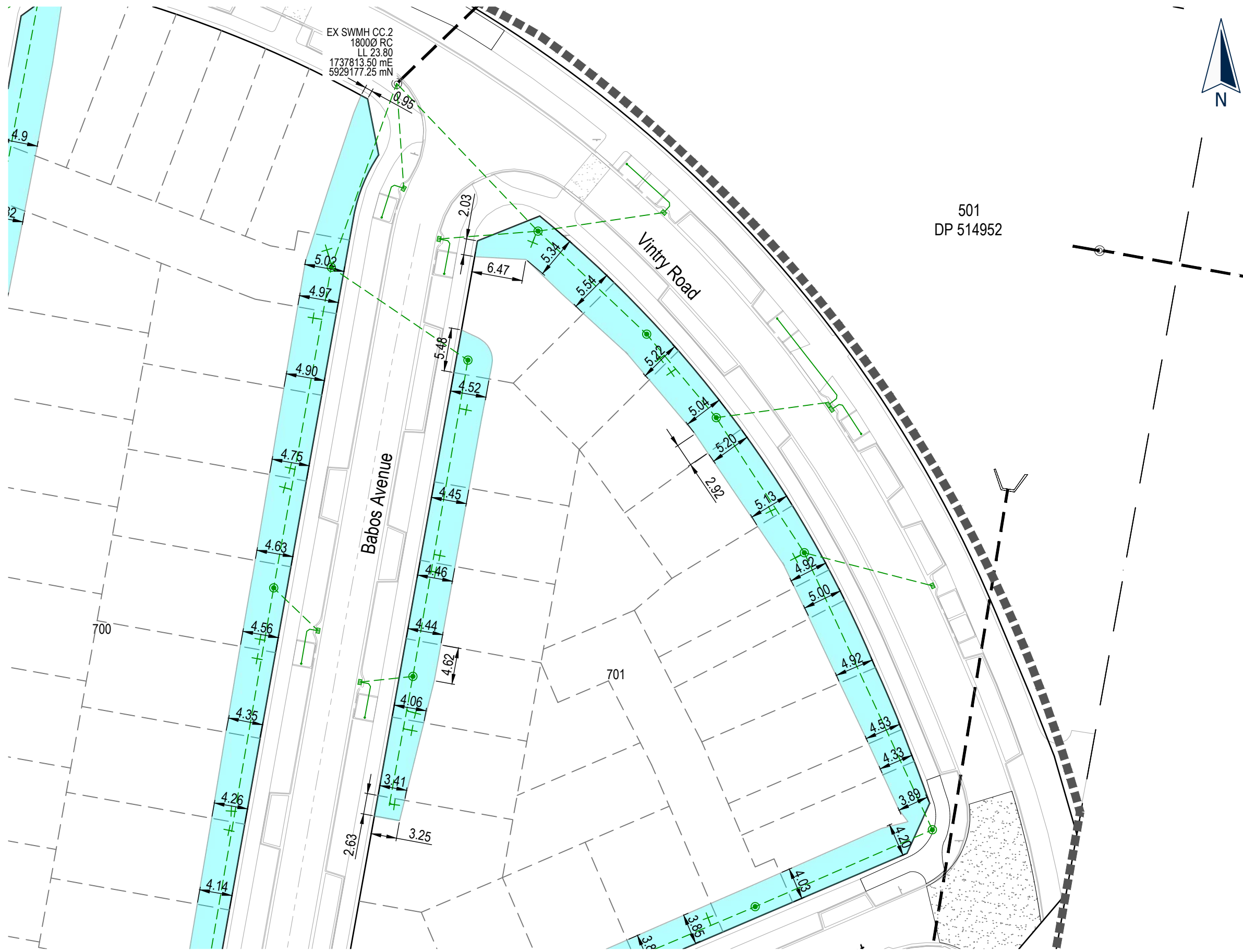
ENG60317653 / SUB60036097-A

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No.	REVISION (DESCRIPTIONS)	NAME	DATE
0	Issued For Completion	K.McPherson	02/02/2022
1	Updated - Issued For Completion	K.McPherson	17/02/2022
2	Updated - Issued For Completion	K.McPherson	28/02/2022

FOR COMPLETION

		NAME	DATE
SURVEYED		H.Baker	18/01/2022
DESIGNED		D.Luton	01/01/2018
DRAWN		B.Nel	24/01/2022
DATE	ORIGINAL SCALE	ORIGINAL SIZE	
24/01/2022	1:500	A3	
DRAWING NO.			REVISION
41201-DR-SU-9801			2



Stormwater Zone of Influence Legend

Pipeline 45° Stormwater Zone of Influence is from 500mm below invert of Drainage Pipes.

Drainage As Built Legend

Existing

Stormwater (Public)

New -As Constructed

- NOTES
- GENERAL
1. Levels are in terms of LINZ Datum 1946.

2. Coordinates are in terms of NZTM 2000.

3. All infrastructure is public unless otherwise shown.
- STORMWATER
1. All pipes are uPVC SN16, unless otherwise shown.

2. All manholes are 1050mmØ concrete flange base and riser, unless otherwise shown.

3. Bedding is H2 type unless otherwise stated.

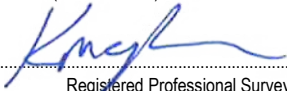
4. All catchpits are 675mm x 450mm cycle friendly grate lids semi recessed unless otherwise shown.

5. House connections 100Ø uPVC SN16

6. All Private retaining wall outlets are 100uPVC SN16 unless otherwise shown.

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 ± 10mm.

Signed: 
Registered Professional Surveyor

Date: 28/02/2022

Name: Kerry McPherson
Phone : (09) 427 0072
Email : kerrym@catoBolam.co.nz

ENG60317653 / SUB60036097-A

C:\112d\Synergy\Workspace\data\CATOAPP141201 - Cabra 73 Nobile Road - Phase 2 21499\Drawgs\As-builts\41201-DR-SU-9800-9805 - Stormwater ZOI As Built

No.	REVISION (DESCRIPTIONS)	NAME	DATE
0	Issued For Completion	K.McPherson	02/02/2022
1	Updated - Issued For Completion	K.McPherson	17/02/2022
2	Updated - Issued For Completion	K.McPherson	28/02/2022

FOR COMPLETION

	NAME	DATE
SURVEYED	H.Baker	18/01/2022
DESIGNED	D.Luton	01/01/2018
DRAWN	B.Nel	24/01/2022

DATE	ORIGINAL SCALE	ORIGINAL SIZE
24/01/2022	1:500	A3

DRAWING NO.	REVISION
41201-DR-SU-9802	2



Stormwater Zone of Influence Legend

Pipeline 45° Stormwater Zone of Influence is from 500mm below invert of Drainage Pipes.

Drainage As Built Legend

Existing

Stormwater (Public)

New -As Constructed

- NOTES
- GENERAL
1. Levels are in terms of LINZ Datum 1946.

2. Coordinates are in terms of NZTM 2000.

3. All infrastructure is public unless otherwise shown.
- STORMWATER
1. All pipes are uPVC SN16, unless otherwise shown.

2. All manholes are 1050mmØ concrete flange base and riser, unless otherwise shown.

3. Bedding is H2 type unless otherwise stated.

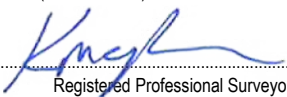
4. All catchpits are 675mm x 450mm cycle friendly grate lids semi recessed unless otherwise shown.

5. House connections 100Ø uPVC SN16

6. All Private retaining wall outlets are 100uPVC SN16 unless otherwise shown.

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 ± 10mm.

Signed:  Registered Professional Surveyor

Date: 28/02/2022

Name: Kerryn McPherson
Phone : (09) 427 0072
Email : kerrynm@catobolam.co.nz

ENG60317653 / SUB60036097-A

C:\12d\Synergy\Workspace\data\CATOAPP141201 - Cabra 73 Nobile Road - Phase 2 21499\Drawgs\As-builts\41201-DR-SU-9800-9805 - Stormwater ZOI As Built

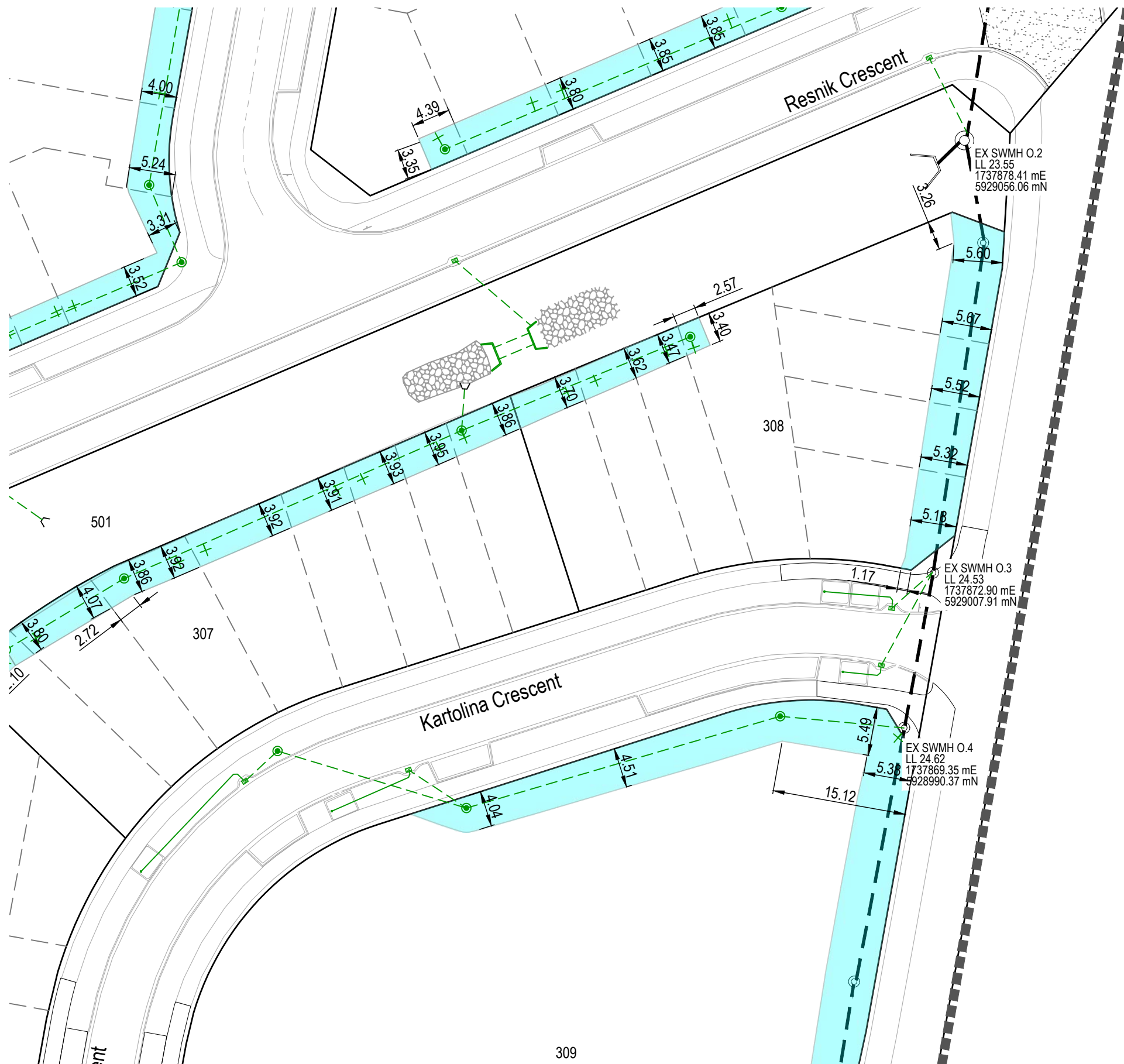
No.	REVISION (DESCRIPTIONS)	NAME	DATE
0	Issued For Completion	K.McPherson	02/02/2022
1	Updated - Issued For Completion	K.McPherson	17/02/2022
2	Updated - Issued For Completion	K.McPherson	28/02/2022

FOR COMPLETION

	NAME	DATE
SURVEYED	H.Baker	18/01/2022
DESIGNED	D.Luton	01/01/2018
DRAWN	B.Nel	24/01/2022

DATE	ORIGINAL SCALE	ORIGINAL SIZE
24/01/2022	1:500	A3


DRAWING NO.	REVISION
41201-DR-SU-9803	2





86
DP 522391



Stormwater Zone of Influence Legend

 Pipeline 45° Stormwater Zone of Influence is from 500mm below invert of Drainage Pipes.

Drainage As Built Legend

Existing
 Stormwater (Public)
New -As Constructed


NOTES

GENERAL

1. Levels are in terms of LINZ Datum 1946.
2. Coordinates are in terms of NZTM 2000.
3. All infrastructure is public unless otherwise shown.

STORMWATER

1. All pipes are uPVC SN16, unless otherwise shown.
2. All manholes are 1050mmØ concrete flange base and riser, unless otherwise shown.
3. Bedding is H2 type unless otherwise stated.
4. All catchpits are 675mm x 450mm cycle friendly grate lids semi recessed unless otherwise shown.
5. House connections 100Ø uPVC SN16
6. All Private retaining wall outlets are 100uPVC SN16 unless otherwise shown.

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 ± 10mm.

Signed: 
Registered Professional Surveyor

Date: 28/02/2022

Name: Kerry McPherson
Phone : (09) 427 0072
Email : kerrym@catobolam.co.nz

ENG60317653 / SUB60036097-A

Cato Bolam
creating great places

PLANNERS | SURVEYORS | ENGINEERS
ARCHITECTS | ENVIRONMENTAL

CABRA
Land & Property Development

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Cabra Developments Limited
73 Nobile Road,
Huapai

Stormwater Zone of Influence
As Built Plan
Sheet 5

No.	REVISION (DESCRIPTIONS)	NAME	DATE
0	Issued For Completion	K.McPherson	02/02/2022
1	Updated - Issued For Completion	K.McPherson	17/02/2022
2	Updated - Issued For Completion	K.McPherson	28/02/2022

FOR COMPLETION

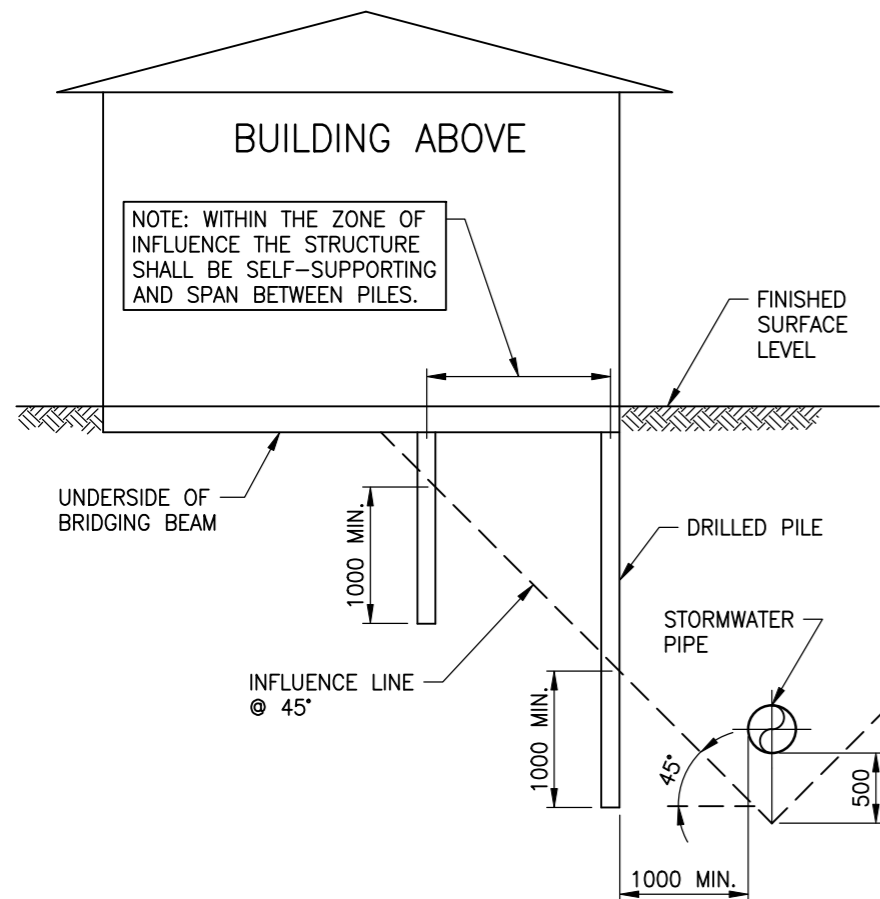
NAME	DATE
H.Baker	18/01/2022
D.Luton	01/01/2018
B.Nel	24/01/2022

DATE	ORIGINAL SCALE	ORIGINAL SIZE
24/01/2022	1:500	A3

DRAWING NO.	REVISION
41201-DR-SU-9804	2

C:\112d\Synergy\Workspace\data\CATOAPP141201 - Cabra 73 Nobile Road - Phase 2_21499\Drawgs\As-builts\41201-DR-SU-9800-9805 - Stormwater ZOI As Built

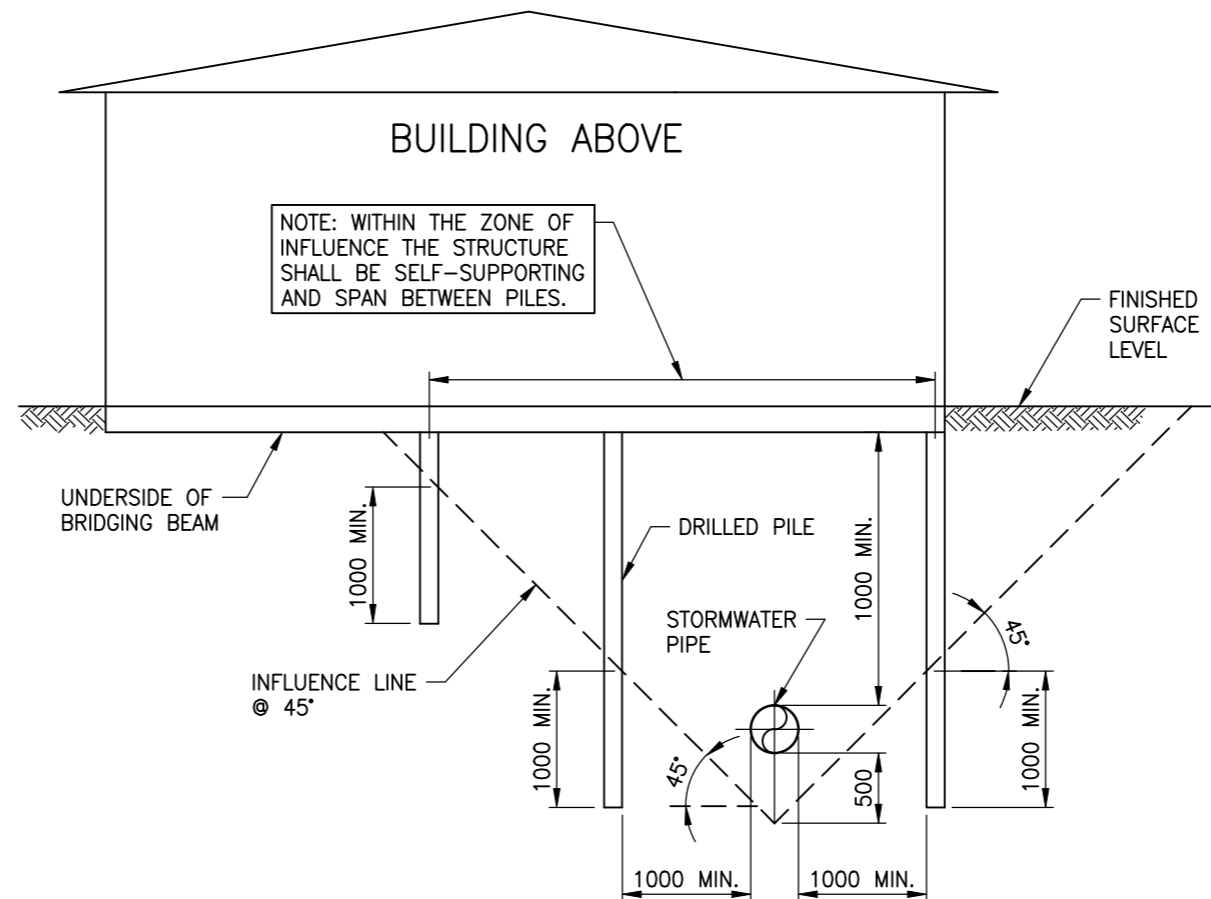
PLOT DATE 12/8/2015 11:54 AM I:\AENVA\Projects\AEO4840 AC CoP Cn1\04 Deliverables\Drawings\AC-STD-SW22.dwg



BUILD CLOSE

"BUILD CLOSE" NOTES:

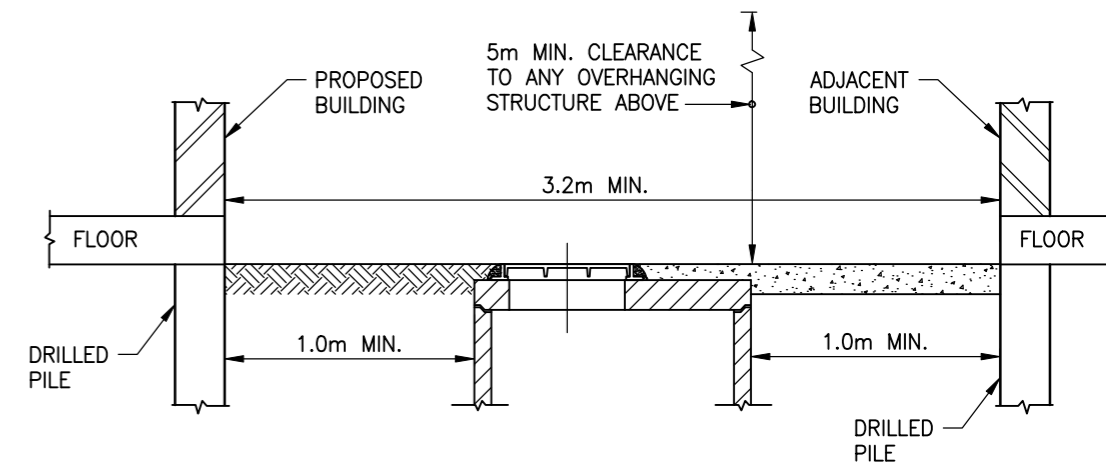
1. OUTSIDE ZONE OF INFLUENCE, NORMAL FOUNDATION REQUIREMENTS APPLY.
2. SPECIFIC APPROVAL IS REQUIRED FROM AUCKLAND COUNCIL IF BUILDING IS ADJACENT TO PIPES LARGER THAN 375mm INTERNAL DIAMETER, OR GREATER THAN 2.0m DEEP.
3. BUILDING SHALL GENERALLY BE OUTSIDE ALL OVERLAND FLOW PATHS AND FLOODPLAINS. SEE SECTION 4.3.5.6 AND 4.3.5.7 OF THE SWCoP FOR FURTHER DETAILS.
4. PILES SHALL BE CONSTRUCTED TO A DEPTH OF 1.0m BELOW INFLUENCE LINE.



BUILD OVER

"BUILD OVER" NOTES:

1. OUTSIDE ZONE OF INFLUENCE, NORMAL FOUNDATION REQUIREMENTS APPLY.
2. THE DETAIL APPLIES TO STORMWATER PIPES 375mm NOMINAL DIAMETER OR LESS.
3. BRIDGING OVER PIPES LARGER THAN 375mm NOMINAL DIAMETER IS GENERALLY NOT ALLOWED.
4. PILES SHALL BE CONSTRUCTED TO A DEPTH OF 1.0m BELOW INFLUENCE LINE.
5. BRIDGING IS GENERALLY NOT ALLOWED OVER PIPES WHERE CLEAR VERTICAL SEPARATION DISTANCE FROM TOP OF PIPE TO UNDERSIDE OF BRIDGING BEAM IS LESS THAN 1.0m.



MANHOLE CONSTRUCTION CLEARANCE

GENERAL NOTES:

1. THE INFORMATION ON THIS PAGE IS INTENDED TO SHOW EXAMPLES OF TYPICAL SCENARIOS AND SHALL 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 THESE REQUIREMENTS WILL GUARANTEE APPROVAL.
2. REQUIREMENTS FOR FOUNDATION DESIGN, ETC. APPLY TO BOTH SIDES OF THE 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 IN LOCATIONS WHERE SUFFICIENT CLEARANCE IS UNAVAILABLE, ARE NOT PERMITTED.
9. ALL PIPE BUILDOVERS WILL REQUIRE APPROVAL BY AUCKLAND COUNCIL.
10. REFER TO SECTION 4.3.23 OF THE SWCoP FOR PIPE BUILDOVER REQUIREMENTS.
11. FOR MANHOLES GREATER THAN 4m DEEP OR LARGER THAN 1200mm DIA. SPECIFIC DESIGN (INCLUDING CLEARANCE REQUIREMENTS) IS REQUIRED.

STORMWATER CODE OF PRACTICE
STANDARD DETAILS

REVISION: 2
REV DATE: 1 NOVEMBER 2015
CAD FILENAME: AC-STD-SW22.DWG

AUCKLAND COUNCIL

STORMWATER PIPE AND MANHOLE CONSTRUCTION CLEARANCE REQUIREMENTS

MANHOLES NEAR BUILDINGS AND BUILDING CLOSE OVER PIPES

ENVIRONMENTAL-SW

ORIGINAL SCALE A3
SCALE: N.T.S.

Auckland Council
Drawing No. SW22

DRAWING SET SHEET
SWCoP 1 OF 1

REV
2

Appendix C: Laboratory Test Data

**DETERMINATION OF THE WATER CONTENT, CONE PENETRATION LIMIT & LINEAR SHRINKAGE
TEST METHOD NZS 4402 : 1986 TEST 2.1, 2.5 & 2.6**Project Name : **73 Noblio Road**Client : CMW Geosciences
Address : PO Box 300206
Albany, Auckland 0754

Project No : 22 0001 05

Page : 1 of 1

Date of Order : 20.1.22

Attention : Jasmine W

Sample Method : Hand auger

Sample Date : 19.01.22

Sampled By : CMW Geosciences

Test Details :

Test performed on :

Whole Sample

History :

Natural

Sample No.	Location	Depth (m)	Cone Penetration (CPL)	Linear Shrinkage (LS)	Natural Water Content (%)
487M	Lot 206	0.4-0.8	59	25	31.9
488M	Lot 203	0.4-0.8	75	20	38.4
489M	Lot 200	0.4-0.8	84	22	34.6
490M	Lot 210	0.4-0.8	70	18	32.6
491M	Lot 213	0.4-0.8	59	16	30.7
492M	Lot 216	0.4-0.8	66	17	31.8
493M	Lot 219	0.4-0.8	63	16	30.0
494M	Lot 222	0.4-0.8	72	17	38.8
495M	Lot 224	0.4-0.8	71	19	38.7
496M	Lot 227	0.4-0.8	63	16	36.9
497M	Lot 304A	0.4-0.8	70	18	28.9
498M	Lot 305	0.4-0.8	65	16	33.4
499M	Lot 700C	0.4-0.8	65	18	27.8
500M	Lot 700D	0.4-0.8	96	22	36.0
501M	Lot 306B	0.4-0.8	62	16	31.1
502M	Lot 308B	0.4-0.8	90	19	51.8
503M	Lot 309A	0.4-0.8	87	22	38.2
504M	Lot 309B	0.4-0.8	62	16	29.8
505M	Lot 700A	0.4-0.8	77	19	35.2
506M	Lot 701B	0.4-0.8	56	16	31.4
507M	Lot 701D	0.4-0.8	65	15	29.3
508M	Lot 209	0.4-0.8	77	20	34.9

Comments :

Tested By:	HC	Date :	24.01.22
Calculated By :	HC	Date :	14.02.22
Checked By :	EC	Date :	17.02.22

Appendix D: Field Test Data



LF11 Rev 5 Soil Field Density NDM Direct Transmission with VSS Report

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

Project: 73 Nobilo Road
Project No: AKL2017_0051
Location: Huapai
Report No: AKL2017_0051LAC Rev.0
Report Date: 18/07/2018
Client: Cabra
Client Address:
Client Reference:

Test Methods: NZS 4402.2.1:1986
NZS 4407.4.2:2015
NZGS:August 2001

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



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

Client Reference:																		
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 (%) *
19/12/2017	N9	Refer to site plan	CLAY	UTP	UTP	UTP	UTP	UTP	1.9650	1.5444	27.2	0.64	300	23.5	2.7	1.60	3.7	No sample taken *
	N10	Refer to site plan	CLAY	162	178	162	162	166	1.7728	1.2889	37.8	3.60	300	-	-	-	-	
	N11	Refer to site plan	CLAY	UTP	UTP	UTP	UTP	UTP	1.8502	1.3713	34.5	4.50	300	34.3	2.7	1.38	1.7	
21/12/2017	N12	Refer to site plan	CLAY	UTP	226	194	UTP	210+	1.8362	1.3898	33.0	5.50	300	26.0	2.7	1.46	8.2	
	N13	Refer to site plan	CLAY	162	226	194	162	186	1.8205	1.3533	34.5	3.08	300	28.7	2.7	1.42	7.0	
	N14	Refer to site plan	CLAY	UTP	200	162	178	180+	1.8455	1.3436	32.0	4.40	300	35.9	2.7	1.36	0.9	
	N15	Refer to site plan	CLAY	UTP	UTP	UTP	UTP	UTP	1.8628	1.3868	33.0	2.70	300	26.6	2.7	1.48	6.3	
19/02/2018	N16	Refer to site plan	CLAY	UTP	218	171	155	181+	1.9560	1.4566	30.0	-0.08	300	31.7	2.7	1.48	-2.1	
	N17	Refer to site plan	CLAY	155	171	155	149	158	1.8430	1.3891	28.0	4.60	300	33.3	2.7	1.38	2.8	
21/03/2018	N18	Refer to site plan	CLAY	UTP	186	UTP	133	160+	1.9620	1.4631	35.0	2.60	300	31.5	2.7	1.50	-2.3	
	N19	Refer to site plan	CLAY	UTP	186+	120	133	146+	1.8426	1.3791	33.6	2.51	300	27.8	2.7	1.44	6.5	
	N20	Refer to site plan	CLAY	UTP	UTP	UTP	UTP	UTP	1.9520	1.5020	34.1	2.84	300	25.5	2.7	1.56	2.7	

This report should only be reproduced in full.

** Gauge Wet Densities outside of the calibrated range of 1.728 to 2.756 t/m³ are not accredited and are outside the laboratories scope of accreditation.

Created By: JLM
Checked By: JLM
Authorised Signatory: 

Date: 23/01/2018
Date: 18/07/2018
Date: 26/7/18

Page: 1 of 2



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: 73 Nobilo Road, Road 6 Works
Project No: AKL2017_0052
Location: Huapai
Report No: AKL2017_0052LAA Rev.0
Report Date: 21/07/2017
Client: ROI Land Developments Ltd
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



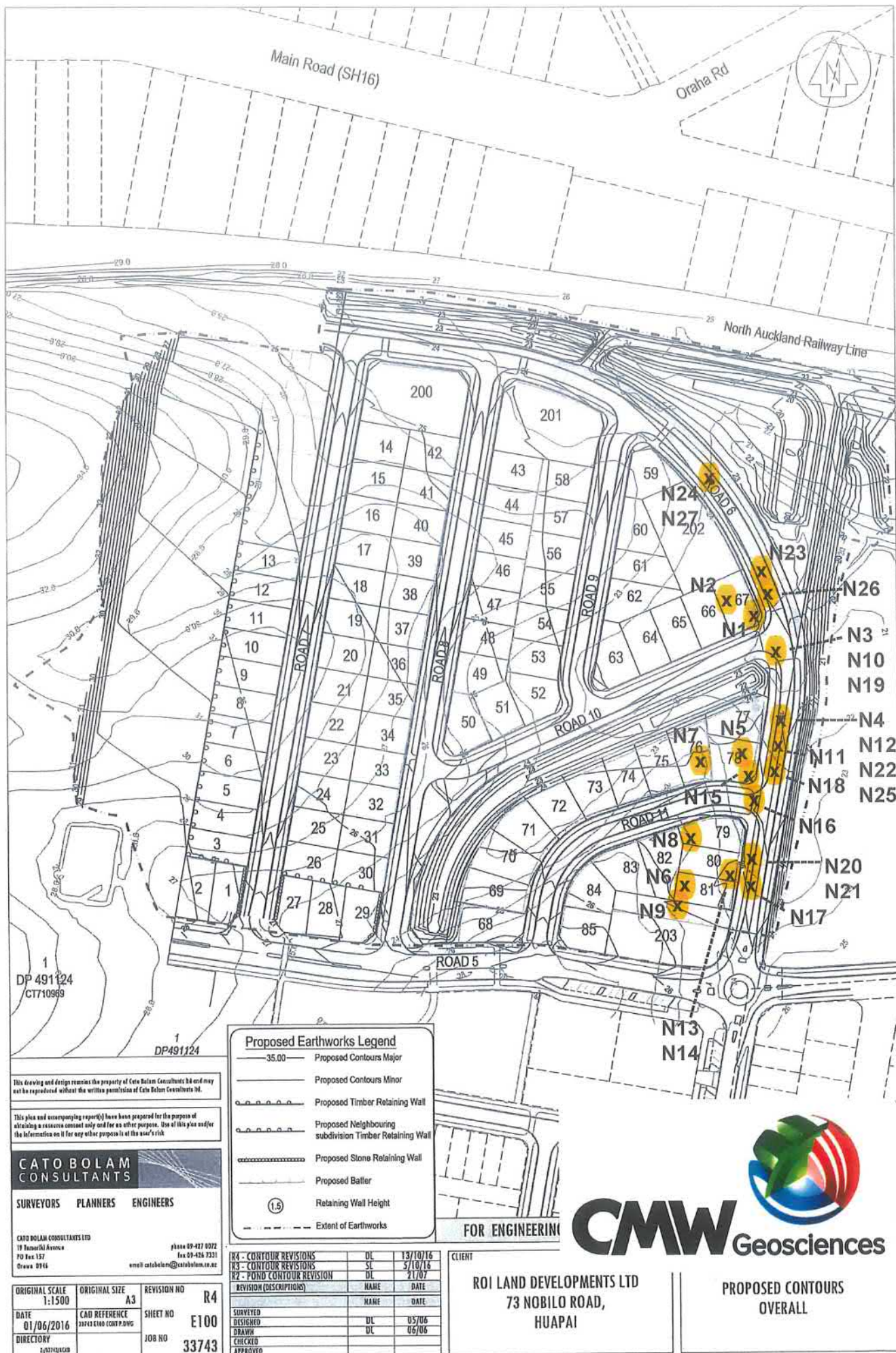
Tests indicated as not accredited are outside the scope of the laboratory's accreditation

Measurements marked * are not accredited and are outside the scope of the laboratory's accreditation

				In-situ Vane Shear Strengths					Field and Laboratory Testing Data									
Date Sampled	Sample No.	Test Location	Soil Description	Test 1 (kPa)	Test 2 (kPa)	Test 3 (kPa)	Test 4 (kPa)	Ave.	Gauge Wet Density (t/m³)	Gauge Dry Density (t/m³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth	Oven Water Content (%)	Solid Density (t/m³) *	Oven Dry Density (t/m³)	Calculated Air Voids (%) *	Comments
28/04/2017	N1	Lot 67	CLAY	119	127	121	92	115	1.7269	1.2516	38.0	6.01	300					Failed
	N2	Lot 67	CLAY	135	145	124	121	131	1.7881	1.3218	35.3	4.30	300					Failed
	N3	Road 6	CLAY	140	148	158	151	149	1.8897	1.4026	34.7	-0.77	300	38.3	2.7	1.36	-2.9	
	N4	Road 6	CLAY	145	121	114	127	127	1.7547	1.2212	43.7	1.31	300					Failed
	N5	Lot 78	CLAY	121	145	132	127	131	1.8078	1.3414	34.8	3.58	300					Failed
8/05/2017	N6	Lot 81	CLAY	119	129	116	132	124	1.7182	1.2655	35.8	7.76	300					Failed
	N7	Lot 76	CLAY	145	143	140	148	144	1.8028	1.3278	35.8	3.22	300	26.0	2.7	1.44	9.8	
	N8	Lot 79	CLAY	158	145	148	140	148	1.7837	1.3149	35.7	4.32	300	38.8	2.7	1.28	2.6	
9/05/2017	N9	Lot 203	CLAY	145	158	151	148	151	1.8518	1.4192	30.5	4.08	300	30.0	2.7	1.42	4.5	Re-test of N6
10/05/2017	N10	Road 6	CLAY	137	140	145	158	145	1.8390	1.3923	32.1	3.66	300	30.9	2.7	1.40	4.6	Re-test of N1 and N2
	N11	Road 6	CLAY	151	137	140	143	143	1.8529	1.3696	35.3	0.84	300	30.9	2.7	1.42	3.8	Re-test of N5
	N12	Road 6	CLAY	151	137	145	158	148	1.8710	1.4149	32.2	1.88	300	30.9	2.7	1.42	2.9	Re-test of N4
1/06/2017	N13	Lot 80	CLAY	145	158	148	153	151	1.8752	1.4505	29.3	3.72	300	31.4	2.7	1.42	2.4	
	N14	Lot 80	CLAY	185	185	185	185	185	1.8095	1.3691	32.2	5.15	300	30.9	2.7	1.38	6.1	
	N15	Lot 78	CLAY	158	145	148	143	149	1.7131	1.3548	26.4	13.91	300					Failed
2/06/2017	N16	Road 6 and Road 11 Intersection	CLAY	>185	>185	>185	>185	>185	1.8128	1.4134	28.3	7.63	300	30.1	2.7	1.40	6.5	Re-test of N15
13/06/2017	N17	Road 6	CLAY	>185	>185	>185	>185	>185	1.8423	1.4426	27.2	6.52	300	27.2	2.7	1.44	7.0	
	N18	Road 6	CLAY	185	145	158	185	168	1.8635	1.4026	32.9	1.86	300	33.0	2.7	1.40	1.9	
	N19	Road 6	CLAY	185	145	158	148	159	1.8155	1.3774	31.8	5.08	300	28.7	2.7	1.42	7.2	
	N20	Road 6	CLAY	185	158	132	145	155	1.7907	1.3459	33.1	5.57	300	34.2	2.7	1.34	4.9	
14/06/2017	N21	Road 6	CLAY	185	145	132	158	155	1.8475	1.4368	28.6	5.63	300	34.2	2.7	1.38	1.9	
	N22	Road 6	CLAY	92	79	100	95	92										Failed
	N23	Road 6	CLAY	185	185	185	185	185	1.9251	1.5166	26.9	2.89	300	28.6	2.7	1.50	1.8	
	N24	Road 6	CLAY	158	185	148	153	161	1.8777	1.4537	29.2	3.67	300	36.9	2.7	1.38	-1.4	
15/06/2017	N25	Road 6	CLAY	145	140	185	148	155	1.8413	1.4265	29.1	5.59	300	35.7	2.7	1.36	1.3	Re-test of N22
19/07/2017	N26	Road 6	Lime Stabilised CLAY	>201	>201	>201	>201	>201	1.8200	1.3454	35.3	2.61	300	35.9	2.7	1.34	2.3	
	N27	Road 6	Lime Stabilised CLAY	149	172	>201	164	>172	1.7915	1.3295	34.2	4.46	150	34.3	2.7	1.34	4.8	

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Created By: TG Date: 16/06/2017
Checked By: TG Date: 21/07/2017
Authorised Signatory: *Greg Suok* Date: 31/07/2017





LF11 Rev 5 Soil Field Density NDM Direct Transmission with VSS Report

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

Project: 73 Nobilo Road
Project No: ALK2017_0052
Location: Huapai
Report No: AKL2017_0052LAC Rev.0
Report Date: 23/01/2018
Client: Cabra
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




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

				In-situ Vane Shear Strengths					Field and Laboratory Testing Data									
Date Sampled	Sample No.	Test Location	Soil Description	Test 1 (kPa)	Test 2 (kPa)	Test 3 (kPa)	Test 4 (kPa)	Ave.	Gauge Wet Density (t/m³) **	Gauge Dry Density (t/m³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth	Oven Water Content (%)	Solid Density (t/m³) *	Oven Dry Density (t/m³)	Calculated Air Voids (%) *	Comments
7/12/2017	N40	Refer to site plan	CLAY	226	UTP	194	178	199	1.8342	1.4611	25.3	8.6	300	27.6	2.7	1.44	7.1	
12/12/2017	N41	Refer to site plan	CLAY	194	UTP	UTP	UTP	194	1.8611	1.3980	31.1	5.0	300	29.7	2.7	1.44	4.3	
15/12/2017	N42	Refer to site plan	CLAY	178	UTP	129	178	162	1.7810	1.2581	37.0	8.2	300	36.0	2.7	1.30	4.3	
	N43	Refer to site plan	CLAY	162	UTP	226	162	183	1.8090	1.3234	36.0	2.3	300	40.1	2.7	1.30	0.4	
	N44	Refer to site plan	CLAY	UTP	178	194	162	178	1.8399	1.3984	31.6	3.9	300	29.8	2.7	1.42	5.3	
	N45	Refer to site plan	CLAY	UTP	UTP	UTP	UTP	UTP	1.7719	1.3520	31.1	7.8	300	28.9	2.7	1.38	9.4	
11/01/2018	N46	Refer to site plan	CLAY	142	178	145	152	154	1.8180	1.3240	37.3	1.4	300	51.5	2.7	1.20	-6.2	
	N47	Refer to site plan	CLAY	142	178	162	150	158	1.8190	1.3230	37.1	1.4	300	32.5	2.7	1.38	4.5	
	N48	Refer to site plan	CLAY	145	162	162	178	162	1.8140	1.3360	33.4	4.1	300	29.5	2.7	1.40	6.8	
	N49	Refer to site plan	CLAY	145	139	162	178	156	1.8009	1.3520	33.0	5.0	300	30.2	2.7	1.38	7.0	
	N50	Refer to site plan	CLAY	145	162	129	145	145	1.8540	1.3870	35.2	6.7	300	34.8	2.7	1.38	1.2	
15/01/2018	N51	Refer to site plan	CLAY	226	226	226	226	226	1.8450	1.3480	37.2	0.2	300	35.6	2.7	1.36	1.1	
	N52	Refer to site plan	CLAY	226	178	162	162	182	1.7990	1.3100	36.9	3.9	300	34.4	2.7	1.34	4.4	
	N53	Refer to site plan	CLAY	162	158	162	178	165	1.7570	1.2698	36.7	5.1	300					No Sample taken
	N54	Refer to site plan	CLAY	162	162	178	162	166	1.7500	1.2801	37.1	9.1	300					Re test of N53
	N55	Refer to site plan	CLAY	226	226	226	226	226	1.8410	1.3980	35.0	3.6	300	27.7	2.7	1.44	6.6	
	N56	Refer to site plan	CLAY	UTP	226	UTP	UTP	226	1.8950	1.4018	36.1	4.8	300	37.6	2.7	1.38	-2.8	
16/01/2018	N57	Refer to site plan	CLAY	226	226	226	226	226	1.8100	1.3452	34.5	3.6	300	29.7	2.7	1.40	6.8	
	N58	Refer to site plan	CLAY	162	178	162	162	166	1.8101	1.3211	36.0	3.0	300	37.2	2.7	1.32	2.1	
	N59	Refer to site plan	CLAY	162	226	162	178	182	1.8610	1.3971	35.0	1.7	300	34.1	2.7	1.38	1.3	
	N60	Refer to site plan	CLAY	226	210	162	178	194	1.9010	1.4000	35.0	4.3	300	36.4	2.7	1.40	-2.4	
	N61	Refer to site plan	CLAY	162	162	178	162	166	1.8010	1.3370	27.3	9.8	300	44.8	2.7	1.24	-1.8	
17/01/2018	N62	Refer to site plan	CLAY	UTP	UTP	UTP	UTP	UTP	1.9500	1.5011	33.0	8.0	300	24.8	2.7	1.56	3.4	
	N63	Refer to site plan	CLAY	162	162	96	162	146	1.7100	1.3010	35.0	14.1	300					No Sample taken
	N64	Refer to site plan	CLAY	162	178	158	162	165	1.6890	1.2500	33.0	11.0	300					No Sample taken
	N65	Refer to site plan	CLAY	UTP	226	162	162	183	1.8230	1.3970	37.0	8.0	300	29.7	2.7	1.4	6.2	

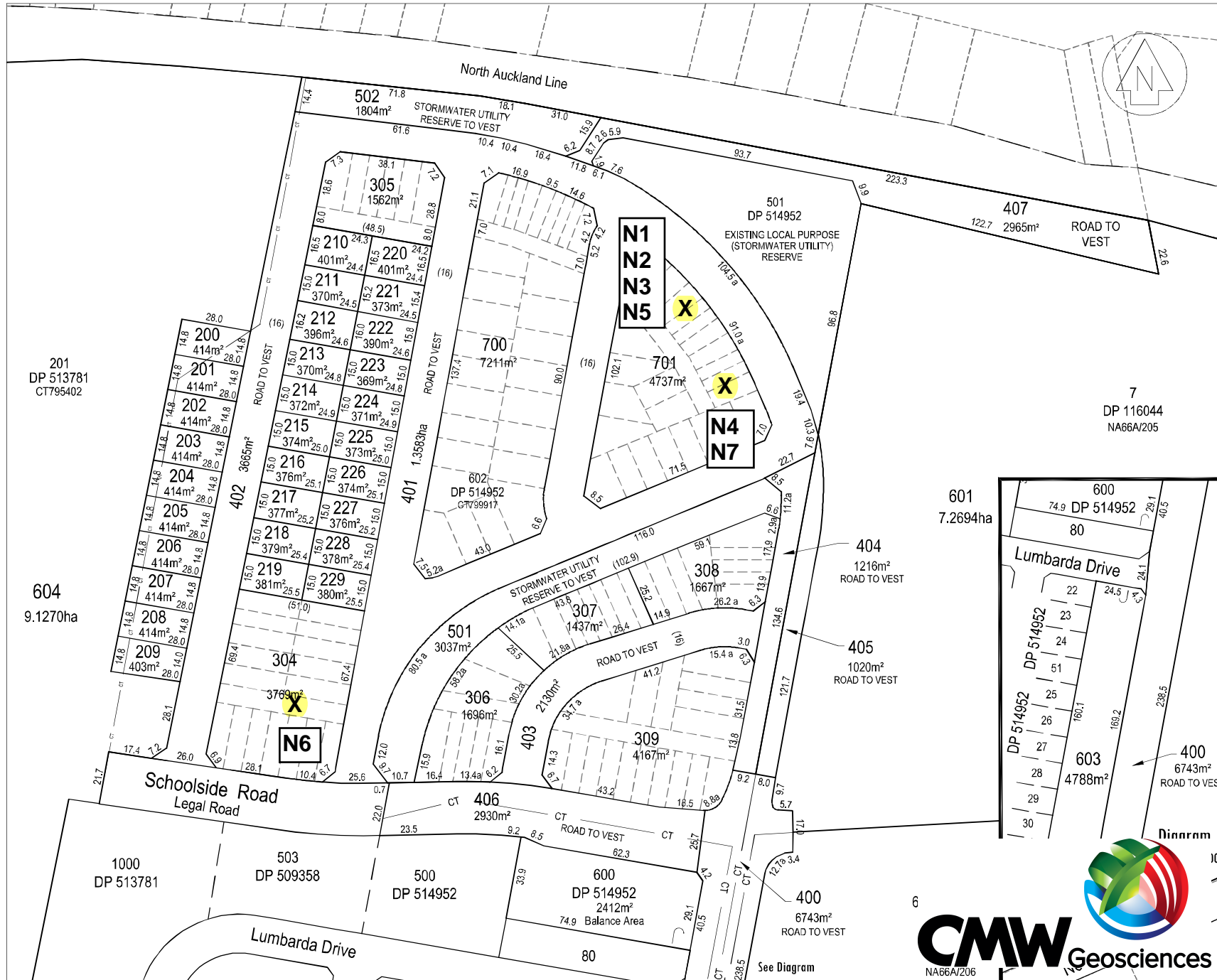
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** Gauge Wet Densities outside of the calibrated range of 1.728 to 2.756 t/m³ are not accredited and are outside the laboratories scope of accreditation.

Created By: JLM
Checked By: JLM
Authorised Signatory: 

Date: 23/1/2018
Date: 25/1/2018
Date: 31/01/2018





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LOCAL AUTHORITY Rodney Section
 COMPRISED IN CT 795402 12.6083ha
 799741 0.0401ha
 799916 1.0867ha
 799917 6.8815ha
 NA66A/205 7.5090ha
 NA66A/206 6.2965ha
 TOTAL AREA 34.4221ha
 AREAS AND MEASUREMENTS ARE SUBJECT TO SURVEY.

Auckland Council
ENG60317653 73 NOBIL ROAD H
 Approved Engineering Plan
 16/10/20GC

REVISION (DESCRIPTIONS)	NAME	DATE
SURVEYED	NAME	DATE
DESIGNED	DL	11/17
DRAWN	LS	02/18
CHECKED		
APPROVED		

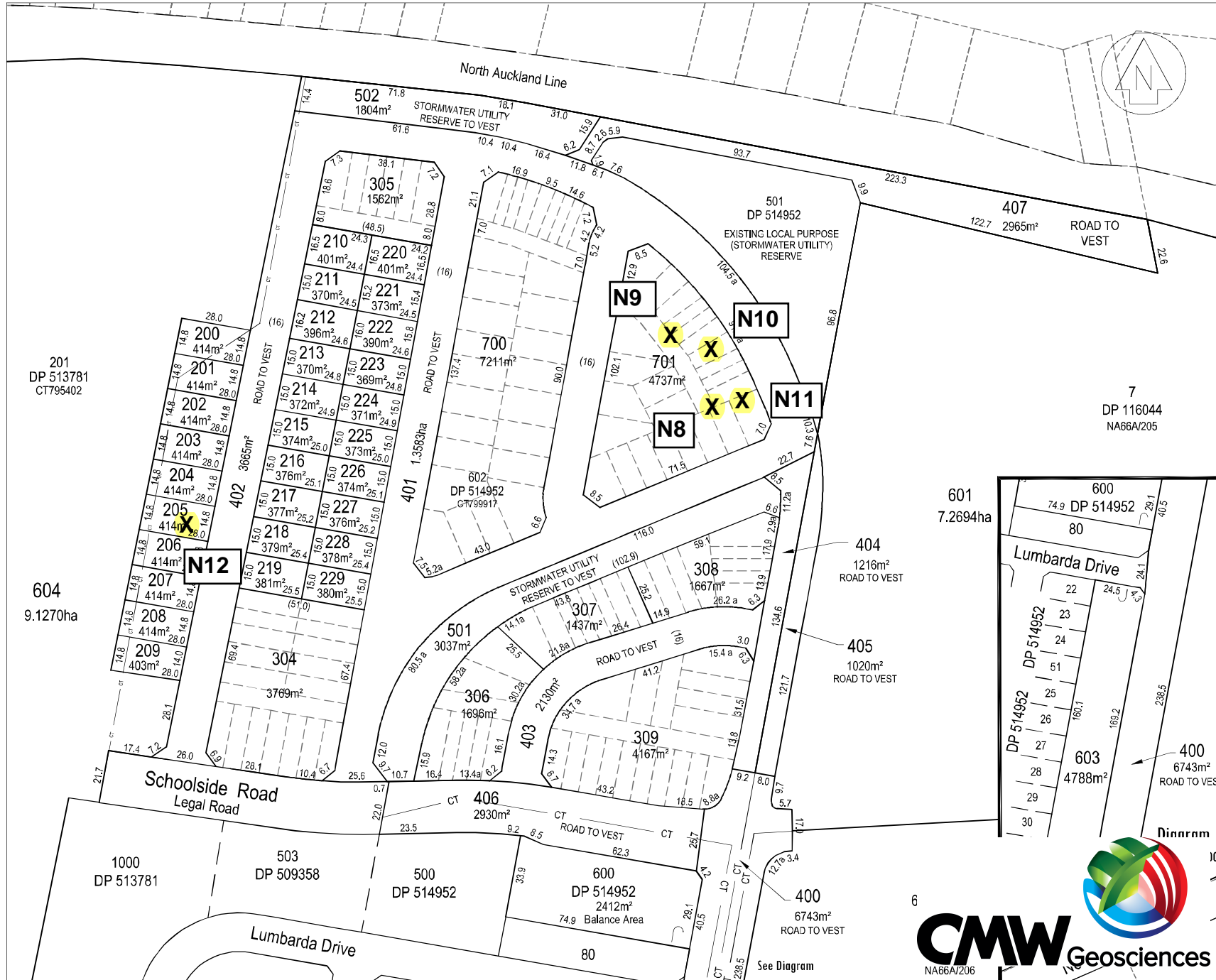
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 PO Box 157 fax 09-428 7331
 Grows 0946 email cato.bolam@cato-bolam.co.nz

CLIENT
CABRA DEVELOPMENTS LTD
 73 NOBIL ROAD,
 HUAPAI

TITLE
 LOTS 200-229,304-309,400-407,501,502,
 601-604, 700,701 BEING PROPOSED
 SUBDIVISION OF
 LOTS 600 & 602 DP 514952,
 LOTS 200 & 201 DP 513781 AND
 LOTS 7 & 8 DP 116044

ORIGINAL SCALE	ORIGINAL SIZE	REVISION NO
1 : 1500	A3	
DATE	CAD REFERENCE	SHEET NO
FEB 2018	41201 1200.dwg	1202
DIRECTORY		JOB NO
1205ym:41201\ACAD\		41201

CMW Geosciences
 NA66A/206



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