

11 January 2017

**RESIDENTIAL SUBDIVISION – 949 OLD WAIROA  
ROAD (AREA 2B), PAPA KURA**

**GEOTECHNICAL COMPLETION REPORT  
STAGE 1**

Cabara Investments Limited

Ref: 2015\_1186AF Rev: 0

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## 1. INTRODUCTION

In accordance with our instructions, this Geotechnical Completion Report has been prepared for Cabara Investments Limited as part of the documentation to be submitted to Auckland Council following earthworks to form Stage 1 of the 949 Old Wairoa Road (Area 2B), Papakura development. Construction of this residential subdivision has been undertaken in accordance with the Auckland Council Resource Consent number R/JSL/2013/2461, 41924, 41926, 41927 and 41925 and Engineering Approval letter dated 19 November 2015. Specific structures constructed during the civil works to create the subdivision include timber pole retaining walls and segmental block retaining walls.

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

This report covers the construction period October 2015 to November 2016 and is intended to be used for certification purposes for new lots (listed below) created from Lot 1 DP 493110 as follows:

40 new residential lots numbered 1-40;

4 new roads named Frazen Avenue, Pakaraka Drive, Twin Parks Rise and Te Aparangi Crescent; and

2 local purpose reserves on Lots 600 and 700;

This stage of the Old Wairoa Road Development is located off Old Wairoa Road and Papakura Clevedon Road, Papakura. As can be seen from the as-built plans, 31 of the lots have been affected by filling as part of the earthworks operations to a maximum depth of approximately 3.5 metres.

## 2. PROJECT BACKGROUND

The initial geotechnical investigation was undertaken by Coffey Geotechnics (NZ) Limited. CMW have undertaken subsequent investigation, design and the construction observation. Recommendations and the information contained in the Coffey Geotechnics geotechnical reports, as referenced below, have been reviewed during the preparation of this document.

- Coffey Geotechnics, Geotechnical Investigation Report, referenced GENZAUCK15303AA, dated 23 January 2013
- CMW Geosciences, Geotechnical Plan Review and Investigation Report, referenced 2015\_1186AA Rev.1, dated 27 July 2015
- CMW Geosciences, Concrete Block Retaining Wall Design Report, referenced 2015\_1186AC Rev.0, dated 4 September 2015
- CMW Geosciences, Geotechnical Works Specification, referenced 2015\_1186AD Rev.0, dated 23 October 2015
- CMW Geosciences, Permanent Stormwater Pond Detail, referenced 2015\_1186AE Rev.0, dated 18 November 2015

## 3. DESCRIPTION OF EARTHWORKS

West City Construction Limited mobilised to site in October 2015. During this period, erosion and sediment controls were installed for the entire site, including a temporary sediment retention pond on Lots 7, 8 and 600. A permanent stormwater detention pond was then constructed by completing an excavation of up to 7 metres on Lot 600. A clay liner was constructed along the entire length and width of the pond to ensure its long term function.

In October 2015 works began to clear Stage 1 of vegetation and strip top soil. The southern gully feature on site (below lots 14, 77 and 78) was mucked out and soft, saturated silty material was undercut and replaced. Deep sub soil drains were installed in this gully alignment consisting of perforated and non-perforated drain coils encased in a drainage aggregate and fully wrapped in a geotextile to ensure long term function. Some minor subsoil drains were installed to control groundwater levels during the initial stages of construction, where possible and practicable these have been connected to the stormwater network. Cut to fill earthworks were also being undertaken during this time to form design ground levels. The filling included the decommissioning of the temporary silt pond situated beneath Lots 7, 8 and 600. This pond was filled with site won clay fill to finished level

Construction of the cantilever timber pole retaining walls began in November 2015 and continued sporadically throughout the remaining construction period with the last wall finished in October 2016.

At the end of March the road subgrades for Road 1 was being prepared and lime stabilised. In the following months subgrades for Roads 3, 5 and 8 and the rest of Old Wairoa Road were being prepared. A layer of geogrid and a thicker pavement subgrade were constructed beneath these roads where lime stabilisation was not completed.

Civil works were undertaken between February 2016 and November 2016. Deep stormwater and sewer lines were the first civil works completed followed by combined service trenches. Topsoiling of lots began in April 2016 and was completed in October 2016.

The main items of plant used by the contractor, West City Construction Limited, included:

- 826 Compactors
- D7 and D8' Bulldozers and Scoops
- Tractor and Disks
- Dump trucks
- 5 to 40 tonne Excavators
- Loaders and 6 Wheel Dump Trucks
- Lime Spreaders
- Lime Hoes
- Graders; and
- Water Trucks

## **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 and retaining wall drainage but excluding road under-channel drains;
- Backfilling of subsoil drains;

- Excavation and backfilling of sewer and stormwater trenches;
- Subsoil drain connections to outlets;
- Retaining wall pile excavations;
- Construction of cantilever pole retaining walls including ground conditions, pile size, spacing and depth; and
- Construction of segmental block walls wall including ground conditions, drainage aggregate and drainage; and
- Placement and compaction of engineered fills.

## 4.2. Compaction Control

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

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 a one occasion that the required compaction standards were not being achieved and to the best of our knowledge the failing areas of fill were re-worked as necessary. Subsequent testing confirmed compliance with the specification.

## 5. EVALUATION OF COMPLETED EARTHWORKS

### 5.1. Natural Hazards

The appended as-built drawings depict the extents of 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 106 of the Resource Management Act, i.e. erosion, falling debris, subsidence, slippage, and inundation. Consideration of the inundation hazard was outside the scope of CMW's brief and has been assessed by others. The applied zones include:

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

Full descriptions of the restrictions associated with 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 include a batter slopes to form the permanent stormwater pond in Lot 600 and the western extents of Lots 7 to 21. This batter has a maximum gradient of 1(v) in 3(h).

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 and we are therefore satisfied that these areas are not subject to the natural stability hazards described in Section 106 of the Resource Management Act and Section 71(3) of the Building Act.

On all sloping land, 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 face. Wherever practical on such land, existing vegetation and grass cover should be well maintained. Any vegetation cleared beyond the immediate area of building platforms for temporary construction purposes should be replanted or replaced as soon as possible. The roots of an established vegetation cover can serve to bind the surface soils while the foliage can reduce rain infiltration and soil saturation, resulting in better resistance to erosion and shallow slumping.

### **5.3. Retaining Walls**

Cantilever pole retaining walls have been constructed in the locations shown on the appended Retaining Wall As-built Plan. These walls reach a maximum height of approximately 2.7 metres and were designed by Aspire Consultants Limited while the segmental block retaining walls were designed by this consultancy.

The construction of all retaining walls was observed by this consultancy and copies of the Producer Statements - Construction Review are provided in Appendix E.

Descriptions of the building and earthworks restrictions within the vicinity of these walls (Specific Design Zones – retaining) are contained in the Suitability Statement in Appendix A. Lots containing these zones include Lots 1 to 6 and 22 to 40 inclusive.

### **5.4. Fill Induced Settlement**

On the basis of the relatively minor magnitude of fill depths on this site, under fill drainage, together with the elapsed time since it was placed, we consider that remaining post-construction settlements will be within code limits and do not pose a hazard to NZS 3604 type building development.

### **5.5. Service Line Trenches**

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

Stormwater and sanitary sewer trenches in key locations contain a punched draincoil to facilitate draining of any groundwater seepages within the trench bedding. These draincoils are connected to the downstream stormwater manhole to outlet the water. This drainage has been installed as a precautionary measure that is not considered to be necessary for private connections.

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

stormwater and wastewater as-built plans. The resulting restrictions are presented in the Suitability Statement below.

## **5.6. Subsoil Drains**

The appended cut to fill depth contour plan - 2 as-built plan shows the positions of subsoil drains on Lots 19 and 24 which were constructed in the natural ground during the earthworks operations. The drains were installed to help control groundwater levels and where possible and practicable were linked to the reticulated storm water system. The ongoing operation of these drains is important to the overall stability conditions of the site.

Fills placed over these subsoils drains were typically between 2 and 2.5 metres deep. Accordingly they are predominantly beyond the depths of anticipated residential foundations.

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

## **5.7. Subsoil Drain Outlets**

All drainage on site (including but not limited to retaining wall drainage, sub soil drainage, service trench drainage) was connected to the council reticulated stormwater system installed on site.

## **5.8. Road Subgrades**

Penetration resistance testing was carried out on the road subgrades during construction and the results of this testing were forwarded to Aspire Consulting Engineers Limited for pavement remedial design. Where soft ground with low equivalent CBR values was identified it was generally undercut and geogrid and geotextile cloth was installed. All road subgrade areas were either lime/ cement stabilised or formed with a thickened pavement to achieve appropriate CBR values.

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

## **5.9. Stormwater Quality Pond**

The earthworks to form the completed subdivision included forming a stormwater quality pond in the northwestern portion of the site (Lot 600). This stormwater quality pond was excavated into cut natural ground. Silty and sandy material was encountered at the finished level of this pond which required undercutting and replacing with clay pond liner to ensure the function of the pond.

Based on the observations and assessment of the soils used to form the pond construction, CMW are satisfied that the pond has been formed to standards appropriate for its purpose.

## **5.10. Design of Shallow Foundations**

### **5.10.1. 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 7 to 35, 37 to 40 have been assessed as having a geotechnical ultimate bearing capacity of 300 kPa within the influence of conventional shallow residential building foundation loads. However on account of the presence of soft natural sub soils, a geotechnical ultimate bearing capacity of 200 kPa has been assessed for lots 1 to 6 and 36 inclusive.

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

#### **5.10.2. 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.

#### **5.10.3. Soil Expansiveness Classification**

Seven sets of soil tests were carried out on samples taken from likely foundation level on lots within Stage 1 of the development.

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

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

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

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

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

### **5.11. Topsoil Depths**

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

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

## **6. CLOSURE**

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

Although regular site visits have been undertaken for observation, for providing guidance and instruction and for testing purposes, the geotechnical services scope did not include full time site presence. To this end, our appended Suitability Statement also relies on the Contractors' work



practices and assumes that when we have not been present to observe the work, it has been completed to high standards and in accordance with the drawings, instructions and consent conditions provided to them.

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

**For and on behalf of  
CMW Geosciences (NZ) Limited**

**Prepared by:**



**Tim Lepper**

Engineering Geologist

**Reviewed and Approved by:**



**Sam Gibb**

Senior Geotechnical Engineer, CPEng

## **Appendix A**

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

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

I, Sam Gibb, of CMW Geosciences (NZ) Limited, Auckland, hereby confirm that:

1. As a Chartered Professional Engineer experienced in the field of geotechnical engineering, I am a Geo-professional as defined in section 1.2.2 of NZS 4404 and was retained by the Developer as the Geotechnical Engineer on Stages 1 of the 949 Old Wairoa Road Development.
2. The extent of preliminary investigations carried out to date are described in the Coffey Geotechnics Geotechnical Investigation Report referenced GENZAUCK15303AA dated 23 January 2013 and the CMW Geosciences (NZ) LTD Geotechnical Report referenced 2015\_1186AA Rev.1 dated 27 July 2015. 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 Cut to Fill Depth As-built Plan have been placed in compliance with NZS 4431 and related documents.
  - (b) The completed earthworks give due regard to land slope and foundation stability considerations on the building platform areas, but as shown on the appended building restriction zones plans, areas on all lots that have gradients steeper than 1(v) in 4 (h) (and generally up to 1(v) in 3(h)) or are adjacent to land having such gradients. Accordingly, restrictions incorporating Specific Design Zones (Slope) have been applied as depicted on the as-built plans as follows:
    - **Specific Design Zone (Slope) areas** have been applied on Lots 3, 4, 7 to 21 and 37 and 38 inclusive. No building construction and no earthworks (i.e. cut or fills of any depth) should take place within the designated **Specific Design Zone (Slope) areas** unless endorsed by a Chartered Professional Engineer experienced in geomechanics and familiar with the contents of this report. The endorsement will need to consider the implications of the proposals on both global stability conditions and soil creep on the development proposals, including the effects of services and associated trench backfills and control of the surface water.

This limitation also applies to long term landscaping works, including any proposed minor cuts either on or near batter toes to be retained by new landscaping walls that might not normally require engineering, and to landscaping fills on or immediately above the batter slopes.
  - (c) **Specific Design Zone (Retaining Walls) areas** have been applied on Lots 1 to 6 and 22 to 40 inclusive for the protection of the function of the retaining walls. No building construction and no earthworks (i.e. cut or fills of any depth) should take place within the designated **Specific Design Zone (Retaining Walls) 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 stability implications of the earthworks and building proposals on the retaining walls.
  - (d) The function of the subsoil drains installed beneath Lots 19 and 24 inclusive 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.

- (e) The formed drainage outlets on Lots 600 and 700 inclusive must be kept free of debris and otherwise maintained as necessary to ensure their ongoing function.
- (f) A geotechnical ultimate bearing capacity of 300 kPa may be assumed for shallow foundation design on the building platforms of Lots 7 to 35 and 37 to 40 inclusive.

Due to the presence of softer natural subsoils on the building platforms a geotechnical ultimate bearing capacity of 200 kPa may be assumed for Lots 1 to 6 and 36 inclusive.

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.

- (g) The expansive site Class for all lots has been assessed as AS2870 Class M (Moderate). 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 5.10.3 of the Geotechnical Completion Report) for reference by foundation contractors.
- (h) The backfilling and compaction of the storm water and sanitary sewer trenches on this subdivision has been carried out to appropriate standards having regard for the prevailing ground conditions and associated compaction induced pipe loadings.

However, no building development should take place within the 45 degree zone of influence of drain inverts unless endorsed by specific design and by construction inspections undertaken by a Chartered Professional Engineer experienced in geomechanics to ensure that lateral stability and differential settlement issues are addressed and that building loads are transferred beyond the influence of the pipe and trench backfill. A copy of drawing SW22 extracted from Chapter 4 of the Auckland Council Code of Practice for Land development and Subdivision this document is provided in Appendix B for clarification. Details for water and wastewater pipes are available in the Watercare COP1 - General Requirements and Procedures.

- (i) Subject to the geotechnical limitations, restrictions and recommendations contained in clauses 3(b), 3(c), 3(d), 3(e), 3(f), 3(g), and 3(h), above:
  - (i) The filled and natural ground is generally suitable for residential buildings constructed in accordance with NZS 3604 and the requirements of AS2870 for the appropriate expansive soil class.
  - (ii) Where shallow foundations are appropriate, design may be carried out in accordance with AS 2870 (Class M) or alternately, a specific foundation and structural design may be undertaken by a Chartered Professional Engineer.

4. Road subgrades have been formed with appropriate regard for slope stability and settlement risks.
5. The permanent stormwater quality pond construction in the drainage reserve Lot 600 has been formed to standards appropriate for its intended use.

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

**For and on behalf of  
CMW Geosciences (NZ) Limited**



**Sam Gibb**

Senior Geotechnical Engineer, CPEng

GCR Summary Table

Condition	Specific Design Zone (slope)	Specific Design Zone (retaining)	Subsoil Drains Present	On-site Drainage Outlet Present	Geotechnical Ultimate Bearing Capacity (kPa)	AS2870 Expansive Class	Service Line Restriction	Indicative Topsoil Depth (mm)
GCR SOPO Clause	3(b)	3(c)	3(d)	3(e)	3(f)	3(g)	3(h)	
Lot number								
1		●			200	M	●	150
2		●			200	M	●	200
3	●	●			200	M	●	250
4	●	●			200	M	●	150
5		●			200	M		150
6		●			200	M	●	200
7	●				300	M	●	200
8	●				300	M	●	300
9	●				300	M	●	250
10	●				300	M	●	200
11	●				300	M	●	150
12	●				300	M	●	150
13	●				300	M	●	250
14	●				300	M	●	200
15	●				300	M	●	250
16	●				300	M	●	200
17	●				300	M	●	300
18	●				300	M	●	250
19	●		●		300	M	●	250

Condition	Specific Design Zone (slope)	Specific Design Zone (retaining)	Subsoil Drains Present	On-site Drainage Outlet Present	Geotechnical Ultimate Bearing Capacity (kPa)	AS2870 Expansive Class	Service Line Restriction	Indicative Topsoil Depth (mm)
GCR SOPO Clause	3(b)	3(c)	3(d)	3(e)	3(f)	3(g)	3(h)	
Lot number								
20	●				300	M	●	250
21	●				300	M		250
22		●			300	M	●	150
23		●			300	M	●	150
24		●	●		300	M	●	150
25		●			300	M	●	150
26		●			300	M	●	200
27		●			300	M	●	200
28		●			300	M	●	150
29		●			300	M	●	150
30		●			300	M	●	150
31		●			300	M	●	150
32		●			300	M	●	150
33		●			300	M	●	150
34		●			300	M	●	150
35		●			300	M	●	250
36		●			200	M	●	250
37	●	●			300	M	●	150
38	●	●			300	M	●	200
39		●			300	M	●	250
40		●			300	M	●	150

Condition	Specific Design Zone (slope)	Specific Design Zone (retaining)	Subsoil Drains Present	On-site Drainage Outlet Present	Geotechnical Ultimate Bearing Capacity (kPa)	AS2870 Expansive Class	Service Line Restriction	Indicative Topsoil Depth (mm)
GCR SOPO Clause	3(b)	3(c)	3(d)	3(e)	3(f)	3(g)	3(h)	
Lot number								
600	-	-	-	●	-	-	-	-
700	-	-	-	●	-	-	-	-



# Appendix B

## Drawings

Title	Reference No.	Date	Revision
Existing Contour Plan	1126-AB-PG102-103	Dec 2016	-
Asbuilt Service Line Restrictions Consent Notice Places	1126-AB-PG104-107	Dec 2016	-
Asbuilt Specific Design Zone Consent Notice Plans	1126-AB-PG108-111	Dec 2016	-
Asbuilt Coordinate Tables	1126-AB-PG112	Dec 2016	-
As-built Contour Plan	1126-AB-EW201-202	Dec 2016	-
Cut/Fill Depth Contour Plan*	1126-AB-EW203-204	Dec 2016	-
Undercut Contour Plan and Subsoil Drain Plan	1126-AB-EW205-206	Dec 2016	-
Asbuilt Roding Plans	1126-AB-RD301-304	Dec 2016	-
Asbuilt Road Cross Sections	1126-AB-RD305-307	Dec 2016	-
Asbuilt Stormwater Plans	1126-AB-SW401-408	Dec 2016	-
Asbuilt Stormwater Pond Plan and Sections	1126-AB-SW409-410	Dec 2016	-
Asbuilt Wastewater Plans	1126-AB-WW501-504	Dec 2016	-
Asbuilt Water Supply Plans	1126-AB-WS601-604	Dec 2016	-
Stormwater Pipe and Manhole Construction Clearance Requirements – Auckland Council	SW22	30/9/13	1
Building Close to or over Sewer – Watercare	WW53, WW54, WW60	-	-

\* The cut/fill depth contour plans depict cut and fill between original existing ground level and finished ground level.

# CABRA INVESTMENTS LIMITED

## ASBUILT PLANS 40 LOT RESIDENTIAL SUBDIVISION (STAGE 1) AT 949 OLD WAIROA ROAD, PAPA KURA R/JSL/2013/2461 EPA2015/276



### PRELIMINARY & GENERAL

- PG101 COVER SHEET
- PG102-103 EXISTING CONTOUR PLANS
- PG104-107 ASBUILT SERVICE LINE RESTRICTIONS CONSENT NOTICE PLANS
- PG108-111 ASBUILT SPECIFIC DESIGN ZONE CONSENT NOTICE PLANS
- PG112 ASBUILT COORDINATE TABLES

### EARTHWORKS

- EW201-202 ASBUILT CONTOUR PLANS
- EW203-204 ASBUILT CUT & FILL DEPTH CONTOUR PLANS
- EW205-206 AS-BUILT UNDERCUT DEPTH CONTOUR PLANS

### ROADING

- RD301-304 ASBUILT ROADING PLANS
- RD305-307 ASBUILT ROAD CROSS SECTIONS

### STORMWATER

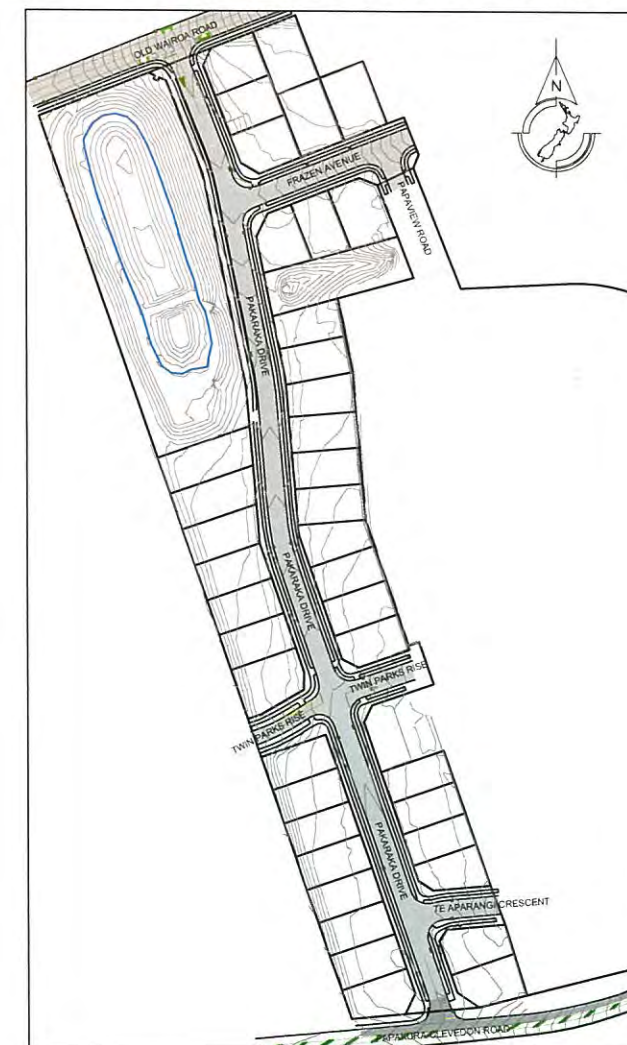
- SW401 ASBUILT STORMWATER PLAN 1
- SW402 ASBUILT STORMWATER MANHOLE PLAN 1
- SW403 ASBUILT STORMWATER PLAN 2
- SW404 ASBUILT STORMWATER MANHOLE PLAN 2
- SW405 ASBUILT STORMWATER PLAN 3
- SW406 ASBUILT STORMWATER MANHOLE PLAN 3
- SW407 ASBUILT STORMWATER PLAN 4
- SW408 ASBUILT STORMWATER MANHOLE PLAN 4
- SW409 ASBUILT STORMWATER POND PLAN
- SW410 ASBUILT STORMWATER POND SECTIONS

### WASTEWATER

- WW501 ASBUILT WASTEWATER PLAN 1
- WW502 ASBUILT WASTEWATER PLAN 2
- WW503 ASBUILT WASTEWATER PLAN 3
- WW504 ASBUILT WASTEWATER PLAN 4

### WATER SUPPLY

- WS601-604 ASBUILT WATER SUPPLY PLANS

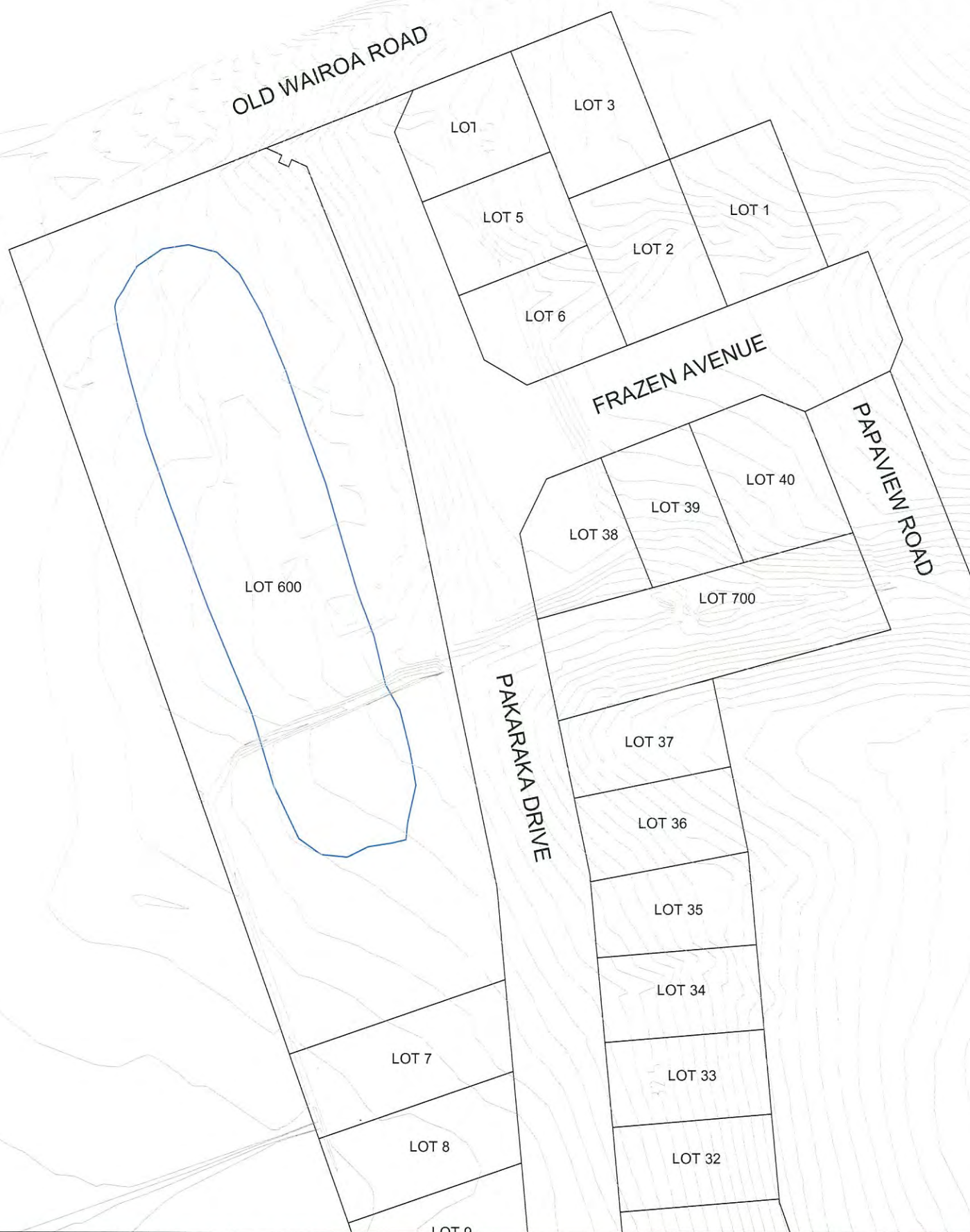


**COVER SHEET PG101**

**JOB NUMBER: 1126**



REV.	DESCRIPTION	CHECK	APPD	DATE	SCALE	1:1000 AT A3		CLIENT	SITE ADDRESS	DRAWING NUMBER			
						NAME	DATE					REVISION	
						DESIGN	MJ	12.16	<b>CABRA INVESTMENTS LIMITED</b>  <small>Conditions of Use:            These drawings shall only be used for the purpose for which they were supplied. Do not measure off this drawing. If doubt please contact Engineer.</small>	40 LOT RESIDENTIAL SUBDIVISION (STAGE 1) AT 949 OLD WAIROA ROAD, PAPAURA R/JSL/2013/2461 EPA 2015/276		1126 - AB - PG103	
						DRAWN	MJ	12.16				DATE	REVISION
						DRAWING CHECK	PF	12.16		DEC 2016	-		
						DESIGN CHECK	PF	12.16		<b>ASPIRE</b> CONSULTING ENGINEERS  Ph: 09 426 6552 Web: www.aspeng.co.nz			
						APPROVED	EP	12.16				DRAWING TITLE <b>EXISTING CONTOUR PLAN-2</b>	



REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE	1:1000 AT A3
					NAME	DATE
					DESIGN	MJ 12.16
					DRAWN	MJ 12.16
					DRAWING CHECK	PF 12.16
					DESIGN CHECK	PF 12.16
					APPROVED	EP 12.16

CLIENT  
**CABRA INVESTMENTS LIMITED**

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SITE ADDRESS  
**40 LOT RESIDENTIAL SUBDIVISION (STAGE 1)  
 AT 949 OLD WAIROA ROAD, PAKAKURA  
 R/JSL/2013/2461 EPA 2015/276**

DRAWING TITLE  
**EXISTING CONTOUR PLAN-1**

DRAWING NUMBER  
**1126 - AB - PG102**

DATE  
**DEC 2016**

REVISION  
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 Web: www.aspeng.co.nz




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- The **Coordinates** (X, Y) are in terms of NZTM on NZGD (2000).
- The **Levels** (Z) are in terms of the Auckland 1946 (MSL) LINZ datum (DOSLI datum).

Signed:   
Chartered Professional Engineer

Date: 11 January 2017  
Name: Evan Alexander Peters  
Contact Phone: (09) 426 6552  
Email: evan@aspeng.co.nz



LEGEND	
	SERVICE LINE RESTRICTIONS CONSENT NOTICE ZONE
	SPECIFIC DESIGN ZONE (RETAINING) CONSENT NOTICE
	SPECIFIC DESIGN ZONE (SLOPE) CONSENT NOTICE

REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE	1:500 AT A3	CLIENT	SITE ADDRESS	DRAWING NUMBER	
A	LOTS 3 & 4 SERVICE LINE RESTRICTION UPDATE	LB	EP	11.01.2017			CABRA INVESTMENTS LIMITED	40 LOT RESIDENTIAL SUBDIVISION (STAGE 1) AT 949 OLD WAIROA ROAD, PAPAOKURA R/JSL/2013/2461 EPA 2015/276	1126 - AB - PG104	
					DESIGN	LB				
					DRAWN	LB				
					DRAWING CHECK	PF				
					DESIGN CHECK	PF				
					APPROVED	EP				
							<b>Conditions of Use:</b> These drawings shall only be used for the purpose for which they were supplied. Do not measure off this drawing. If doubt please contact Engineer.	<b>DRAWING TITLE</b> AS-BUILT SERVICE LINE RESTRICTIONS CONSENT NOTICE PLAN-1	<b>DATE</b> DEC 2016	<b>REVISION</b> A



Ph: 09 426 6552  
Web: www.aspeng.co.nz



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Signed:   
 Chartered Professional Engineer  
 Date: 19 December 2016  
 Name: Evan Alexander Peters  
 Contact Phone: (09) 426 6552  
 Email: evan@aspeng.co.nz



**LEGEND**

-  SERVICE LINE RESTRICTIONS CONSENT NOTICE ZONE
-  SPECIFIC DESIGN ZONE (RETAINING) CONSENT NOTICE
-  SPECIFIC DESIGN ZONE (SLOPE) CONSENT NOTICE

REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE	1:500 AT A3
	DESIGN		LB	12.16		
	DRAWN		LB	12.16		
	DRAWING CHECK		PF	12.16		
	DESIGN CHECK		PF	12.16		
	APPROVED		EP	12.16		

CLIENT  
**CABRA INVESTMENTS LIMITED**

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SITE ADDRESS  
**40 LOT RESIDENTIAL SUBDIVISION (STAGE 1)  
 AT 949 OLD WAIROA ROAD, PAKAKURA  
 R/JSL/2013/2461 EPA 2015/276**

DRAWING TITLE  
**AS-BUILT SERVICE LINE  
 RESTRICTIONS CONSENT NOTICE PLAN-2**

DRAWING NUMBER  
**1126 - AB - PG105**

DATE  
**DEC 2016**

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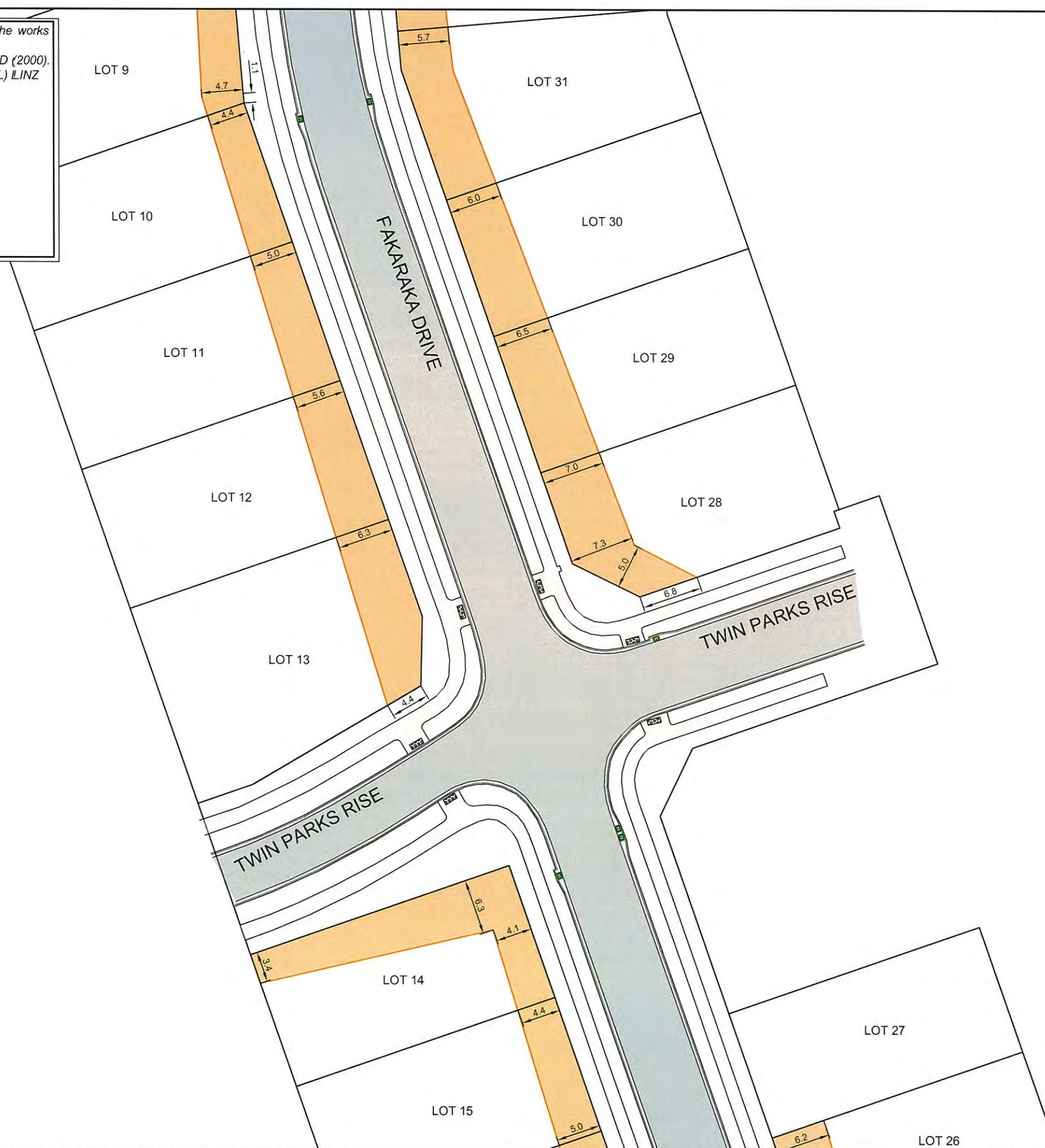
Signed:   
Chartered Professional Engineer




Date: 19 December 2016

Name: Evan Alexander Peters

Contact Phone: (09) 426 6552

Email: evan@aspeng.co.nz



LEGEND	
	SERVICE LINE RESTRICTIONS CONSENT NOTICE ZONE
	SPECIFIC DESIGN ZONE (RETAINING) CONSENT NOTICE
	SPECIFIC DESIGN ZONE (SLOPE) CONSENT NOTICE

REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE	1:500 AT A3	
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						DESIGN	LB 12.16
						DRAWN	LB 12.16
						DRAWING CHECK	PF 12.16
						DESIGN CHECK	PF 12.16
						APPROVED	EP 12.16

CLIENT  
**CABRA INVESTMENTS LIMITED**

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SITE ADDRESS  
**40 LOT RESIDENTIAL SUBDIVISION (STAGE 1)  
AT 949 OLD WAIROA ROAD, PAPAURA  
R/JSL/2013/2461 EPA 2015/276**

DRAWING TITLE  
**AS-BUILT SERVICE LINE  
RESTRICTIONS CONSENT NOTICE PLAN-3**

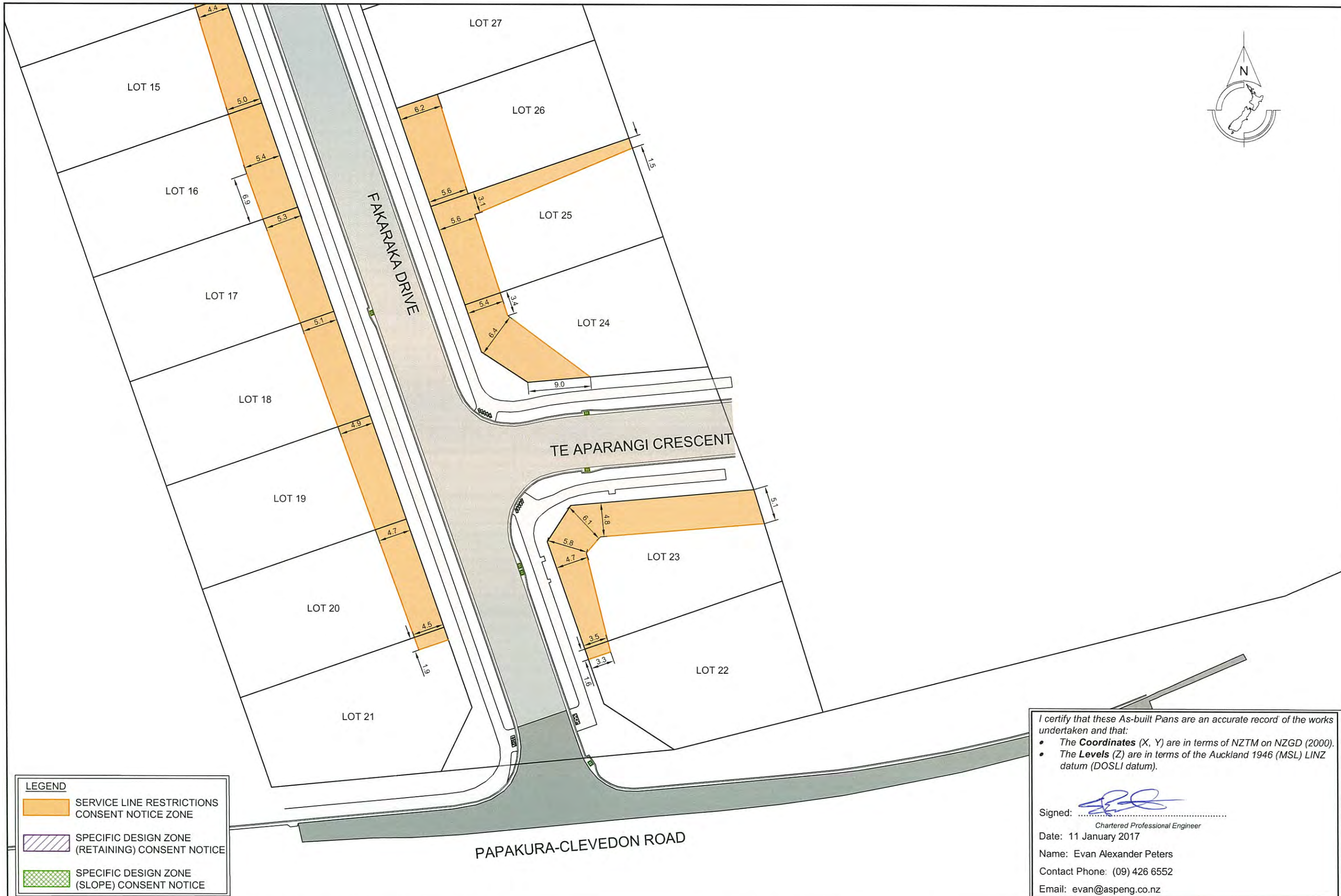
DRAWING NUMBER  
**1126 - AB - PG106**




DATE  
**DEC 2016**

REVISION  
**-**




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Web: www.aspeng.co.nz



LEGEND	
	SERVICE LINE RESTRICTIONS CONSENT NOTICE ZONE
	SPECIFIC DESIGN ZONE (RETAINING) CONSENT NOTICE
	SPECIFIC DESIGN ZONE (SLOPE) CONSENT NOTICE

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Signed:   
Chartered Professional Engineer  
Date: 11 January 2017  
Name: Evan Alexander Peters  
Contact Phone: (09) 426 6552  
Email: evan@aspeng.co.nz

REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE	1:500 AT A3	CLIENT	SITE ADDRESS	DRAWING NUMBER
A	LOTS 21 & 22 SERVICE LINE RESTRICTION UPDATE	LB	EP	11.01.2017			CABRA INVESTMENTS LIMITED	40 LOT RESIDENTIAL SUBDIVISION (STAGE 1) AT 949 OLD WAIROA ROAD, PAPA KURA R/JSL/2013/2461 EPA 2015/276	1126 - AB - PG107
					DESIGN	LB			
					DRAWN	LB			
					DRAWING CHECK	PF			
					DESIGN CHECK	PF			
					APPROVED	EP			
							Conditions of Use: These drawings shall only be used for the purpose for which they were supplied. Do not measure off this drawing. If doubt please contact Engineer.	DRAWING TITLE	DATE
								AS-BUILT SERVICE LINE RESTRICTIONS CONSENT NOTICE PLAN-4	DEC 2016
									REVISION
									A

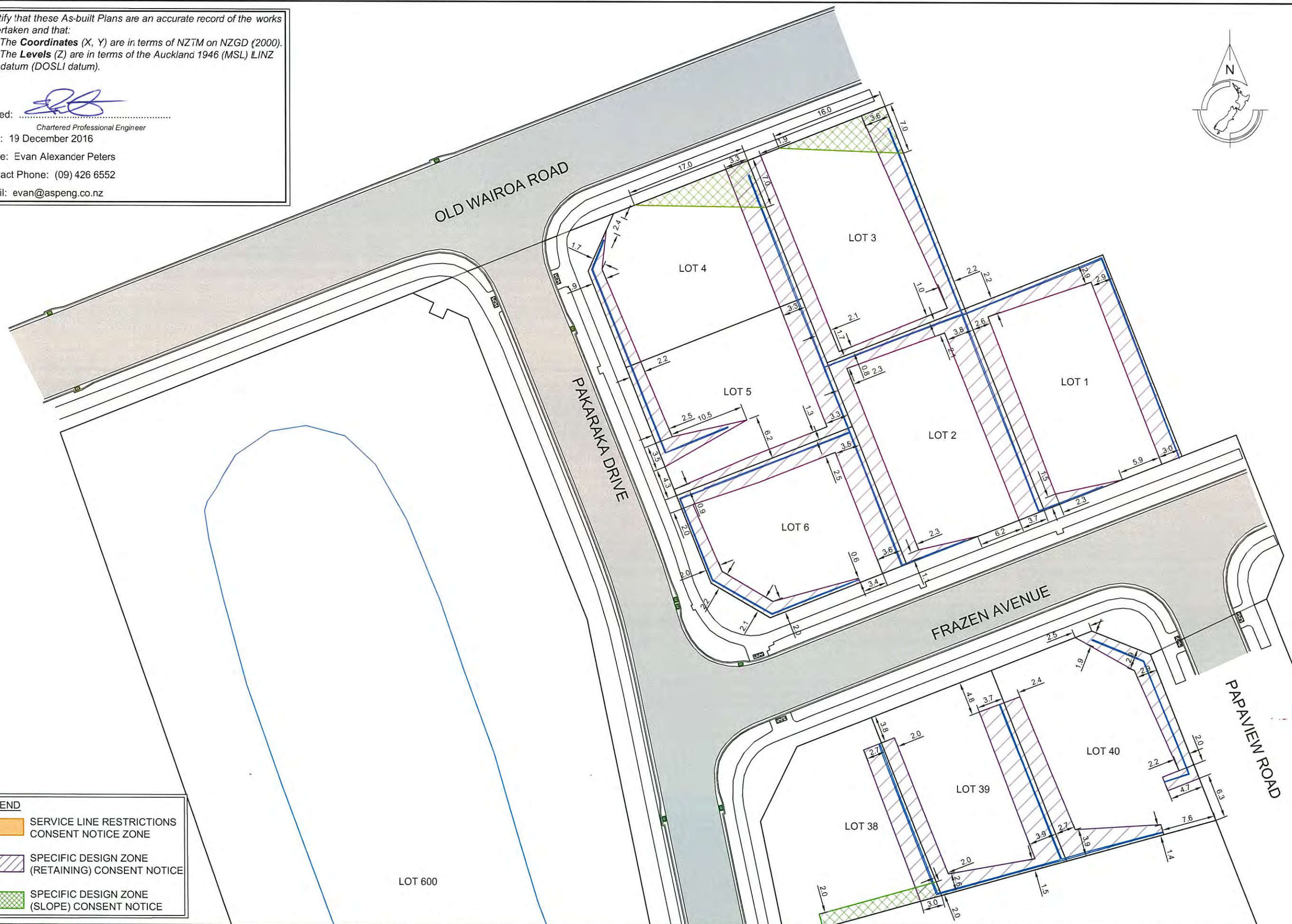







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Signed:   
 Chartered Professional Engineer  
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 Name: Evan Alexander Peters  
 Contact Phone: (09) 426 6552  
 Email: evan@aspeng.co.nz



**LEGEND**

-  SERVICE LINE RESTRICTIONS CONSENT NOTICE ZONE
-  SPECIFIC DESIGN ZONE (RETAINING) CONSENT NOTICE
-  SPECIFIC DESIGN ZONE (SLOPE) CONSENT NOTICE

REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE	1:500 AT A3
					DESIGN	LB 12.16
					DRAWN	LB 12.16
					DRAWING CHECK	PF 12.16
					DESIGN CHECK	PF 12.16
					APPROVED	EP 12.16

CLIENT  
**CABRA INVESTMENTS LIMITED**

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SITE ADDRESS  
**40 LOT RESIDENTIAL SUBDIVISION (STAGE 1)  
 AT 949 OLD WAIROA ROAD, PAKAKURA  
 R/JSL/2013/2461 EPA 2015/276**

DRAWING TITLE  
**AS-BUILT SPECIFIC DESIGN ZONE  
 CONSENT NOTICE PLAN-1**

DRAWING NUMBER  
**1126 - AB - PG108**

DATE  
**DEC 2016**

REVISION  
 -

**ASPIRE**  
 CONSULTING ENGINEERS

Ph: 09 426 6552  
 Web: www.aspeng.co.nz

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Signed: 

Chartered Professional Engineer

Date: 19 December 2016

Name: Evan Alexander Peters

Contact Phone: (09) 426 6552

Email: evan@aspeng.co.nz



LOT 600

LOT 700

PAKARAKA DRIVE

LOT 37

LOT 36

LOT 35

LOT 34




LOT 33

LOT 32

LOT 7

LOT 8

**LEGEND**

-  SERVICE LINE RESTRICTIONS  
CONSENT NOTICE ZONE
-  SPECIFIC DESIGN ZONE  
(RETAINING) CONSENT NOTICE
-  SPECIFIC DESIGN ZONE  
(SLOPE) CONSENT NOTICE

REV.	DESCRIPTION	CHECK	APPD	DATE	SCALE	1:500 AT A3	
						NAME	DATE
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	DRAWN			12.16		LB	12.16
	DRAWING CHECK			12.16		PF	12.16
	DESIGN CHECK			12.16		PF	12.16
	APPROVED			12.16		EP	12.16

CLIENT  
**CABRA INVESTMENTS LIMITED**

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SITE ADDRESS  
**40 LOT RESIDENTIAL SUBDIVISION (STAGE 1)  
AT 949 OLD WAIROA ROAD, PAKARAKA  
R/JSL/2013/2461 EPA 2015/276**

DRAWING TITLE  
**AS-BUILT SPECIFIC DESIGN ZONE  
CONSENT NOTICE PLAN-2**

DRAWING NUMBER  
**1126 - AB - PG109**

DATE  
**DEC 2016**

REVISION  
**-**



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Signed: 

Chartered Professional Engineer




Date: 19 December 2016

Name: Evan Alexander Peters

Contact Phone: (09) 426 6552

Email: evan@aspeng.co.nz



LEGEND	
	SERVICE LINE RESTRICTIONS CONSENT NOTICE ZONE
	SPECIFIC DESIGN ZONE (RETAINING) CONSENT NOTICE
	SPECIFIC DESIGN ZONE (SLOPE) CONSENT NOTICE

REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE	1:500 AT A3

CLIENT  
**CABRA INVESTMENTS LIMITED**

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SITE ADDRESS  
**40 LOT RESIDENTIAL SUBDIVISION (STAGE 1)  
AT 949 OLD WAIROA ROAD, PAPAURA  
R/JSL/2013/2461 EPA 2015/276**

DRAWING TITLE  
**AS-BUILT SPECIFIC DESIGN ZONE  
CONSENT NOTICE PLAN-3**

DRAWING NUMBER  
**1126 - AB - PG110**

DATE  
**DEC 2016**

REVISION  
**-**







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Web: www.aspeng.co.nz



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Name: Evan Alexander Peters  
Contact Phone: (09) 426 6552  
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LEGEND	
	SERVICE LINE RESTRICTIONS CONSENT NOTICE ZONE
	SPECIFIC DESIGN ZONE (RETAINING) CONSENT NOTICE
	SPECIFIC DESIGN ZONE (SLOPE) CONSENT NOTICE

REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE	1:500 AT A3	CLIENT	SITE ADDRESS	DRAWING NUMBER	
							CABRA INVESTMENTS LIMITED	40 LOT RESIDENTIAL SUBDIVISION (STAGE 1) AT 949 OLD WAIROA ROAD, PAPAURA R/JSL/2013/2461 EPA 2015/276	1126 - AB - PG111	
					DESIGN	LB				12.16
					DRAWN	LB				12.16
					DRAWING CHECK	PF				12.16
					DESIGN CHECK	PF				12.16
					APPROVED	EP	12.16	DRAWING TITLE	AS-BUILT SPECIFIC DESIGN ZONE CONSENT NOTICE PLAN-4	
<small>Conditions of Use: These drawings shall only be used for the purpose for which they were supplied. Do not measure off this drawing. If doubt please contact Engineer.</small>								DATE	REVISION	
								DEC 2016	-	



# ASBUILT CO-ORDINATE TABLES

## STORMWATER MANHOLE

COORDINATES		
POINTS	EASTING	NORTHING
ABSW-WW A0	1774886.122	5897700.285
ABSWMH A1	1774899.783	5897698.558
ABSWMH A2	1774919.541	5897700.104
ABSWMH A3	1774923.988	5897631.855
ABSWMH A4	1774941.694	5897576.752
ABSWMH A5	1774948.669	5897573.137
ABSWMH A6	1774957.189	5897558.261
ABSWMH B0	1774913.915	5897729.074
ABSWMH C1	1774903.691	5897629.014
ABSWMH C2	1774922.765	5897570.407
ABSWMH C3	1774932.127	5897542.564
ABSWMH C4	1774951.178	5897482.617
ABSWMH C5	1774965.745	5897438.483
ABSWMH D1	1774951.032	5897547.317
ABSWMH D2	1774973.980	5897476.475
ABSWMH D3	1774980.409	5897472.727
ABSWMH D4	1774986.273	5897452.877
ABSWMH E1	1775006.612	5897474.234
ABSWMH AD1	1774983.422	5897448.943
ABSWMH AD2	1774990.498	5897425.941
ABSWMH X1	1774910.003	5897748.887
ABSWMH X2	1774907.446	5897765.345
ABSWMH X3	1774911.740	5897773.843
ABSWMH X4	1774908.132	5897790.392
ABSWMH X5	1774897.870	5897795.585
ABSWMH X6	1774885.587	5897828.682
ABSWMH X7	1774914.259	5897839.267
ABSWMH Y1	1774929.707	5897798.161
ABSWMH Y2	1774949.014	5897805.362
ABSWMH Z1	1774941.975	5897784.573
ABSWMH AE1	1774860.455	5897841.882
ABSWMH AE2	1774916.762	5897863.757
ABSWMH POND	1774826.446	5897815.098
ABSW-WW POND	1774830.217	5897812.450

## STORMWATER CESSPIT

COORDINATES		
POINTS	EASTING	NORTHING
ABSWCP01	1774808.684	5897837.778
ABSWCP02	1774812.347	5897827.207
ABSWCP03	1774863.175	5897858.069
ABSWCP04	1774881.606	5897834.403
ABSWCP05	1774895.421	5897795.577
ABSWCP06	1774904.056	5897787.448
ABSWCP07	1774892.889	5897766.116
ABSWCP08	1774900.858	5897767.513
ABSWCP09	1774902.754	5897712.370
ABSWCP10	1774910.857	5897713.340
ABSWCP11	1774911.333	5897626.362
ABSWCP12	1774919.166	5897628.191
ABSWCP13	1774950.238	5897567.319
ABSWCP14	1774945.832	5897545.000
ABSWCP15	1774938.694	5897540.771
ABSWCP16	1774957.837	5897481.824
ABSWCP17	1774988.255	5897467.048
ABSWCP18	1774988.153	5897458.984
ABSWCP19	1774978.486	5897444.492
ABSWCP20	1774987.624	5897417.138

## WASTEWATER MANHOLE

COORDINATES		
POINTS	EASTING	NORTHING
ABWWMH WA1	1774904.921	5897531.991
ABWWMH WA2	1774931.701	5897540.421
ABWWMH WA3	1774921.109	5897570.923
ABWWMH WA4	1774943.052	5897578.082
ABWWMH WA5	1774955.143	5897571.613
ABWWMH WA6	1774975.290	5897577.909
ABWWMH WB1	1774925.779	5897630.939
ABWWMH WB2	1774921.931	5897683.621
ABWWMH WB3	1774951.198	5897684.512
ABWWMH WC1	1774920.690	5897701.383
ABWWMH WC2	1774914.578	5897731.731
ABWWMH WC4	1774908.443	5897764.266
ABWWMH WC5	1774913.684	5897775.503
ABWWMH WC6	1774909.330	5897797.236
ABWWMH WD1	1774928.672	5897803.921
ABWWMH WD2	1774947.911	5897811.610
ABWWMH WR1	1774921.702	5897823.201
ABWWMH WE1	1774943.356	5897786.553
ABWWMH WF1	1774902.412	5897629.270
ABWWMH WF2	1774900.789	5897663.511
ABWWMH WM11	1774960.363	5897556.075
ABWWMH WG1	1774943.572	5897502.984
ABWWMH WG2	1774965.664	5897508.268
ABWWMH WG3	1774969.330	5897496.486
ABWWMH WG4	1774974.845	5897479.428
ABWWMH WG5	1774982.326	5897473.665
ABWWMHWG6	1774987.795	5897451.100
ABWWMH WK1	1774985.361	5897447.504
ABWWMHWK2	1774989.308	5897433.512
ABWWMH WJ1	1774997.302	5897505.981
ABWWMH WH1	1774965.630	5897435.434
ABWWMH WAD2	1774817.892	5897823.148
ABWWMHWAD3	1774859.372	5897838.968
ABWWMHWAD4	1774888.221	5897849.498
ABWWMH WAD5	1774927.291	5897864.057

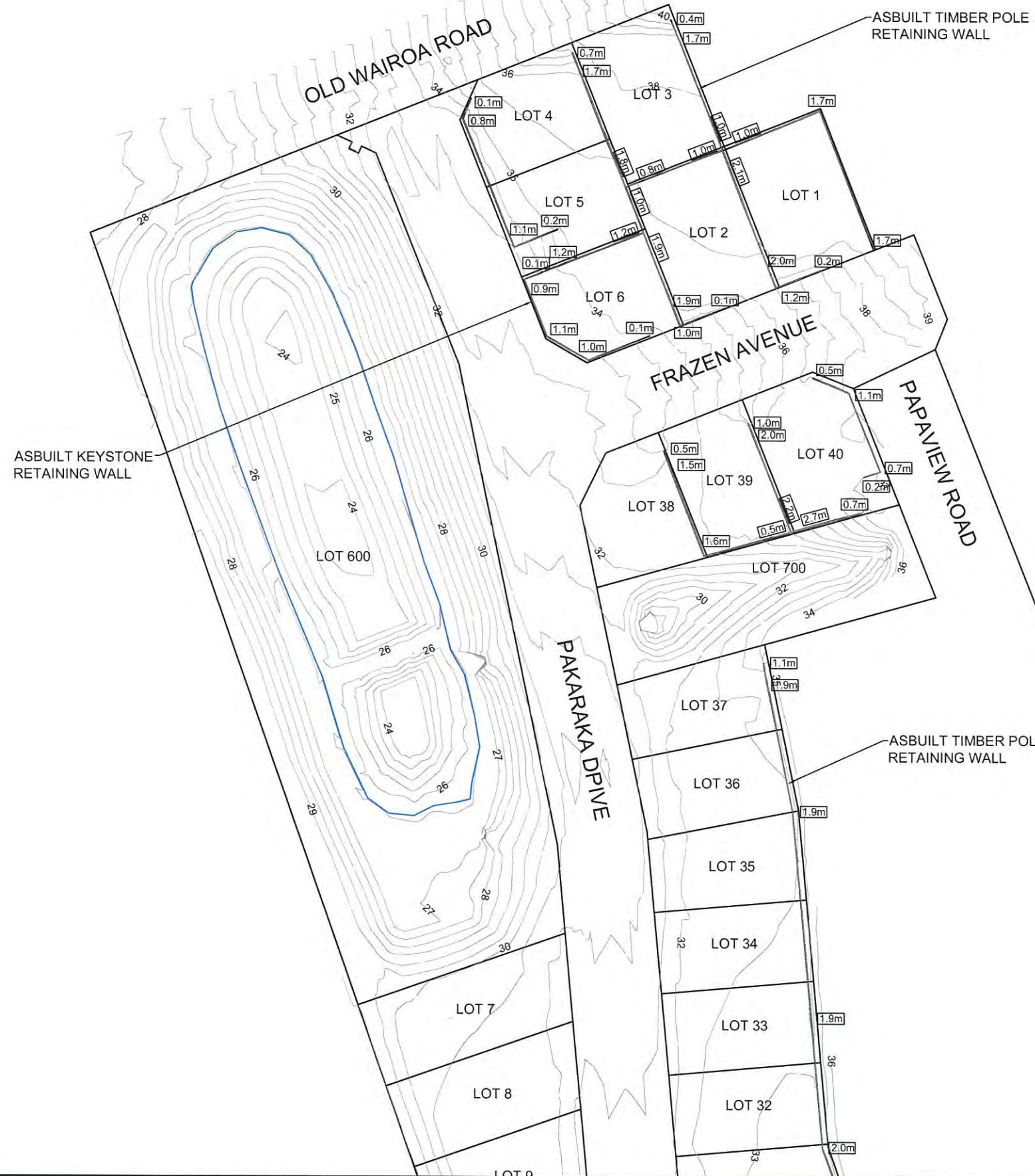
## FIRE HYDRANT

COORDINATES		
POINTS	EASTING	NORTHING
ABWSFH01	1774924.478	5897865.898
ABWSFH02	1774907.898	5897771.025
ABWSFH03	1774920.278	5897652.587
ABWSFH04	1774950.878	5897551.359
ABWSFH05	1774981.539	5897446.376

REV.	DESCRIPTION	CHECK	APPD	DATE	SCALE	N.T.S.	NAME	DATE	CLIENT	SITE ADDRESS	DRAWING NUMBER	DATE	REVISION
									CABRA INVESTMENTS LIMITED	40 LOT RESIDENTIAL SUBDIVISION (STAGE 1) AT 949 OLD WAIROA ROAD, PAPA KURA R/JSL/2013/2461 EPA 2015/276	1126 - AB - PG112	DEC 2016	-
							DESIGN	MJ					
							DRAWN	MJ					
							DRAWING CHECK	PF					
							DESIGN CHECK	PF					
							APPROVED	EP					



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Signed:   
Chartered Professional Engineer  
Date: 12 December 2016  
Name: Evan Alexander Peters  
Contact Phone: (09) 426 6552  
Email: evan@aspeng.co.nz

REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE	1:1000 AT A3
					NAME	DATE
					DESIGN	MJ 12.16
					DRAWN	MJ 12.16
					DRAWING CHECK	PF 12.16
					DESIGN CHECK	PF 12.16
					APPROVED	EP 12.16

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SITE ADDRESS  
**40 LOT RESIDENTIAL SUBDIVISION (STAGE 1)  
AT 949 OLD WAIROA ROAD, PAKARAKA  
R/JSL/2013/2461 EPA 2015/276**

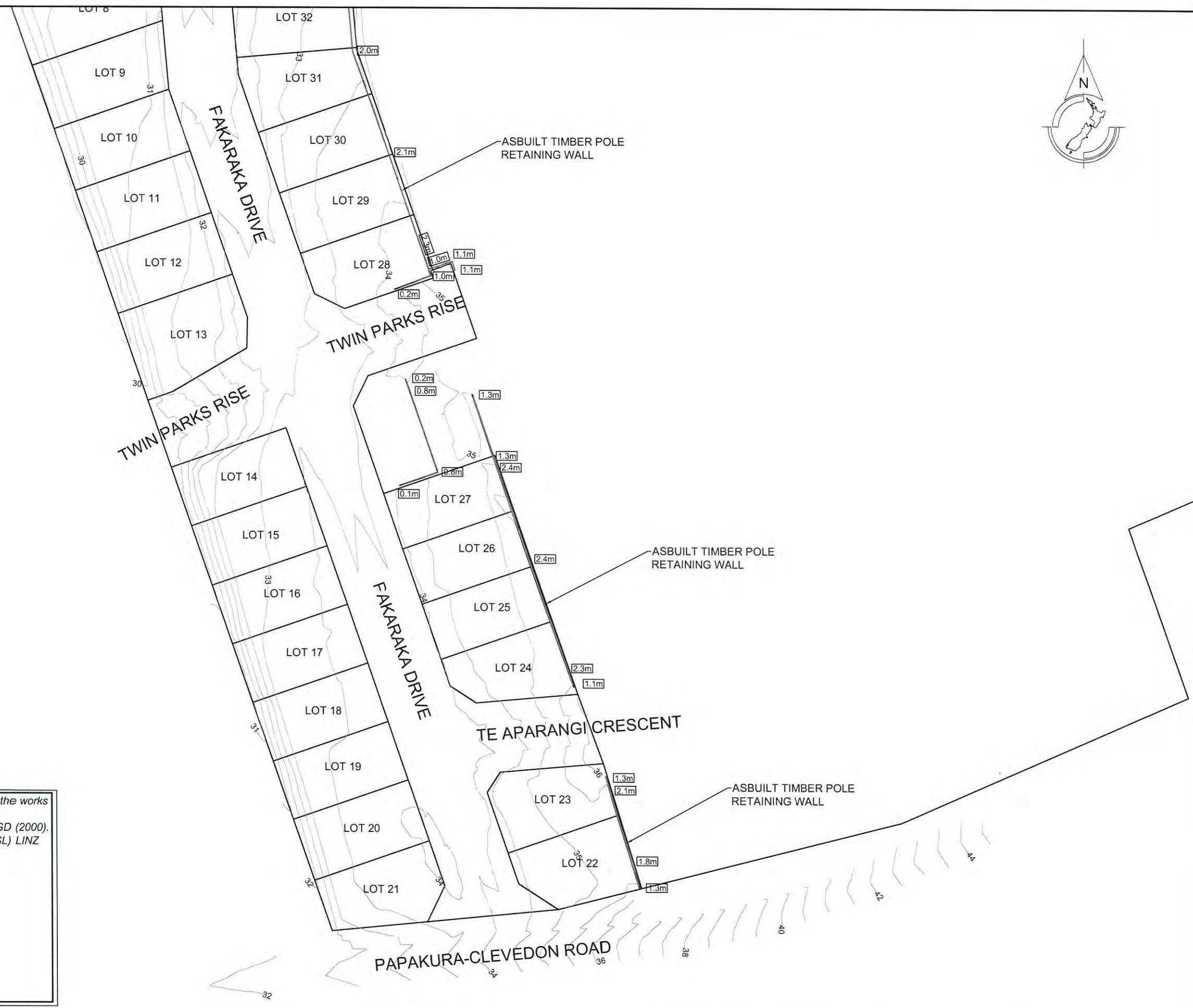
DRAWING TITLE  
**AS-BUILT CONTOUR PLAN-1**

DRAWING NUMBER  
**1126 - AB - EW201**

DATE  
**DEC 2016**

REVISION  
-





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REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE 1:1000 AT A3			CLIENT	SITE ADDRESS	DRAWING NUMBER	DATE	REVISION
					NAME	DATE	DATE					
								CABRA INVESTMENTS LIMITED  Conditions of Use: These drawings shall only be used for the purpose for which they were supplied. Do not measure off this drawing. If doubt please contact Engineer.	40 LOT RESIDENTIAL SUBDIVISION (STAGE 1) AT 949 OLD WAIROA ROAD, PAPAKURA R/JSL/2013/2461 EPA 2015/276	1126 - AB - EW202	DEC 2016	-






**LEGEND**

TOTAL EARTHWORKS AREA: 75,470m<sup>2</sup>

	CUT VOLUME: 56,560m <sup>3</sup> MAX CUT DEPTH 7.2m
	FILL VOLUME: 35,095m <sup>3</sup> MAX FILL DEPTH 3.3m

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Contact Phone: (09) 426 6552  
Email: evan@aspeng.co.nz

REV.	DESCRIPTION	CHECK	APPD	DATE	SCALE	1:1000 AT A3
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					MJ	12.16
					MJ	12.16
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**CABRA INVESTMENTS LIMITED**

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SITE ADDRESS  
**40 LOT RESIDENTIAL SUBDIVISION (STAGE 1)  
AT 949 OLD WAIROA ROAD, PAPAURA  
R/JSL/2013/2461 EPA 2015/276**

DRAWING TITLE  
**AS-BUILT CUT TO FILL DEPTH CONTOUR PLAN-1**

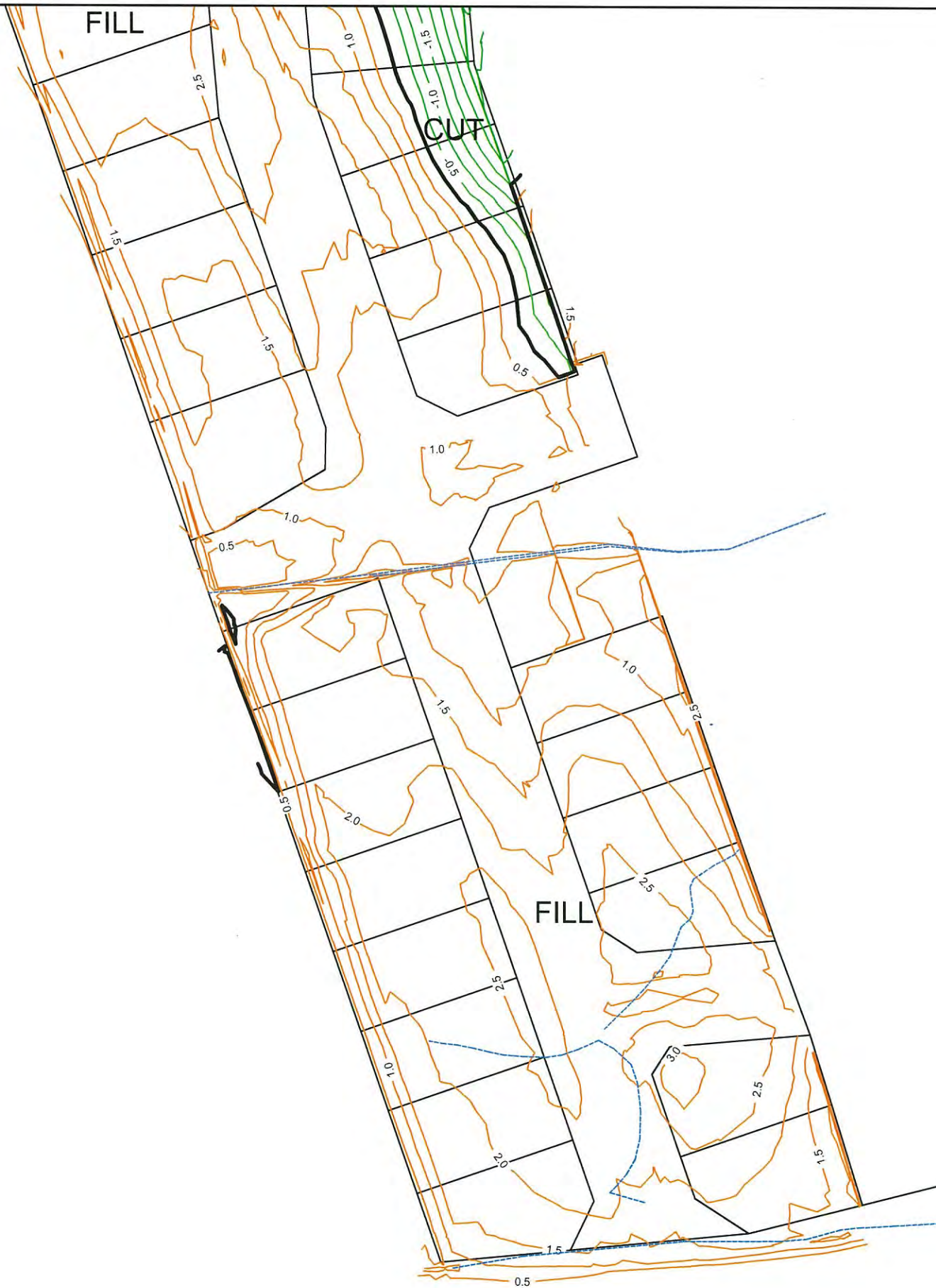
DRAWING NUMBER  
**1126 - AB - EW203**

DATE  
**DEC 2016**

REVISION  
-







LEGEND	
TOTAL EARTHWORKS AREA: 75,470m <sup>2</sup>	
	CUT VOLUME: 56,560m <sup>3</sup> MAX CUT DEPTH 7.2m
	FILL VOLUME: 35,095m <sup>3</sup> MAX FILL DEPTH 3.3m

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).
- The **Levels** (Z) are in terms of the Auckland 1946 (MSL) LINZ datum (DOSLI datum).

Signed:   
Chartered Professional Engineer  
Date: 12 December 2016  
Name: Evan Alexander Peters  
Contact Phone: (09) 426 6552  
Email: evan@aspeng.co.nz

REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE 1:1000 AT A3		
					NAME	DATE	
	DESIGN				MJ	12.16	
	DRAWN				MJ	12.16	
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	DESIGN CHECK				PF	12.16	
	APPROVED				EP	12.16	

CLIENT  
**CABRA INVESTMENTS LIMITED**

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SITE ADDRESS  
**40 LOT RESIDENTIAL SUBDIVISION (STAGE 1)  
AT 949 OLD WAIROA ROAD, PAPAURA  
R/JSL/2013/2461 EPA 2015/276**

DRAWING TITLE  
**AS-BUILT CUT TO FILL DEPTH CONTOUR PLAN-2**

DRAWING NUMBER  
**1126 - AB - EW204**

DATE  
**DEC 2016**

REVISION  
-





**LEGEND**  
 TOTAL UNDERCUT EARTHWORKS AREA: 6710m<sup>2</sup>  
 FILL VOLUME: 9265m<sup>3</sup>  
 MAX FILL DEPTH 3.5m  
 AS-BUILT UNDERFILL DRAIN

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).

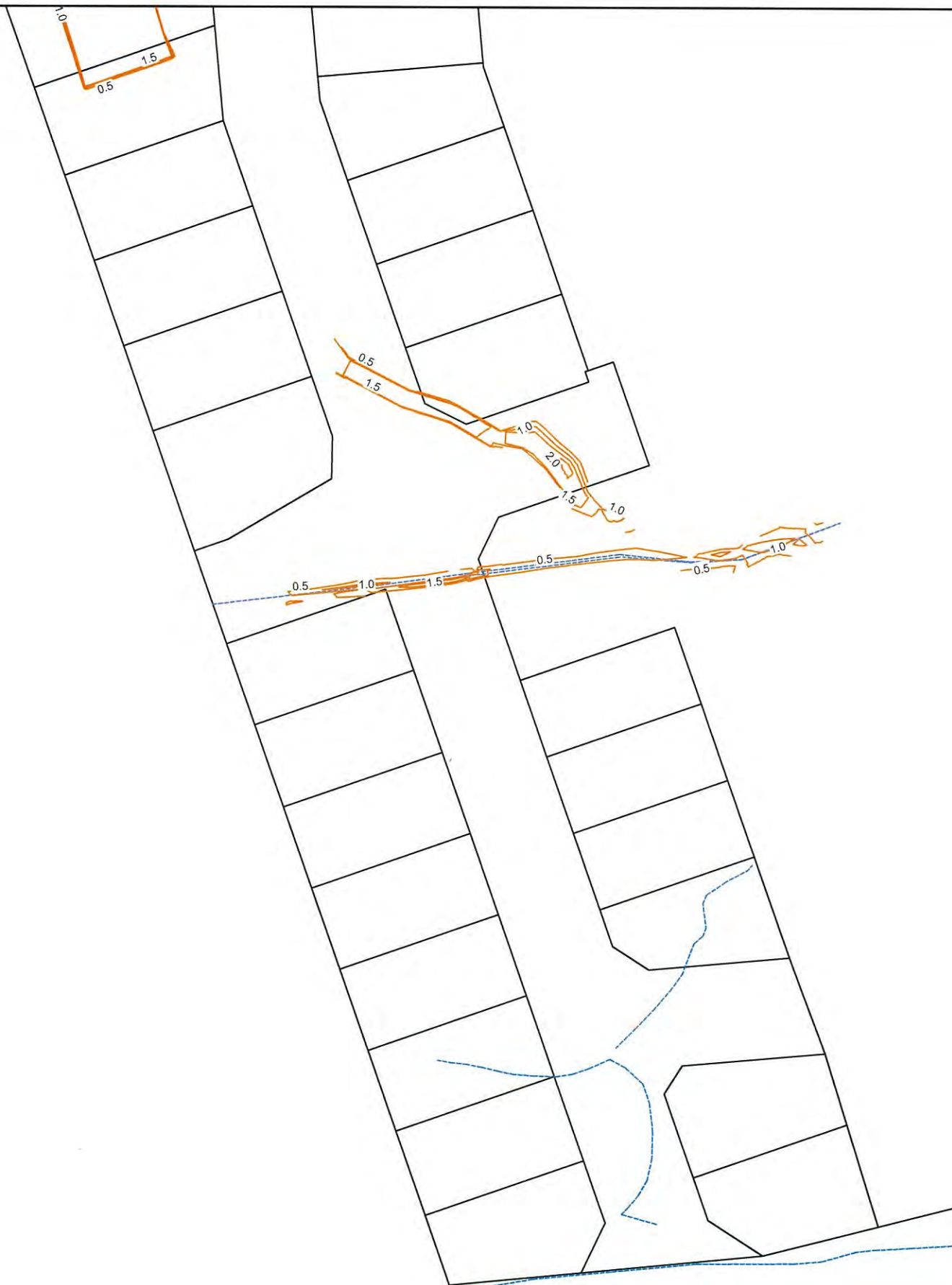
Signed:   
 Chartered Professional Engineer  
 Date: 19 December 2016  
 Name: Evan Alexander Peters  
 Contact Phone: (09) 426 6552  
 Email: evan@aspeng.co.nz

REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE	1:1000 AT A3	CLIENT	SITE ADDRESS	DRAWING NUMBER	
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					APPROVED	EP	12.16	DRAWING TITLE	DATE	
							Conditions of Use: These drawings shall only be used for the purpose for which they were supplied. Do not measure off this drawing. If doubt please contact Engineer.	AS-BUILT UNDERCUT DEPTH CONTOUR PLAN-1	DEC 2016	
								REVISION	-	






**LEGEND**  
 TOTAL UNDERCUT EARTHWORKS AREA: 6710m<sup>2</sup>  
 FILL VOLUME: 9265m<sup>3</sup>  
 MAX FILL DEPTH 3.5m  
 AS-BUILT UNDERFILL DRAIN



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 Chartered Professional Engineer  
 Date: 19 December 2016  
 Name: Evan Alexander Peters  
 Contact Phone: (09) 426 6552  
 Email: evan@aspeng.co.nz

REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE	1:1000 AT A3
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					DESIGN	MJ 12.16
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					APPROVED	EP 12.16

CLIENT  
**CABRA INVESTMENTS LIMITED**

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SITE ADDRESS  
**40 LOT RESIDENTIAL SUBDIVISION (STAGE 1)  
 AT 949 OLD WAIROA ROAD, PAPAURA  
 R/JSL/2013/2461 EPA 2015/276**

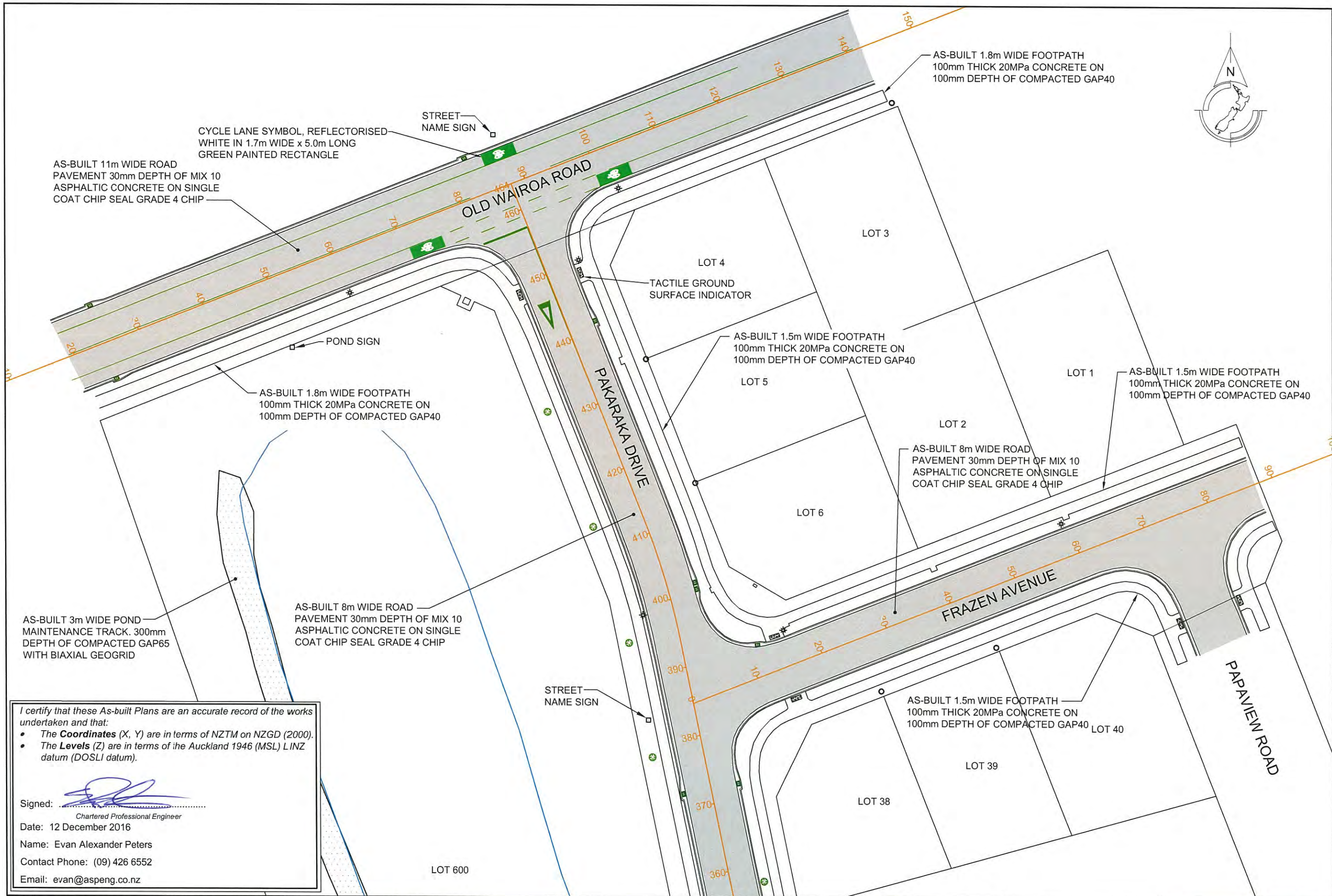
DRAWING TITLE  
**AS-BUILT UNDERCUT DEPTH CONTOUR PLAN-2**

DRAWING NUMBER  
**1126 - AB - EW206**

DATE  
**DEC 2016**

REVISION  
 -





AS-BUILT 11m WIDE ROAD  
PAVEMENT 30mm DEPTH OF MIX 10  
ASPHALTIC CONCRETE ON SINGLE  
COAT CHIP SEAL GRADE 4 CHIP

CYCLE LANE SYMBOL, REFLECTORISED  
WHITE IN 1.7m WIDE x 5.0m LONG  
GREEN PAINTED RECTANGLE

STREET  
NAME SIGN

AS-BUILT 1.8m WIDE FOOTPATH  
100mm THICK 20MPa CONCRETE ON  
100mm DEPTH OF COMPACTED GAP40

POND SIGN

AS-BUILT 1.8m WIDE FOOTPATH  
100mm THICK 20MPa CONCRETE ON  
100mm DEPTH OF COMPACTED GAP40

TACTILE GROUND  
SURFACE INDICATOR

AS-BUILT 1.5m WIDE FOOTPATH  
100mm THICK 20MPa CONCRETE ON  
100mm DEPTH OF COMPACTED GAP40

AS-BUILT 1.5m WIDE FOOTPATH  
100mm THICK 20MPa CONCRETE ON  
100mm DEPTH OF COMPACTED GAP40

AS-BUILT 8m WIDE ROAD  
PAVEMENT 30mm DEPTH OF MIX 10  
ASPHALTIC CONCRETE ON SINGLE  
COAT CHIP SEAL GRADE 4 CHIP

AS-BUILT 3m WIDE POND  
MAINTENANCE TRACK. 300mm  
DEPTH OF COMPACTED GAP65  
WITH BIAXIAL GEOGRID

AS-BUILT 8m WIDE ROAD  
PAVEMENT 30mm DEPTH OF MIX 10  
ASPHALTIC CONCRETE ON SINGLE  
COAT CHIP SEAL GRADE 4 CHIP

STREET  
NAME SIGN

AS-BUILT 1.5m WIDE FOOTPATH  
100mm THICK 20MPa CONCRETE ON  
100mm DEPTH OF COMPACTED GAP40

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Signed:   
Chartered Professional Engineer

Date: 12 December 2016  
Name: Evan Alexander Peters  
Contact Phone: (09) 426 6552  
Email: [evan@aspeng.co.nz](mailto:evan@aspeng.co.nz)

REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE	1:500 AT A3
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	DRAWN		LB	12.16		
	DRAWING CHECK		PF	12.16		
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	APPROVED		EP	12.16		

CLIENT  
**CABRA INVESTMENTS LIMITED**

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SITE ADDRESS  
**40 LOT RESIDENTIAL SUBDIVISION (STAGE 1)  
AT 949 OLD WAIROA ROAD, PAPAURA  
R/JSL/2013/2461 EPA 2015/276**

DRAWING TITLE  
**AS-BUILT ROADING PLAN 1**

DRAWING NUMBER  
**1126 - AB - RD301**

DATE  
**DEC 2016**

REVISION  
**-**

**ASPIRE**  
CONSULTING ENGINEERS

Ph: 09 426 6552  
Web: [www.aspeng.co.nz](http://www.aspeng.co.nz)



LOT 600

LOT 700

LOT 37

LOT 36

LOT 35

LOT 34

LOT 33

LOT 32

LOT 8

PAKARAKA DRIVE

360  
350  
340  
330  
320  
310  
300  
290  
280  
270  
260  
250  
240

AS-BUILT 3m WIDE POND  
MAINTENANCE TRACK. 300mm  
DEPTH OF COMPACTED GAP65  
WITH BIAXIAL GEOGRID

AS-BUILT 8m WIDE ROAD  
PAVEMENT 30mm DEPTH OF MIX 10  
ASPHALTIC CONCRETE ON SINGLE  
COAT CHIP SEAL GRADE 4 CHIP


POND SIGN

150mm THICK  
20MPa CONCRETE  
CROSSING

AS-BUILT 1.5m WIDE FOOTPATH  
100mm THICK 20MPa CONCRETE ON  
100mm DEPTH OF COMPACTED GAP40

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Chartered Professional Engineer  
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Contact Phone: (09) 426 6552  
Email: evan@aspeng.co.nz

REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE	1:500 AT A3
					NAME	DATE
					DESIGN	LB 12.16
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					DRAWING CHECK	PF 12.16
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					APPROVED	EP 12.16

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**CABRA INVESTMENTS LIMITED**

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SITE ADDRESS  
**40 LOT RESIDENTIAL SUBDIVISION (STAGE 1)  
AT 949 OLD WAIROA ROAD, PAKAKURA  
R/JSL/2013/2461 EPA 2015/276**

DRAWING TITLE  
**AS-BUILT ROADING PLAN 2**

DRAWING NUMBER  
**1126 - AB - RD302**

DATE  
**DEC 2016**

REVISION  
**-**


**ASPIRE**  
CONSULTING ENGINEERS

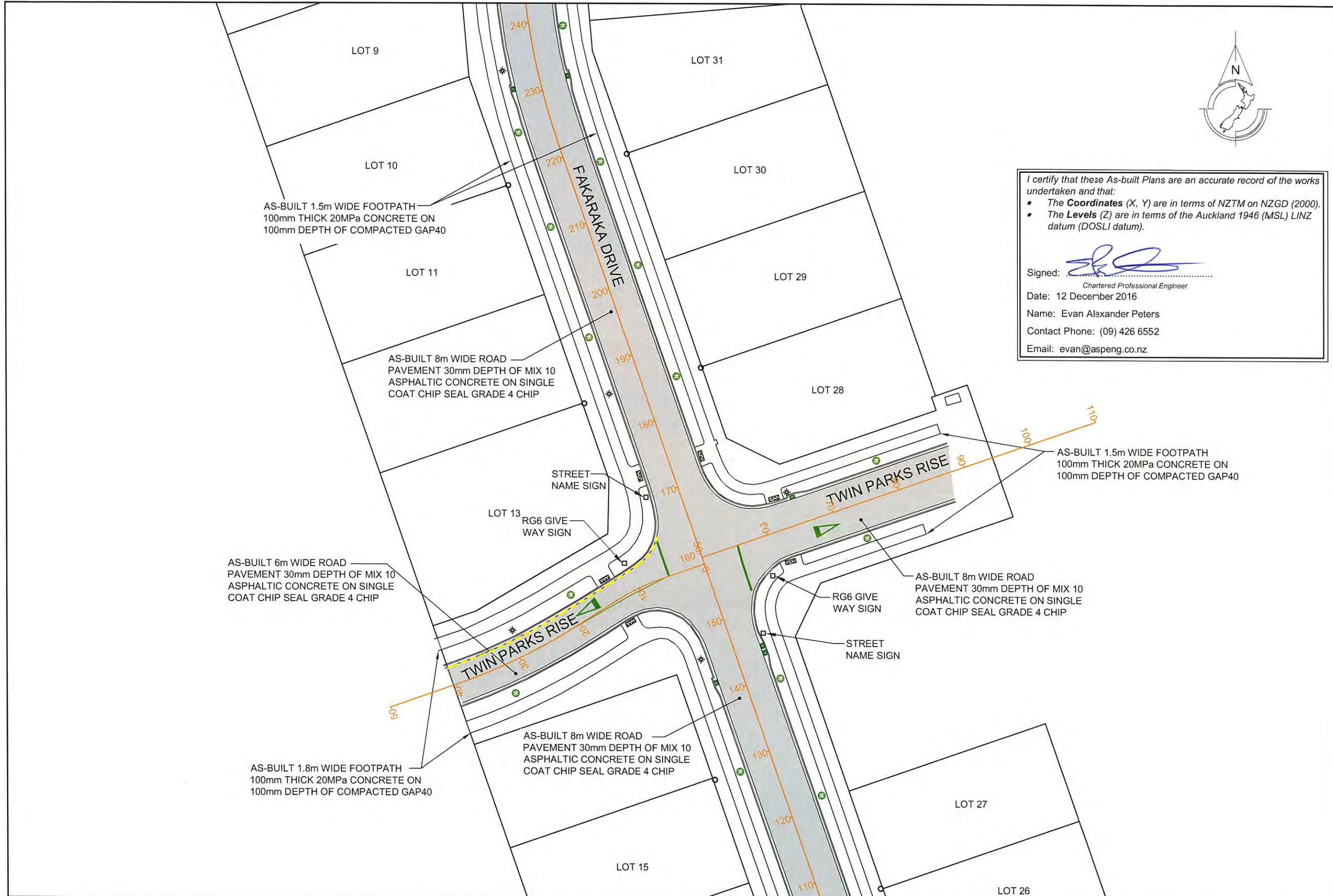
Ph: 09 426 6552  
Web: www.aspeng.co.nz



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Signed:   
 Chartered Professional Engineer  
 Date: 12 December 2016  
 Name: Evan Alexander Peters  
 Contact Phone: (09) 426 6552  
 Email: evan@aspeng.co.nz



REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE	1:500 AT A3
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					DESIGN	LB 12.16
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					APPROVED	EP 12.16

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SITE ADDRESS  
**40 LOT RESIDENTIAL SUBDIVISION (STAGE 1)  
 AT 949 OLD WAIROA ROAD, PAPAURA  
 R/JSL/2013/2461 EPA 2015/276**

DRAWING TITLE  
**AS-BUILT ROADING PLAN 3**

DRAWING NUMBER  
**1126 - AB - RD303**

DATE  
**DEC 2016**

REVISION  
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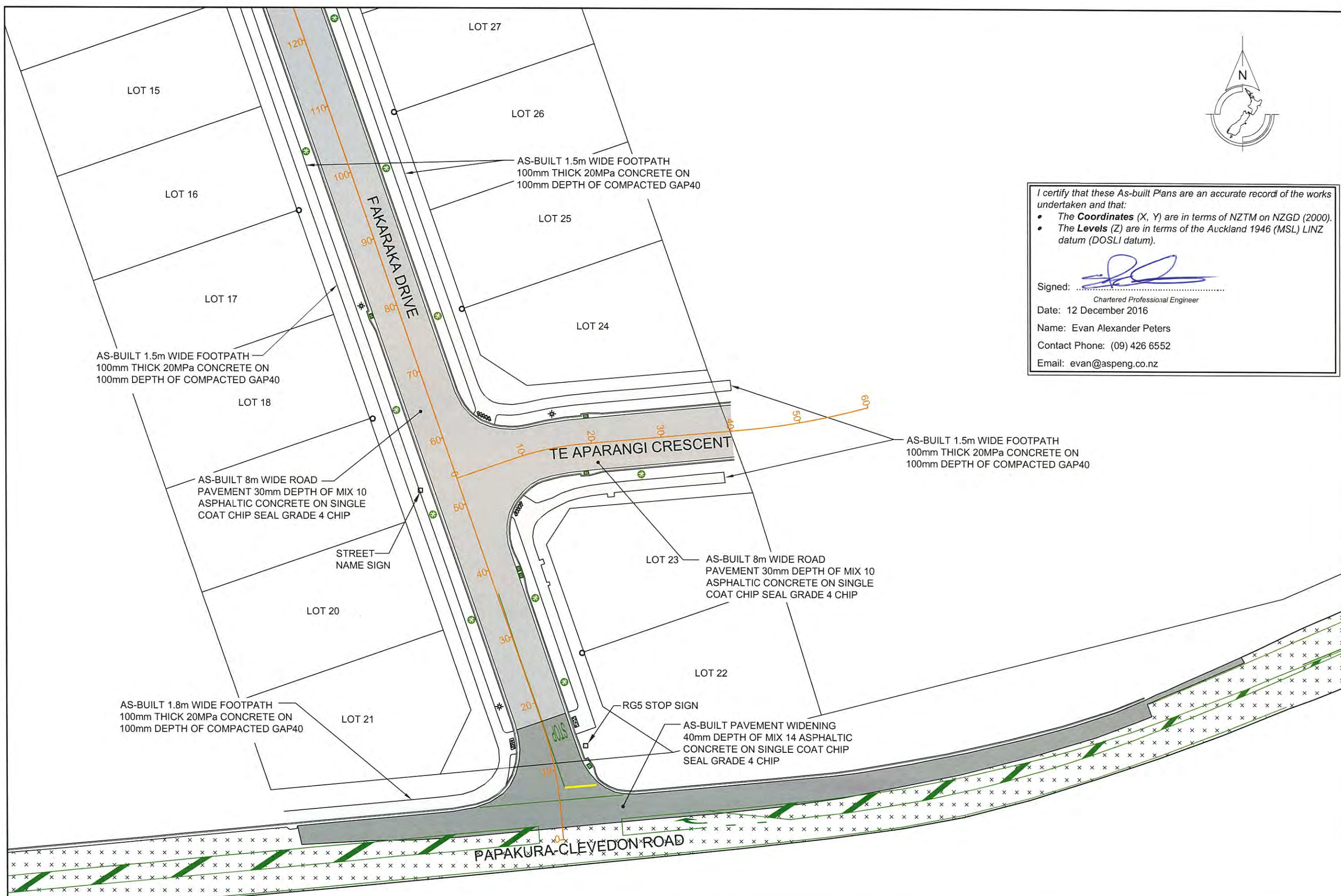
Ph: 09 426 6552  
 Web: www.aspeng.co.nz



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Chartered Professional Engineer  
Date: 12 December 2016  
Name: Evan Alexander Peters  
Contact Phone: (09) 426 6552  
Email: evan@aspeng.co.nz



REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE	1:500 AT A3
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					PF	12.16
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					EP	12.16

CLIENT  
**CABRA INVESTMENTS LIMITED**

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SITE ADDRESS  
**40 LOT RESIDENTIAL SUBDIVISION (STAGE 1)  
AT 949 OLD WAIROA ROAD, PAPA KURA  
R/JSL/2013/2461 EPA 2015/276**

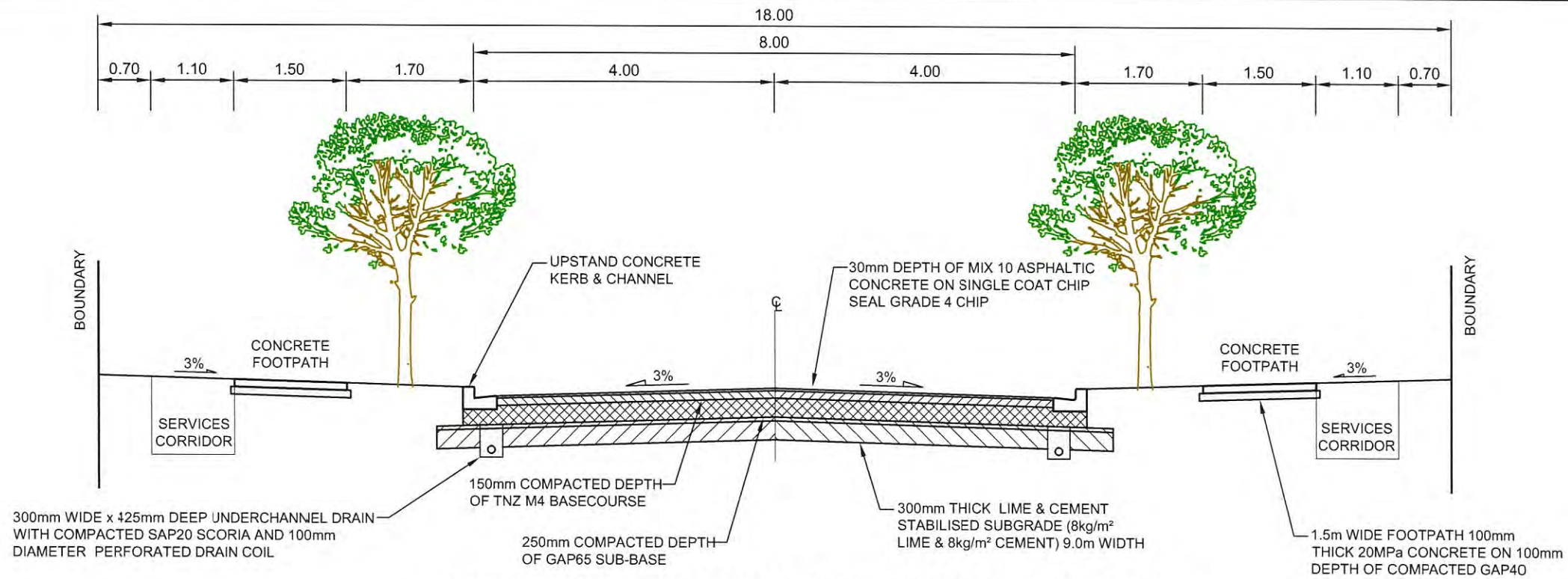
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**AS-BUILT ROADING PLAN 4**

DRAWING NUMBER  
**1126 - AB - RD304**

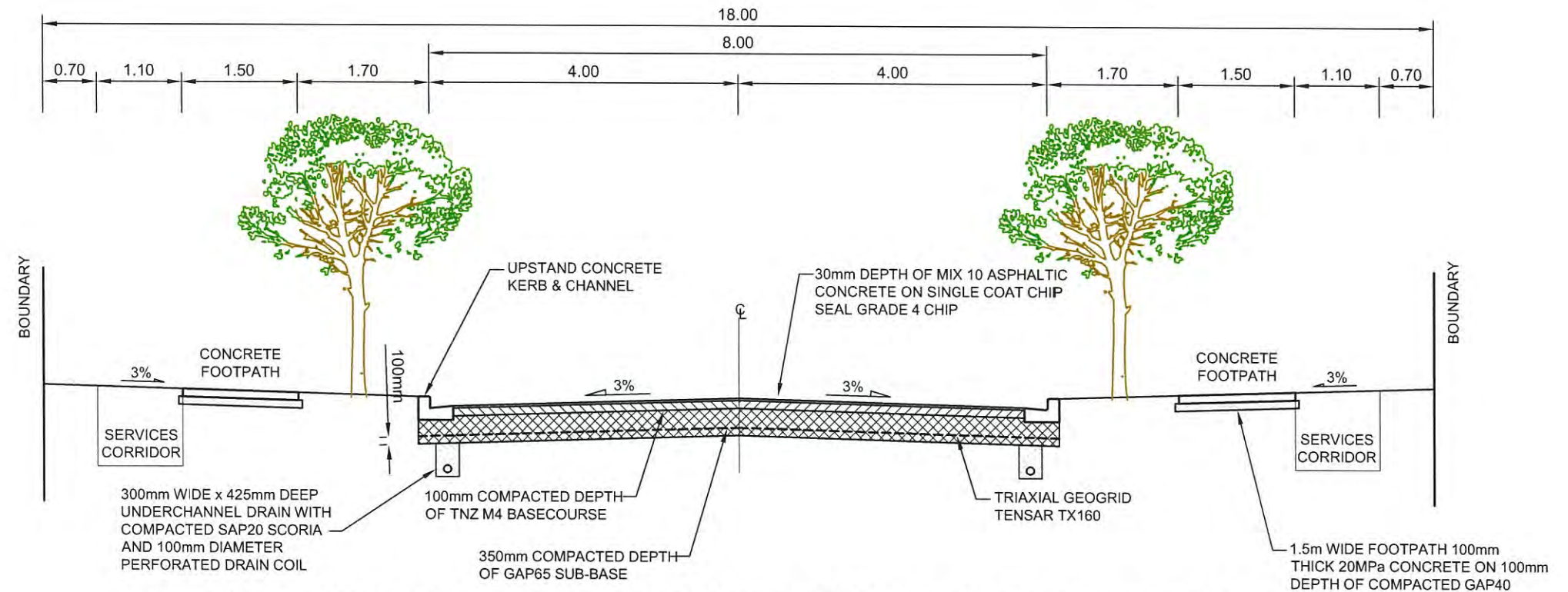
DATE  
**DEC 2016**

REVISION  
-





AS BUILT 8.0m WIDE (PAKARAKA DRIVE) ROAD CROSS SECTION



AS BUILT 8.0m WIDE (TWIN PARKS RISE, TE APARANGI CRESCENT, FRAZEN AVENUE) ROAD CROSS SECTION

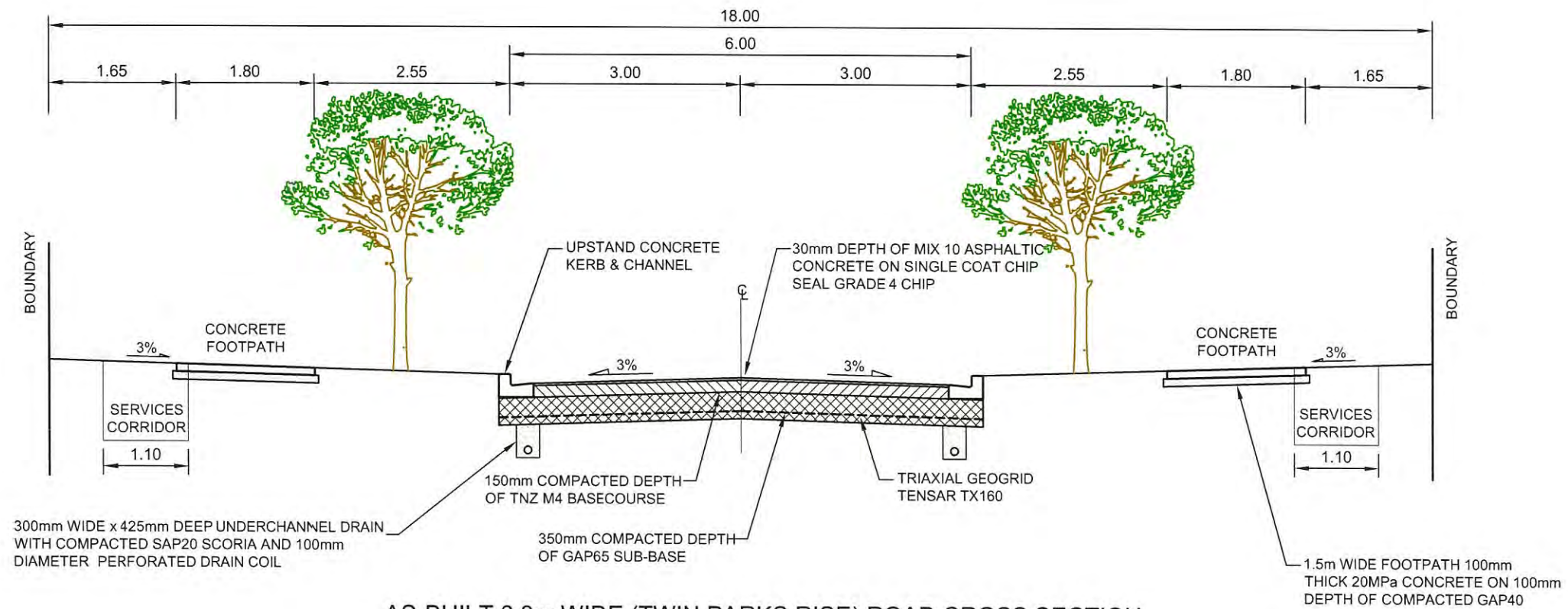
I certify that these As-built Plans are an accurate record of the works undertaken and that:

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- The Levels (Z) are in terms of the Auckland 1946 (MSL) LINZ datum (DOSLI datum).

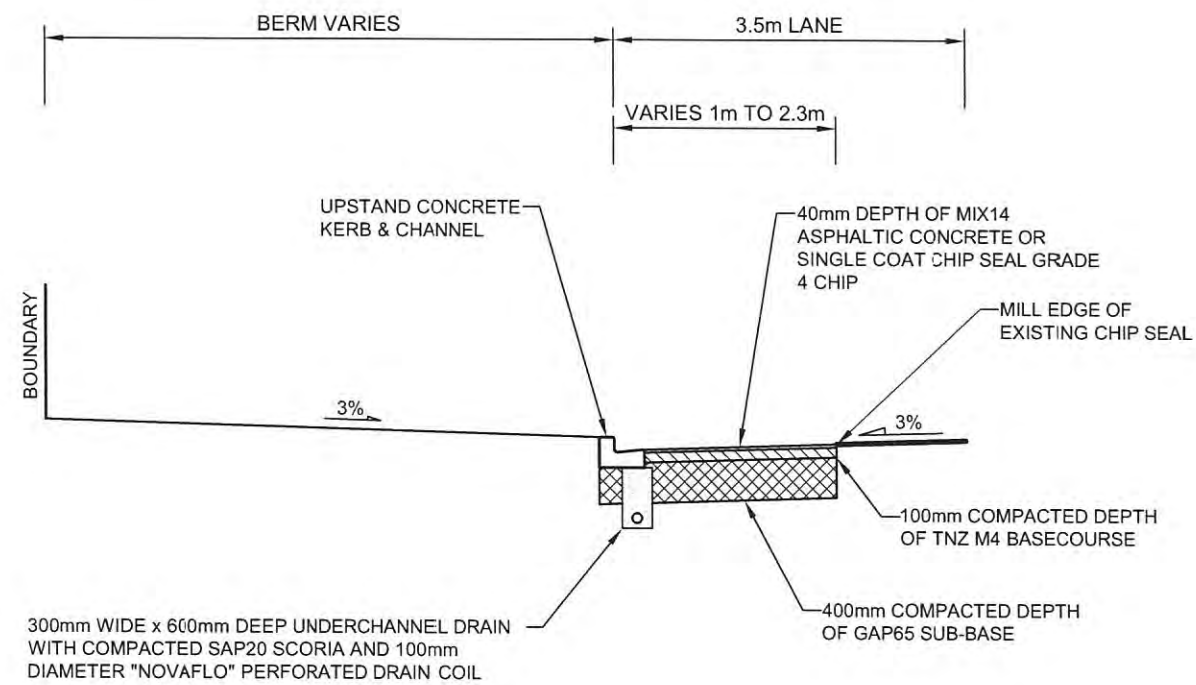
Signed:   
 Chartered Professional Engineer  
 Date: 12 December 2016  
 Name: Evan Alexander Peters  
 Contact Phone: (09) 426 6552  
 Email: evan@aspeng.co.nz

REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE	1:75 AT A3	CLIENT	SITE ADDRESS	DRAWING NUMBER		
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					APPROVED	EP	12.16	ASPIRE CONSULTING ENGINEERS			
							Conditions of Use: These drawings shall only be used for the purpose for which they were supplied. Do not measure off this drawing. If doubt please contact Engineer.	AS BUILT ROAD CROSS SECTIONS-1		Ph: 09 426 6552 Web: www.aspeng.co.nz	





AS-BUILT 6.0m WIDE (TWIN PARKS RISE) ROAD CROSS SECTION



AS BUILT PAPAURA-CLEVEDON ROAD WIDENING CROSS SECTION

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

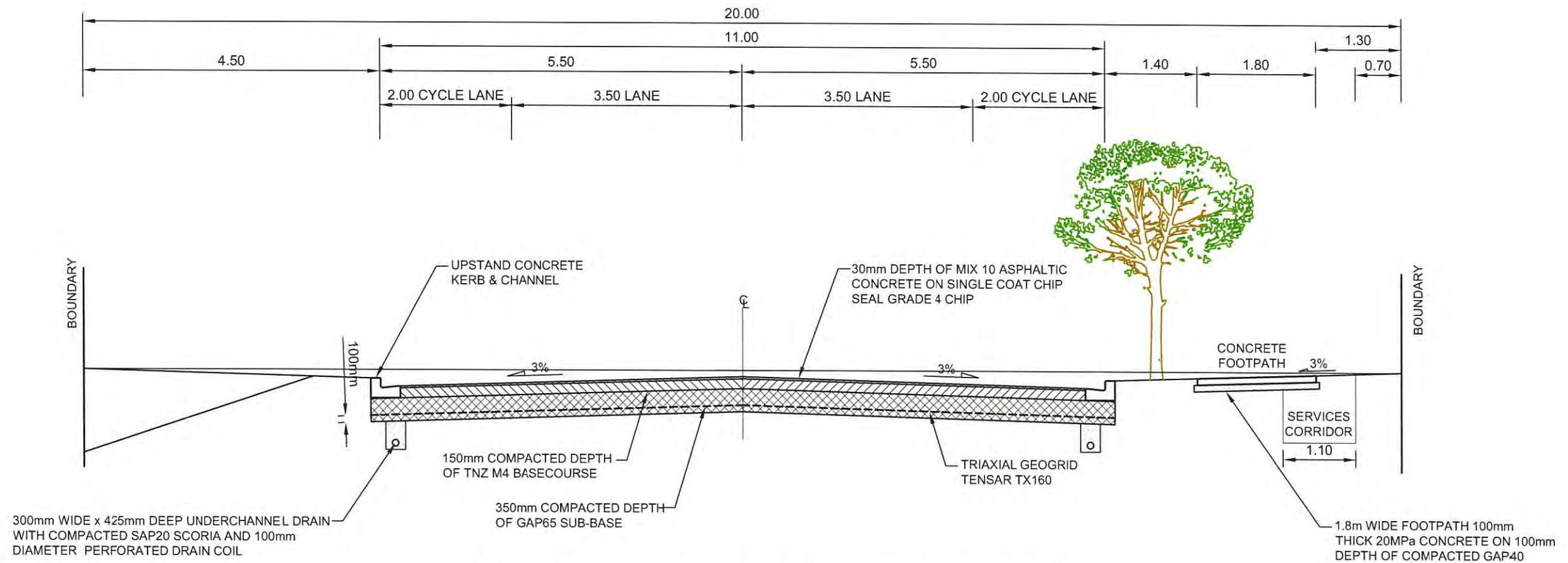
- The **Coordinates** (X, Y) are in terms of NZTM on NZGD (2000).
- The **Levels** (Z) are in terms of the Auckland 1946 (MSL) LINZ datum (DOSLI datum).

Signed:   
 Chartered Professional Engineer  
 Date: 12 December 2016  
 Name: Evan Alexander Peters  
 Contact Phone: (09) 426 6552  
 Email: evan@aspeng.co.nz

REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE	1:75 AT A3	CLIENT	SITE ADDRESS	DRAWING NUMBER	
							CABRA INVESTMENTS LIMITED	40 LOT RESIDENTIAL SUBDIVISION (STAGE 1) AT 949 OLD WAIROA ROAD, PAPAURA R/JSL/2013/2461 EPA 2015/276	1126 - AB - RD306	
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					APPROVED	EP	12.16			
Conditions of Use: These drawings shall only be used for the purpose for which they were supplied. Do not measure off this drawing. If doubt please contact Engineer.								DRAWING TITLE	DATE	REVISION
								AS BUILT ROAD CROSS SECTIONS-2	DEC 2016	-



Ph: 09 426 6552  
 Web: www.aspeng.co.nz



**AS BUILT 11.0m WIDE (OLD WAIROA ROAD) CROSS SECTION**

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Signed:   
 Chartered Professional Engineer  
 Date: 12 December 2016  
 Name: Evan Alexander Peters  
 Contact Phone: (09) 426 6552  
 Email: evan@aspeng.co.nz

REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE	1:75 AT A3	CLIENT	SITE ADDRESS	DRAWING NUMBER	
							CABRA INVESTMENTS LIMITED	40 LOT RESIDENTIAL SUBDIVISION (STAGE 1) AT 949 OLD WAIROA ROAD, PAPAURA R/JSL/2013/2461 EPA 2015/276	1126 - AB - RD307	
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	APPROVED					EP	12.16			
							<b>Conditions of Use:</b> These drawings shall only be used for the purpose for which they were supplied. Do not measure off this drawing. If doubt please contact Engineer.	DRAWING TITLE AS BUILT ROAD CROSS SECTIONS-3	DATE DEC 2016	REVISION -



Ph: 09 426 6552  
 Web: www.aspeng.co.nz

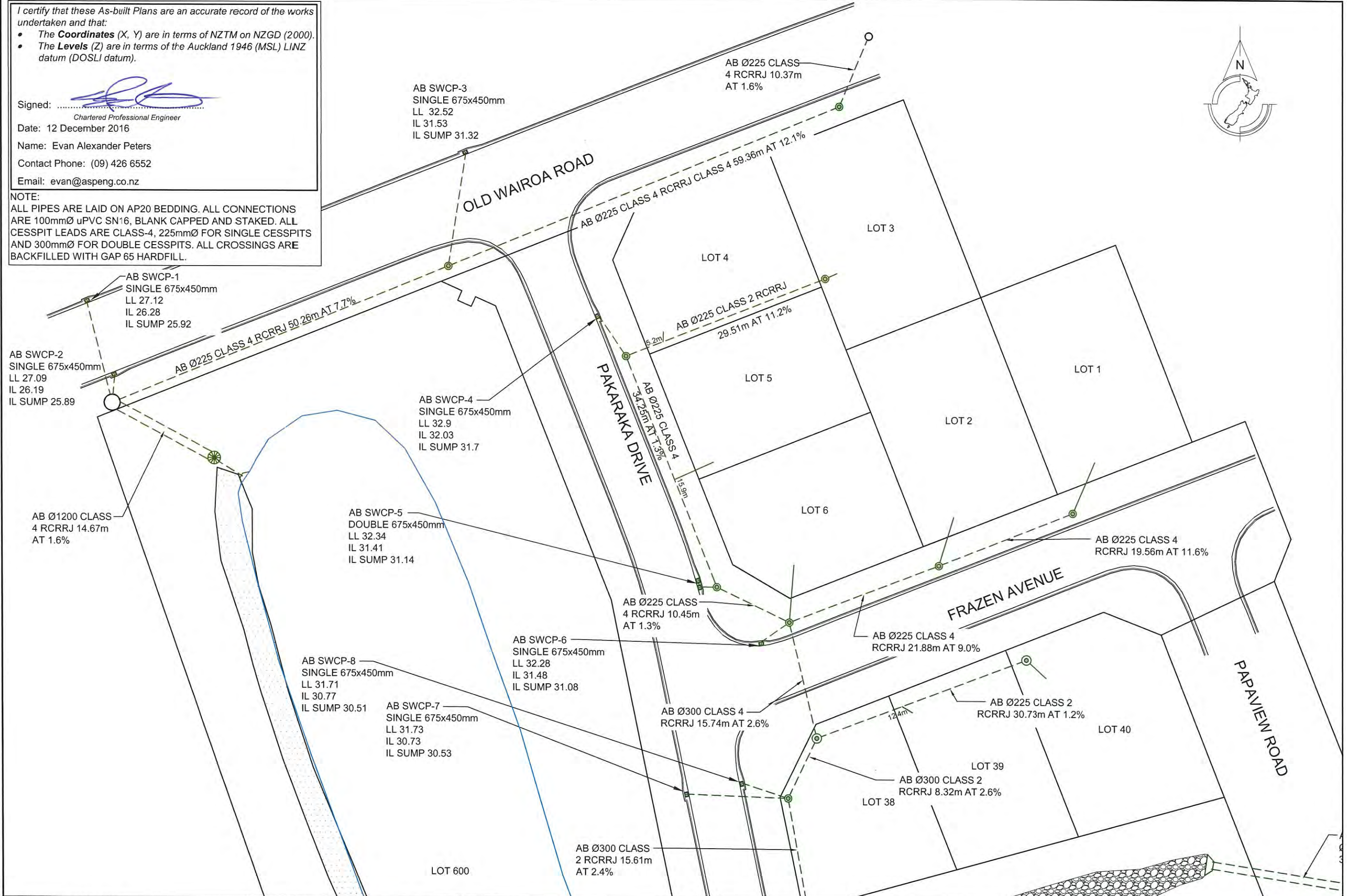
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 Chartered Professional Engineer  
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 Name: Evan Alexander Peters  
 Contact Phone: (09) 426 6552  
 Email: evan@aspeng.co.nz



NOTE:  
 ALL PIPES ARE LAID ON AP20 BEDDING. ALL CONNECTIONS ARE 100mmØ uPVC SN16, BLANK CAPPED AND STAKED. ALL CESSPIT LEADS ARE CLASS-4, 225mmØ FOR SINGLE CESSPITS AND 300mmØ FOR DOUBLE CESSPITS. ALL CROSSINGS ARE BACKFILLED WITH GAP 65 HARDFILL.



REV.	DESCRIPTION	CHECK	APPD	DATE	SCALE	1:500 AT A3	
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					APPROVED	EP	12.16

CLIENT  
**CABRA INVESTMENTS LIMITED**

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SITE ADDRESS  
 40 LOT RESIDENTIAL SUBDIVISION (STAGE 1)  
 AT 949 OLD WAIROA ROAD, PAPA KURA  
 R/JSL/2013/2461 EPA 2015/276

DRAWING TITLE  
**AS-BUILT STORMWATER PLAN 1**

DRAWING NUMBER  
 1126 - AB - SW401

DATE  
 DEC 2016

REVISION  
 -



Ph: 09 426 6552  
 Web: www.aspeng.co.nz

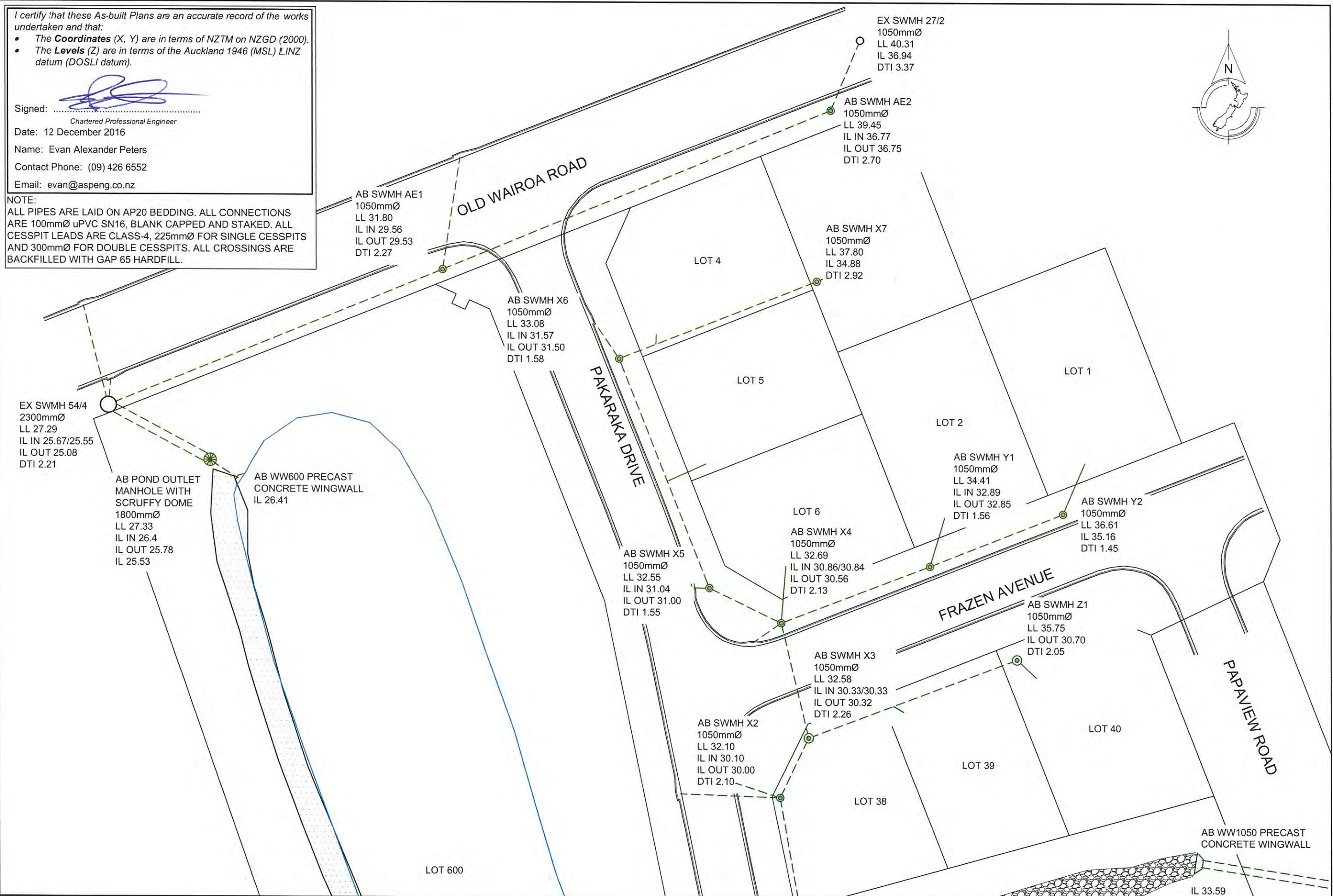
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Signed: 

Chartered Professional Engineer  
 Date: 12 December 2016  
 Name: Evan Alexander Peters  
 Contact Phone: (09) 426 6552  
 Email: evan@aspeng.co.nz

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REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE	1:500 AT A3	
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	APPROVED			12.16		EP	12.16

CLIENT  
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SITE ADDRESS  
**40 LOT RESIDENTIAL SUBDIVISION (STAGE 1)  
 AT 949 OLD WAIROA ROAD, PAPA KURA  
 R/JSL/2013/2461 EPA 2015/276**

DRAWING TITLE  
**AS-BUILT STORMWATER MANHOLE PLAN 1**

DRAWING NUMBER  
**1126 - AB - SW402**

DATE  
**DEC 2016**

REVISION  
 -



Ph: 09 426 6552  
 Web: www.aspeng.co.nz

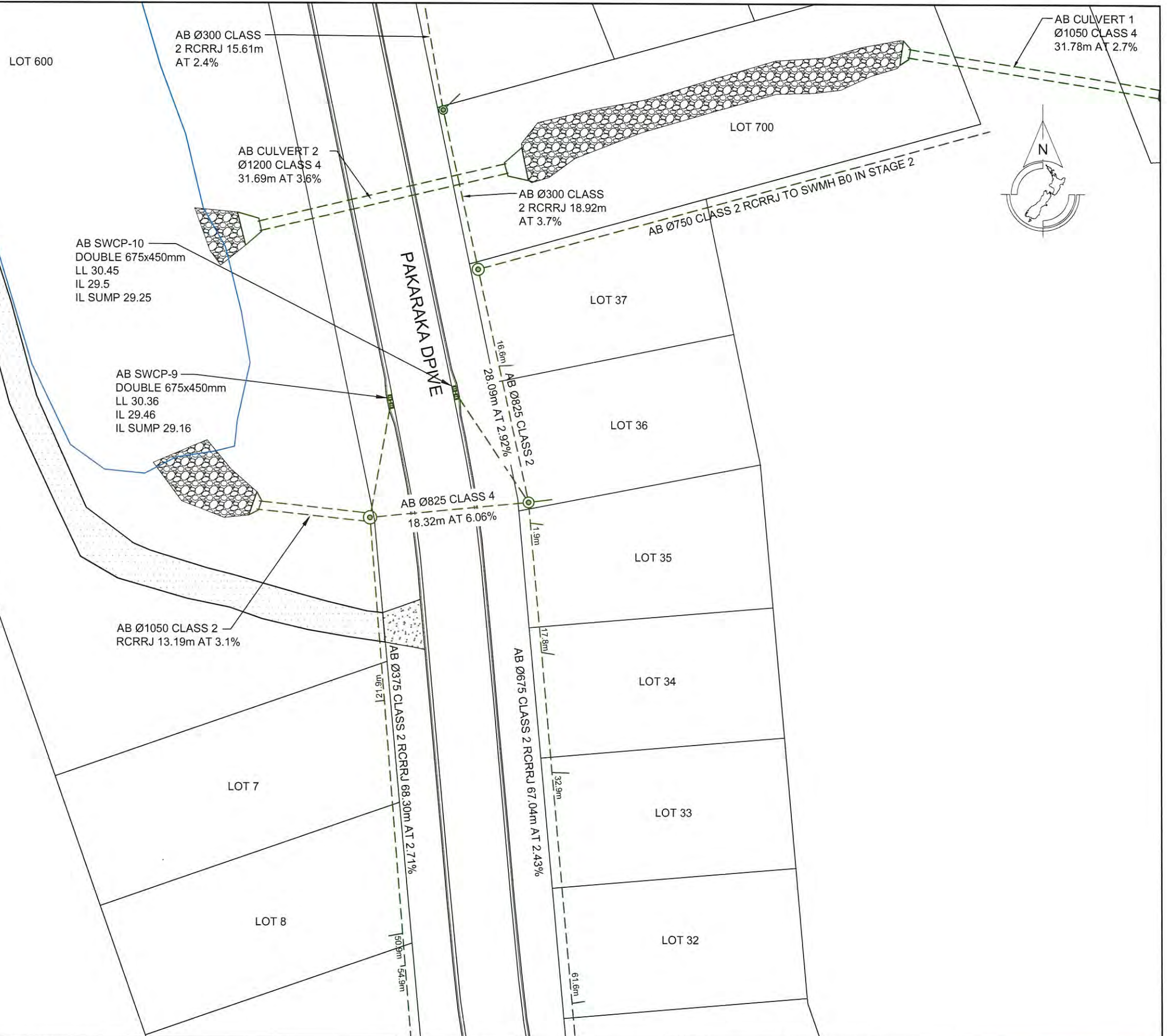
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Signed:   
Chartered Professional Engineer

Date: 12 December 2016  
Name: Evan Alexander Peters  
Contact Phone: (09) 426 6552  
Email: evan@aspeng.co.nz

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REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE	1:500 AT A3	
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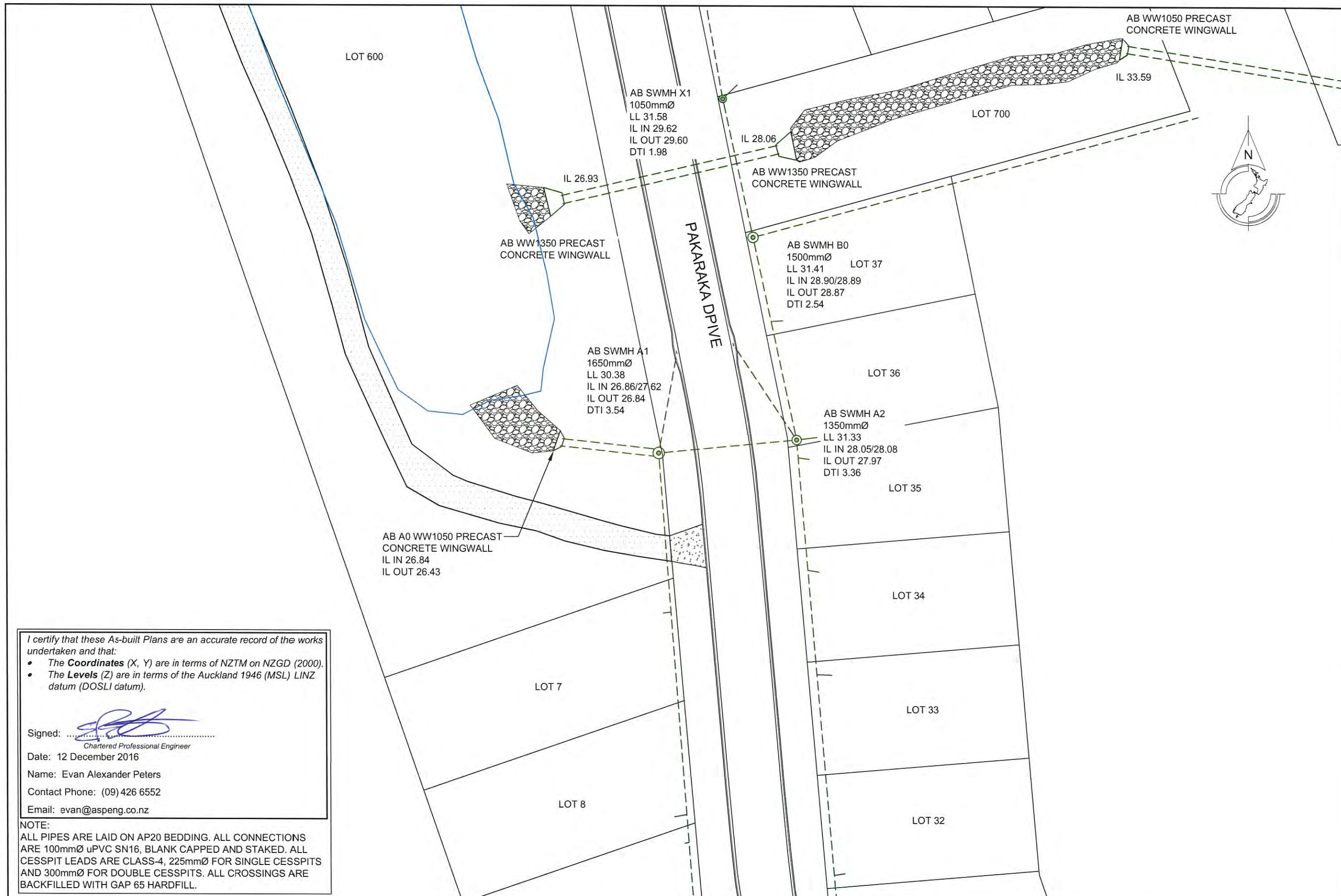
CLIENT	CABRA INVESTMENTS LIMITED
Conditions of Use:	These drawings shall only be used for the purpose for which they were supplied. Do not measure off this drawing. If doubt please contact Engineer.

SITE ADDRESS	40 LOT RESIDENTIAL SUBDIVISION (STAGE 1) AT 949 OLD WAIROA ROAD, PAKAKURA R/JSL/2013/2461 EPA 2015/276
DRAWING TITLE	AS-BUILT STORMWATER PLAN 2

DRAWING NUMBER	1126 - AB - SW403
DATE	DEC 2016
REVISION	-




Ph: 09 426 6552  
Web: www.aspeng.co.nz




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).
- The **Levels** (Z) are in terms of the Auckland 1946 (MSL) LINZ datum (DOSLI datum).

Signed:   
Chartered Professional Engineer  
Date: 12 December 2016  
Name: Evan Alexander Peters  
Contact Phone: (09) 426 6552  
Email: evan@aspeng.co.nz

**NOTE:**  
ALL PIPES ARE LAID ON AP20 BEDDING. ALL CONNECTIONS ARE 100mmØ uPVC SN16, BLANK CAPPED AND STAKED. ALL CESSPIT LEADS ARE CLASS-4, 225mmØ FOR SINGLE CESSPITS AND 300mmØ FOR DOUBLE CESSPITS. ALL CROSSINGS ARE BACKFILLED WITH GAP 65 HARDFILL.

REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE	1:500 AT A3	CLIENT		SITE ADDRESS		DRAWING NUMBER	
							CABRA INVESTMENTS LIMITED		40 LOT RESIDENTIAL SUBDIVISION (STAGE 1) AT 949 OLD WAIROA ROAD, PAKAKURA R/JSL/2013/2461 EPA 2015/276		1126 - AB - SW404	
							Conditions of Use: These drawings shall only be used for the purpose for which they were supplied. Do not measure off this drawing. If doubt please contact Engineer.		DRAWING TITLE		DATE	REVISION
									AS-BUILT STORMWATER MANHOLE PLAN 2		DEC 2016	-
											 Ph: 09 426 6552 Web: www.aspeng.co.nz	

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Signed: 

Chartered Professional Engineer

Date: 12 December 2016

Name: Evan Alexander Peters

Contact Phone: (09) 426 6552

Email: [evan@aspeng.co.nz](mailto:evan@aspeng.co.nz)

**NOTE:**

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REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE	1:500 AT A3
					NAME	DATE
					DESIGN	LB 12.16
					DRAWN	LB 12.16
					DRAWING CHECK	PF 12.16
					DESIGN CHECK	PF 12.16
					APPROVED	EP 12.16

CLIENT	CABRA INVESTMENTS LIMITED
Conditions of Use:	These drawings shall only be used for the purpose for which they were supplied. Do not measure off this drawing. If doubt please contact Engineer.

SITE ADDRESS	40 LOT RESIDENTIAL SUBDIVISION (STAGE 1) AT 949 OLD WAIROA ROAD, PAPAURA R/JSL/2013/2461 EPA 2015/276
DRAWING TITLE	AS-BUILT STORMWATER PLAN 3

DRAWING NUMBER	1126 - AB - SW405
DATE	DEC 2016
REVISION	-



Ph: 09 426 6552  
Web: [www.aspeng.co.nz](http://www.aspeng.co.nz)

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Signed: 

Chartered Professional Engineer

Date: 12 December 2016

Name: Evan Alexander Peters

Contact Phone: (09) 426 6552

Email: [evan@aspeng.co.nz](mailto:evan@aspeng.co.nz)

**NOTE:**

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REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE	1:500 AT A3
					DESIGN	LB 12.16
					DRAWN	LB 12.16
					DRAWING CHECK	PF 12.16
					DESIGN CHECK	PF 12.16
					APPROVED	EP 12.16

CLIENT	CABRA INVESTMENTS LIMITED
Conditions of Use:	These drawings shall only be used for the purpose for which they were supplied. Do not measure off this drawing. If doubt please contact Engineer.

SITE ADDRESS	40 LOT RESIDENTIAL SUBDIVISION (STAGE 1) AT 949 OLD WAIROA ROAD, PAPA KURA R/JSL/2013/2461 EPA 2015/276
DRAWING TITLE	AS-BUILT STORMWATER MANHOLE PLAN 3

DRAWING NUMBER	1126 - AB - SW406
DATE	DEC 2016
REVISION	-



Ph: 09 426 6552  
Web: [www.aspeng.co.nz](http://www.aspeng.co.nz)



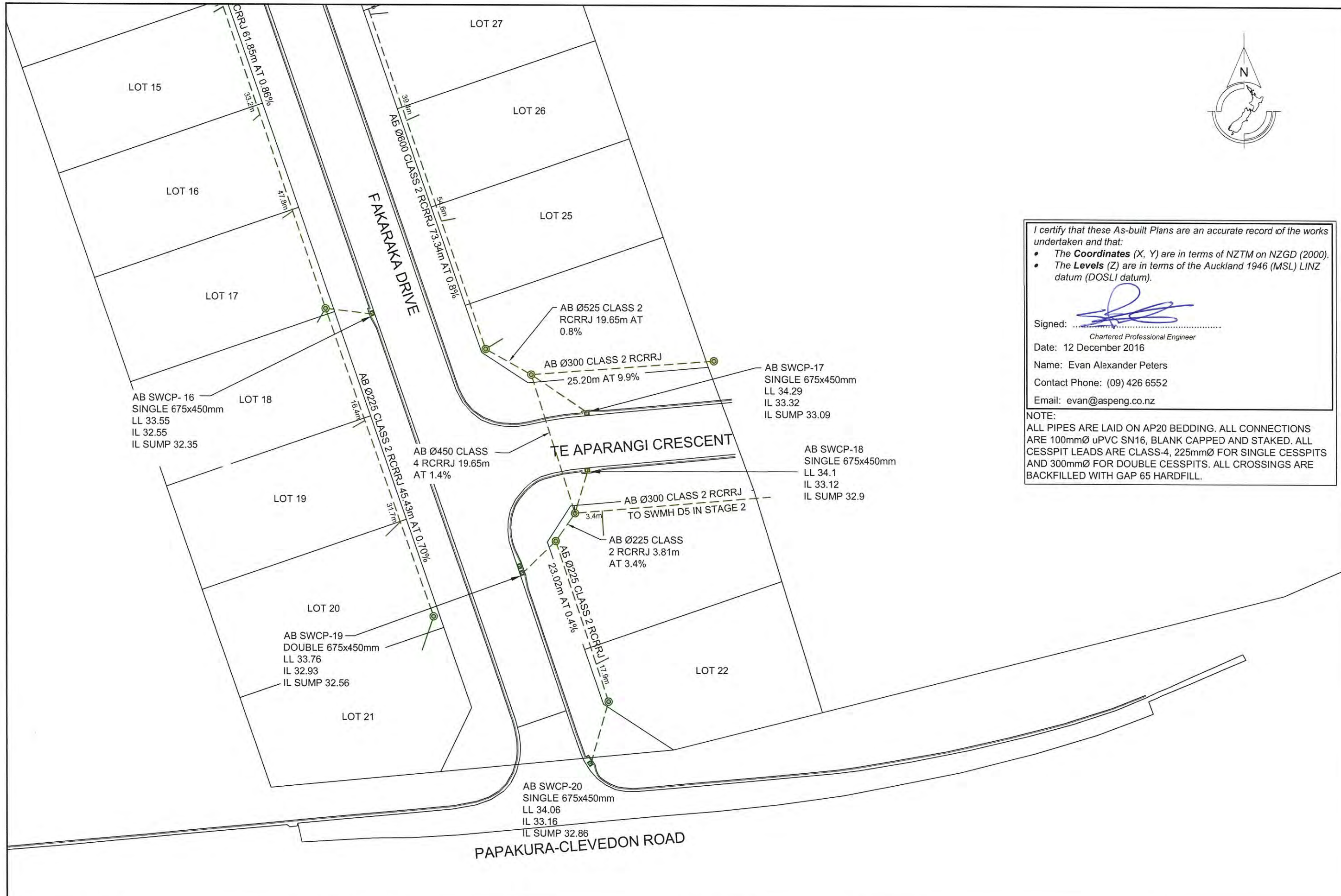



I certify that these As-built Plans are an accurate record of the works undertaken and that:

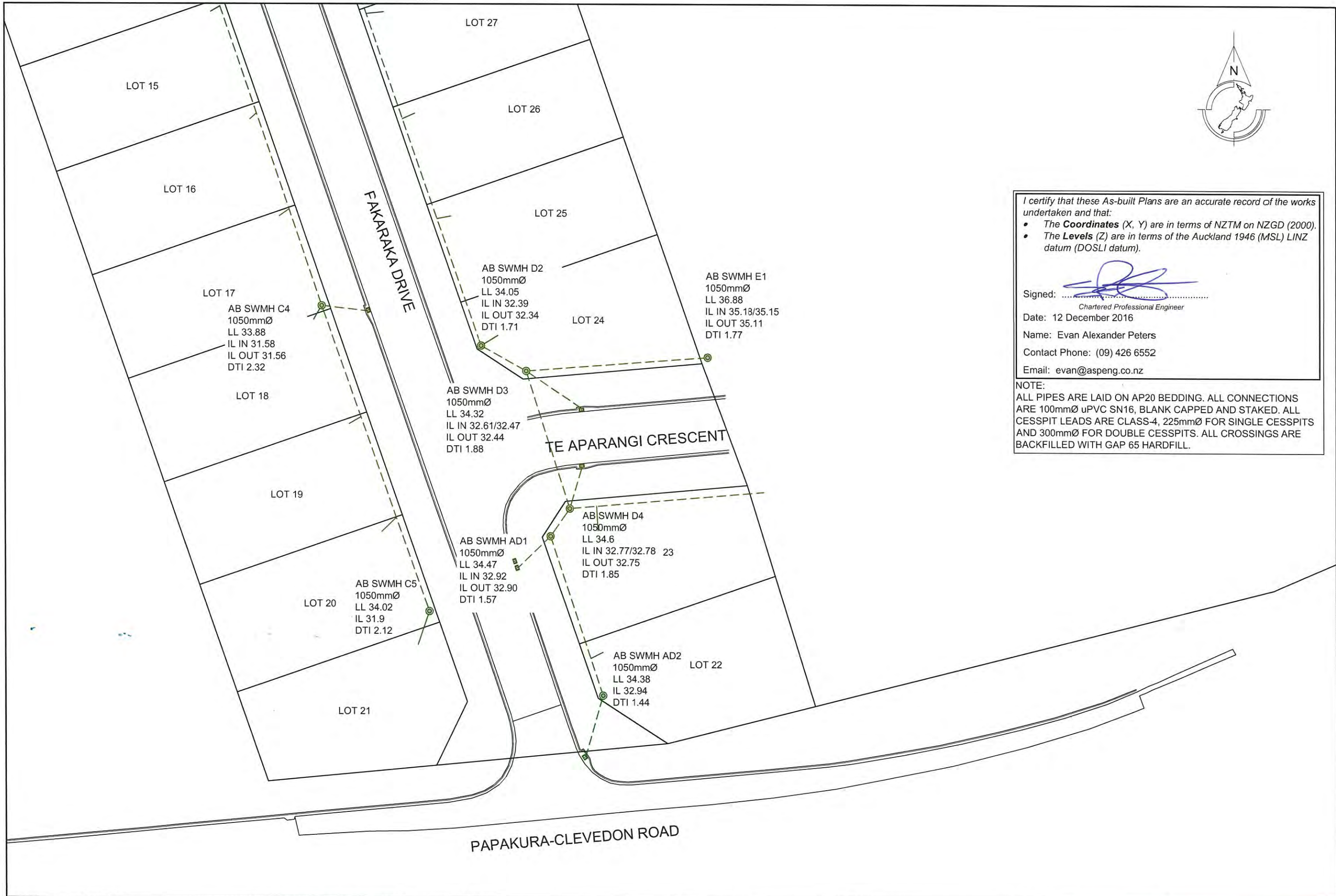
- The **Coordinates** (X, Y) are in terms of NZTM on NZGD (2000).
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Signed:   
Chartered Professional Engineer  
Date: 12 December 2016  
Name: Evan Alexander Peters  
Contact Phone: (09) 426 6552  
Email: evan@aspeng.co.nz

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REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE	1:500 AT A3	CLIENT	SITE ADDRESS	DRAWING NUMBER	
					DESIGN	LB	12.16	<b>CABRA INVESTMENTS LIMITED</b> 40 LOT RESIDENTIAL SUBDIVISION (STAGE 1) AT 949 OLD WAIROA ROAD, PAPA KURA R/JSL/2013/2461 EPA 2015/276	1126 - AB - SW407	
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					DRAWING CHECK	PF	12.16		REVISION	
					DESIGN CHECK	PF	12.16		DEC 2016	-
					APPROVED	EP	12.16			
<b>Conditions of Use:</b> These drawings shall only be used for the purpose for which they were supplied. Do not measure off this drawing. If doubt please contact Engineer.							<b>DRAWING TITLE</b> AS-BUILT STORMWATER PLAN 4		 Ph: 09 426 6552 Web: www.aspeng.co.nz	



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).

Signed:   
 Chartered Professional Engineer  
 Date: 12 December 2016  
 Name: Evan Alexander Peters  
 Contact Phone: (09) 426 6552  
 Email: evan@aspeng.co.nz

NOTE:  
 ALL PIPES ARE LAID ON AP20 BEDDING. ALL CONNECTIONS ARE 100mmØ uPVC SN16, BLANK CAPPED AND STAKED. ALL CESSPIT LEADS ARE CLASS-4, 225mmØ FOR SINGLE CESSPITS AND 300mmØ FOR DOUBLE CESSPITS. ALL CROSSINGS ARE BACKFILLED WITH GAP 65 HARDFILL.

REV.	DESCRIPTION	CHECK	APPD	DATE	SCALE	1:500 AT A3	CLIENT	SITE ADDRESS	DRAWING NUMBER		
							CABRA INVESTMENTS LIMITED	40 LOT RESIDENTIAL SUBDIVISION (STAGE 1) AT 949 OLD WAIROA ROAD, PAPA KURA R/JSL/2013/2461 EPA 2015/276	1126 - AB - SW408		
	DESIGN	LB		12.16		Conditions of Use: These drawings shall only be used for the purpose for which they were supplied. Do not measure off this drawing. If doubt please contact Engineer.				AS-BUILT STORMWATER MANHOLE PLAN 4	-
	DRAWN	LB		12.16							
	DRAWING CHECK	PF		12.16							
	DESIGN CHECK	PF		12.16							
	APPROVED	EP		12.16				DATE	REVISION		
								DEC 2016	-		

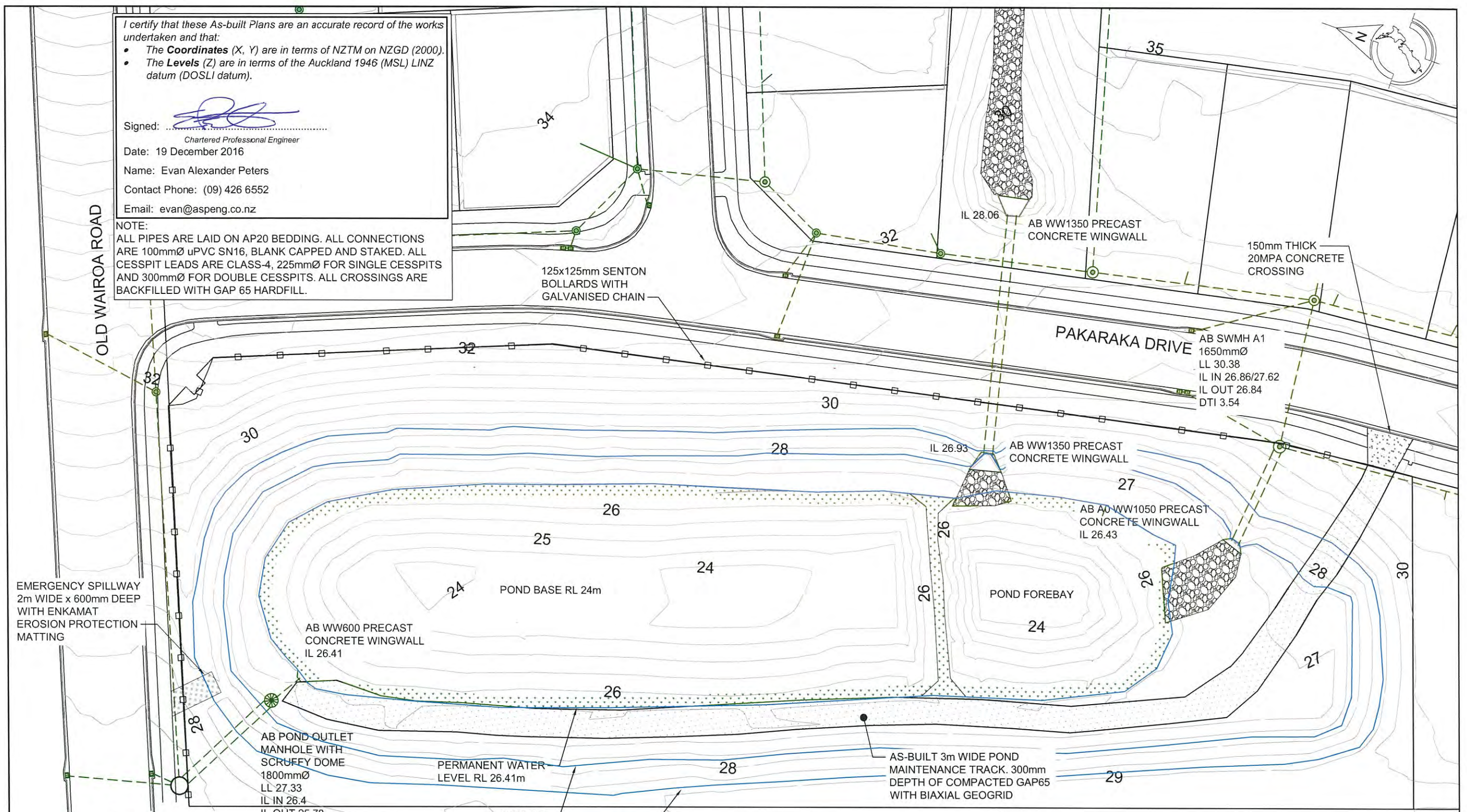


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Signed:   
 Chartered Professional Engineer  
 Date: 19 December 2016  
 Name: Evan Alexander Peters  
 Contact Phone: (09) 426 6552  
 Email: evan@aspeng.co.nz

NOTE:  
 ALL PIPES ARE LAID ON AP20 BEDDING. ALL CONNECTIONS ARE 100mmØ uPVC SN16, BLANK CAPPED AND STAKED. ALL CESSPIT LEADS ARE CLASS-4, 225mmØ FOR SINGLE CESSPITS AND 300mmØ FOR DOUBLE CESSPITS. ALL CROSSINGS ARE BACKFILLED WITH GAP 65 HARDFILL.



EMERGENCY SPILLWAY  
 2m WIDE x 600mm DEEP  
 WITH ENKAMAT  
 EROSION PROTECTION  
 MATTING

EX SWMH 54/4  
 2300mmØ  
 LL 27.29  
 IL IN 25.67/25.55  
 IL OUT 25.08  
 DTI 2.21

AB POND OUTLET  
 MANHOLE WITH  
 SCRUFFY DOME  
 1800mmØ  
 LL 27.33  
 IL IN 26.4  
 IL OUT 25.78  
 IL 25.53

AB WW600 PRECAST  
 CONCRETE WINGWALL  
 IL 26.41

PERMANENT WATER  
 LEVEL RL 26.41m

2 YR ARI  
 RL 27.7m  
 100 YR ARI  
 RL 28.8m

DESIGN POND STORAGE

EVENT	R.L. (MAX)	STORAGE (m³)	COMBINED STORAGE (m³)
W.Q.V.	26.55	4400	4400
E.D.V.	27.50	4490	8890
2-YR ARI	27.70	1060	9950
10-YR ARI	28.00	1680	11630
100-YR ARI	28.80	4970	16600

AS BUILT POND STORAGE

EVENT	R.L. (MAX)	STORAGE (m³)	COMBINED STORAGE (m³)
W.Q.V.	26.41	4040	4040
E.D.V.	27.33	3872	7912
2-YR ARI	27.70	1902	9814
10-YR ARI	28.00	1649	11463
100-YR ARI	28.80	4895	16358

REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE	1:500 AT A3
					DESIGN	LB 12.16
					DRAWN	LB 12.16
					DRAWING CHECK	PF 12.16
					DESIGN CHECK	PF 12.16
					APPROVED	EP 12.16

CLIENT  
**CABRA INVESTMENTS LIMITED**

Conditions of Use:  
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SITE ADDRESS  
**40 LOT RESIDENTIAL SUBDIVISION (STAGE 1)  
 AT 949 OLD WAIROA ROAD, PAPA KURA  
 R/JSL/2013/2461 EPA 2015/276**

DRAWING TITLE  
**AS-BUILT STORMWATER POND PLAN**

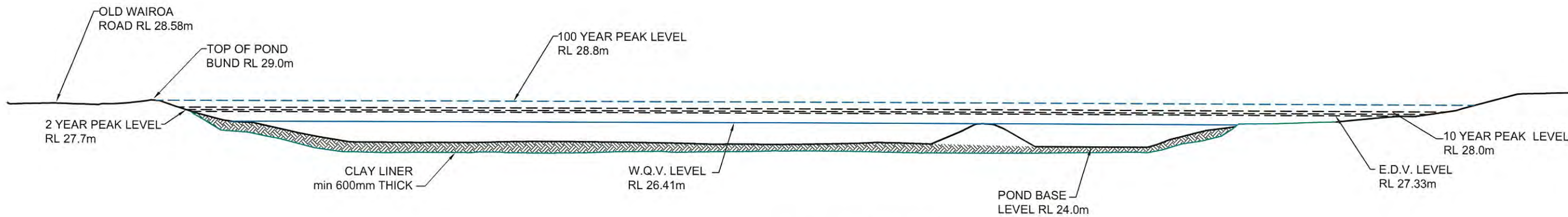
DRAWING NUMBER  
**1126 - AB - SW409**

DATE  
**DEC 2016**

REVISION  
 -



Ph: 09 426 6552  
 Web: www.aspeng.co.nz



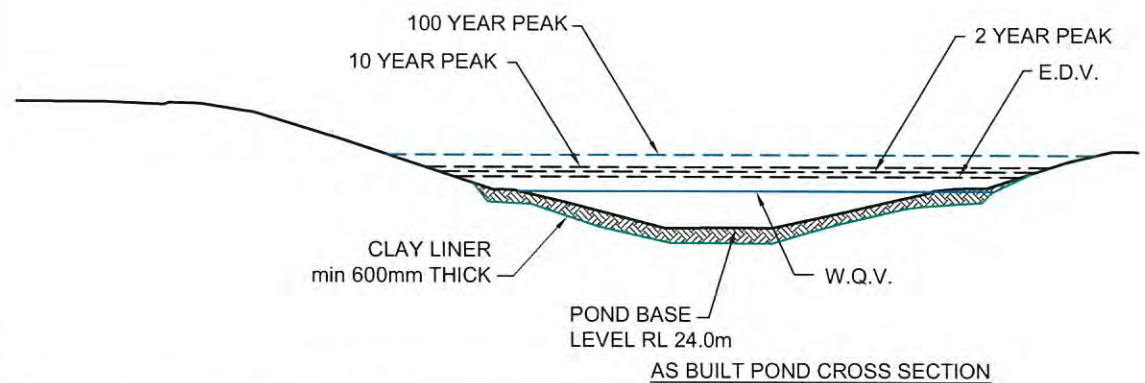
AS BUILT POND LONG SECTION  
SCALE 1:500 AT A3

DESIGN POND STORAGE

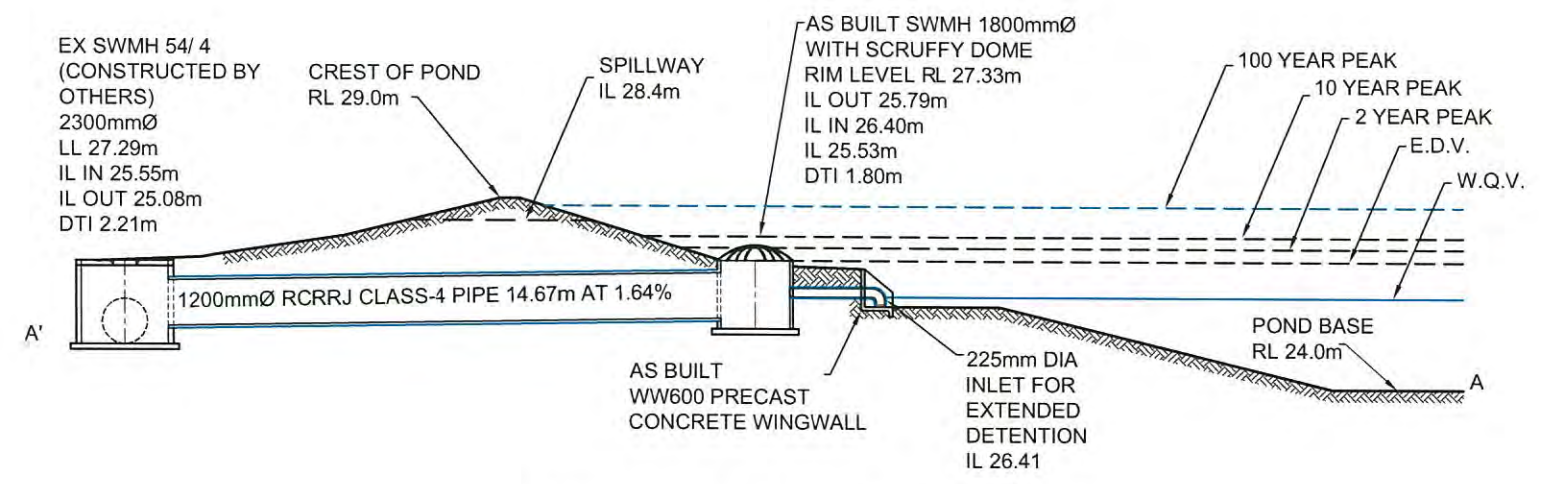
EVENT	R.L. (MAX)	STORAGE (m³)	COMBINED STORAGE (m³)
W.Q.V.	26.55	4400	4400
E.D.V.	27.50	4490	8890
2-YR ARI	27.70	1060	9950
10-YR ARI	28.00	1680	11630
100-YR ARI	28.80	4970	16600

AS BUILT POND STORAGE

EVENT	R.L. (MAX)	STORAGE (m³)	COMBINED STORAGE (m³)
W.Q.V.	26.41	4040	4040
E.D.V.	27.33	3872	7912
2-YR ARI	27.70	1902	9814
10-YR ARI	28.00	1649	11463
100-YR ARI	28.80	4895	16358



AS BUILT POND CROSS SECTION  
SCALE 1:500 AT A3



AS BUILT POND OUTLET SECTION A-A'  
SCALE 1:200 AT A3

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- The Levels (Z) are in terms of the Auckland 1946 (MSL) LINZ datum (DOSLI datum).

Signed:   
Chartered Professional Engineer  
Date: 12 December 2016  
Name: Evan Alexander Peters  
Contact Phone: (09) 426 6552  
Email: evan@aspeng.co.nz

REV.	DESCRIPTION	CHECK	APPD	DATE	SCALE	AS SHOWN AT A3	CLIENT	SITE ADDRESS	DRAWING NUMBER	
					DESIGN	JH 12.16	CABRA INVESTMENTS LIMITED	40 LOT RESIDENTIAL SUBDIVISION (STAGE 1) AT 949 OLD WAIROA ROAD, PAPAOKURA R/JSL/2013/2461 EPA2015/276	1126 - AB - SW410	
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					DESIGN CHECK	PF 12.16				
					APPROVED	EP 12.16				
							Conditions of Use: These drawings shall only be used for the purpose for which they were supplied. Do not measure off this drawing. If doubt please contact Engineer.	DRAWING TITLE	DATE	REVISION
							AS BUILT STORMWATER POND LONG SECTION AND CROSS SECTIONS	DEC 2016	-	



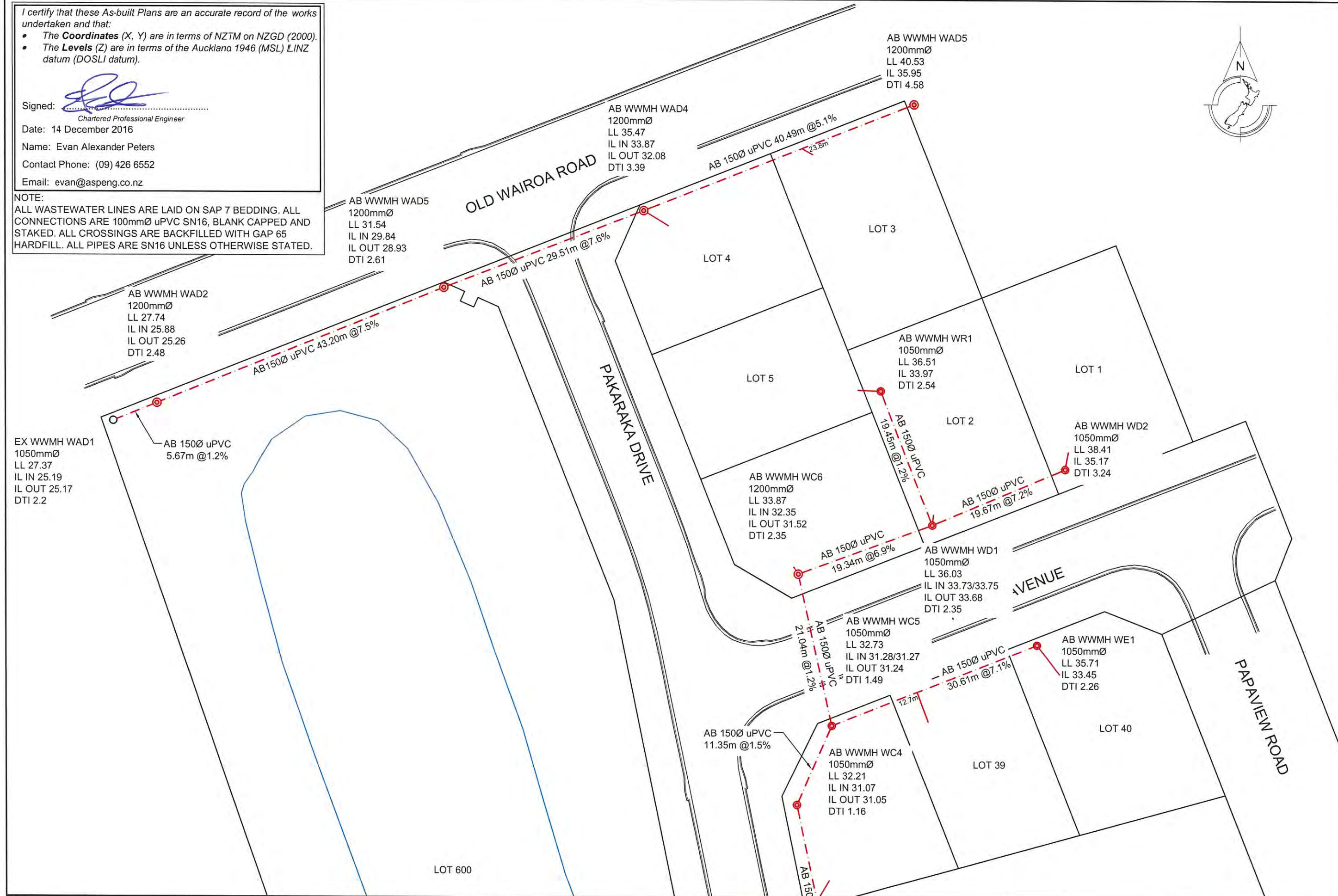
Ph: 09 426 6552  
Web: www.aspeng.co.nz

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Signed:   
 Chartered Professional Engineer  
 Date: 14 December 2016  
 Name: Evan Alexander Peters  
 Contact Phone: (09) 426 6552  
 Email: evan@aspeng.co.nz

NOTE:  
 ALL WASTEWATER LINES ARE LAID ON SAP 7 BEDDING. ALL CONNECTIONS ARE 100mmØ uPVC SN16, BLANK CAPPED AND STAKED. ALL CROSSINGS ARE BACKFILLED WITH GAP 65 HARDFILL. ALL PIPES ARE SN16 UNLESS OTHERWISE STATED.



REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE	1:500 AT A3
A	LOT CONNECTION ADDED, WAD1 & WAD2 LEVELS UPDATED			14.12.16		
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					DRAWN	LB 12.16
					DRAWING CHECK	PF 12.16
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					APPROVED	EP 12.16

CLIENT  
**CABRA INVESTMENTS LIMITED**

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SITE ADDRESS  
**40 LOT RESIDENTIAL SUBDIVISION (STAGE 1)  
 AT 949 OLD WAIROA ROAD, PAKAKURA  
 R/JSL/2013/2461 EPA 2015/276**

DRAWING TITLE  
**AS-BUILT WASTEWATER PLAN 1**

DRAWING NUMBER  
**1126 - AB - WW501**

DATE  
**DEC 2016**

REVISION  
**A**



Ph: 09 426 6552  
 Web: www.aspeng.co.nz

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Signed: 

Chartered Professional Engineer

Date: 12 December 2016

Name: Evan Alexander Peters

Contact Phone: (09) 426 6552

Email: [evan@aspeng.co.nz](mailto:evan@aspeng.co.nz)

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REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE 1:500 AT A3		
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	DRAWING CHECK			12.16	PF		
	DESIGN CHECK			12.16	PF		
	APPROVED			12.16	EP		

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SITE ADDRESS  
**40 LOT RESIDENTIAL SUBDIVISION (STAGE 1)  
 AT 949 OLD WAIROA ROAD, PAKAPURA  
 R/JSL/2013/2461 EPA 2015/276**

DRAWING TITLE  
**AS-BUILT WASTEWATER PLAN 2**

DRAWING NUMBER  
**1126 - AB - WW502**

DATE  
**DEC 2016**

REVISION  
 -



Ph: 09 426 6552  
 Web: [www.aspeng.co.nz](http://www.aspeng.co.nz)

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Signed: 

Chartered Professional Engineer

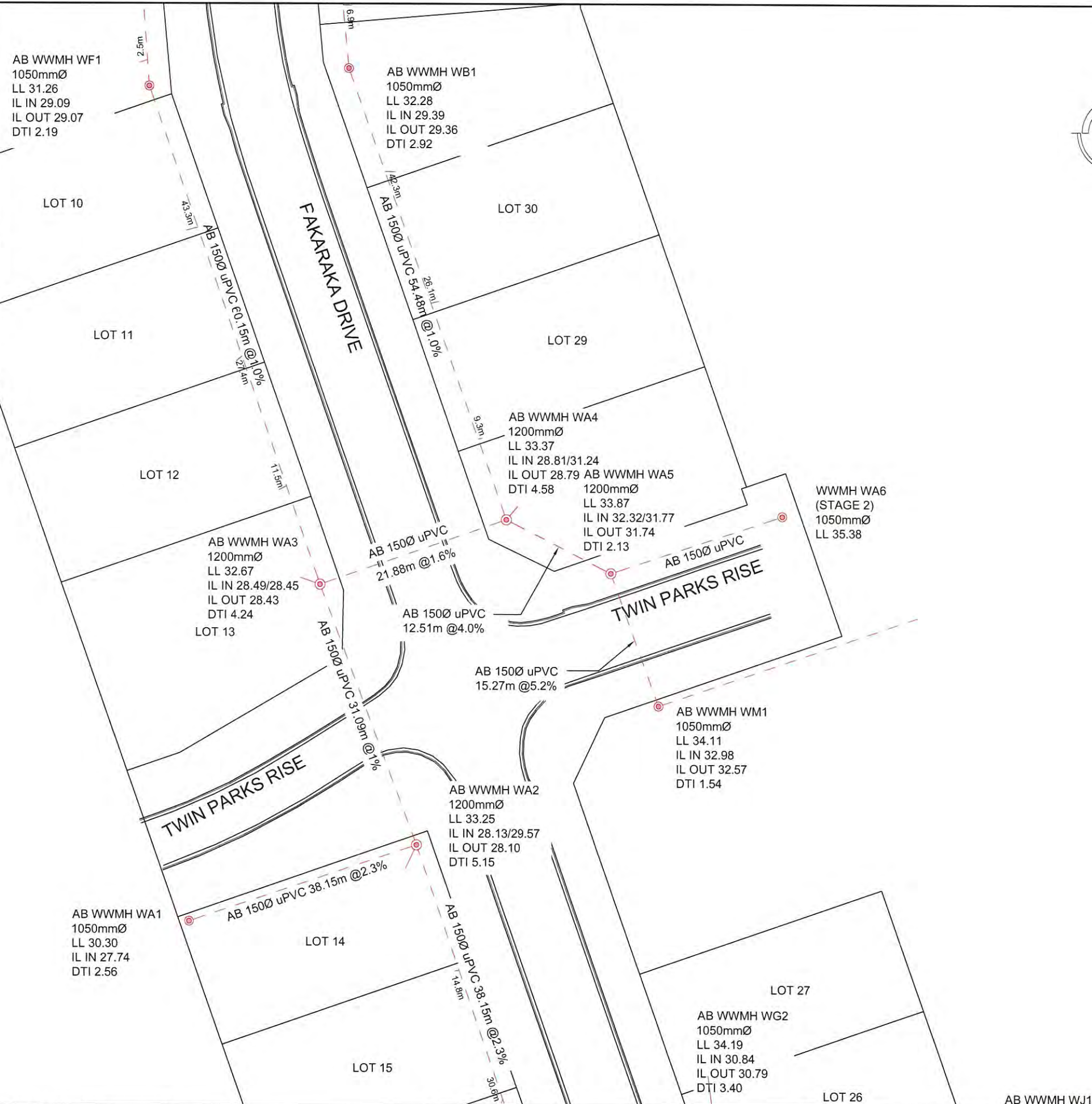
Date: 12 December 2016

Name: Evan Alexander Peters

Contact Phone: (09) 426 6552

Email: [evan@aspeng.co.nz](mailto:evan@aspeng.co.nz)

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REV.	DESCRIPTION	CHECK	APP'D	DATE	SCALE	1:500 AT A3
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	DESIGN			12.16	LB	12.16
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	DRAWING CHECK			12.16	PF	12.16
	DESIGN CHECK			12.16	PF	12.16
	APPROVED			12.16	EP	12.16

CLIENT  
**CABRA INVESTMENTS LIMITED**

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SITE ADDRESS  
**40 LOT RESIDENTIAL SUBDIVISION (STAGE 1)  
AT 949 OLD WAIROA ROAD, PAPA KURA  
R/JSL/2013/2461 EPA 2015/276**

DRAWING TITLE  
**AS-BUILT WASTEWATER PLAN 3**

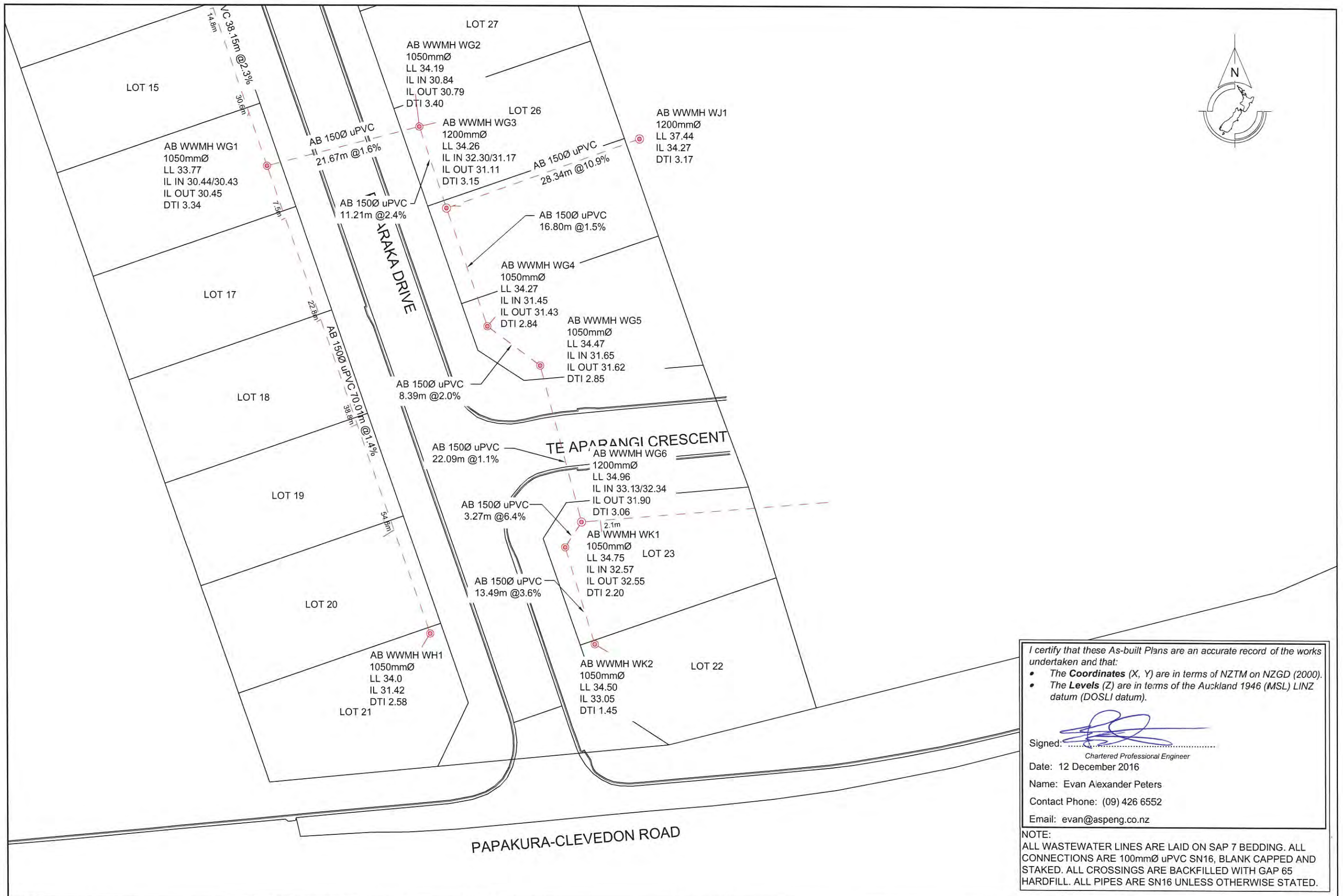
DRAWING NUMBER  
**1126 - AB - WW503**

DATE  
**DEC 2016**

REVISION  
**-**



Ph: 09 426 6552  
Web: [www.aspeng.co.nz](http://www.aspeng.co.nz)



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Signed:   
Chartered Professional Engineer  
Date: 12 December 2016  
Name: Evan Alexander Peters  
Contact Phone: (09) 426 6552  
Email: evan@aspeng.co.nz







NOTE:  
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REV.	DESCRIPTION	CHECK	APPD	DATE	SCALE	1:500 AT A3	CLIENT	SITE ADDRESS	DRAWING NUMBER	
							CABRA INVESTMENTS LIMITED	40 LOT RESIDENTIAL SUBDIVISION (STAGE 1) AT 949 OLD WAIROA ROAD, PAPAURA R/JSL/2013/2461 EPA 2015/276	1126 - AB - WW504	
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					APPROVED	EP	12.16	DRAWING TITLE	DATE	
Conditions of Use: These drawings shall only be used for the purpose for which they were supplied. Do not measure off this drawing. If doubt please contact Engineer.								AS-BUILT WASTEWATER PLAN 4	DEC 2016	
									REVISION	
									-	

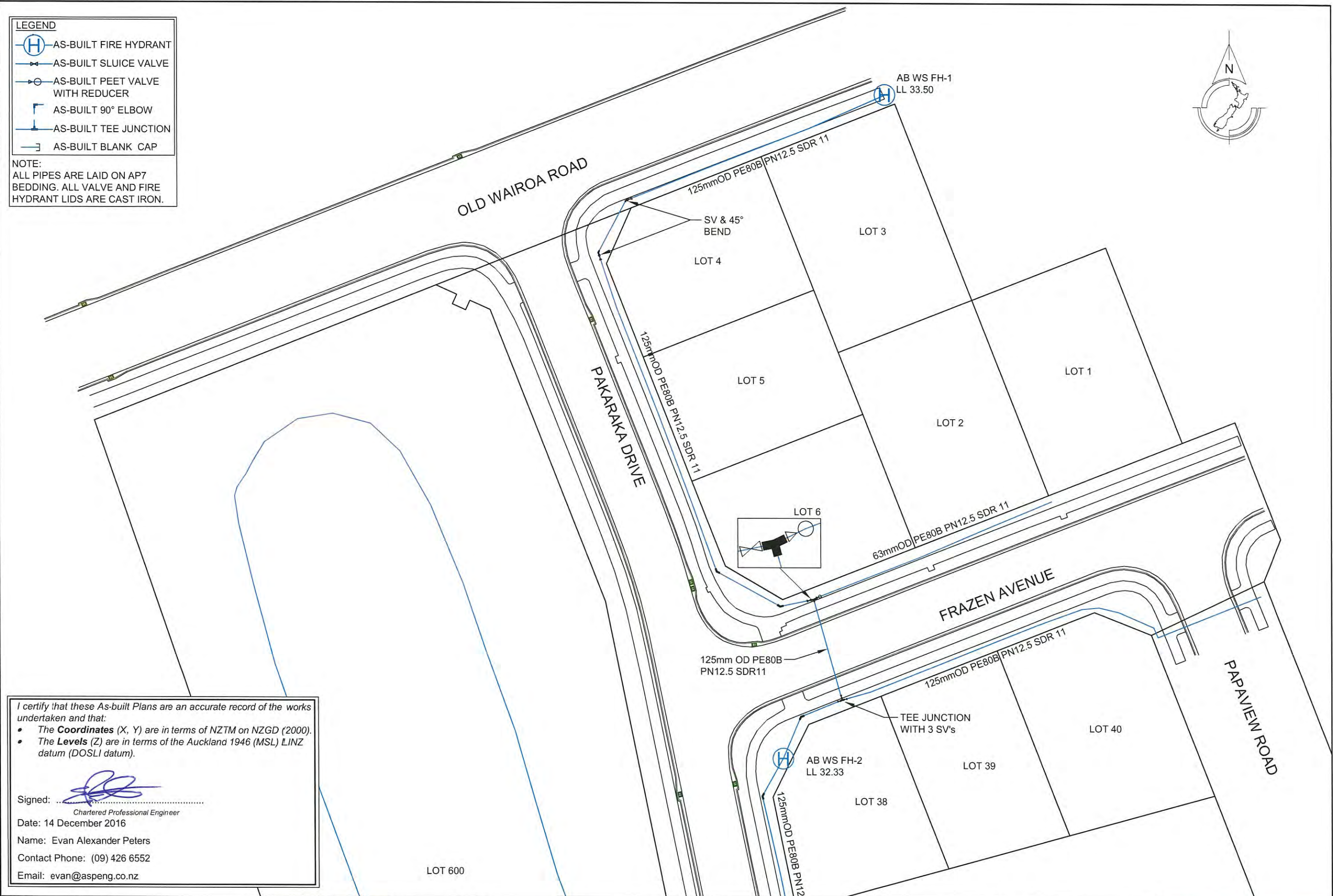




**LEGEND**

-  AS-BUILT FIRE HYDRANT
-  AS-BUILT SLUICE VALVE
-  AS-BUILT PEET VALVE WITH REDUCER
-  AS-BUILT 90° ELBOW
-  AS-BUILT TEE JUNCTION
-  AS-BUILT BLANK CAP

NOTE:  
ALL PIPES ARE LAID ON AP7  
BEDDING. ALL VALVE AND FIRE  
HYDRANT LIDS ARE CAST IRON.



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Signed:   
Chartered Professional Engineer  
Date: 14 December 2016  
Name: Evan Alexander Peters  
Contact Phone: (09) 426 6552  
Email: [evan@aspeng.co.nz](mailto:evan@aspeng.co.nz)

REV.	DESCRIPTION	CHECK	APPD	DATE	SCALE	1:500 AT A3	NAME	DATE
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	DRAWN						LB	12.16
	DRAWING CHECK						PF	12.16
	DESIGN CHECK						PF	12.16
	APPROVED						EP	12.16

CLIENT  
**CABRA INVESTMENTS LIMITED**

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SITE ADDRESS  
**40 LOT RESIDENTIAL SUBDIVISION (STAGE 1)  
AT 949 OLD WAIROA ROAD, PAKARAKA  
R/JSL/2013/2461 EPA 2015/276**

DRAWING TITLE  
**AS-BUILT WATER SUPPLY PLAN 1**







DRAWING NUMBER  
**1126 - AB - WS601**

DATE  
**DEC 2016**

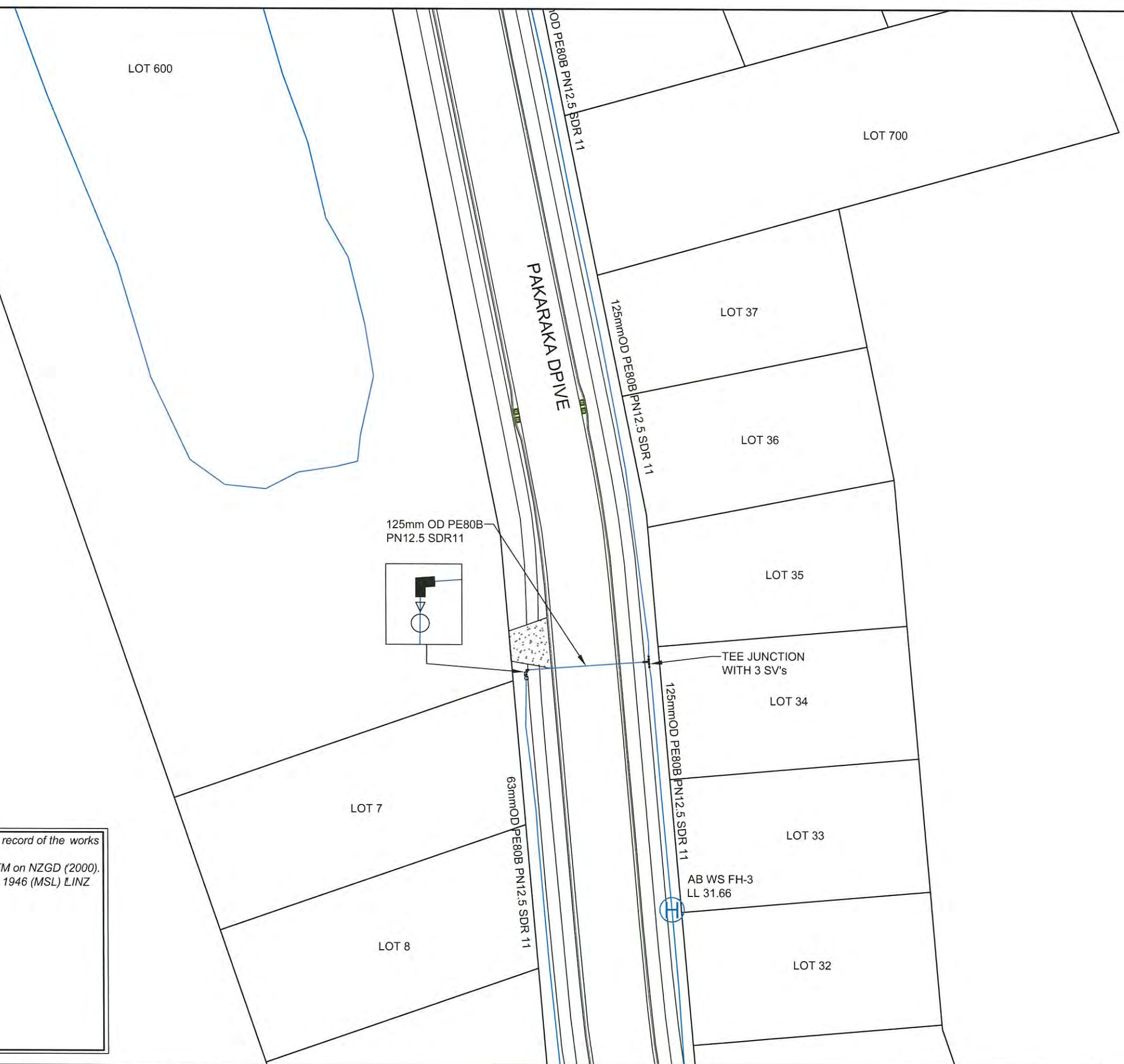
REVISION  
**-**



Ph: 09 426 6552  
Web: [www.aspeng.co.nz](http://www.aspeng.co.nz)

- LEGEND**
-  AS-BUILT FIRE HYDRANT
  -  AS-BUILT SLUICE VALVE
  -  AS-BUILT PEET VALVE WITH REDUCER
  -  AS-BUILT 90° ELBOW
  -  AS-BUILT TEE JUNCTION
  -  AS-BUILT BLANK CAP

**NOTE:**  
 ALL PIPES ARE LAID ON AP7 BEDDING. ALL VALVE AND FIRE HYDRANT LIDS ARE CAST IRON.



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).
- The **Levels** (Z) are in terms of the Auckland 1946 (MSL) LINZ datum (DOSLI datum).

Signed:   
 Chartered Professional Engineer  
 Date: 14 December 2016  
 Name: Evan Alexander Peters  
 Contact Phone: (09) 426 6552  
 Email: evan@aspeng.co.nz

REV.	DESCRIPTION	CHECK	APPD	DATE	SCALE 1:500 AT A3		
					NAME	DATE	
	DESIGN				LB	12.16	
	DRAWN				LB	12.16	
	DRAWING CHECK				PF	12.16	
	DESIGN CHECK				PF	12.16	
	APPROVED				EP	12.16	

**CLIENT**  
 CABRA INVESTMENTS LIMITED

Conditions of Use:  
 These drawings shall only be used for the purpose for which they were supplied. Do not measure off this drawing. If doubt please contact Engineer.

**SITE ADDRESS**  
 40 LOT RESIDENTIAL SUBDIVISION (STAGE 1)  
 AT 949 OLD WAIROA ROAD, PAKAKURA  
 R/JSL/2013/2461 EPA 2015/276

**DRAWING TITLE**  
 AS-BUILT WATER SUPPLY PLAN 2







**DRAWING NUMBER**  
 1126 - AB - WS602

**DATE**  
 DEC 2016

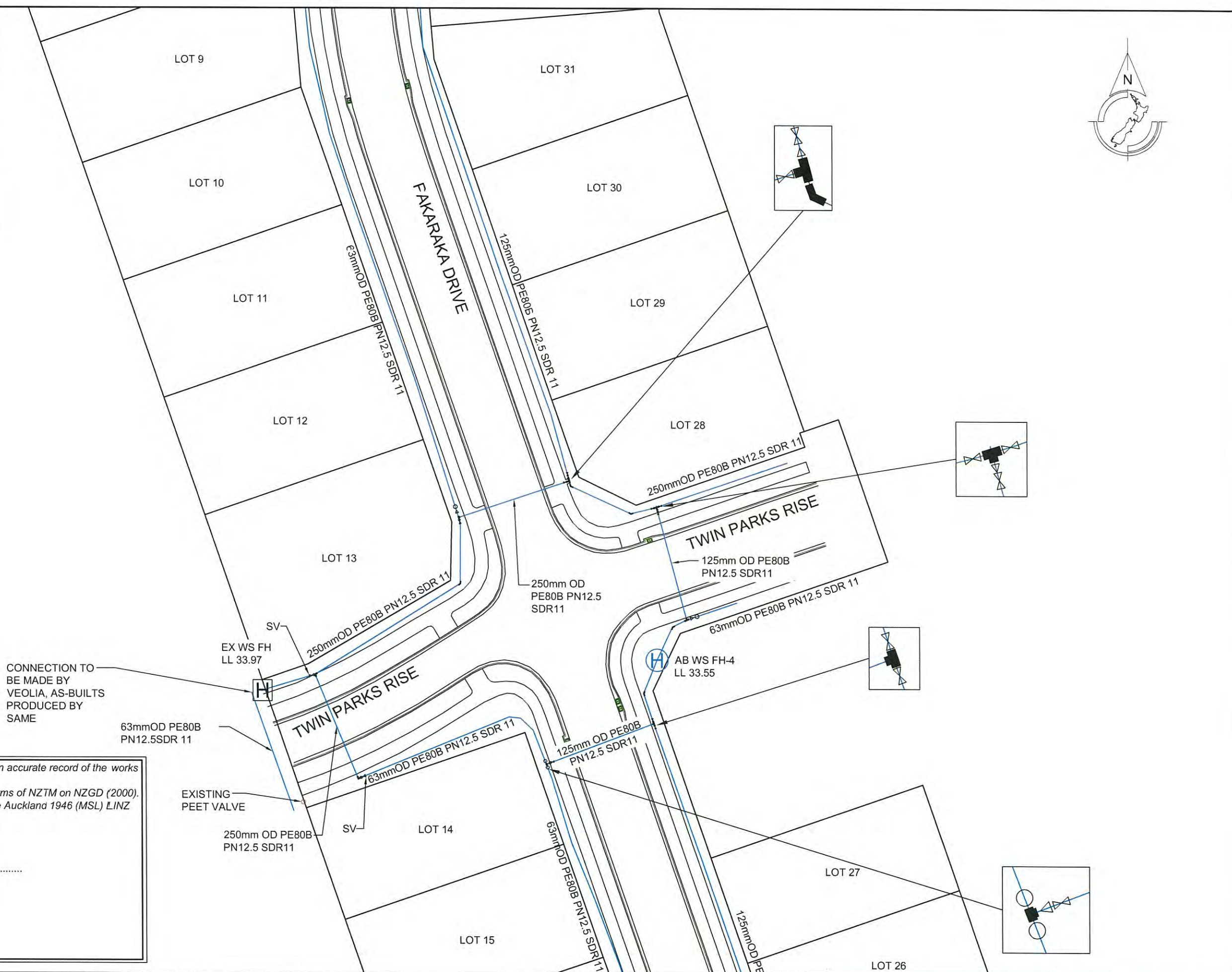
**REVISION**  
 -



Ph: 09 426 6552  
 Web: www.aspeng.co.nz

- LEGEND**
-  AS-BUILT FIRE HYDRANT
  -  AS-BUILT SLUICE VALVE
  -  AS-BUILT PEET VALVE WITH REDUCER
  -  AS-BUILT 90° ELBOW
  -  AS-BUILT TEE JUNCTION
  -  AS-BUILT BLANK CAP

**NOTE:**  
 ALL PIPES ARE LAID ON AP7 BEDDING. ALL VALVE AND FIRE HYDRANT LIDS ARE CAST IRON.



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).
- The **Levels** (Z) are in terms of the Auckland 1946 (MSL) LINZ datum (DOSLI datum).

Signed:   
 Chartered Professional Engineer  
 Date: 14 December 2016  
 Name: Evan Alexander Peters  
 Contact Phone: (09) 426 6552  
 Email: evan@aspeng.co.nz

REV.	DESCRIPTION	CHECK	APPD	DATE	SCALE	1:500 AT A3

**CLIENT**  
 CABRA INVESTMENTS LIMITED

**Conditions of Use:**  
 These drawings shall only be used for the purpose for which they were supplied. Do not measure off this drawing. If doubt please contact Engineer.

**SITE ADDRESS**  
 40 LOT RESIDENTIAL SUBDIVISION (STAGE 1)  
 AT 949 OLD WAIROA ROAD, PAPAOKURA  
 R/JSL/2013/2461 EPA 2015/276

**DRAWING TITLE**  
 AS-BUILT WATER SUPPLY PLAN 3

**DRAWING NUMBER**  
 1126 - AB - WS603







**DATE**  
 DEC 2016

**REVISION**  
 -

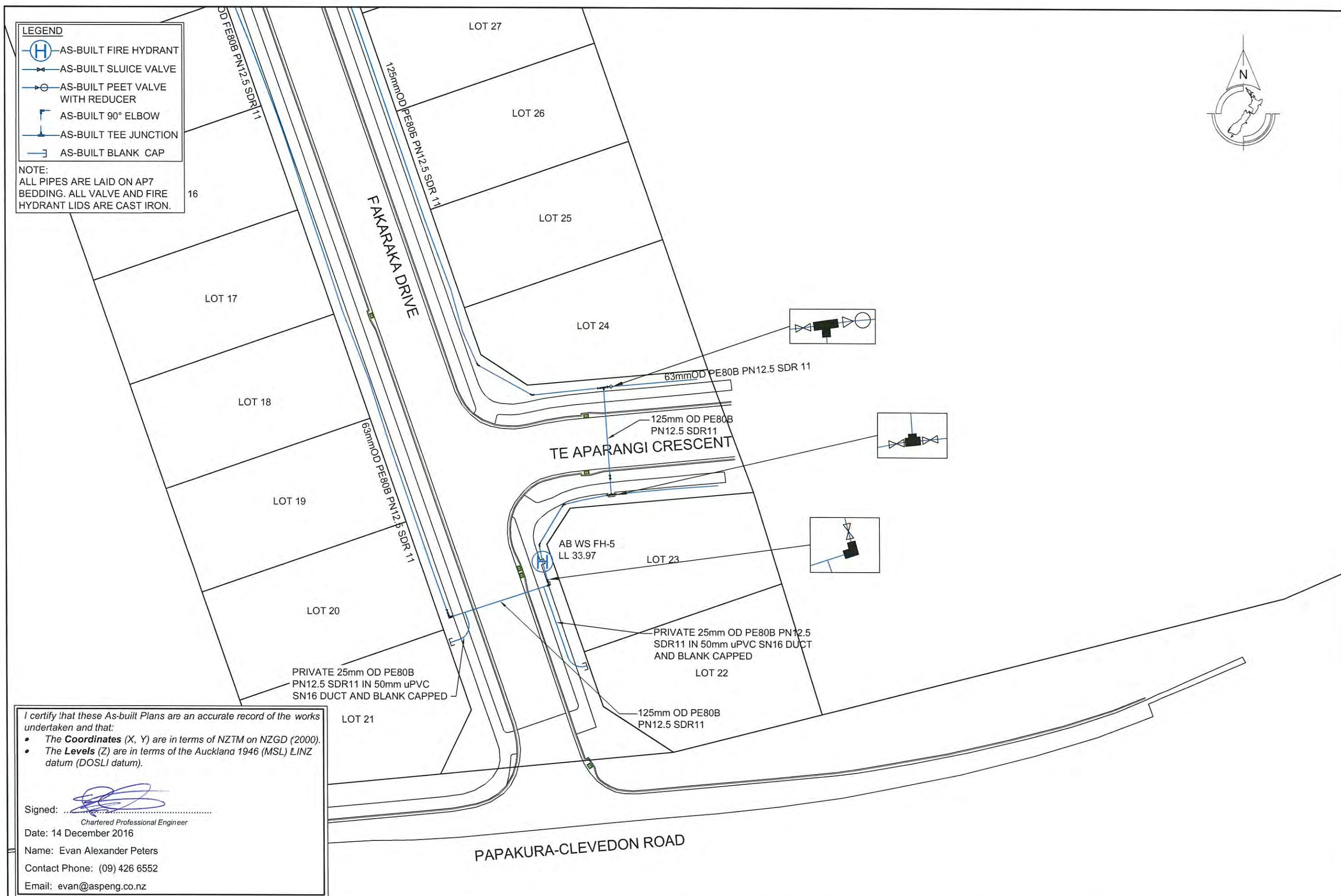


Ph: 09 426 6552  
 Web: www.aspeng.co.nz

**LEGEND**


-  AS-BUILT FIRE HYDRANT
-  AS-BUILT SLUICE VALVE
-  AS-BUILT PEET VALVE WITH REDUCER
-  AS-BUILT 90° ELBOW
-  AS-BUILT TEE JUNCTION
-  AS-BUILT BLANK CAP

**NOTE:**  
ALL PIPES ARE LAID ON AP7 BEDDING. ALL VALVE AND FIRE HYDRANT LIDS ARE CAST IRON.



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

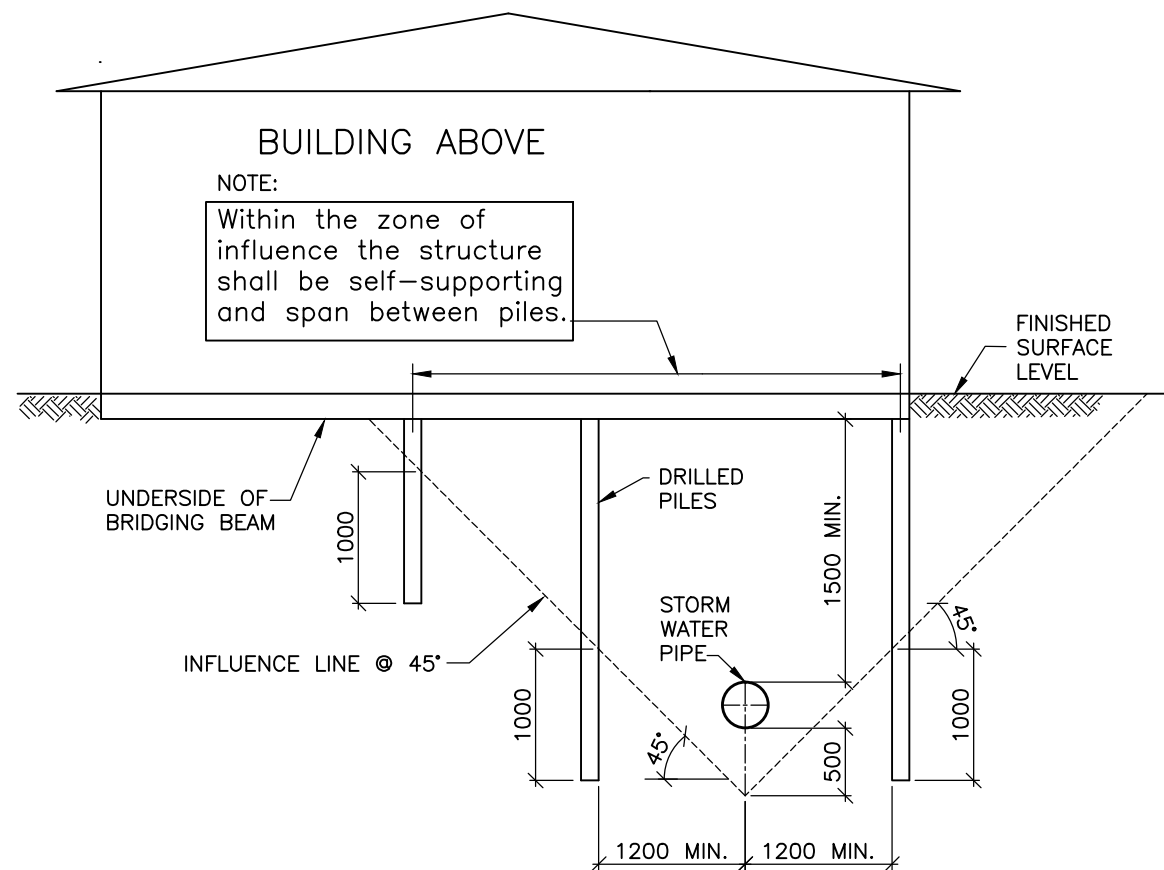
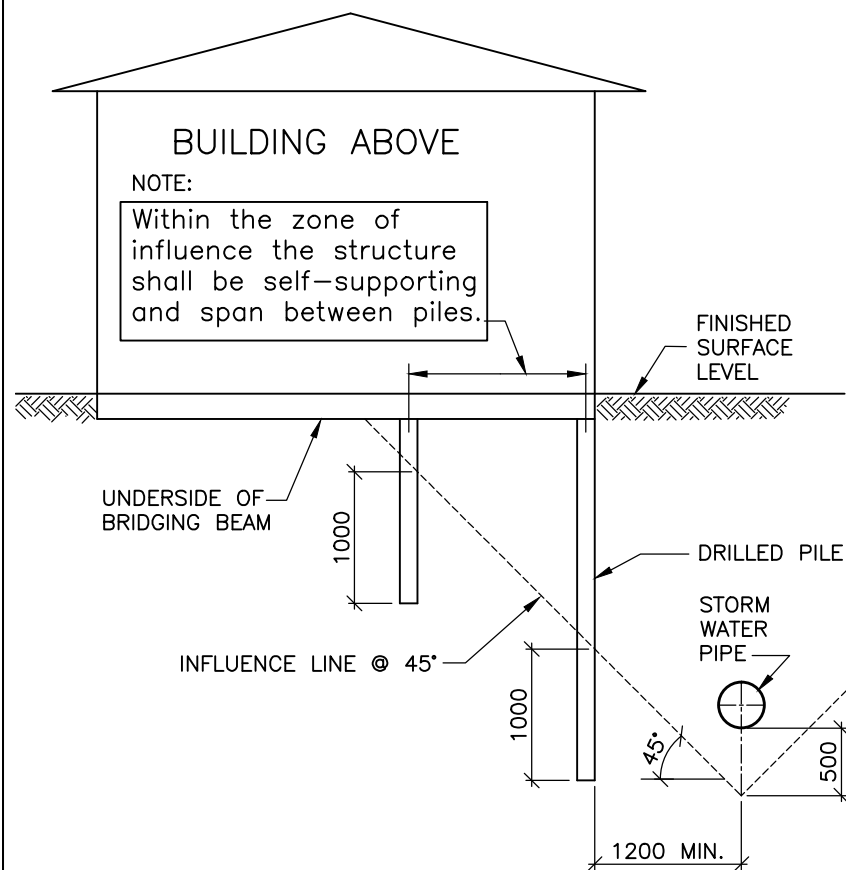
- The **Coordinates** (X, Y) are in terms of NZTM on NZGD (2000).
- The **Levels** (Z) are in terms of the Auckland 1946 (MSL) LINZ datum (DOSLI datum).

Signed:   
Chartered Professional Engineer  
Date: 14 December 2016  
Name: Evan Alexander Peters  
Contact Phone: (09) 426 6552  
Email: evan@aspeng.co.nz

REV.	DESCRIPTION	CHECK	APPD	DATE	SCALE	1:500 AT A3	CLIENT	SITE ADDRESS	DRAWING NUMBER		
							CABRA INVESTMENTS LIMITED	40 LOT RESIDENTIAL SUBDIVISION (STAGE 1) AT 949 OLD WAIROA ROAD, PAPAURA R/JSL/2013/2461 EPA 2015/276	1126 - AB - WS604		
					DESIGN	LB			12.16	DATE	REVISION
					DRAWN	LB			12.16	DEC 2016	-
					DRAWING CHECK	PF			12.16		
					DESIGN CHECK	PF			12.16		
					APPROVED	EP	12.16	AS-BUILT WATER SUPPLY PLAN 4			



Ph: 09 426 6552  
Web: www.aspeng.co.nz



**NOTES**

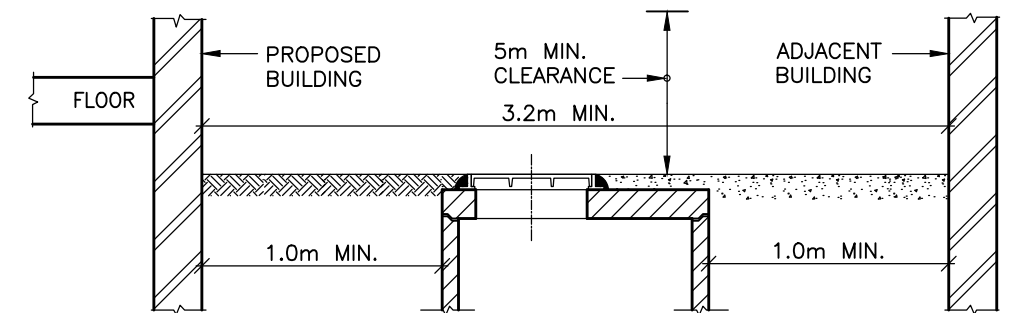
1. The information on this page is intended to show examples of typical scenarios and should be used for general guidance purposes only. Significant variations on a site by site basis are to be expected and it is in no way implied that meeting any of the above will guarantee approval.
2. Requirements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

**"BUILD CLOSE" NOTES:**

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

**"BUILD OVER" NOTES:**

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



**MANHOLE CONSTRUCTION CLEARANCE**

STORMWATER ENGINEERING  
STANDARD DETAILS

ISSUE/REVISION: 1  
DATE: 30 September 2013  
CAD FILE: AC-STD-SW22

**AUCKLAND COUNCIL**

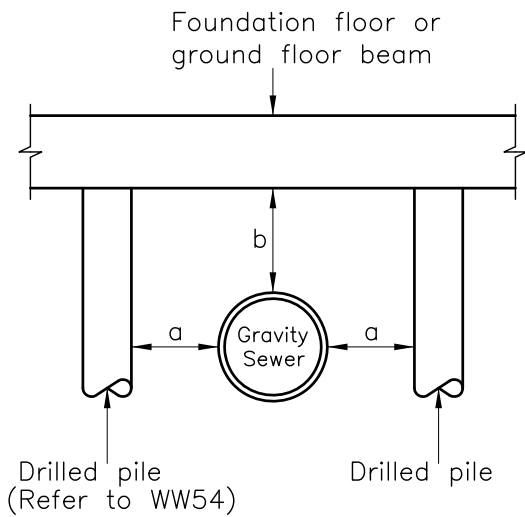
**STORMWATER PIPE AND MANHOLE CONSTRUCTION CLEARANCE REQUIREMENTS**  
MANHOLES NEAR BUILDINGS AND BUILDING CLOSE OR OVER PIPES

ENVIRONMENTAL-SW

ORIGINAL SCALE: AS NOTED

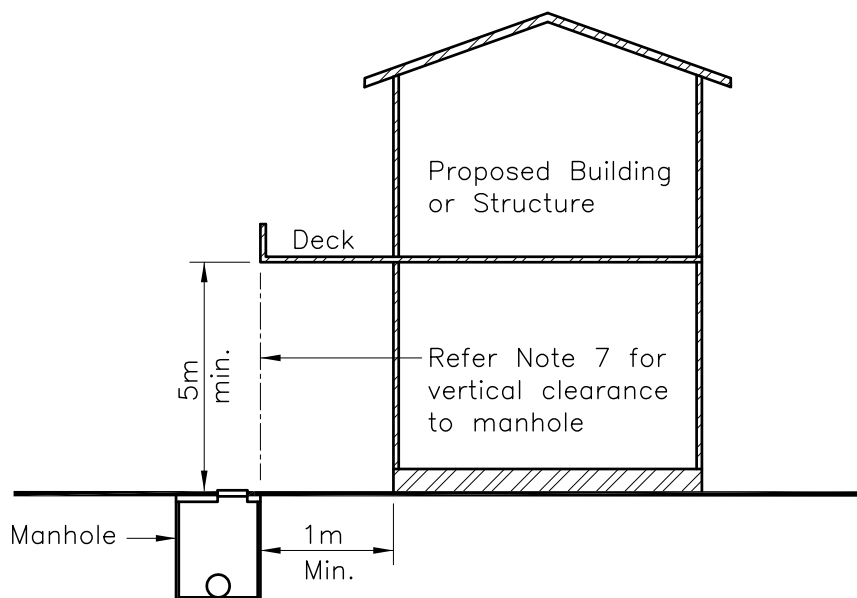


Sht	DRAWING No.	REV
1	ACSD	
OF		
1	SW22	
Shts		A3



Minimum Pile Clearances						
Type of Sewer	Sewer Depth < 3m		Sewer Depth 3m–5m		Sewer Depth >5m	
	a	b	a	b	a	b
Local Wastewater Network	1m	0.6m	1m	0.6m	1.5m	0.6m
Transmission (Trunk) Sewer	1m	1m	2m	1m	3m	1.5m

**PIPE CONSTRUCTION CLEARANCE**



**MANHOLE CONSTRUCTION CLEARANCE**

**NOTES:**

1. Locate sewer to survey accuracy or by hand piloting.
2. No driven piles within 5m of a sewer or 10m of brick sewer.
3. All manholes shall have 24 hrs unobstructed access.
4. No construction shall occur above a manhole or within tolerances 'a' or 'b' in table above.
5. Rising mains shall not be built over.
6. Brick sewers and those sewers in poor condition shall not be built over unless they are replaced with new sewers which will be to current standard.
7. Vertical clearance from the top of the chamber shall be 5m Min. over the full width of the chamber.

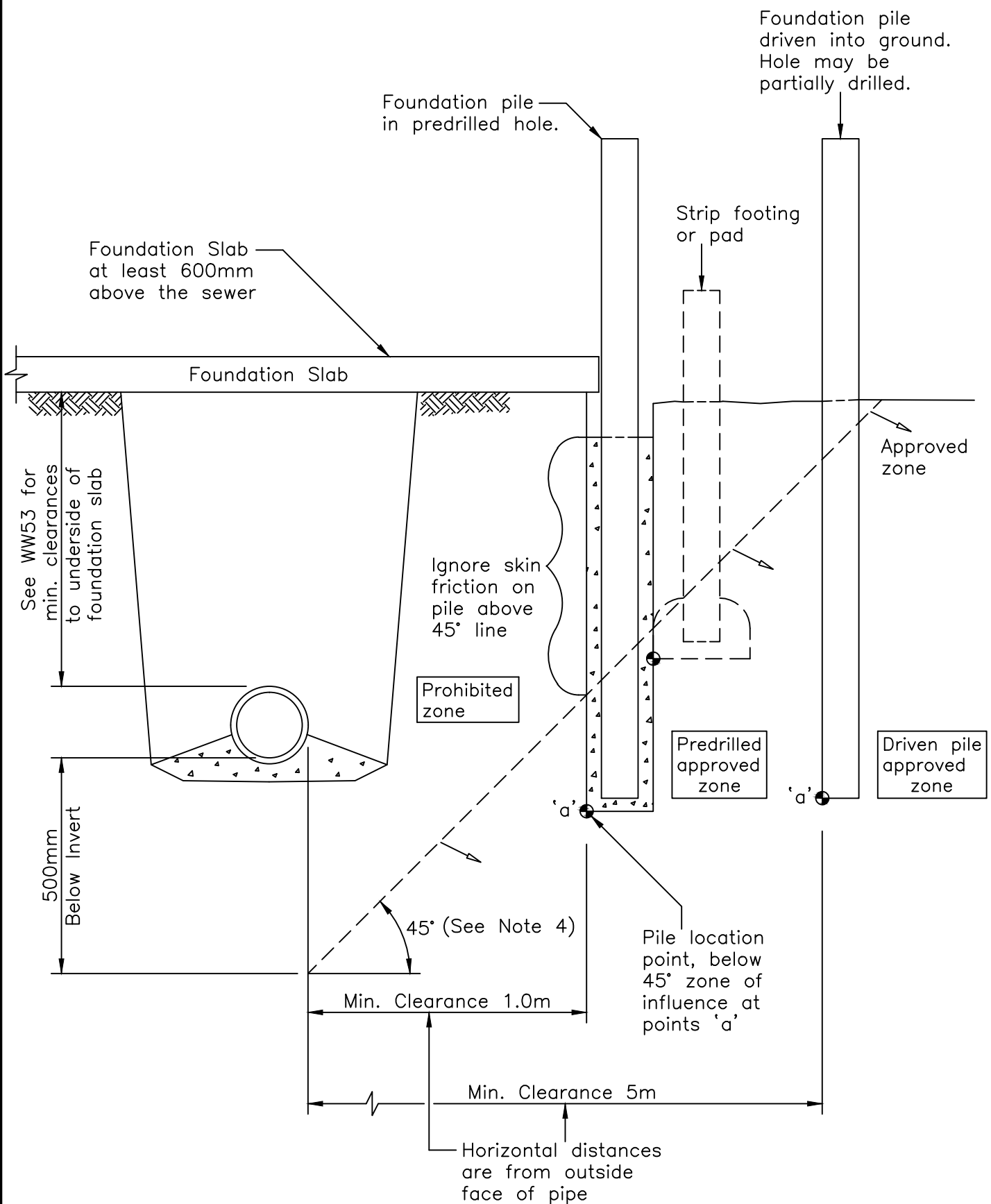
L:\---\ EGCADFI \ 2013 \ WATER & WASTEWATER NETWORK STD DWGS \ 2010070.044B .DWG



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**PIPE AND MANHOLE CONSTRUCTION CLEARANCE**

SCALE:	N.T.S.
ISSUE DATE:	19-05-2015
DWG No.	2010070.044B
REFERENCE No.	WW 53



**NOTES:**

1. No driven piles are permitted within 10m of brick Sewers, or within 5m of all other sewers.
2. Piles that are required to resist horizontal forces will require specific design.
3. Pile/Footing location point must be below 45° zone of influence.
4. Zone of influence typically 45° or angle determined by a structural engineer.

L:\---\EGCADFI \ 2013 \ WATER & WASTEWATER NETWORK STD DWGS \ 2010070.045 .DWG



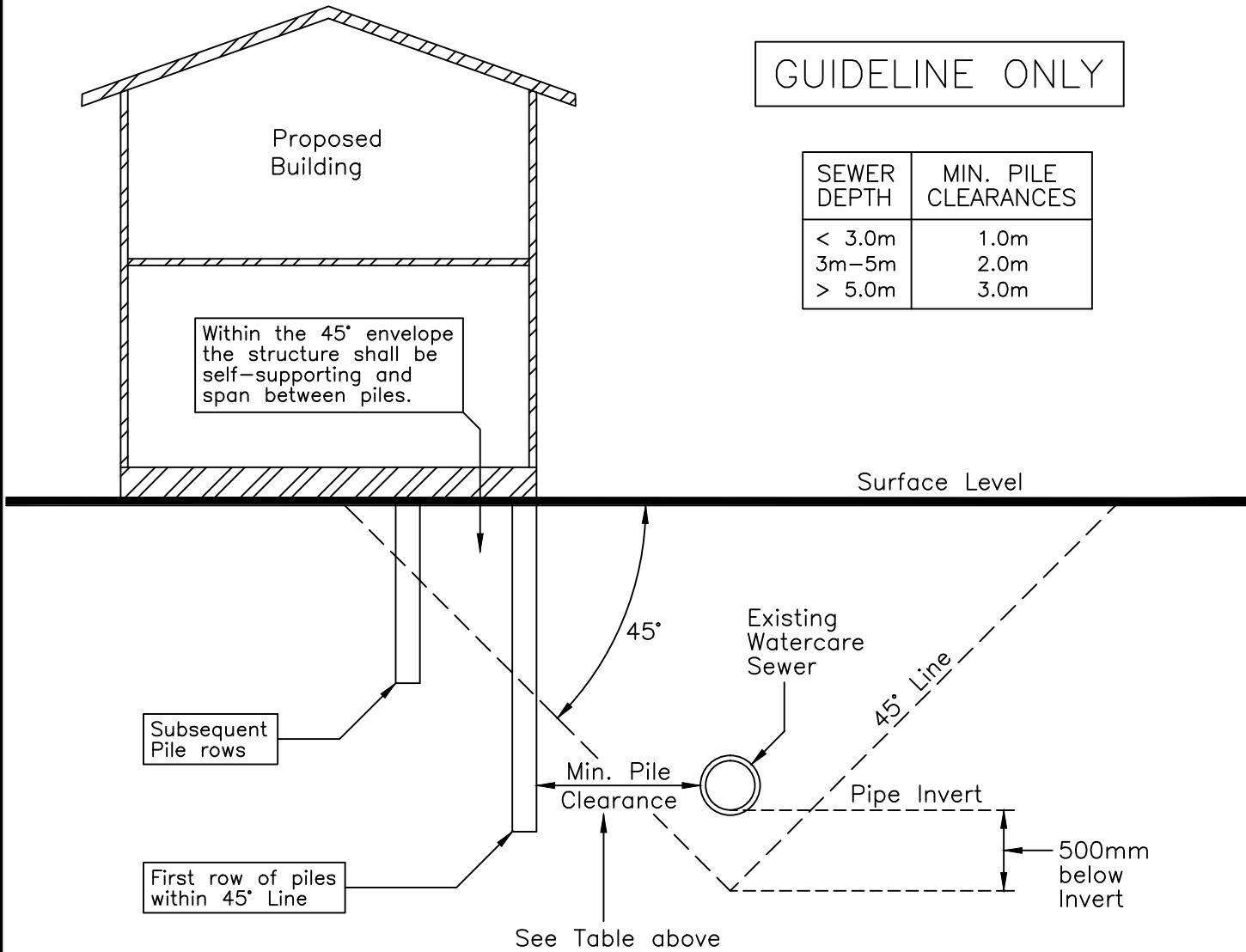
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**BUILDING CLOSE TO OR OVER LOCAL NETWORK SEWER**

SCALE:	N.T.S.
ISSUE DATE:	20-9-2013
DWG No.	2010070.045
REFERENCE No.	WW 54

GUIDELINE ONLY

SEWER DEPTH	MIN. PILE CLEARANCES
< 3.0m	1.0m
3m-5m	2.0m
> 5.0m	3.0m



SECTION THROUGH BUILDING AND TRANSMISSION SEWER

NOTES:

1. This detail shall be used as a guideline only. All applications will be assessed on individual basis and conditions imposed could be more specific than these shown.
2. No structural loads are to be placed on public sewer lines.
3. All structural loads on piles shall be absorbed outside the 45° envelope and below the pipe invert level for the first row of piles.
4. Where raft foundations or strip footings are proposed within the 45° envelope, statement from a structural engineer is required to confirm that the foundation design complies with Clause 2.
5. Driven piles are not permitted within 10 metres of a brick sewer or 5 metres of any other sewers.
6. Closed Circuit Television ( CCTV ) inspections of Transmission sewer only on approval from Watercare Services Ltd.
7. Drawings of the proposed works must accurately identify the location of the sewer/s affected and the distances with cross-section details for all structures. Watercare approved registered surveyor must be engaged to carry out the mark out.

L:\---\ EGCADFI \ 2015 \ WATER & WASTEWATER NETWORK STD DWGS \ 2010070.051A .DWG



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GUIDELINE FOR BUILDING CLOSE TO OR OVER TRANSMISSION ( TRUNK ) SEWER

SCALE:	N.T.S.
ISSUE DATE:	14-04-2015
DWG No.	2010070.051A
REFERENCE No.	WW 60



## **Appendix C**

### **Laboratory Test Data**

Report No: 16 0236 00  
Page: 1 of 1**DETERMINATION OF THE LIQUID LIMIT & LINEAR SHRINKAGE  
TEST METHOD NZS 4402 : 1986 TEST 2.2 & 2.6**

---

Job: **Papakura 2B**  
Date of order: 28.09.16      Sample origin: -  
Sample method: Hand auger      Sample Description: -  
Sample By: RHD      Date: 27.09.16

---

**Test Details :**

Test performed on : Whole Sample  
History : Natural

Sample No.	Location	Depth (m)	Liquid Limit	Linear Shrinkage	Natural Water Content (%)
E266A	Lot 4	0.4m - 0.8m	53	15	35.2
E267A	Lot 21	0.4m - 0.8m	77	21	31.4
E268A	Lot 28	0.4m - 0.8m	60	19	27.4
E269A	Lot 31	0.4m - 0.8m	95	22	39.2
E270A	Lot 35	0.4m - 0.8m	53	16	35.8
E271A	Lot 39	0.4m - 0.8m	64	18	37.0

**Comments :**

---

Tested By: EC      Date : 08.10.16  
Calculated By : Ec      Date : 09.10.16  
Checked By : EC      Date : 11.10.16

---

Report No: 16 0289 00  
Page: 1 of 1**DETERMINATION OF THE LIQUID LIMIT & LINEAR SHRINKAGE  
TEST METHOD NZS 4402 : 1986 TEST 2.2 & 2.6**

---

Job: **Area 2B, Papakura**  
Date of order: 17.11.16  
Sample method: Hand auger  
Sample By: CMW Geosciences NZ Ltd

Sample origin: Lot 1 - 0.4m to 0.7m  
Sample Description: -  
Date: 16.11.16

---

**Test Details :**

Test performed on : Whole Sample  
History : Natural

Sample No.	Location	Depth (m)	Liquid Limit	Linear Shrinkage	Natural Water Content (%)
282E	Lot 1	0.4m to 0.7m	45	12	30.0

**Comments :**

---

Tested By: MC & MW Date : 18.11.16  
Calculated By : MC & MW Date : 21.11.16  
Checked By : ZH Date : 22.11.16

---

## **Appendix D**

### **Field Test Data**

55A Druces Road, Manukau, Auckland 2104

### FILL CONTROL SUMMARY SHEET

TEST STANDARD - NUCLEAR DENSOMETER, NZS 4407:1991 TEST 4.2.1; WATER CONTENT, NZS 4402 TEST 2.1; SHEAR VANE, NZ GEOTECHNICAL SOCIETY GUIDELINES INC. 2001

(Please note Air Void calculations are not IANZ endorsed as part of this report)

**Job Name :** Old Wairoa Road, Papakura  
**Client :** CMW Geosciences NZ Ltd  
**Address :** PO Box 300206  
 Albany, Auckland 0754  
**Attention :** Tim Lepper

**Project No. :** 15 0240 02  
**Date of Order :** 06.11.15



TEST NUMBER	TESTED BY	DATE TESTED	TEST LOCATION	TEST DEPTH (mm)	WET DENSITY (t/m <sup>3</sup> )	OVEN WATER CONTENT (%)	DRY DENSITY (t/m <sup>3</sup> )	SOLID DENSITY (t/m <sup>3</sup> ) Assumed	AIR VOIDS %	FIELD SHEAR STRENGTH in kPa				RL (m)	NOTES
1	ZH	09.11.15	See Plan	150	1.92	29.1	1.49	2.7	1.5	176+	176+	176+	176+	-	
2	ZH	09.11.15	See Plan	150	1.89	31.2	1.44	2.7	1.8	138	140	155	163	-	
3	ZH	13.11.15	See Plan	150	1.94	22.3	1.59	2.7	6.0	146	155	176+	176+	-	
4	ZH	13.11.15	See Plan	150	1.98	26.0	1.57	2.7	1.0	176+	176+	176+	176+	-	
5	ZH	25.11.15	See Plan	150	1.92	25.3	1.53	2.7	4.7	176+	176+	176+	176+	-	
6	ZH	25.11.15	See Plan	150	1.95	25.2	1.56	2.7	3.0	176+	176+	176+	176+	-	
7	EC	25.11.15	See Plan	150	1.89	27.9	1.47	2.7	4.3	176+	176+	176+	176+	-	
8	EC	27.11.15	See Plan	150	1.93	27.9	1.51	2.7	2.2	176+	176+	176+	176+	-	
9	EC	27.11.15	See Plan	150	1.95	28.2	1.52	2.7	1.0	176+	176+	176+	176+	-	
10	ZH	04.12.15	See Plan	150	1.92	30.7	1.47	2.7	0.6	140	149	152	176+	-	
11	ZH	04.12.15	See Plan	150	1.90	27.2	1.49	2.7	4.3	166	140	146	158	-	
12	ZH	04.12.15	See Plan	150	1.81	35.7	1.34	2.7	2.8	176+	169	146	158	-	
13	ZH	04.12.15	See Plan	150	1.89	23.9	1.52	2.7	7.1	138	140	138	143	-	
14	ZH	07.12.15	See Plan	150	1.83	35.2	1.35	2.7	2.3	169	140	158	155	-	
15	ZH	08.12.15	See Plan	150	1.86	27.3	1.46	2.7	6.0	176+	176+	176+	176+	-	
16	ZH	10.12.15	See Plan	150	1.88	30.6	1.44	2.7	2.6	176+	176+	155	169	-	
17	ZH	10.12.15	See Plan	150	1.96	24.5	1.58	2.7	3.0	176+	176+	176+	176+	-	
18	ZH	17.12.15	See Plan	150	1.94	28.7	1.51	2.7	1.0	176+	176+	176+	176+	-	
19	ZH	14.01.16	See Plan	150	1.78	36.6	1.31	2.7	3.8	176+	176+	176+	176+	-	

Checked By: ZH  
 Date: 20.12.16  
 Page: 1 of 6

NT = Not Tested

55A Druces Road, Manukau, Auckland 2104

**FILL CONTROL SUMMARY SHEET**
**TEST STANDARD - NUCLEAR DENSOMETER, NZS 4407:1991 TEST 4.2.1; WATER CONTENT, NZS 4402 TEST 2.1; SHEAR VANE, NZ GEOTECHNICAL SOCIETY GUIDELINES INC. 2001**  
 (Please note Air Void calculations are not IANZ endorsed as part of this report)

**Job Name :** Old Wairoa Road, Papakura  
**Client :** CMW Geosciences NZ Ltd  
**Address :** PO Box 300206  
 Albany, Auckland 0754  
**Attention :** Tim Lepper

**Project No. :** 15 0240 02  
**Date of Order :** 06.11.15


TEST NUMBER	TESTED BY	DATE TESTED	TEST LOCATION	TEST DEPTH (mm)	WET DENSITY (t/m <sup>3</sup> )	OVEN WATER CONTENT (%)	DRY DENSITY (t/m <sup>3</sup> )	SOLID DENSITY (t/m <sup>3</sup> ) Assumed	AIR VOIDS %	FIELD SHEAR STRENGTH in kPa				RL (m)	NOTES
20	ZH	14.01.16	See Plan	150	1.85	32.6	1.39	2.7	2.8	176+	176+	176+	176+	-	
21	ZH	27.01.16	See Plan	150	1.94	24.0	1.57	2.7	4.5	176+	176+	176+	176+	-	
22	ZH	27.01.16	See Plan	150	1.83	36.5	1.34	2.7	1.6	176+	176+	176+	176+	-	
23	ZH	27.01.16	See Plan	150	1.90	28.6	1.47	2.7	3.3	176+	176+	176+	176+	-	
24	ZH	27.01.16	See Plan	150	1.84	34.4	1.37	2.7	2.2	176+	176+	176+	176+	-	
25	ZH	25.02.16	See Plan	150	1.92	25.2	1.54	2.7	4.4	176+	176+	176+	176+	-	
26	ZH	25.02.16	See Plan	150	1.87	29.9	1.44	2.7	3.9	176+	176+	176+	176+	-	
27	ZH	25.02.16	See Plan	150	1.89	25.3	1.51	2.7	6.0	176+	176+	176+	176+	-	
28	ZH	25.02.16	See Plan	150	1.93	26.4	1.52	2.7	3.3	176+	176+	176+	176+	-	
29	ZH	25.02.16	See Plan	150	1.91	32.9	1.44	2.7	0.0	176+	176+	176+	176+	-	
30	ZH	15.03.16	See Plan	150	1.96	25.2	1.57	2.7	2.4	176+	176+	176+	176+	-	
31	ZH	15.03.16	See Plan	150	1.93	20.4	1.60	2.7	8.0	176+	176+	176+	176+	-	
32	ZH	05.04.16	See Plan	150	1.98	24.8	1.59	2.7	2.0	138	140	146	155	-	
33	ZH	05.04.16	See Plan	150	1.95	25.0	1.56	2.7	3.3	140	140	143	146	-	
34	MC	08.04.16	See Plan	150	1.87	30.5	1.43	2.7	3.3	116	99	126	123	-	
35	ZH	12.04.16	See Plan	150	1.85	33.6	1.39	2.7	2.1	176+	176+	152	161	-	Retest from 08.04.16 No. 34
36	ZH	19.04.16	See Plan	150	1.84	34.8	1.36	2.7	2.0	138	146	151	158	-	
37	ZH	19.04.16	See Plan	150	1.85	27.3	1.45	2.7	6.7	169	169	169	176+	-	
38	EC	21.04.16	See Plan	150	1.91	25.0	1.53	2.7	5.4	193	158	161	142	-	
39	ZH	22.04.16	See Plan	150	1.90	29.2	1.47	2.7	2.8	176+	176+	176+	176+	-	

 Checked By: ZH  
 Date: 20.12.16  
 Page: 2 of 6

**NT = Not Tested**

55A Druces Road, Manukau, Auckland 2104

**FILL CONTROL SUMMARY SHEET**
**TEST STANDARD - NUCLEAR DENSOMETER, NZS 4407:1991 TEST 4.2.1; WATER CONTENT, NZS 4402 TEST 2.1; SHEAR VANE, NZ GEOTECHNICAL SOCIETY GUIDELINES INC. 2001**  
 (Please note Air Void calculations are not IANZ endorsed as part of this report)

**Job Name :** Old Wairoa Road, Papakura  
**Client :** CMW Geosciences NZ Ltd  
**Address :** PO Box 300206  
 Albany, Auckland 0754  
**Attention :** Tim Lepper

**Project No. :** 15 0240 02  
**Date of Order :** 06.11.15


TEST NUMBER	TESTED BY	DATE TESTED	TEST LOCATION	TEST DEPTH (mm)	WET DENSITY (t/m <sup>3</sup> )	OVEN WATER CONTENT (%)	DRY DENSITY (t/m <sup>3</sup> )	SOLID DENSITY (t/m <sup>3</sup> ) Assumed	AIR VOIDS %	FIELD SHEAR STRENGTH in kPa				RL (m)	NOTES
40	ZH	22.04.16	See Plan	150	1.89	29.2	1.47	2.7	2.9	176+	176+	176+	176+	-	
41	MC	06.05.16	See Plan	150	1.93	20.8	1.59	2.7	7.8	179+	179+	179+	179+	-	Old Wairoa Road
42	MC	06.05.16	See Plan	150	1.93	25.4	1.54	2.7	3.9	179+	179+	179+	179+	-	Old Wairoa Road
43	MC	11.05.16	See Plan	150	1.91	25.0	1.53	2.7	5.4	179+	179+	179+	179+	-	Road 4
44	MC	11.05.17	See Plan	150	1.86	29.3	1.44	2.7	4.5	179+	179+	179+	179+	-	Old Wairoa Road
45	MC	11.05.18	See Plan	150	1.96	24.2	1.57	2.7	3.5	179+	179+	179+	179+	-	
46	MC	11.05.19	See Plan	150	1.91	26.7	1.51	2.7	3.8	179+	179+	179+	179+	-	
47	MC	11.05.20	See Plan	150	1.87	27.5	1.47	2.7	5.2	179+	179+	179+	179+	-	
48	MC	05.07.16	See Plan	150	1.89	28.9	1.47	2.7	3.3	184	226+	226+	177	-	
49	ZH	06.07.16	See Plan	150	1.95	27.5	1.53	2.7	1.5	140	140	146	149	-	
50	ZH	07.07.16	See Plan	150	1.87	32.9	1.41	2.7	1.4	158	166	175	152	-	
51	MC	19.10.16	See Plan	150	1.84	32.4	1.39	2.7	3.4	177	226+	226+	226+	-	
52	MC	19.10.16	See Plan	150	1.88	29.1	1.46	2.7	3.5	226+	226+	226+	226+	-	
53	MC	19.10.16	See Plan	150	1.84	32.3	1.39	2.7	3.7	187	226+	226+	226+	-	
54	MC	19.10.16	See Plan	150	1.74	33.1	1.31	2.7	8.4	226+	226+	226+	226+	-	
55	MC	21.10.16	See Plan	150	1.85	34.0	1.38	2.7	2.2	177	171	155	164	-	
56	MC	21.10.16	See Plan	150	1.81	37.3	1.32	2.7	2.1	181	174	152	158	-	
57	MC	28.10.16	See Plan	150	1.88	30.0	1.45	2.7	2.9	161	145	148	152	-	
58	MC	28.10.16	See Plan	150	1.90	26.4	1.50	2.7	4.7	164	155	142	168	-	
59	MC & MW	09.11.16	See Plan	150	1.80	32.9	1.35	2.7	5.2	145	177	168	174	-	

 Checked By: ZH  
 Date: 20.12.16  
 Page: 3 of 6

**NT = Not Tested**

55A Druces Road, Manukau, Auckland 2104

**FILL CONTROL SUMMARY SHEET**
**TEST STANDARD - NUCLEAR DENSOMETER, NZS 4407:1991 TEST 4.2.1; WATER CONTENT, NZS 4402 TEST 2.1; SHEAR VANE, NZ GEOTECHNICAL SOCIETY GUIDELINES INC. 2001**  
 (Please note Air Void calculations are not IANZ endorsed as part of this report)

**Job Name :** Old Wairoa Road, Papakura  
**Client :** CMW Geosciences NZ Ltd  
**Address :** PO Box 300206  
 Albany, Auckland 0754  
**Attention :** Tim Lepper

**Project No. :** 15 0240 02  
**Date of Order :** 06.11.15


TEST NUMBER	TESTED BY	DATE TESTED	TEST LOCATION	TEST DEPTH (mm)	WET DENSITY (t/m <sup>3</sup> )	OVEN WATER CONTENT (%)	DRY DENSITY (t/m <sup>3</sup> )	SOLID DENSITY (t/m <sup>3</sup> ) Assumed	AIR VOIDS %	FIELD SHEAR STRENGTH in kPa				RL (m)	NOTES
										145	148	161	171		
60	MC & MW	09.11.16	See Plan	150	1.81	29.5	1.40	2.7	6.8	145	148	161	171	-	
61	MC & MW	10.11.16	See Plan	150	1.88	30.2	1.44	2.7	2.9	177	181	193	184	-	
62	MC & MW	10.11.16	See Plan	150	1.86	34.6	1.38	2.7	1.3	177	197	155	181	-	
63	MC & MW	10.11.16	See Plan	150	1.88	29.7	1.45	2.7	3.3	168	226+	193	161	-	
64	MC & MW	10.11.16	See Plan	150	1.81	32.6	1.37	2.7	4.8	203	161	145	177	-	
65	MC & MW	11.11.16	See Plan	150	1.88	30.8	1.44	2.7	2.4	161	148	139	171	-	
66	MC & MW	11.11.16	See Plan	150	1.90	26.6	1.50	2.7	4.4	193	177	226+	226+	-	
67	MC & MW	11.11.16	See Plan	150	1.87	30.0	1.44	2.7	3.6	145	168	156	135	-	
68	MC & MW	11.11.16	See Plan	150	1.80	32.5	1.36	2.7	5.8	190	210	177	266+	-	
69	MC	14.11.16	See Plan	150	1.88	27.7	1.47	2.7	4.7	148	145	177	168	-	
70	MC	14.11.16	See Plan	150	1.86	29.0	1.44	2.7	4.8	152	164	155	184	-	
71	ZH	21.11.16	See Plan	150	1.81	42.5	1.27	2.7	0.0	141	131	159	129	-	Fill placed by another contractor
72	ZH	21.11.16	See Plan	150	1.77	39.8	1.27	2.7	2.5	98	105	141	118	-	Fill placed by another contractor
73	ZH	21.11.16	See Plan	150	1.80	39.4	1.29	2.7	1.5	95	110	90	119	-	Fill placed by another contractor
74	ZH	22.11.16	See Plan	150	1.86	30.2	1.43	2.7	4.1	163+	163+	163+	163+	-	
75	ZH	22.11.16	See Plan	150	1.82	36.8	1.33	2.7	1.6	163+	163+	163+	163+	-	
76	ZH	22.11.16	See Plan	150	1.82	35.0	1.35	2.7	2.9	141	147	141	150	-	
77	ZH	22.11.16	See Plan	150	1.91	26.4	1.51	2.7	4.4	156	159	147	141	-	
78	MW	23.11.16	See Plan	150	1.91	24.8	1.53	2.7	5.5	139	187	187	187	-	
79	MW	23.11.16	See Plan	150	1.88	25.6	1.49	2.7	6.5	157	187	187	136	-	

 Checked By: ZH  
 Date: 20.12.16  
 Page: 4 of 6

**NT = Not Tested**



55A Druces Road, Manukau, Auckland 2104

## FILL CONTROL SUMMARY SHEET

TEST STANDARD - NUCLEAR DENSOMETER, NZS 4407:1991 TEST 4.2.1; WATER CONTENT, NZS 4402 TEST 2.1; SHEAR VANE, NZ GEOTECHNICAL SOCIETY GUIDELINES INC. 2001

(Please note Air Void calculations are not IANZ endorsed as part of this report)

**Job Name :** Old Wairoa Road, Papakura  
**Client :** CMW Geosciences NZ Ltd  
**Address :** PO Box 300206  
 Albany, Auckland 0754  
**Attention :** Tim Lepper

**Project No. :** 15 0240 02  
**Date of Order :** 06.11.15



TEST NUMBER	TESTED BY	DATE TESTED	TEST LOCATION	TEST DEPTH (mm)	WET DENSITY (t/m <sup>3</sup> )	OVEN WATER CONTENT (%)	DRY DENSITY (t/m <sup>3</sup> )	SOLID DENSITY (t/m <sup>3</sup> ) Assumed	AIR VOIDS %	FIELD SHEAR STRENGTH in kPa				RL (m)	NOTES
80	MW	24.11.16	See Plan	150	1.82	34.3	1.35	2.7	3.4	91	91	91	97	-	
81	MW	24.11.16	See Plan	150	1.88	24.6	1.51	2.7	7.1	133	136	145	187+	-	
82	MW	24.11.16	See Plan	150	1.86	33.1	1.39	2.7	2.2	133	160	173	187+	-	

Checked By: ZH  
 Date: 20.12.16  
 Page: 5 of 6

NT = Not Tested

Job Name : Old Wairoa Road, Papakura

Location : -

### Site Plan - Not to scale



Tested By :

ZH & MC

Date :

09.11.15 to 24.11.16

Checked By :

ZH & MC

Date :

20.12.16

## **Appendix E**

### **Producer Statement**

11 January 2016

Ref: 2015\_1186AG Rev.0

Cabra Investments Limited  
PO Box 197  
Orewa 0946

**Attention: Duncan Unsworth**

**RE: PRODUCER STATEMENT PS4 FOR THE CONSTRUCTION OF DRAIN BRIDGING ON THE  
TIMBER POLE RETAINING WALLS AND KEY STONE RETAINING WALLS ON THE  
PAPAKURA 2B DEVELOPMENT STAGE 1 – BUILDING CONSENT NUMBER B/2015/10265/A**

CMW Geosciences (NZ) Limited (CMW) have visited the above site, legally described as CT-3A/1210 Allot 248 Hunua PSH On SO 31425 BLK XV Otahuhu SD on multiple occasions between December 2015 and October 2016 to observe the ground conditions and construction details relating to the construction of the drain bridging on the timber pole retaining walls and segmental block walls as part of Stage 1 of the Papakura 2B subdivision development.

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

- Conditions of Building Consent referenced B/2015/10265/A, issued 9 May 2016;
- Construction drawings prepared by Aspire Consulting Engineers, referenced 1126 – BC – RW101 to RW103 and 1126 – ENG – ST702 to ST705 dated September 2015;
- Technical Memo for Concrete Block Retaining Wall Design for Residential Subdivision at 949 Old Wairoa Road prepared by CMW, referenced 2015\_1186AC Rev.0, dated 4 September 2015.
- Peters Holdings Limited Drain Bridging Details for 949 Old Wairoa Road.

The site works observed and/or tested by CMW staff for the timber pole retaining walls incorporated:

- assessment of soil strengths in the exposed pile foundation excavations;
- construction observations for timber pole retaining walls including:
  - Pile Size;
  - Pile Depth;
  - Timber pole size, treatment and placement;
  - Drainage materials and installation;
  - Lagging construction.
  - Pipe Bridging

Drain bridging on the timber pole retaining wall construction was observed on the following lots; 1 to 6, 24, 25 and 34 inclusive. Ground conditions within the timber pole pile holes ranged from natural soils of the Waitemata Group (comprising of silty clays, sandy clays, weathered rock) certified engineered filling or alluvial clays and silts. Design cases A and B were used across these lots as applicable.

The site works observed and/or tested by CMW staff for drain bridging on the segmental block walls incorporated:

- Assessment of soil strengths of the exposed foundation excavations;
- Drainage installation;
- Geogrid reinforcement placement (type, length and vertical spacing);

- No-fines Concrete Placement.

Drain bridging on the key stone retaining wall construction was observed on the following lots 1, 2, 4, and 6 inclusive.

On the basis of our observations and testing, we consider that the construction of the drain bridging on the timber pole retaining walls and key stone retaining walls have been undertaken in accordance with the approved documentation described above and are in accordance with the requirements and/or recommendations of both the design cases by Aspire Consulting Engineers and the technical memorandum prepared by CMW for the keystone walls.

**For and on behalf of**  
**CMW Geosciences NZ Ltd**



**Sam Gibb**

Senior Geotechnical Engineer, CPEng

Attachments:     Producer Statement - Construction Review



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

# PRODUCER STATEMENT – PS4 – CONSTRUCTION REVIEW

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

ISSUED BY: ..... S.E.GIBB of CMW GEOSCIENCES (NZ) LIMITED.....  
(Construction Review Firm)

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

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

IN RESPECT OF: CONSTRUCTION OF DRAIN BRIDGING ON THE TIMBER POLE RETAINING WALLS AND  
KEYSTONE RETAINING WALLS  
(Description of Building Work)

AT: ..... 949 OLD WAIROA ROAD, ARDMORE, AUCKLAND 2110.....  
(Address)

... LOT... CT-3A/1210 ALLOT 248 HUNUA PSH ON ... DP ..... SO ... 31425 BLK XV OTAHUHU SD.....

CMW GEOSCIENCES (NZ) LIMITED has been engaged by CABRA INVESTMENTS LIMITED.....  
(Construction Review Firm)

To provide  CM1  CM2  CM3  CM4  CM5 (Engineering Categories) or  observation as per agreement with owner/developer  
or  other ... REFER TO ATTACHED DOCUMENT 2015\_1186AG REV.0 DATED 11/1/17..... services  
(Extent of Engagement)

in respect of clause(s) ..... B1..... of the Building Code for the building work described in  
documents relating to Building Consent No. .... B/2015/10265..... and those relating to  
Building Consent Amendment(s) Nos. .... B/2015/10265/A..... issued during the  
course of the works. We have sighted these Building Consents and the conditions of attached to them.

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

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

I, ..... S.E.GIBB..... am:  CPEng No. 1023416 AUCKLAND COUNCIL AUTHOR #3126  
(Name of Construction Review Professional)

Reg Arch No. ....

I am a Member of :  IPENZ  NZIA and hold the following qualifications: ..... BSc CPEng.....

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

The Construction Review Firm is a member of ACENZ :

SIGNED BY ..... S.E.GIBB ..... ON BEHALF OF ..... CMW GEOSCIENCES (NZ) LIMITED.....

Date: ..... 11/1/17 ..... Signature:

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

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

## GUIDANCE ON USE OF PRODUCER STATEMENTS

Producer statements were first introduced with the Building Act 1991. The producer statements were developed by a combined task committee consisting of members of the New Zealand Institute of Architects, Institution of Professional Engineers New Zealand, Association of Consulting Engineers New Zealand in consultation with the Building Officials Institute of New Zealand. The original suit of producer statements has been revised at the date of this form as a result of enactment of the Building Act (2004) by these organisations to ensure standard use within the industry.

The producer statement system is intended to provide Building Consent Authorities (BCAs) with reasonable grounds for the issue of a Building Consent or a Code Compliance Certificate, without having to duplicate design or construction checking undertaken by others.

**PS1 Design** Intended for use by a suitably qualified independent design professional in circumstances where the BCA accepts a producer statement for establishing reasonable grounds to issue a Building Consent;

**PS2 Design Review** Intended for use by a suitably qualified independent design professional where the BCA accepts an independent design professional's review as the basis for establishing reasonable grounds to issue a Building Consent;

**PS3 Construction** Forms commonly used as a certificate of completion of building work are Schedule 6 of NZS 3910:2013 or Schedules E1/E2 of NZIA's SCC 2011<sup>2</sup>

**PS4 Construction Review** Intended for use by a suitably qualified independent design professional who undertakes construction monitoring of the building works where the BCA requests a producer statement prior to issuing a Code Compliance Certificate.

This must be accompanied by a statement of completion of building work (Schedule 6).

The following guidelines are provided by ACENZ, IPENZ and NZIA to interpret the Producer Statement.

### Competence of Design Professional

This statement is made by a Design Firm that has undertaken a contract of services for the services named, and is signed by a person authorised by that firm to verify the processes within the firm and competence of its designers.

A competent design professional will have a professional qualification and proven current competence through registration on a national competence based register, either as a Chartered Professional Engineer (CPEng) or a Registered Architect.

Membership of a professional body, such as the Institution of Professional Engineers New Zealand (IPENZ) or the New Zealand Institute of Architects (NZIA), provides additional assurance of the designer's standing within the profession. If the design firm is a member of the Association of Consulting Engineers New Zealand (ACENZ), this provides additional assurance about the standing of the firm.

Persons or firms meeting these criteria satisfy the term "suitably qualified independent design professional".

### \*Professional Indemnity Insurance

As part of membership requirements, ACENZ requires all member firms to hold Professional Indemnity Insurance to a minimum level.

The PI Insurance minimum stated on the front of this form reflects standard, small projects. If the parties deem this inappropriate for large projects the minimum may be up to \$500,000.

### Professional Services during Construction Phase

There are several levels of service which a Design Firm may provide during the construction phase of a project (CM1-CM5 for Engineers<sup>3</sup>). The Building Consent Authority is encouraged to require that the service to be provided by the Design Firm is appropriate for the project concerned.

### Requirement to provide Producer Statement PS4

Building Consent Authorities should ensure that the applicant is aware of any requirement for producer statements for the construction phase of building work at the time the building consent is issued as no design professional should be expected to provide a producer statement unless such a requirement forms part of the Design firm's engagement.

### Attached Particulars

Attached particulars referred to in this producer statement refer to supplementary information appended to the producer statement.

### Refer Also:

- 1 Conditions of Contract for Building & Civil Engineering Construction NZS 3910: 2013
- 2 NZIA Standard Conditions of Contract SCC 2011
- 3 Guideline on the Briefing & Engagement for Consulting Engineering Services (ACENZ/IPENZ 2004)
- 4 PN Guidelines on Producer Statements

[www.acenz.org.nz](http://www.acenz.org.nz)  
[www.ipenz.org.nz](http://www.ipenz.org.nz)  
[www.nzia.co.nz](http://www.nzia.co.nz)

