Appendices

Appendix A Design for Surge and Fatigue

A1 Introduction

All pipelines are subjected to pressure variations during their lifetimes. Some of these pipelines, e.g. rising mains, will experience significant and regular pressure surges, while others may be subjected only to minor diurnal pressure variations.

Rapid pressure fluctuations and surges generally result from events such as pump start - up and shutdown, or rapid closing or opening of valves, including 'slamming' of air valves as can happen during venting of bulk air from pipelines.

For the purposes of the WDC ES, a pressure surge is defined as a rapid, short-term pressure variation. Surges are characterised by rapid, high-pressure rise rates, with minimal time spent at the peak pressure. Surge events usually consist of a number of diminishing pressure waves that cease within a few minutes.

The frequency and magnitude of the pressure transients affects the choice of pipe pressure class. Ensure that the following aspects are considered when designing for surges and fatigue:

a. That the maximum and minimum pressures are within acceptable limits for the pipe and fittings for all surge events (including infrequent events such as power failure, emergency shut-down, rapid closure of fire hydrants),

b. Consider the potential for fatigue and select the pipe pressure class accordingly, to allow for frequent repetitive pressure variations, and

c. The pipe and the quality of installation and their influence on the fatigue resistance of the pipe.

The following sections provide a methodology for dealing with surge and fatigue, so that pipes are adequately designed to provide the 100-year design life that is required.

The PIPA Guidelines may also be used, specifically the following:

d. POP010A – Polyethylene Pressure Pipes Design for Dynamic Stresses

e. POP101 – PVC Pressure Pipes Design for Dynamic Stresses

These may be found at https:/www.pipa.com.au/technical/pop-guidelines.

A2 Pressure Surge Events

A surge analysis is required to check whether damaging pressure surges (or surges that could cause customer complaint) could occur in a system. The level of detail of the surge analysis should be appropriate to the pipeline. For example, a reticulation pipeline may require only consideration of rapid closure of fire hydrants and conservative selection of pipe pressure rating.

Pipelines that may be subjected to more severe surge effects e.g. rising mains, areas close to control valves (reservoir inlet valves and pressure reducing valves) and where

specified by Council, require a more detailed level of analysis, or the selection of pipe materials that are highly resistant to surge and fatigue issues.

The source(s) of significant pressure surges in a water system should be identified and included in any surge analysis. Mitigating measures may be needed to minimise any surges generated, and any surge control devices must be designed accordingly. As a minimum, such a surge analysis should consider:

a. Identified causative scenarios (e.g. power failure, pump trip, component failure, air valve operation, rapid closure of valves),

b. The highest pressure along the pipeline,

c. The lowest pressure along the pipeline, and

d. Vacuum and air relief requirements along the pipeline under all conditions.

Note that non-slam air valves may be required on plastic pipelines, to minimise the risk of severe surges being generated by the movement of trapped air, and to minimise the potential for instantaneous ‘slamming’ shut of a conventional air valve.

If, during the design phase, it is found that the minimum pressure in the mains could fall below atmospheric pressure during pressure surge events or drain down, mitigating measures must be designed to eliminate or minimise these effects. If negative pressures are a possibility, buckling of the pipe must be considered and a safety factor of at least 2.0 applied.

A3 Fatigue

Consideration of the effect of fatigue is particularly relevant to plastic pipes that are subjected to a large number of pressure cycles. Fatigue considerations can generally be ignored for ferrous pipe materials, e.g. ductile iron and concrete-lined steel. The important factors are the magnitude and frequency of the pressure fluctuations.

For fatigue loading situations, the maximum pressure reached in the pressure cycle must not exceed the nominal pressure rating of the pipe.

Fatigue does not need to be considered if the number of pressure cycles during the pipe’s designed lifetime does not exceed the values in Table 0-1 below.

Table 0-1: Critical number of surges in pipe lifetime

Pipe Material	Critical Number of Cycles in Lifetime
PVC-U, PVC-O	100,000
PE 80B, PE100	300,000

The procedure for fatigue design is:

a. Confirm the design lifetime of pipeline. (The pipeline design life must be taken as 100 years unless specified otherwise by Council),

b. Estimate the likely number of pressure cycles during design life,

c. Calculate the range of pressure surges,

d. Calculate the fatigue load factor,

e. Determine the equivalent operating pressure, and

f. Select the pipe PN rating.

A4 Number of Pressure Cycles

Calculate the expected number of cycles during the pipe's lifetime, based on realistic estimates of the number of pressure cycles per day or per hour. If the primary pressure variation is followed by a smaller number of pressure fluctuations on each cycle, as shown in Figure 0-1, the calculated number of cycles should be doubled.

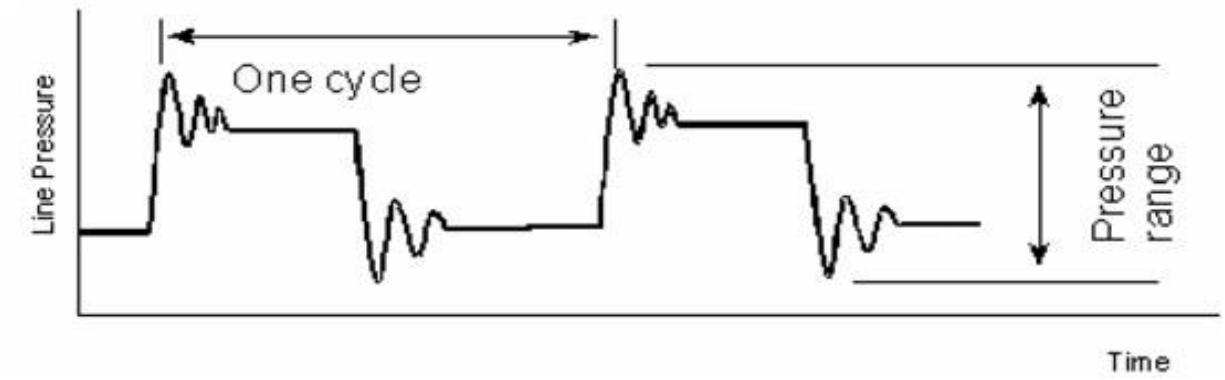


Figure 0-1: Pressure Cycle and Pressure Range (From POP101 Figure1)

Table 0-2 below shows the number of pressure cycles over 100 years for various numbers of cycles per day and hour

Table 0-2: Pressure Cycles in 100 Years for Various Numbers per Hour and per Day

Cycles per Hour	Cycles per Day	Total Number of Cycles in 100 Years
0.04	1	36,000
0.5	12	440,000
1	24	880,000
10	240	8,800,000
60	1440	52,500,000
120	2880	105,000,000

A5 Range of Pressure Surges

Calculate the pressure range of the regular pressure variations by surge analysis. Figure 0-1 shows a typical cyclic pressure pattern. Where pumps are controlled by variable speed drives, select a pressure cycle that is most representative of the expected pipeline operation over its design life.

Note that the pressure range will vary along the pipeline. Economies may be possible on some pipelines by dividing the pipeline into sections and evaluating the fatigue design for each, subject to the approval of Council.

A6 Fatigue Load Factor

The fatigue load factors for plastic pipes are as shown below in Table 0-3 and Table 0-4.

Table 0-3: Fatigue Load Factors for PE80B and PE100 (from POP010A Table 1)

Total Cycles	Cycles per day for 100 year life	PE80B	PE100
36,500	1	1.00	1.00

Total Cycles	Cycles per day for 100 year life	PE80B	PE100
100,000	3	1.00	1.00
300,000	8	1.00	1.00
500,000	14	0.95	0.95
1,000,000	27	0.88	0.88
5,000,000	137	0.74	0.74
10,000,000	274	0.68	0.68
50,000,000	1370	0.57	0.57
36,500	1	1.00	1.00
100,000	3	1.00	1.00
300,000	8	1.00	1.00
500,000	14	0.95	0.95

Table 0-4: Fatigue Load Factors for PVC (from POP101 Table 1)

Total Cycles	Cycles per day for 100 year life	PVC-U	PVC-M	PVC-O
26,400	1	1.00	1.00	1.00
100,000	3	1.00	0.67	0.75
200,000	5.5	0.81	0.54	0.66
500,000	14	0.62	0.41	0.56
1,000,000	27	0.50	0.33	0.49
2,500,000	82	0.38	0.25	0.41
5,000,000	137	0.38	0.25	0.41
10,000,000	274	0.38	0.25	0.41

A7 Equivalent Operating Pressure

Calculate this using the following equation;

Equation 0-1: Equivalent Operating Pressure

Where:

$$Peo = \frac{\Delta P}{FLF}$$

Peo = $\underline{\Delta P}$

Peo = Equivalent operating pressure (bar)

ΔP = Cyclic pressure range (bar).

FLF = Fatigue Load Factor

Appendix B ES-SEW1

Onsite Wastewater Disposal Investigation

This form is to be read in conjunction with AS/NZS 1547:2012 (or any amendments as applicable), and, in particular with Part 4: Means of Compliance

Part A – Contact Details

1 - Applicant

Name: _____

_____

Property Address: _____

_____

Lot/DP Number: _____

2 - Consultant / Site Evaluator

Site Evaluator Name: _____

_____

Company Name: _____

_____

Postal Address: _____

_____

Business Phone: _____ Mobile: _____

Email: _____

Details of SQEP who will carry out on-site effluent investigations/designs are to be supplied below.

Name of SQEP: _____

Qualification(s): _____

_____

Company Name: _____

_____

Postal Address: _____

Business Phone: _____ Mobile: _____

Email: _____

Part B - Site and Soil Evaluation

1: Desk Study

Requirements (✓ appropriate box) Please complete **all** options. (*If more than one option applies to land under consideration, please clarify with supporting information)*

☐	WDC REQUIREMENT	APPLIES TO LOT(S)	COMMENTS
1	**Hazard maps/GIS hazard layer - stability**		
☐	Low stability risk		
☐	Moderate stability risk		
☐	High stability risk		
2	**GIS hazard layer – effluent on slope stability**		
☐	Low disposal potential		
☐	Moderate disposal potential		
☐	High disposal potential		
3	**GIS hazard layer – effluent suitability**		
☐	Medium unsuitability		
☐	High unsuitability		
4	**GIS hazard layer – flood susceptibility**		
☐	Is flood susceptible		
☐	Is partially flood susceptible		
☐	Is not flood susceptible		
5	**GIS land resources layer - streams**		

Are there streams on or adjacent to land under investigation?		Yes		
		No		
6	**GIS land resources layer – aquifers at risk**			
Is land situated over or adjacent to aquifer?		Yes		
		No		
7	**Annual Rainfall (HIRDS)**			

Note: It is to be noted that all information obtained off WDC GIS/Hazard Maps is to be taken as a guide only.

Note: All information obtained from the above sites is to be confirmed by a specific site investigation as localised conditions could vary substantially. However, should the above data checks indicate the potential for a hazard/non-complying activity etc., this must be further investigated to confirm/deny the indicated situation.

2: On-Site Evaluation

a. Determination of Soil Category *(refer table 4.1.1* AS/NZS 1547:2012*)* (✓ appropriate box)

Soil Category		Structure	Applies to lot(s)	Comments
1 Gravels & Sands		Structureless (massive)		
2 Sandy loams		Weakly Structured		
		Massive		
3 Loams		High/Moderate structured		
		Weakly structured or Massive		
4 Clay loams		High/moderate structured		
		Weakly structured		
		Massive		
5 Light clays		Strongly structured		
		Moderately structured		
		Weakly structured or massive		
6 Medium to heavy clays		Strongly structured		
		Moderately structured		
		Weakly structured or massive		

Note: Refer 4.1 A4 – Soil Assessment AS/NZS 1547:2012 for assessment criteria.

Note: Details of the method used to determine soil type etc. are to be clearly stated, along with positions of boreholes/test pits etc. clearly marked on a site plan. Bore logs are to be provided. Photos should be included.

Note: The site plan should also clearly show the intended area for effluent disposal, along with any site features such as drains, water bores, overland flows etc., along with separation distance achieved.

On-Site Evaluation Continued

b. Site Characteristics for Proposed Disposal Area: (if there is a marked difference between sites, please fill in a separate form for each site and clearly note which site the assessment applies to) (✓ appropriate box)

□	DETAILS	APPLIES TO SITE(S)
1	**Flooding potential to proposed field and reserve field (refer note 1 below)**	
	Fields will not flood, or	
	Fields will flood in	
	20% AEP event	
	5% AEP event	
	1% AEP event	
2	**Surface water separation to proposed field and reserve field (refer note 2 below)**	
	Main/reserve disposal field comply with NRC rules	
	Main/reserve disposal field do not comply with NRC rules	
3	**Surface water separation to proposed field and reserve field (refer note 2 below)**	
	Main/reserve disposal field comply with NRC rules	
	Main/reserve disposal field do not comply with NRC rules	
4	**Winter ground water separation to proposed field and reserve field (refer note 3 below)**	
	Main and reserve disposal field comply with NRC rules	
	Main and reserve disposal field do NOT comply with NRC rules	
5	**Slope of ground of proposed field and reserve field (refer note 4)**	
Description		
6	**Shape of ground of proposed field and reserve field (Refer note 5 below)**	

	Waxing divergent		Linear divergent		Waning divergent
	Waxing planar		Liner planar		Waning planar
	Waxing convergent		Linear convergent		Waning convergent

Comments	

	DETAILS	**APPLIES TO SITE(S)**
7	**Intended water supply source**	
	Public supply	
	Rainwater	
	Bore	
8	**Proposed method of disposal and recommended Daily Loading rate (DLR) (refer note 6 below)**	

Description	

Peak loading factored in (refer not 6 below)		Yes		No

Comments	

9	**Site exposure (refer note 7 below)**	**Description**	**Applies to Site(s)**
Site(s) aspect			
Pre-dominant wind direction			
Presence of shelter belts			
Presence of topographical features or structures			
10	**Proximity of water bores (include adjacent to properties) (refer note 9 below)**		

11	**Visible evidence of slips / instability (refer not 8 below)**
12	**Total suitable area available for type of effluent disposal proposed (including reserve area)**
13	**Setback areas proposed (if any) (refer note 10 below)**

Notes

1. *If the WDC hazard maps/GIS indicate a flooding susceptibility on the site being evaluated, an on -site evaluation is to be carried out to determine the effects from 20%, 5% and 1% AEP storm events. This evaluation is to include all calculations to substantiate conclusions drawn. If necessary, include a detailed contour plan and photos.*
2. *NRC Water & Soil plan defines surface water as 'All water, flowing or not, above the ground. It includes water in continually or intermittently flowing rivers, artificial watercourses, lakes and wetlands, and water impounded by structures such as dams or weirs but does not include water while in pipes, tanks, cisterns, nor water within the Coastal Marine Area'. By this definition, separation (complying with NRC rules) is to be maintained by both the proposed disposal and reserve areas from any OLFP and/or swale drains etc., or R/C will be required from NRC. Surface water is to be clearly marked on each site plan, showing the extent of a 1% AEP storm event, and detailing separation distances to main/reserve disposal areas.*
3. *Positions of test borehole/s to be shown and bore logs to be provided. Separation (complying with NRC rules) is to be maintained by both the proposed disposal and reserve areas from winter ground water level or R/C will be required from NRC. If the investigation is done outside of the winter period, allowance is to be made in determining the likely winter level.*
4. *Slopes of ground are to be compared with those recommended maximums for type of system proposed (refer Appendix 4.2B AS/NZS 1547:2012). Designs exceeding those maximums will require specific design to justify the proposal and may also need Resource Consent from NRC.*
5. *Shape of ground is important as it will determine whether there is potential for concentrated overland flows from the upper slopes and also if effluent might be concentrated at base of slope if leeching occurs. Refer Figure 4.1B2 AS/NZS 1547:2012.*
6. *The proposed system (for residential developments) should be sized to accommodate an average 3-bedroom house with 5 people. Sites in holiday areas need to take peak loading into effect in determining daily volumes. The design must state what DLR was used to determine area necessary (including reserve*

area). If ground conditions are marginal for type of disposal proposed, then a soil permeability test utilising the constant head method is to be carried out across the proposed disposal area. Refer Appendix 4.1F AS/NZS 1547:2012.

7. *The site aspect is important as a north-facing site that is not sheltered from wind and sun by shelterbelts or other topographical features or structures will perform far better than a south-facing site on the lee of a hill that is shaded from wind and sun etc.*
8. *If any effluent disposal area (including any reserve area) proposed has or is adjacent to areas that show signs of instability, then a full report from a CPEng (Geotech) will be required to justify the viability of the area for effluent disposal.*
9. *If there are any water bores on the subject property or adjacent properties, then a site plan will be required showing bore positions in relation to any proposed effluent field(s).*
10. *If setback areas are proposed to mitigate effects, the extent and position/s need to be shown on a site plan.*

Appendix C ES-PO1

Statement of Professional Opinion on Suitability of Land for Building Construction

Development _____

Developer _____

Location _____

I *(full name)* _____

Of *(Name and address of firm)* _____

1 I am a Geo-Professional as defined in Section 1.3 Abbreviations and Definitions and was retained by the Developer as the geo-professional on the above development

2 The extent of my preliminary investigations are described in my Report(s) number _____ dated _____ and the conclusions and recommendations of that/those document(s) have been re-evaluated in the preparation of this report. The extent of my inspections during construction, and the results of all tests and/or re-evaluations carried out are as described in my geotechnical completion report dated _____.

3 In my professional opinion, not to be construed as a guarantee, I consider that *(delete as appropriate)*:

a. The earth fills shown on the attached Plan No _____have been placed in compliance with the requirements of the Whangārei District Council and my specification. (However, lots _____ did not pass final fill specification testing and as a result, specific site investigations and foundation designs will be required here at the time of building consent application)

b. The completed works take into account land slope and foundation stability considerations, subject to the appended foundation recommendations and earthworks restrictions, *(which should be read in conjunction with the appended final site contour plan)*

c. Subject to 3(a) and 3(b) above, the original ground not affected by filling satisfies the description of 'good ground' as described in B1 Acceptable Solutions and Verification Methods and NZS 4229:2013 □ Yes □ No

(If no, a specific foundation investigation/design will be required at the time of Building Consent)

d. Subject to 3(a) and 3(b) above, the filled ground satisfies the description of 'good ground' as described in NZS 3604:2011 and NZS 4229:2013 □ Yes □ No

(If no, a specific foundation investigation/design will be required at the time of Building Consent)

e. The original ground not affected by filling and the filled ground are not subject to erosion, subsidence, or slippage in accordance with the

provisions of section 106 of the Resource Management Act 1991 provided that:

i. _____

ii. _____

iii. _____

iv. _____

4 This professional opinion is furnished to the TA and the Developer for their purposes alone on the express condition that it will not be relied upon by any other person and does not remove the necessity for the normal inspection of foundation conditions at the time of erection of any building

5 This certificate shall be read in conjunction with my geotechnical report referred to in clause 2 above and shall not be copied or reproduced except in conjunction with the full geotechnical completion report

Signature	*Professional Qualifications*	*Date*

Appendix D ES-W1

Application to Connect Water Reticulation to WDC Mains

Subdivision / Development Name	
Subdivision / Development Number	
Application No	
Building Consent	
PID	
Surveyor	
Approved Contractor	
Developer	
Document Information	
Drawing Numbers	
Other Documents	

1 Approval of Works	Yes	No
The works have been built in full accordance with the approved drawings and have been inspected against the SEEO checklist and passed all inspections	☐	☐

2 Pressure Testing	Pass	Fail
Pressure taken to _____Kpa For _____ hours N1 _____	☐	☐
Pressure drop _____% N2 _____		

3 Disinfection	Pass	Fail
Initial Chlorine Residual _____ 24hr Chlorine Residual _____ppm	☐	☐
Final Chlorine Residual _____ppm		

4 the above inspection / testing is for the:

☐ completed works or ☐ part of the works.

If for part of the works, please give specific details

_____

_____

_____

Approved by

(SEEO of Delegated Representative) *Date*

Office Use Only

	Yes	No
Approved to connect into Public Water Supply	☐	☐

Name of Approving Officer *Signature* *Date*

Appendix E Permeability Test Sheets

Falling-Head Permeability Test (Borehole)

Site Address _____

Completed By _____

Date of Test _____ Signature _____

Ensure the following procedures are followed (□ when complete)

❒ Bore hole of minimum 150mm diameter and minimum 1.5 m depth (or to groundwater level)

❒ Bore is filled to minimum 75% of total depth

❒ Drop in water level is recorded at intervals of 15 minutes or less

❒ Test is continued for 4 hours or until hole is to 25% of depth

❒ Three tests completed in bore

1 – Details

a. diameter of bore = D = _____m b. total bore depth = _____m

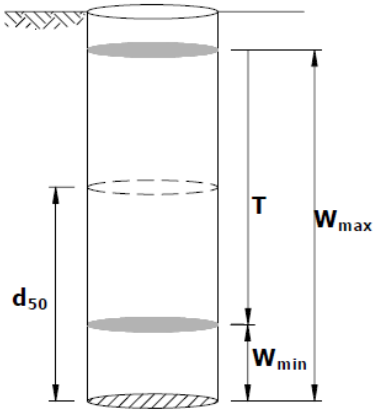
Test 1	
c. depth to water (m)	Time (min)

Test 2	
c. depth to water (m)	Time (min)

Test 3	
c. depth to water (m)	Time (min)

2 – Calculate Permeability Rate: Note Base area disregarded

	a	Maximum water depth = W_{max} =		m
	b	Minimum water depth = W_{min} =		m
	c	d50 = (W_{max} – W_{min}) /2 + W_{min} =		m
	d	As50 = (22 x D x d50) / 7 =		m^2

	e	Vol = (22 x D^2) / 28 =		m^3
	f	T (time between W_{max} and W_{min})(Test #3) =		min
	g	Soil permeability = P = Vol / A_{s50} x T x 60) =		m/sec
	h	Safe soil permeability = P_{safe} = P / 2 =		m/sec

Falling-Head Permeability Test (Soak Pit)

Site Address _____

Completed By _____

Date of Test _____ Signature _____

Ensure the following procedures are followed (☐ when complete)

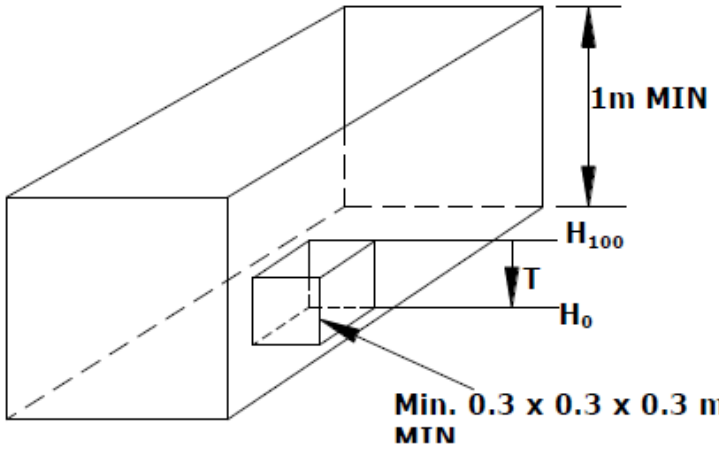
- ❒ Excavate 0.3 x 0.3 x 0.3 m test pit at base of main excavation (minimum 1 m deep)
- ❒ Refill test pit 3 times
- ❒ Use results from 3rd test

1 – Test Pit Details

a. depth of pit = H = _____m

b. Length of pit = L = _____m

c. width of pit = W = _____m



Test 1 – Time (min)	Test 2 – Time (min)	Test 3 – Time (min)

2 – Calculate Permeability Rate

a.	Test pit volume = V = W x L x D =		m^3
b.	A = (H x L x 2) + (W x H x 2) =		m^2 (base ignored)
c.	Time for pit to drain full to empty H_{100} to H_0 = T =		minutes (Test 3 result)
d.	Permeability (test) P_t = V / (T x 60 x A) =		m/sec
e.	Permeability (final) P_f = P_t x 0.5 =		m/sec

Use P_f for soak pit designs

Appendix F Drawing Standards

General

Drawings shall comply with the following standards, which are based on NZS 1100:1985/1986/2002. Where the drawings do not comply or are not clear in their presentation, WDC may require revised plans to be presented.

Coloured lines may be used for services in drawings, but standard line type and thickness shall be used alongside the colour. If colour is used for services, it shall be as follows:

g. sewer (red),

h. water (blue), and

i. stormwater (green)

Standard symbols and line styles as detailed in **Sheet 1** shall be used to ensure uniformity.

Existing services shall be shown in faint lines and proposed services in heavy bold lines, in the specified line type for the particular service.

Existing infrastructure that is proposed to be modified or removed shall be clearly identified.

Drawings shall clearly identify infrastructure that is/will be public as distinct to infrastructure that is/will be in private ownership.

Existing and proposed property boundaries shall be shown and clearly marked on all plans.

Design plans shall be provided in hard copy format. For larger developments plans shall also be provided in DWG format (or other format agreed to by WDC in writing) by way of a USB Drive or as agree with the WDC).

As-Built Plans shall be provided in .pdf and .dwg/dxf format.

Survey Co-ordinates and Levels

As built coordinates shall be in terms of NZTM coordinate projection NZGD2000.

As-built levels for assets to vest in WDC shall be reduced levels on NZ Vertical Datum 2016 (NZVD2016).

Note: Submission of local circuit or site-specific coordinates and levels for any assets to vest in WDC will not be accepted, unless previously discussed with WDC and approval obtained in writing.

Drawing Layout

a. Plan views should generally be oriented with north to the top of the sheet; however, plan views may be oriented otherwise if this improves clarity by allowing use of a larger scale on the sheet.

b. All plans shall have a North point.

c. Plans shall have a scale bar to confirm printed scale.

d. Long sections shall commence with the lowest distance/lowest invert on the left-hand side of the sheet.

e. Cross sections shall commence at the bottom left hand corner of the sheet and proceed upwards and to the right.

Title Blocks

Title block shall include:

a. A project title, including street address,

b. A unique number or identifier, preferably the consent or project number,

c. Designer's name, signature and contact details,

d. Draughtsperson's name,

e. Drawing checker's name,

f. Design reviewer's name and signature,

g. Stage of work e.g. for acceptance, accepted engineering drawings, construction, as-built,

h. Date of preparation and of acceptance,

i. Scale or scales used,

j. Graphic scale bar(s),

k. Datum and origin,

l. Original sheet size,

m. Drawing title e.g. Long section,

n. Sheet numbers, including the number in the set, and

o. An amendment box, including brief description of amendment and sign off by designer.

Scales

Table 0-5: Preferred Scales gives preferred scales for plans. Plans using other scales will generally not be accepted. Items listed within the table refer to the minimum scales that will be accepted on A3 sheets. If plans are produced on A1 sheets, a reduced plan on A3 must meet these minimum scales. All text and symbols must be clearly legible at A3 size.

Table 0-5: Preferred Scales (to ensure clarity)

Preferred drawing scales	Items listed show minimum preferred scale at A3 sheet size
1:50	
1:100	
1:200	Road cross-section horizontal
1:250	
1:500	Long section horizontal. Site plan view showing details of services etc
1:750	
1:1000	
1:1250	
1:1500	

All scales are to be clearly depicted, along with the plan size they relate to.

Long section details shall have a scale ratio of 1 horizontal to 5 vertical.

Plans are to have both a horizontal and vertical graphical scale bar for confirmation of print size/scale.

Hard Copy Format

Drawings shall be prepared on standard ISO A3 plan sheets, with a clean background.

Plans must be suitable for photo reduction and scanning

Printing should be spaced sufficiently to retain clarity when reduced.

Capital letters shall be not less than 2.5 mm in height.

Electronic Formats

The following electronic file formats are acceptable:

a. AutoCAD .dwg/dxf files, provided these include all referenced files so that a full replication of the hardcopy drawings can be reproduced.

b. .pdf copies of plans, endorsed/certified as As-Built Plans. These .pdf copies are to be high resolution, suitable for producing quality prints

Particular requirements for AutoCad plans include:

a. Layouts shall be set up so they may be printed as they are required to be printed, i.e. with all necessary layers turned on and irrelevant information frozen. Layers that are required for the design but are not required to be printed shall have the ‘Do not Print’ symbol selected in the layer control area,

b. All x-refs, pen assignments, images and special fonts used shall be included with the plan file,

c. Layouts shall be named to represent the content of each sheet (normally the sheet title),

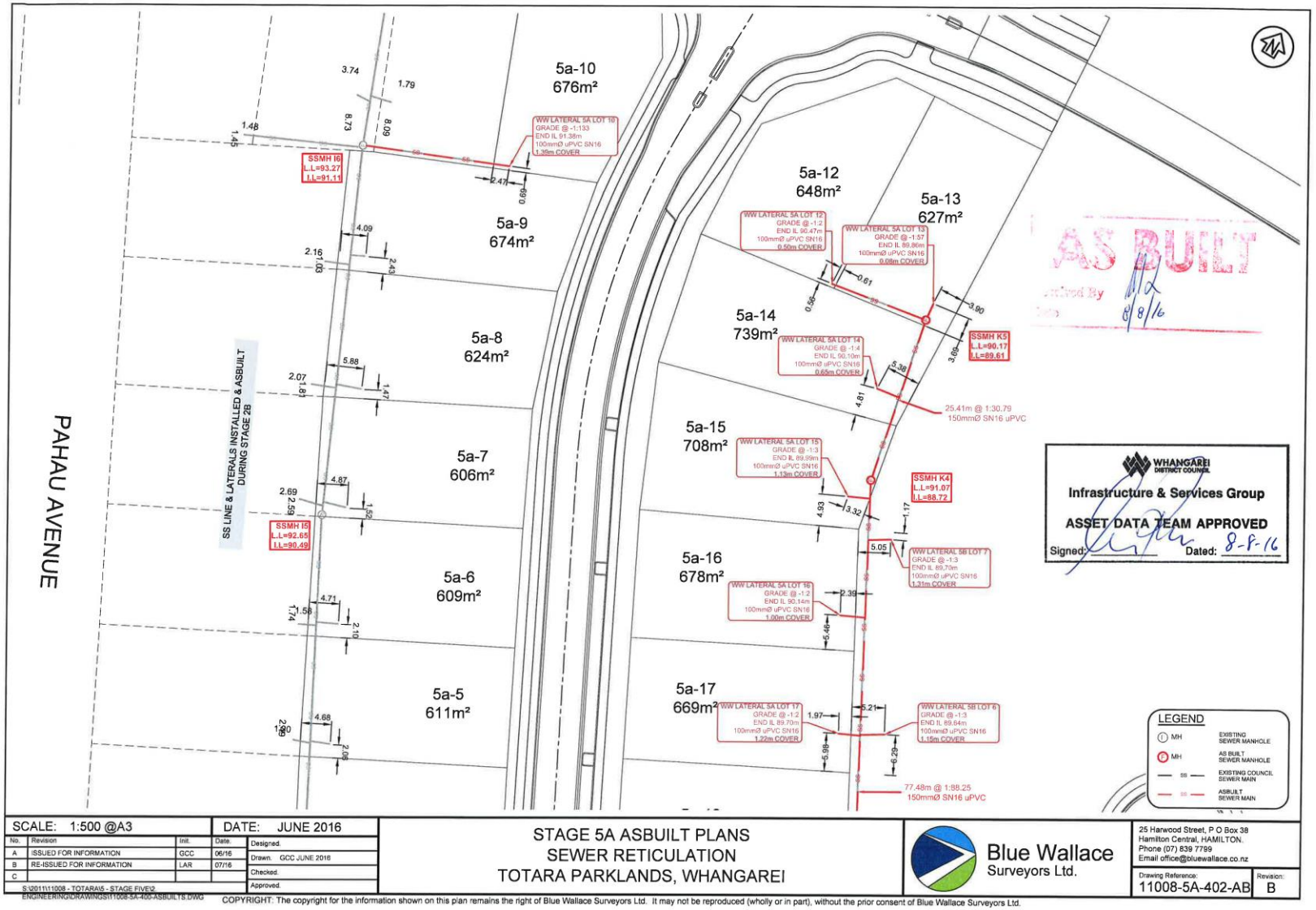
d. Different elements of the plan shall be drawn on its own appropriately named layer, e.g. sewer manholes on a ‘SWMH’ layer,

e. As-built layouts shall have ‘As-built’ incorporated in the title, and

f. Layouts should have line-type scale setting inset into them to ensure correct printing.

Appendix G Example As-Built Drawings

Wastewater As-Built Plan examples


PAHAU AVENUE
SS LINE & LATERALS INSTALLED & ASBUILT DURING STAGE 2B
5a-10
676m²
5a-9
674m²
5a-8
624m²
5a-7
606m²
5a-6
609m²
5a-5
611m²
5a-12
648m²
5a-13
627m²
5a-14
739m²
5a-15
708m²
5a-16
678m²
5a-17
669m²
SSMH I6
L.L=93.27
I.L=91.11
SSMH I5
L.L=92.65
I.L=90.49
SSMH K5
L.L=90.17
I.L=89.61
SSMH K4
L.L=91.07
I.L=88.72
25.41m @ 1:30.79
150mmØ SN16 uPVC
77.48m @ 1:88.25
150mmØ SN16 uPVC
AS BUILT
8/8/16
WHANGAREI DISTRICT COUNCIL
Infrastructure & Services Group
ASSET DATA TEAM APPROVED
Signed:
Dated: 8-8-16
LEGEND
EXISTING SEWER MANHOLE
AS BUILT SEWER MANHOLE
EXISTING COUNCIL SEWER MAIN
ASBUILT SEWER MAIN
SCALE: 1:500 @A3
DATE: JUNE 2016
No. Revision Init. Date
A ISSUED FOR INFORMATION GCC 06/16
B RE-ISSUED FOR INFORMATION LAR 07/16
C
Designed.
Drawn. GCC JUNE 2016
Checked.
Approved.
S:\2011\11008 - TOTARA\5 - STAGE FIVE\2. ENGINEERING\DRAWINGS\11008-5A-400-ASBUILTS.DWG
STAGE 5A ASBUILT PLANS
SEWER RETICULATION
TOTARA PARKLANDS, WHANGAREI
Blue Wallace Surveyors Ltd.
25 Harwood Street, P O Box 38
Hamilton Central, HAMILTON.
Phone (07) 839 7789
Email office@bluewallace.co.nz
Drawing Reference: 11008-5A-402-AB
Revision: B
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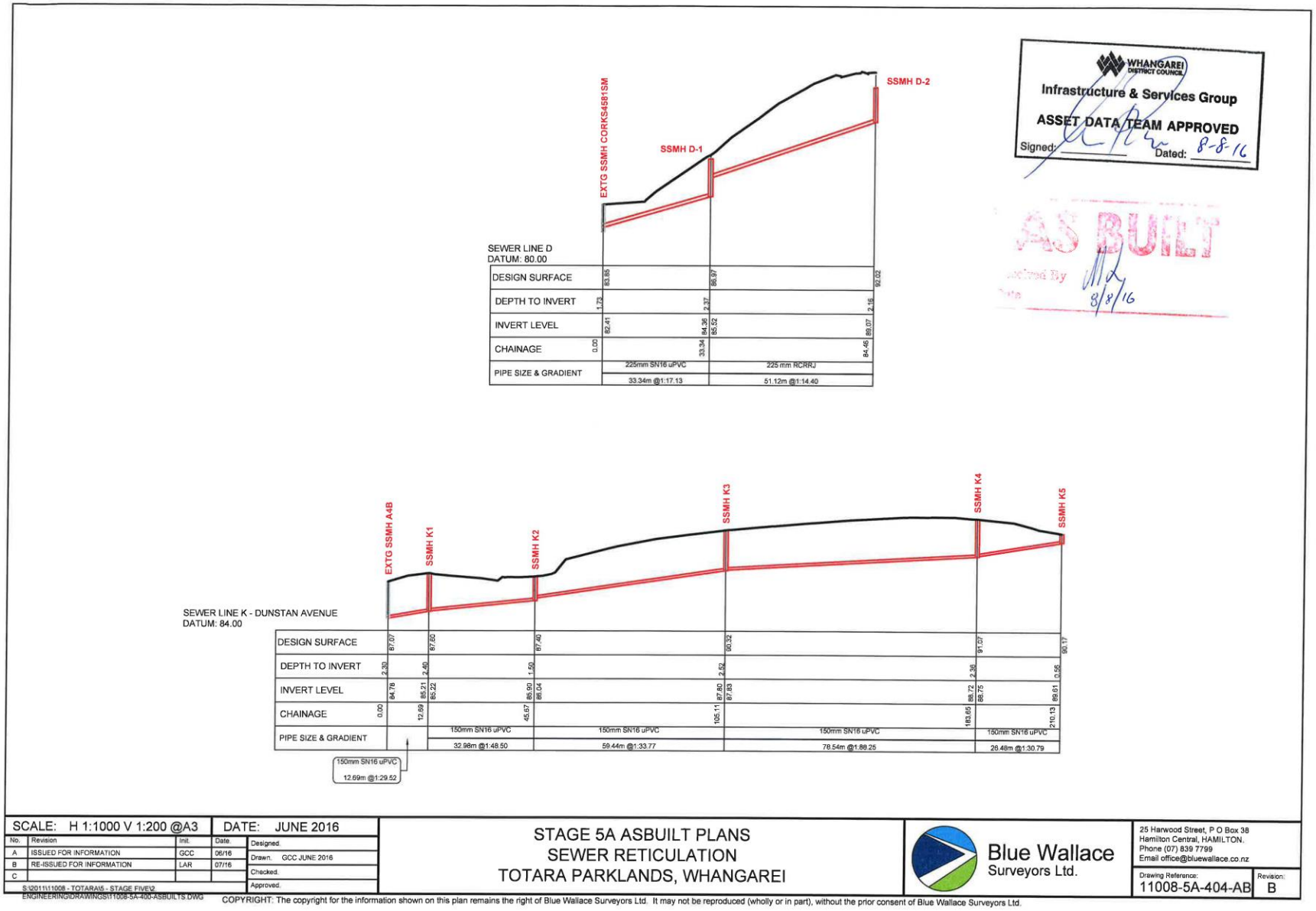
EXTG SSMH CORKS4581SM
SSMH D-1
SSMH D-2
SEWER LINE D
DATUM: 80.00
DESIGN SURFACE 83.85 86.97 92.02
DEPTH TO INVERT 1.73 2.37 2.16
INVERT LEVEL 82.41 84.36 85.52 89.07
CHAINAGE 0.00 33.34 84.45
PIPE SIZE & GRADIENT 225mm SN16 uPVC 225 mm RCRRJ
33.34m @1:17.13 51.12m @1:14.40
EXTG SSMH A4B
SSMH K1
SSMH K2
SSMH K3
SSMH K4
SSMH K5
SEWER LINE K - DUNSTAN AVENUE
DATUM: 84.00
DESIGN SURFACE 87.07 87.80 87.40 90.32 91.07 90.17
DEPTH TO INVERT 2.30 2.40 1.50 2.52 2.30 0.56
INVERT LEVEL 84.78 85.21 85.22 85.90 86.04 87.80 87.83 88.72 88.75 89.61
CHAINAGE 0.00 12.69 45.67 105.11 183.65 210.13
150mm SN16 uPVC 150mm SN16 uPVC 150mm SN16 uPVC 150mm SN16 uPVC
12.69m @1:29.52 32.98m @1:48.50 59.44m @1:33.77 78.54m @1:88.25 26.48m @1:30.79
150mm SN16 uPVC
12.69m @1:29.52
WHANGAREI DISTRICT COUNCIL
Infrastructure & Services Group
ASSET DATA TEAM APPROVED
Signed: Dated: 8-8-16
AS BUILT
Approved By
Date 8/8/16
SCALE: H 1:1000 V 1:200 @A3
DATE: JUNE 2016
No. Revision Init. Date.
A ISSUED FOR INFORMATION GCC 06/16
B RE-ISSUED FOR INFORMATION LAR 07/16
C
Designed.
Drawn. GCC JUNE 2016
Checked.
Approved.
S:\2011\11008 - TOTARA\5 - STAGE FIVE\2 ENGINEERING\DRAWINGS\11008-5A-400-ASBUILTS.DWG
STAGE 5A ASBUILT PLANS
SEWER RETICULATION
TOTARA PARKLANDS, WHANGAREI
Blue Wallace Surveyors Ltd.
25 Harwood Street, P O Box 38
Hamilton Central, HAMILTON.
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Drawing Reference: 11008-5A-404-AB
Revision: B
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WHANGAREI DISTRICT COUNCIL
Infrastructure & Services Group
ASSET DATA TEAM APPROVED
Signed: Dated: 8-8-16

AS BUILT
Signed By 8/8/16

						Mt Eden Circuit 2000		NZTM Proj										
CODE	XREF	UNIT TYPE	DESCRIPTION	INSTALL DATE	EXP LIFE	X Co-Ord (Easting)	Y Co-Ord (Northing)	X Co-Ord (Easting)	Y Co-Ord (Northing)	Z Co-Ord (Elevation)	US Invert	DS Invert	Material	Size	Quantity	Public/ Private	Surface
Stage 5A Sewer Reticulation																	
SSMH	EXTG SSMH A4B	SSMH		Jun-16	50	359860.84	933517.62	1719525.33	6051234.91	87.06			CC	1050	1	PUBLIC	GRASS
SSMH	SSMH K1	SSMH		Jun-16	50	359849.88	933524.02	1719514.49	6051241.51	87.80			CC	1050	1	PUBLIC	GRASS
SSMH	SSMH K2	SSMH		Jun-16	50	359824.66	933502.77	1719488.90	6051220.72	87.46			CC	1050	1	PUBLIC	GRASS
SSMH	SSMH K3	SSMH		Jun-16	50	359787.74	933549.34	1719452.82	6051267.94	90.47			CC	1050	1	PUBLIC	GRASS
SSMH	SSMH K4	SSMH		Jun-16	50	359749.86	933618.15	1719416.19	6051337.40	91.38			CC	1050	1	PUBLIC	GRASS
SSMH	SSMH K5	SSMH		Jun-16	50	359744.20	933644.02	1719411.00	6051363.36	90.94			CC	1050	1	PUBLIC	GRASS
SSMH	SSMH D1	SSMH		Jun-16	50	359688.81	933761.81	1719357.73	6051482.12	86.73			CC	1200	1	PUBLIC	GRASS
SSMH	SSMH D2	SSMH		Jun-16	50	359663.35	933717.48	1719331.49	6051438.26	91.23			CC	1050	1	PUBLIC	GRASS
SMN		SEWER	SSMH K1 - EXTG SSMH A4B	Jun-16	50						85.21	84.78	uPVC	150		PUBLIC	GRASS
SMN		SEWER	SSMH K2 - SSMH K1	Jun-16	50						85.90	85.22	uPVC	150		PUBLIC	GRASS
SMN		SEWER	SSMH K3 - SSMH K2	Jun-16	50						87.80	86.04	uPVC	150		PUBLIC	GRASS
SMN		SEWER	SSMH K4 - SSMH K3	Jun-16	50						88.72	87.83	uPVC	150		PUBLIC	GRASS
SMN		SEWER	SSMH K5 - SSMH K5	Jun-16	50						89.61	88.75	uPVC	150		PUBLIC	GRASS
SMN		SEWER	SSMH D1 - CORKS4581SM	Jun-16	50						84.36	82.41	uPVC	225		PUBLIC	GRASS
SMN		SEWER	SSMH D2 - SSMH D1	Jun-16	50						89.07	85.52	RCRRJ	225		PUBLIC	GRASS
SND	5A-1-A	JUNCT-Y	LOT 5A-1 CONN. TO MAIN	Jun-16	50	359757.51	933458.17	1719420.97	6051177.34	84.76			uPVC	100/150	1	PUBLIC	GRASS
SND	5A-1-B	SEWER	LOT 5A-1 LINE	Jun-16	50						84.80	84.76	uPVC	100	3.39	PUBLIC	GRASS
SND	5A-1-C	END PT	LOT 5A-1 CONN. END	Jun-16	50	359759.27	933461.07	1719422.78	6051180.20	84.80			uPVC		1	PUBLIC	GRASS
SND	5B-2-A	JUNCT-Y	LOT 5B-2 CONN. TO MAIN	Jun-16	50	359844.06	933519.12	1719508.58	6051236.71	85.38			uPVC	100/150	1	PUBLIC	GRASS
SND	5B-2-B	SEWER	LOT 5B-2 LINE	Jun-16	50						87.07	85.38	uPVC	100	7.18	PRIVATE	GRASS
SND	5B-2-C	END PT	LOT 5B-2 CONN. END	Jun-16	50	359839.42	933524.32	1719504.03	6051241.99	87.07			uPVC		1	PRIVATE	GRASS
SND	5A-21-A	JUNCT-Y	LOT 5A-21 CONN. TO MAIN	Jun-16	50	359821.14	933507.22	1719485.45	6051225.23	86.20			uPVC	100/150	1	PUBLIC	GRASS
SND	5A-21-B	SEWER	LOT 5A-21 LINE	Jun-16	50						86.80	86.20	uPVC	100	19.88	PRIVATE	GRASS
SND	5A-21-C	END PT	LOT 5A-21 CONN. END	Jun-16	50	359805.44	933495.03	1719469.54	6051213.32	86.80			uPVC	100	1	PRIVATE	GRASS
SND	5B-1-A	JUNCT-Y	LOT 5B-1 CONN. TO MAIN	Jun-16	50	359820.44	933508.10	1719484.77	6051226.12	86.23			uPVC	100/150	1	PUBLIC	GRASS
SND	5B-1-B	SEWER	LOT 5B-1 LINE	Jun-16	50						86.85	86.23	uPVC	100	2.9	PRIVATE	GRASS
SND	5B-1-C	END PT	LOT 5B-1 CONN. END	Jun-16	50	359822.53	933510.01	1719486.90	6051227.99	86.85			uPVC	100	1	PRIVATE	GRASS
SND	5A-22-A	JUNCT-Y	LOT 5A-22 CONN. TO MAIN	Jun-16	50	359819.98	933508.67	1719484.33	6051226.70	86.25			uPVC	100/150	1	PUBLIC	GRASS
SND	5A-22-B	SEWER	LOT 5A - 22 LINE	Jun-16	50						86.84	86.25	uPVC	100	4.21	PRIVATE	GRASS
SND	5A-22-C	END PT	LOT 5A-22 CONN. END	Jun-16	50	359816.60	933506.24	1719480.90	6051224.33	86.84			uPVC	100	1	PRIVATE	GRASS
SND	5A-20-A	JUNCT-Y	LOT 5A-20 CONN. TO MAIN	Jun-16	50	359797.76	933536.70	1719462.62	6051255.12	87.33			uPVC	100/150	1	PUBLIC	GRASS
SND	5A-20-B	SEWER	LOT 5A-20 LINE	Jun-16	50						88.90	87.33	uPVC	100	4	PRIVATE	GRASS
SND	5A-20-C	END PT	LOT 5A-20 CONN. END	Jun-16	50	359794.76	933534.57	1719459.57	6051253.04	88.90			uPVC	100	1	PRIVATE	GRASS
SND	5B-3-A	JUNCT-Y	LOT 5B-3 CONN. TO MAIN	Jun-16	50	359797.57	933536.94	1719462.43	6051255.37	87.34			uPVC	100/150	1	PUBLIC	GRASS
SND	5B-3-B	SEWER	LOT 5B-3 LINE	Jun-16	50						88.68	87.34	uPVC	100	3.72	PRIVATE	GRASS
SND	5B-3-C	END PT	LOT 5B-3 CONN. END	Jun-16	50	359800.17	933539.26	1719465.07	6051257.63	88.68			uPVC	100	1	PRIVATE	GRASS
SND	5A-19-A	JUNCT-Y	LOT 5A-19 CONN. TO MAIN	Jun-16	50	359784.22	933555.73	1719449.42	6051274.39	87.90			uPVC	100/150	1	PUBLIC	GRASS
SND	5A-19-B	SEWER	LOT 5A- LINE	Jun-16	50						89.50	87.90	uPVC	100	3.62	PRIVATE	GRASS
SND	5A-19-C	END PT	LOT 5A-19 CONN. END	Jun-16	50	359781.28	933554.34	1719446.46	6051273.05	89.50			uPVC	100	1	PRIVATE	GRASS
SND	5B-4-A	JUNCT-Y	LOT 5B-4 CONN. TO MAIN	Jun-16	50	359784.16	933555.84	1719449.37	6051274.49	87.91			uPVC	100/150	1	PUBLIC	GRASS
SND	5B-4-B	SEWER	LOT 5B-4 LINE	Jun-16	50						89.23	87.91	uPVC	100	3.46	PRIVATE	GRASS
SND	5B-4-C	END PT	LOT 5B-4 CONN. END	Jun-16	50	359786.86	933557.55	1719452.09	6051276.16	89.23			uPVC	100	1	PRIVATE	GRASS
SND	5A-18-A	JUNCT-Y	LOT 5A-18 CONN. TO MAIN	Jun-16	50	359778.08	933566.89	1719443.48	6051285.66	88.05			uPVC	100/150	1	PUBLIC	GRASS
SND	5A-18-B	SEWER	LOT 5A-18 LINE	Jun-16	50						89.44	88.05	uPVC	100	3.24	PRIVATE	GRASS
SND	5A-18-C	END PT	LOT 5A-18 CONN. END	Jun-16	50	359775.42	933565.66	1719440.80	6051284.47	89.44			uPVC	100	1	PRIVATE	GRASS
SND	5B-5-A	JUNCT-Y	LOT 5B-5 CONN. TO MAIN	Jun-16	50	359778.07	933566.91	1719443.47	6051285.67	88.05			uPVC	100/150	1	PUBLIC	GRASS
SND	5B-5-B	SEWER	LOT 5B-5 LINE	Jun-16	50						88.99	88.05	uPVC	100	3.16	PRIVATE	GRASS
SND	5B-5-C	END PT	LOT 5B-5 CONN. END	Jun-16	50	359780.61	933568.53	1719446.04	6051287.25	88.99			uPVC	100	1	PRIVATE	GRASS
SND	5A-17-A	JUNCT-Y	LOT 5A-17 CONN. TO MAIN	Jun-16	50	359769.16	933583.10	1719434.85	6051302.02	88.26			uPVC	100/150	1	PUBLIC	GRASS
SND	5A-17-B	SEWER	LOT 5A-17 LINE	Jun-16	50						89.70	88.26	uPVC	100	3.68	PRIVATE	GRASS

SCALE:

DATE: JUNE 2016

No.	Revision	Init.	Date.
A	ISSUED FOR INFORMATION	GCC	06/16
B	RE-ISSUED FOR INFORMATION	LAR	07/16
C			

Designed.
Drawn. GCC JUNE 2016
Checked.
Approved.

S:\2011\11008 - TOTARA\5 - STAGE FIVE\2. ENGINEERING\DRAWINGS\11008-5A-400-ASBUILTS.DWG

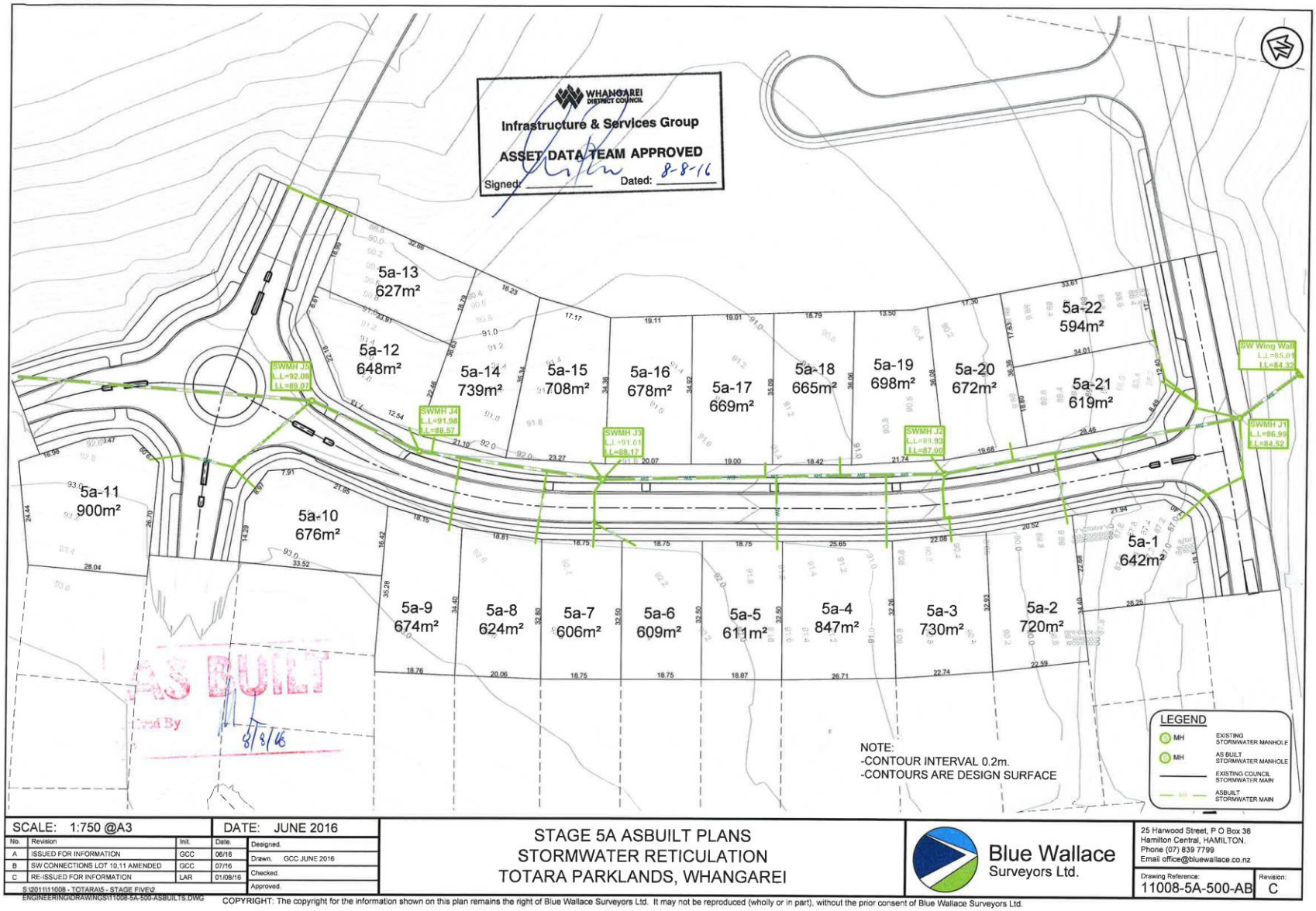
STAGE 5A ASBUILT PLANS
SEWER RETICULATION
TOTARA PARKLANDS, WHANGAREI

Blue Wallace Surveyors Ltd.

25 Harwood Street, P O Box 38
Hamilton Central, HAMILTON.
Phone (07) 839 7799
Email office@bluewallace.co.nz

Drawing Reference: 11008-5A-405-AB
Revision: B

Stormwater As-Built examples


WHANGAREI DISTRICT COUNCIL
Infrastructure & Services Group
ASSET DATA TEAM APPROVED
Signed:
Dated: 8-8-16
5a-13 627m²
5a-12 648m²
5a-14 739m²
5a-15 708m²
5a-16 678m²
5a-17 669m²
5a-18 665m²
5a-19 698m²
5a-20 672m²
5a-21 619m²
5a-22 594m²
5a-11 900m²
5a-10 676m²
5a-9 674m²
5a-8 624m²
5a-7 606m²
5a-6 609m²
5a-5 611m²
5a-4 847m²
5a-3 730m²
5a-2 720m²
5a-1 642m²
SWMH J5 L.L=92.08 I.L=89.87
SWMH J4 L.L=91.98 I.L=88.57
SWMH J3 L.L=91.64 I.L=88.17
SWMH J2 L.L=89.93 I.L=87.00
SW Wing Wall L.L=85.0 I.L=84.32
SWMH J1 L.L=86.99 I.L=84.52
AS BUILT
Checked By
8/8/16
NOTE:
-CONTOUR INTERVAL 0.2m.
-CONTOURS ARE DESIGN SURFACE
LEGEND
MH EXISTING STORMWATER MANHOLE
MH AS BUILT STORMWATER MANHOLE
EXISTING COUNCIL STORMWATER MAIN
ASBUILT STORMWATER MAIN
SCALE: 1:750 @A3
DATE: JUNE 2016
No. Revision Init. Date.
A ISSUED FOR INFORMATION GCC 06/16
B SW CONNECTIONS LOT 10,11 AMENDED GCC 07/16
C RE-ISSUED FOR INFORMATION LAR 01/08/16
Designed.
Drawn. GCC JUNE 2016
Checked.
Approved.
S:\2011\11008 - TOTARA\5 - STAGE FIVE\2 ENGINEERING\DRAWINGS\11008-5A-500-ASBUILTS.DWG
STAGE 5A ASBUILT PLANS
STORMWATER RETICULATION
TOTARA PARKLANDS, WHANGAREI
Blue Wallace Surveyors Ltd.
25 Harwood Street, P O Box 38
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Revision: C
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WAIRAU-STORMWATER MAIN
DATUM: 82.00

	SW Wing Wall	SWMH J1	SWMH J2	SWMH J3	SWMH J4	SWMH J5	End
DESIGN SURFACE	84.81	86.99	89.93	91.81	91.98	92.08	92.06
DEPTH TO INVERT	0.69	2.48	2.94	3.45	3.42	3.02	2.15
INVERT LEVEL	84.36	84.56 / 84.65	87.04 / 87.22	88.21 / 88.27	88.61 / 88.72	89.11 / 89.21	89.95
CHAINAGE	0.00	16.89	87.08	166.99	210.29	238.10	307.23

PIPE SIZE & GRADIENT	Wing Wall – J1	J1 – J2	J2 – J3	J3 – J4	J4 – J5	J5 – End
Pipe size	600 mm RCRRJ	600 mm RCRRJ	600 mm RCRRJ	600 mm RCRRJ	600 mm RCRRJ	600 mm RCRRJ
Gradient	16.88m @-1:84.38	70.20m @-1:29.37	79.91m @-1:80.72	43.31m @-1:127.38	27.80m @-1:71.29	69.14m @-1:93.43

WHANGAREI DISTRICT COUNCIL
Infrastructure & Services Group
ASSET DATA TEAM APPROVED
Signed: [signature] Dated: 8-8-16

SCALE: H 1:1000 V 1:100 @A3 DATE: JUNE 2016

No.	Revision	Init.	Date.
A	ISSUED FOR INFORMATION	GCC	06/16
B	SW CONNECTIONS LOT 10,11 AMENDED	GCC	07/16
C	RE-ISSUED FOR INFORMATION	LAR	01/08/16

Designed.
Drawn. GCC JUNE 2016
Checked.
Approved.

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STAGE 5A ASBUILT PLANS
STORMWATER RETICULATION
TOTARA PARKLANDS, WHANGAREI

Blue Wallace Surveyors Ltd.

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Email office@bluewallace.co.nz

Drawing Reference: 11008-5A-504-AB Revision: C

WHANGAREI DISTRICT COUNCIL

Infrastructure & Services Group

ASSET DATA TEAM APPROVED

Signed: Dated: 8-8-16

CODE	XREF	UNIT TYPE	DESCRIPTION	APPROVED DATE	EXP LIFE	Mt Eden Circuit 2000 X Co-Ord (Easting)	Mt Eden Circuit 2000 Y Co-Ord (Northing)	NZTM Proj X Co-Ord (Easting)	NZTM Proj Y Co-Ord (Northing)	Z Co-Ord (Elevation)	US Invert	DS Invert	Material	Size	Quantity	Public/ Private	Surface
Stage 5A Stormwater Reticulation																	
SWMN		STORM	SW WING WALL - SWMH J1	Jun-16	50						84.56	84.36	RCRRJ	600	15.67	Public	Grass
SWMN		STORM	SWMH J1 - SWMH J2	Jun-16	50						87.04	84.65	RCRRJ	600	69.13	Public	Road
SWMN		STORM	SWMH J2 - SWMH J3	Jun-16	50						88.21	87.22	RCRRJ	600	78.84	Public	Grass
SWMN		STORM	SWMH J3 - SWMH J4	Jun-16	50						88.61	88.27	RCRRJ	600	42.24	Public	Grass
SWMN		STORM	SWMH J4 - SWMH J5	Jun-16	50						89.11	88.72	RCRRJ	600	26.74	Public	Grass
SWMN		STORM	SWMH J5 - ENDPOINT	Jun-16	50	359676.06	933727.11	1719344.37	6051447.66	89.95	89.95	89.21	RCRRJ	600	68.07	Public	Road
SWMN		STORM	SWMH J1 - CP 1	Jun-16	50						85.10	84.96	RCRRJ	375	13.84	Public	Grass
SWMN		STORM	CP1 - CP2	Jun-16	50						85.33	85.16	RCRRJ	375	9.28	Public	Road
SWC	5A-1-A	JUNCT-Y	LOT 5A-1 CONNECTION TO CP2	Jun-16	50	359780.10	933467.82	1719443.72	6051186.58	85.66					1	Public	Road
SWC	5A-1-B	STORM	LOT 5A-1 CONNECTION LINE	Jun-16	50						86.12	85.66	uPVC	100	8.62	Private	Grass
SWC	5A-1-C	ENDPT	LOT 5A-1 CONNECTION END	Jun-16	50	359772.29	933470.60	1719435.97	6051189.50	86.12					1	Private	Grass
SWMN		STORM	CP2 - CP15	Jun-16	50						85.43	85.43	RCRRJ	375	1.2	Public	Road
SWCP	CP2	CP	CP2 - DOUBLE CATCH PIT WITH CP15	Jun-16	50	359780.30	933467.78	1719443.92	6051186.53	86.33			RC	675 x 450	1	Public	Road
SWCP	CP15	CP	CP15 - DOUBLE CATCH PIT WITH CP2	Jun-16	50	359780.57	933468.94	1719444.21	6051187.69	86.44			RC	675 x 450	1	Public	Road
SWCP	CP1	CP	CP1	Jun-16	50	359787.80	933462.30	1719451.32	6051180.93	86.28			RC	675 x 450	1	Public	Road
SWMN		STORM	SWMH-J1 - CP3	Jun-16	50	359799.62	933469.98	1719463.27	6051188.39		85.74	85.59	RCRRJ	375	9.87	Public	Road
SWMN		STORM	CP3 - CP14	Jun-16	50	359797.32	933479.74	1719461.15	6051198.18		86.12	86.12	RCRRJ	375	1.2	Public	Road
SWC		JUNCT-Y	LOT 5A-21 - CONNECTION TO CP14	Jun-16	50	359798.07	933480.20	1719461.91	6051198.63	86.16					1	Public	Road
SWC		STORM	LOT 5A-21 - CONNECTION LINE	Jun-16	50						86.99	86.16	uPVC	100	9.36	Private	Grass
SWC		ENDPT	LOT 5A-21- CONNECTION END	Jun-16	50	359798.84	933489.53	1719462.84	6051207.94	86.99					1	Private	Grass
SWC		JUNCT-Y	LOT 5A-22 - CONNECTION TO CP14	Jun-16	50	359798.13	933480.22	1719461.97	6051198.65	86.16					1	Public	Road
SWC		STORM	LOT 5A-22 - CONNECTION LINE	Jun-16	50						87.03	86.16	uPVC	100	20.83	Private	Grass
SWND		BEND	BEND IN LOT 5A-22 CONNECTION	Jul-16	50	359799.76	933489.11	1719463.76	6051207.51	86.54					1	Private	Grass
SWC		ENDPT	LOT 5A-22 - CONNECTION END	Jun-16	50	359808.39	933497.15	1719472.53	6051215.39	87.03					1	Private	Grass
SWCP	CP14	CP	CP14 - DOUBLE CATCH PIT WITH CP3	Jun-16	50	359798.12	933480.00	1719461.96	6051198.43	86.99			RC	675 x 450	1	Public	Road
SWCP	CP3	CP	CP3 - DOUBLE CATCH PIT WITH CP14	Jun-16	50	359797.01	933479.65	1719460.84	6051198.10	86.99			RC	675 x 450	1	Public	Road
SWC		JUNCT-Y	LOT 5A-2 - CONNECTION TO LINE	Jun-16	50	359772.33	933503.91	1719436.60	6051222.80	86.15					1	Public	Road
SWC		STORM	LOT 5A-2 - CONNECTION LINE	Jun-16	50						87.97	86.15	uPVC	100	16.78	Private	Grass
SWC		ENDPT	LOT 5A-2 - CONNECTION END	Jun-16	50	359759.19	933493.47	1719423.28	6051212.60	87.97					1	Private	Grass
SWC		JUNCT-Y	LOT 5A-20 - CONNECTION TO LINE	Jun-16	50	359766.20	933511.63	1719430.61	6051230.62	86.49					1	Public	Road
SWC		STORM	LOT 5A-20 - CONNECTION LINE	Jun-16	50						88.35	86.49	uPVC	100	4.18	Private	Grass
SWC		ENDPT	LOT 5A-20 - CONNECTION END	Jun-16	50	359769.47	933514.23	1719433.93	6051233.16	88.35					1	Private	Grass
SWC		JUNCT-Y	LOT 5A-19 - CONNECTION TO SWMH J2	Jun-16	50	359756.24	933524.90	1719420.90	6051244.07	89.14					1	Public	Road
SWC		STORM	LOT 5A-19 - CONNECTION LINE	Jun-16	50						89.56	89.14			4.46	Private	Grass
SWC		ENDPT	LOT 5A-19 - CONNECTION END	Jun-16	50	359758.06	933528.97	1719422.78	6051248.11	89.56					1	Private	Grass
SWC		JUNCT-Y	LOT 5A-3 - CONNECTION TO CP16	Jun-16	50	359747.27	933518.49	1719411.81	6051237.82	89.06					1	Public	Road
SWC		STORM	LOT 5A-3 - CONNECTION LINE	Jun-16	50						89.60	89.06	uPVC	100	5.37	Private	Grass
SWC		ENDPT	LOT 5A-3 - CONNECTION END	Jun-16	50	359742.78	933515.56	1719407.27	6051234.97	89.60					1	Private	Grass
SWCP	CP16	CP	CP16 - DOUBLE CATCH PIT WITH CP4	Jun-16	50	359747.52	933518.65	1719412.07	6051237.98	89.79			RC	675 x 450	1	Public	Road
SWMN		STORM	CP16 - CP4	Jun-16	50						88.95	88.95	RCRRJ	375	0.5	Public	Road
SWCP	CP4	CP	CP4 - DOUBLE CATCH PIT WITH CP16	Jun-16	50	359746.90	933519.58	1719411.47	6051238.91	89.82			RC	675 x 450	1	Public	Road
SWMN			CP4 - CP5	Jun-16	50						88.69	88.66	RCRRJ	375	6.39	Public	Road
SWCP	CP5	CP	CP5	Jun-16	50	359752.64	933523.11	1719417.26	6051242.35	89.82			RC	675 x 450	1	Public	Road
SWMN		STORM	CP5 - SWMH J2	Jun-16	50	359752.80	933523.22	1719417.43	6051242.45		88.59	88.50	RCRRJ	375	2.92	Public	Road
SWC		JUNCT-Y	LOT 5A-4 - CONNECTION TO LINE	Jun-16	50	359749.46	933536.47	1719414.32	6051255.76	87.39					1	Public	Road
SWC		STORM	LOT 5A-4 - CONNECTION LINE	Jun-16	50						89.39	87.37	uPVC	100	17.03	Private	Road
SWC		ENDPT	LOT 5A-4 - CONNECTION END	Jun-16	50	359734.51	933528.32	1719399.23	6051247.88	89.37					1	Private	Grass
SWC		JUNCT-Y	LOT 5A-18 - CONNECTION TO LINE	Jun-16	50	359744.33	933545.88	1719409.37	6051265.26	87.52					1	Public	Road
SWC		STORM	LOT 5A-18 - CONNECTION LINE	Jun-16	50						89.76	87.52	uPVC	100	4.19	Private	Grass
SWC		ENDPT	LOT 5A-18 - CONNECTION END	Jun-16	50	359748.01	933547.89	1719413.08	6051267.20	89.76					1	Private	Grass
SWC		JUNCT-Y	LOT 5A-5 - CONNECTION TO LINE	Jun-16	50	359737.21	933558.96	1719402.48	6051278.46	87.71					1	Public	Road
SWC		STORM	LOT 5A-5 - CONNECTION LINE	Jun-16	50						89.67	87.71	uPVC	100	17.06	Private	Road

SCALE:

DATE: JUNE 2016

No.	Revision	Init.	Date.
A	ISSUED FOR INFORMATION	GCC	06/16
B	SW CONNECTIONS LOT 10,11 AMENDED	GCC	07/16
C	RE-ISSUED FOR INFORMATION	LAR	01/08/16

Designed.
Drawn. GCC JUNE 2016
Checked.
Approved.

S:\2011\11008 - TOTARA\5 - STAGE FIVE\2 ENGINEERING\DRAWINGS\11008-5A-500-ASBUILTS.DWG

STAGE 5A ASBUILT PLANS
STORMWATER RETICULATION
TOTARA PARKLANDS, WHANGAREI

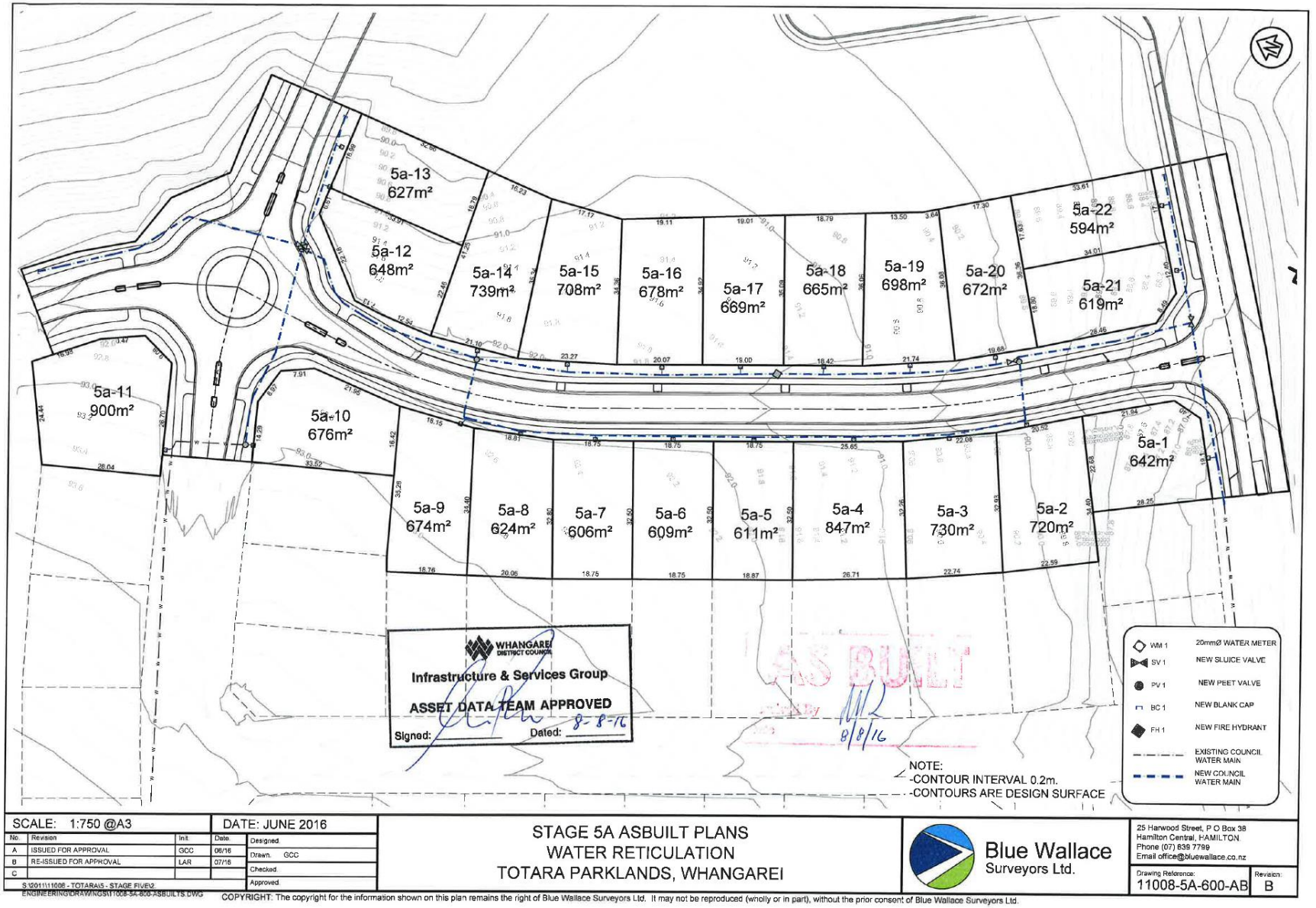
Blue Wallace Surveyors Ltd.

25 Harwood Street, P O Box 38
Hamilton Central, HAMILTON.
Phone (07) 839 7799
Email office@bluewallace.co.nz

Drawing Reference: 11008-5A-506-AB

Revision: C

Water Reticulation As-Built examples


5a-13
627m²
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5a-18
665m²
5a-19
698m²
5a-20
672m²
5a-22
594m²
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619m²
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5a-8
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5a-7
606m²
5a-6
609m²
5a-5
611m²
5a-4
847m²
5a-3
730m²
5a-2
720m²
WHANGAREI DISTRICT COUNCIL
Infrastructure & Services Group
ASSET DATA TEAM APPROVED
Signed:
Dated: 8-8-16
AS BUILT
8/8/16
NOTE:
-CONTOUR INTERVAL 0.2m.
-CONTOURS ARE DESIGN SURFACE
WM 1 20mmØ WATER METER
SV 1 NEW SLUICE VALVE
PV 1 NEW PEET VALVE
BC 1 NEW BLANK CAP
FH 1 NEW FIRE HYDRANT
EXISTING COUNCIL WATER MAIN
NEW COUNCIL WATER MAIN
SCALE: 1:750 @A3
DATE: JUNE 2016
No. Revision Init Date
A ISSUED FOR APPROVAL GCC 06/16
B RE-ISSUED FOR APPROVAL LAR 07/16
C
Designed.
Drawn. GCC
Checked.
Approved.
S:\2011\11008 - TOTARA\5 - STAGE FIVE\2. ENGINEERING\DRAWINGS\11008-5A-600-ASBUILTS.DWG
STAGE 5A ASBUILT PLANS
WATER RETICULATION
TOTARA PARKLANDS, WHANGAREI
Blue Wallace Surveyors Ltd.
25 Harwood Street, P O Box 38
Hamilton Central, HAMILTON
Phone (07) 839 7799
Email office@bluewallace.co.nz
Drawing Reference: 11008-5A-600-AB
Revision: B
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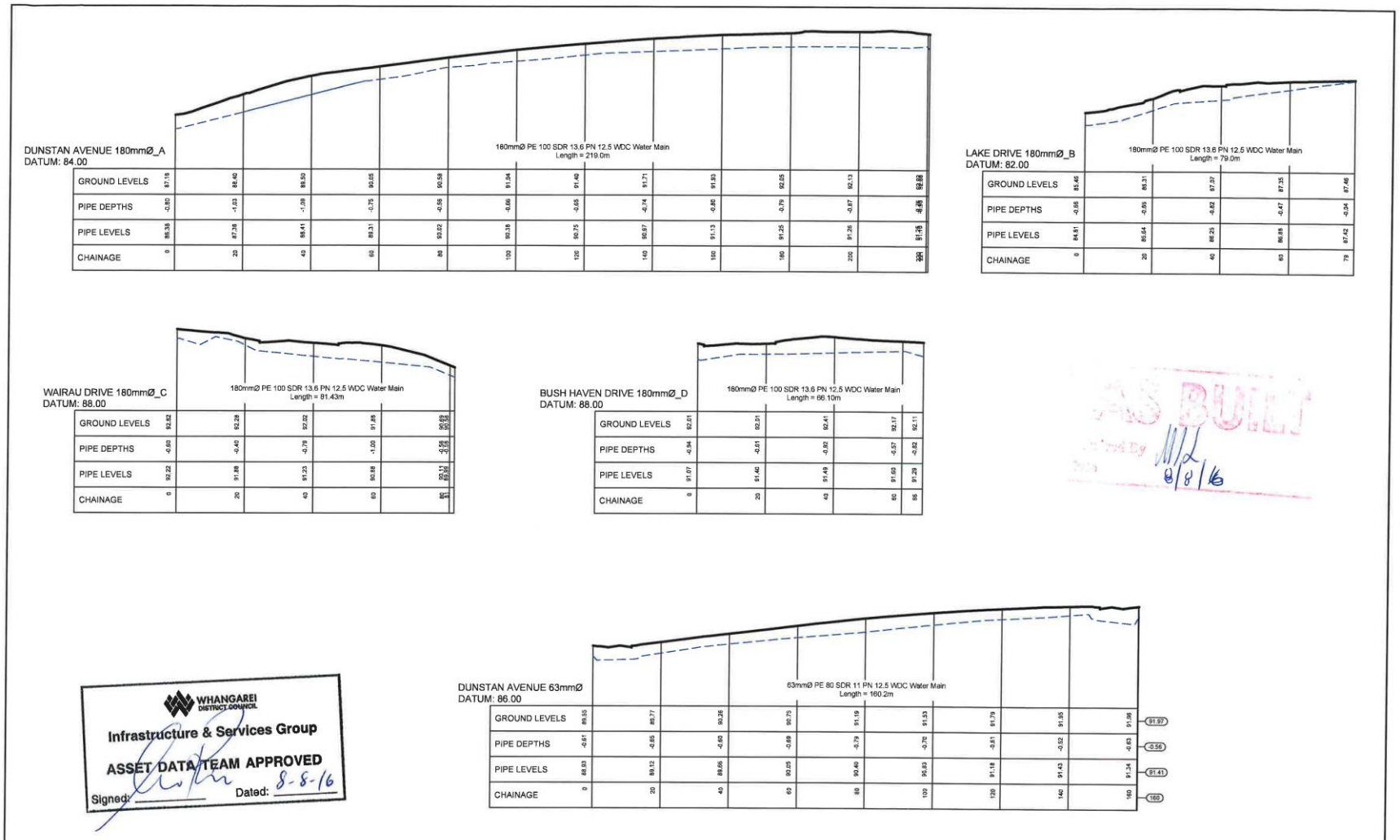

WHANGAREI DISTRICT COUNCIL
Infrastructure & Services Group
ASSET DATA TEAM APPROVED
Signed: Dated: 8-6-16

						Mt Eden Circuit 2000		NZTM Proj							
CODE	XREF	UNIT TYPE	DESCRIPTION	INSTALL DATE	EXP LIFE	X Co-Ord (Easting)	Y Co-Ord (Northing)	X Co-Ord (Easting)	Y Co-Ord (Northing)	Z Co-Ord (Elevation)	Material	Size	Quantity	Public/ Private	Surface
Stage 5A Water Reticulation															
WW	W1	WATER	WELD 1	Jun-16	50	359759.49	933454.86	1719422.89	6051173.99	84.75	PE 100	180	1	PUBLIC	GRASS
WND		JUNCT - T	LOT 1 TAPPING BAND	Jun-16	15	359767.54	933461.07	1719431.04	6051180.06	85.07	PE 100	180	1	PUBLIC	GRASS
SCTP	SCTP1	DOMESTIC	LOT 1 SERVICE CONNECTION TERMINATION POINT	Jun-16	15	359766.53	933462.59	1719430.06	6051181.59	85.80		20	1	PUBLIC	GRASS
WW	W2	WATER	WELD 2	Jun-16	50	359792.45	933480.85	1719456.30	6051199.38	86.29	PE 100	180	1	PUBLIC	GRASS
SV	SV1	SLUICE	SLUICE VALVE 1	Jun-16	50	359793.02	933481.19	1719456.88	6051199.71	86.76	PE 100	180	1	PUBLIC	GRASS
WND	T1	JUNCT - T	TEE1 180/180	Jun-16	50	359792.79	933481.05	1719456.65	6051199.58	86.35	PE 100	180	1	PUBLIC	GRASS
WND		JUNCT - T	LOT 21 TAPPING BAND	Jun-16	15	359802.77	933488.89	1719466.76	6051207.24	86.77	PE 100	180	1	PUBLIC	GRASS
SCTP	SCTP21	DOMESTIC	LOT 21 SERVICE CONNECTION TERMINATION POINT	Jun-16	15	359802.05	933489.86	1719466.06	6051208.22	87.34		20	1	PUBLIC	GRASS
WND		JUNCT - T	LOT 22 TAPPING BAND	Jun-16	15	359815.13	933498.71	1719479.30	6051216.83	87.22	PE 100	180	1	PUBLIC	GRASS
SCTP	SCTP22	DOMESTIC	LOT 22 SERVICE CONNECTION TERMINATION POINT	Jun-16	15	359813.97	933500.11	1719478.16	6051218.25	87.54		20	1	PUBLIC	GRASS
WND	BC1	END - PT	BLANK CAP 180	Jun-16	50	359820.76	933503.19	1719485.00	6051221.21	87.20	PE 100	180	1	PUBLIC	GRASS
SV	SV2	SLUICE	SLUICE VALVE 2	Jun-16	50	359792.56	933481.30	1719456.42	6051199.83	86.64	PE 100	180	1	PUBLIC	GRASS
WND	T2	JUNCT - T	TEE2 180/63	Jun-16	50	359766.77	933513.16	1719431.21	6051232.14	88.78	PE 100	180	1	PUBLIC	GRASS
WW	W4	WATER	WELD4	Jun-16	50	359792.35	933481.56	1719456.21	6051200.09	86.38	PE 100	180	1	PUBLIC	GRASS
PV	PV1	PEET	PEET VALVE 1	Jun-16	50	359765.80	933512.46	1719430.23	6051231.46	88.93	PE 80	63	1	PUBLIC	GRASS
SV	SV3	SLUICE	SLUICE VALVE 3	Jun-16	50	359765.13	933513.96	1719429.58	6051232.97	89.11	PE 100	180	1	PUBLIC	GRASS
WW	W4	WATER	WELD 4	Jun-16	50	359764.95	933514.17	1719429.41	6051233.19	88.83	PE 100	180	1	PUBLIC	GRASS
WW	W5	WATER	WELD 5	Jun-16	50	359764.97	933511.85	1719429.39	6051230.87	88.69	PE 100	180	1	PUBLIC	GRASS
SCTP	SCTP2	DOMESTIC	LOT 2 SERVICE CONNECTION TERMINATION POINT	Jun-16	15	359753.52	933503.94	1719417.80	6051223.16	89.22		20	1	PUBLIC	GRASS
WND		JUNCT - T	LOT 2 TAPPING BAND	Jun-16	15	359753.95	933505.16	1719418.25	6051224.38	88.94	PE 100	180	1	PUBLIC	GRASS
WND		JUNCT - T	LOT 3 TAPPING BAND	Jun-16	15	359742.92	933519.07	1719407.47	6051238.48	89.49	PE 100	180	1	PUBLIC	GRASS
SCTP	SCTP3	DOMESTIC	LOT 3 SERVICE CONNECTION TERMINATION POINT	Jun-16	15	359742.19	933518.60	1719406.74	6051238.02	89.79		20	1	PUBLIC	GRASS
WND		JUNCT - T	LOT 4 TAPPING BAND	Jun-16	15	359732.06	933538.58	1719396.97	6051258.18	89.96	PE 100	180	1	PUBLIC	GRASS
SCTP	SCTP4	DOMESTIC	LOT 4 SERVICE CONNECTION TERMINATION POINT	Jun-16	15	359731.45	933538.28	1719396.35	6051257.89	90.23		20	1	PUBLIC	GRASS
WND		JUNCT - T	LOT 5 TAPPING BAND	Jun-16	15	359721.09	933559.23	1719386.37	6051279.02	90.35	PE 100	180	1	PUBLIC	GRASS
SCTP	SCTP5	DOMESTIC	LOT 5 SERVICE CONNECTION TERMINATION POINT	Jun-16	15	359720.47	933558.94	1719385.75	6051278.74	90.75		20	1	PUBLIC	GRASS
WND		JUNCT - T	LOT 6 TAPPING BAND	Jun-16	15	359712.53	933576.15	1719378.12	6051296.09	90.77	PE 100	180	1	PUBLIC	GRASS
SCTP	SCTP6	DOMESTIC	LOT 6 SERVICE CONNECTION TERMINATION POINT	Jun-16	15	359711.85	933575.83	1719377.43	6051295.78	91.05		20	1	PUBLIC	GRASS
WND		JUNCT - T	LOT 7 TAPPING BAND	Jun-16	15	359704.27	933592.36	1719370.15	6051312.44	91.13	PE 100	180	1	PUBLIC	GRASS
SCTP	SCTP7	DOMESTIC	LOT 7 SERVICE CONNECTION TERMINATION POINT	Jun-16	15	359703.41	933591.93	1719369.28	6051312.03	91.40		20	1	PUBLIC	GRASS
WND		JUNCT - T	LOT 8 TAPPING BAND	Jun-16	15	359696.99	933608.34	1719363.16	6051328.55	91.31	PE 100	180	1	PUBLIC	GRASS
SCTP	SCTP8	DOMESTIC	LOT 8 SERVICE CONNECTION TERMINATION POINT	Jun-16	15	359696.46	933608.03	1719362.62	6051328.25	91.55		20	1	PUBLIC	GRASS
WND		JUNCT - T	LOT 9 TAPPING BAND	Jun-16	15	359693.95	933620.90	1719360.35	6051341.16	91.51	PE 100	180	1	PUBLIC	GRASS
SCTP	SCTP9	DOMESTIC	LOT 9 SERVICE CONNECTION TERMINATION POINT	Jun-16	15	359692.06	933621.64	1719358.47	6051341.93	91.74		20	1	PUBLIC	GRASS
WND		JUNCT - T	LOT 20 TAPPING BAND	Jun-16	15	359762.72	933517.03	1719427.23	6051236.09	89.10	PE 100	180	1	PUBLIC	GRASS
SCTP	SCTP20	DOMESTIC	LOT 20 SERVICE CONNECTION TERMINATION POINT	Jun-16	15	359764.06	933517.89	1719428.59	6051236.92	89.55		20	1	PUBLIC	GRASS
WW	W6	WATER	WELD 6	Jun-16	50	359757.75	933523.77	1719422.38	6051242.91	89.20	PE 100	180	1	PUBLIC	GRASS
WW	W7	WATER	WELD 7	Jun-16	50	359751.57	933533.85	1719416.39	6051253.10	89.50	PE 100	180	1	PUBLIC	GRASS
WND		JUNCT - T	LOT 19 TAPPING BAND	Jun-16	15	359751.42	933534.02	1719416.24	6051253.27	89.65	PE 100	180	1	PUBLIC	GRASS
SCTP	SCTP19	DOMESTIC	LOT 19 SERVICE CONNECTION TERMINATION POINT	Jun-16	15	359753.06	933534.80	1719417.89	6051254.02	90.26		20	1	PUBLIC	GRASS
WW	W8	WATER	WELD 8	Jun-16	50	359745.78	933544.32	1719410.79	6051263.67	90.00	PE 100	180	1	PUBLIC	GRASS
WND		JUNCT - T	LOT 18 TAPPING BAND	Jun-16	15	359741.65	933551.86	1719406.79	6051271.28	90.26	PE 100	180	1	PUBLIC	GRASS
SCTP	SCTP18	DOMESTIC	LOT 18 SERVICE CONNECTION TERMINATION POINT	Jun-16	15	359743.39	933552.55	1719408.54	6051271.94	90.84		20	1	PUBLIC	GRASS
WW	W9	WATER	WELD 9	Jun-16	50	359740.08	933555.06	1719405.28	6051274.51	90.25	PE 100	180	1	PUBLIC	GRASS
FH	FH1	TALL	FIRE HYDRANT 1	Jun-16	50	359736.73	933561.40	1719402.05	6051280.91	90.92	PE 100	180	1	PUBLIC	GRASS
WND		JUNCT - T	LOT 17 TAPPING BAND	Jun-16	15	359732.67	933569.08	1719398.12	6051288.66	90.62	PE 100	180	1	PUBLIC	GRASS
SCTP	SCTP17	DOMESTIC	LOT 17 SERVICE CONNECTION TERMINATION POINT	Jun-16	15	359734.27	933569.83	1719399.74	6051289.38	90.99		20	1	PUBLIC	GRASS
WND		JUNCT - T	LOT 16 TAPPING BAND	Jun-16	15	359723.99	933585.32	1719389.74	6051305.05	90.87	PE 100	180	1	PUBLIC	GRASS
SCTP	SCTP16	DOMESTIC	LOT 16 SERVICE CONNECTION TERMINATION POINT	Jun-16	15	359725.60	933586.06	1719391.36	6051305.76	91.39		20	1	PUBLIC	GRASS

SCALE:

DATE: JUNE 2016

No.	Revision	Init.	Date.
A	ISSUED FOR APPROVAL	GCC	06/16
B	RE-ISSUED FOR APPROVAL	LAR	07/16
C			

Designed.
Drawn. GCC
Checked.
Approved.

S:\2011\11008 - TOTARA\5 - STAGE FIVE\2. ENGINEERING\DRAWINGS\11008-5A-600-ASBUILTS.DWG

STAGE 5A ASBUILT PLANS
WATER RETICULATION
TOTARA PARKLANDS, WHANGAREI

Blue Wallace Surveyors Ltd.

25 Harwood Street, P O Box 38
Hamilton Central, HAMILTON.
Phone (07) 839 7799
Email office@bluewallace.co.nz

Drawing Reference: 11008-5A-605-AB
Revision: B

Appendix H Asset Attributes

Roading RAMM

Refer to Whangārei District Councils WDC Road Assessment and Maintenance (RAMM) Data Collection Form

Stormwater

Asset Component Type	Asset Attribute Required	Show on plans	Description of Asset Attribute
Stormwater Inlet	Plan ID	Yes	Plan number used to identify as-built plan
	Downstream MH ID	Yes	
	Property ID	Yes	Either property number or legal description adjacent to manhole
	Street Name	Yes	If street name is not applicable use a property deposited plan (DP) number
	Street Type	Yes	Qualifier to street name e.g. Crescent, Road, Lane, etc
	Location		Private property, roadway, berm, reserve
	Reduced Level	Yes	
	Grate/Lid Level		Level of Grate or Lid of pit
	Invert Level		Level of bottom of cesspit
	Structure Type	Yes	Plain end pipe, headwall, in-ground chamber, etc. Show structure location on plan
	Structure Material		PVC, concrete, timber, etc
	Eastern Coordinate		
	Northern Coordinate		
	Install Date		Installation date
	Comments		Any pertinent comments (particularly water table depth and soil conditions)
Stormwater Pipeline (including culverts)	Plan ID	Yes	Plan number used to identify as-built plan
	Upstream MH ID	Yes	Use pipe-end ID if pipeline is simply blanked-off
	Downstream MH ID	Yes	Or ID of stormwater outlet structure
	Street Name	Yes	If street name is not applicable use a property deposited plan (DP) number

Asset Component Type	Asset Attribute Required	Show on plans	Description of Asset Attribute
	Street Type	Yes	Qualifier to street name e.g. Crescent, Road, Lane, etc
	Physical Location		Private property, roadway, berm, reserve, adjoining street
	Pipe Diameter	Yes	Nominal bore
	Pipe Length		Length upstream MH to downstream MH
	Pipe Material	Yes	Material and strength classification
	Joint Type		RRJ
	Invert Level Upstream	Yes	Pipe invert level
	Invert Level Downstream	Yes	Pipe invert level
	Secondary Flow Path	Yes	Show on As-Built Plans (easement required on private land). Not required on data sheet.
	Service Status	Yes	Abandoned or removed pipelines are required to be identified on as-built records. Show “A” for abandoned pipes, “R” for removed pipes, otherwise leave blank
	Install Date		Installation date
	Comments		Any pertinent comments (particularly water table depth and soil conditions) Identify culverts
Stormwater Connection	Plan ID	Yes	Plan number used to identify as-built plan
	Upstream MH ID	Yes	Use ‘Pipe-End ID’ if pipeline is simply blanked-off
	Downstream MH ID	Yes	Or ID of downstream asset
	Property ID	Yes	Either property number or legal description
	Street Name	Yes	If street name is not applicable use a property deposited plan (DP) number

Asset Component Type	Asset Attribute Required	Show on plans	Description of Asset Attribute
	Street Type	Yes	Qualifier to street name e.g. Crescent, Road, Lane, etc
	Service Type		Pipe drain, K & C connection
	Service Pipe Diameter	Yes	Nominal bore in millimetres
	Service Pipe Length	Yes	
	Service Pipe Material	Yes	Material and strength classification
	Invert Level at Private End	Yes	Pipe invert level
	Depth at Private End		Depth from ground level to invert level
	Eastern Coordinate Connection		Coordinate of customer end of service connection
	Northern Coordinate Connection		Coordinate of customer end of service connection
	Eastern Coordinates – Downstream End		If downstream end is not on a manhole or other point asset
	Northern Coordinates – Downstream End		If downstream end is not on a manhole or other point asset
	Distance from left (LB) or right (RB) boundary	Yes	Distance to customer connection point relative to left-hand or right-hand boundary facing the property from the street
	Distance from front (FB) or back (BB) boundary	Yes	
	Install Date		Installation date
	Comments		Any pertinent comments (particularly water table depth and soil conditions)
Stormwater Manhole	Plan ID	Yes	Plan number used to identify as-built plan
	MH ID	Yes	
	Property ID	Yes	Either property number or legal description adjacent to manhole

Asset Component Type	Asset Attribute Required	Show on plans	Description of Asset Attribute
	Street Name	Yes	If street name is not applicable use a property deposited plan (DP) number
	Street Type	Yes	Qualifier to street name e.g. Crescent, Road, Lane, etc
	Lid Level	Yes	Top edge and northern part of rim casting
	Invert Level	Yes	
	MH Diameter		Nominal Bore of MH risers
	Eastern Coordinate		Location as per lid level
	Northern Coordinate		Location as per lid level
	Service Status	Yes	Abandoned or removed pipelines are required to be identified on as-built records. Show “A” for abandoned pipes, “R” for removed pipes, otherwise leave blank
	Install Date		Installation date
	Comments		Any pertinent comments (particularly water table depth and soil conditions)
Stormwater Soakage Trench	Plan ID	Yes	Plan number used to identify as-built plan
	Street Name	Yes	If street name is not applicable use a property deposited plan (DP) number
	Street Type	Yes	Qualifier to street name e.g. Crescent, Road, Lane, etc
	Location		Roadway, private, recreation reserve, etc
	Trench Soakage Media	Yes	
	Length	Yes	
	Width	Yes	
	Depth	Yes	
	Ground Level		
	Invert Level		

Asset Component Type	Asset Attribute Required	Show on plans	Description of Asset Attribute
	Eastern Coordinate – End 1		
	Northern Coordinate - End 1		
	Eastern Coordinate – End 2		
	Northern Coordinate - End 2		
	Structure Type	Yes	Proprietary name, lined hole, perforated pipe, etc.
	Install Date		Installation date
	Comments		Any pertinent comments (particularly water table depth and soil conditions)
Stormwater Outlet	Plan ID	Yes	Plan number used to identify as-built plan
	Upstream MH ID	Yes	
	Property ID	Yes	Either property number or legal description adjacent to manhole
	Street Name	Yes	If street name is not applicable use a property deposited plan (DP) number
	Street Type	Yes	Qualifier to street name e.g. Crescent, Road, Lane, etc
	Location	Yes	Private property, roadway, berm, reserve
	Structure Type	Yes	Plain end pipe, headwall, etc. Show structure location on plan
	Structure material		PVC, concrete, timber, etc
	Discharges To		Name of receiving environment, e.g. Waikato River
	Ground Level		
	Eastern Coordinate		Location at point of stormwater discharge

Asset Component Type	Asset Attribute Required	Show on plans	Description of Asset Attribute
	Northern Coordinate		Location at point of stormwater discharge
	Install Date		Installation date
	Comments		Any pertinent comments (particularly water table depth and soil conditions)
Stormwater Catchpit	Plan ID	Yes	Plan number used to identify as-built plan
	Catchpit ID	Yes	Provide a catchpit ID to ensure correct association of tabulated information and plan
	Property ID	Yes	Either property number or legal description adjacent to manhole
	Street Name	Yes	If street name is not applicable use a property deposited plan (DP) number
	Street Type		Qualifier to street name e.g. Crescent, Road, Lane, etc
	Catchpit Type	Yes	Footpath berm, single or double sump, vertical entry
	Catchpit Grate Level		
	Catchpit Dimensions		Length and width of catchpit in mm
	Invert Level		Level of bottom of cesspit
	Eastern Coordinate		Centre of catchpit grate
	Northern Coordinate		Centre of catchpit grate
	Install Date		Installation date
	Comments		Any pertinent comments (particularly water table depth and soil conditions)
Stormwater catchpit/ connection / lead	Plan ID	Yes	Plan number used to identify as-built plan
	Catchpit ID	Yes	Identifier to associate pipeline with correct catchpit
	Downstream MH ID	Yes	Or ID of downstream asset

Asset Component Type	Asset Attribute Required	Show on plans	Description of Asset Attribute
	Property ID	Yes	Either property number or legal description adjacent to manhole
	Street Name	Yes	If street name is not applicable use a property deposited plan (DP) number
	Street Type	Yes	Qualifier to street name e.g. Crescent, Road, Lane, etc
	Connection Pipe		Nominal Bore of connection pipeline
	Diameter		
	Connection Pipe Length	Yes	
	Connection Pipe Material		Material of connection pipeline
	Invert level Downstream End of Connection		RL of pipeline invert when catchpit connected to a manhole
	Invert Level		Level of bottom of cesspit
	Eastern Coordinates – Downstream End		If downstream end is not on a manhole or other point asset
	Northern Coordinates – Downstream End		If downstream end is not on a manhole or other point asset
	Install Date		Installation date
	Comments		Any pertinent comments (particularly water table depth and soil conditions)
Stormwater Open Channel	Plan ID	Yes	Plan number used to identify as-built plan
	Upstream Outlet ID	Yes	Define lengths of open channel as draining between structures or junctions with other water courses / drains
	Downstream Inlet ID	Yes	Define lengths of open channel as draining between structures or junctions with other water courses / drains

Asset Component Type	Asset Attribute Required	Show on plans	Description of Asset Attribute
	Street Name	Yes	If street name is not applicable use a property deposited plan (DP) number
	Street Type	Yes	Qualifier to street name e.g. Crescent, Road, Lane, etc
	Location	Yes	Private property, roadway, berm, reserve, adjoining street
	Channel Lining Material	Yes	
	Channel Length	Yes	Length upstream outlet to downstream inlet
	Channel Width	Yes	
	Average Depth		Formation depth, ground level to invert level
	Invert Level Upstream	Yes	
	Invert Level Donwstream	Yes	
	Eastern Coordinate – Upstream Inlet.		
	Northern Coordinate – Upstream Inlet		
	Eastern Coordinate – Downstream Outlet		
	Northern Coordinate – Downstream Outlet		
	Install Date		Installation date
	Comments		Any pertinent comments (particularly water table depth and soil conditions)
Stormwater subsoil Drain	Plan ID	Yes	Plan number used to identify as-built plan
	Downstream MH ID	Yes	Or ID of discharge point for drain
	Street Name	Yes	If street name is not applicable use a property deposited plan (DP) number

Asset Component Type	Asset Attribute Required	Show on plans	Description of Asset Attribute
	Street Type	Yes	Qualifier to street name e.g. Crescent, Road, Lane, etc.
	Location	Yes	Private property, roadway, berm, reserve, adjoining street
	Ownership	Yes	Public or private responsibility for the subsoil drain
	Pipe Diameter	Yes	Nominal bore in millimetres
	Pipe Length	Yes	Length upstream MH to downstream MH
	Pipe Material	Yes	PE, Earthenware, etc
	Invert Level Upstream	Yes	
	Invert Level Downstream	Yes	
	Eastern Coordinate – Upstream End		
	Northern Coordinate – Upstream End		
	Eastern Coordinate – Downstream Outlet		
	Northern Coordinate – Downstream Outlet		
	Install Date		Installation date
	Comments		Any pertinent comments (particularly water table depth and soil conditions)
Stormwater and detention treatment device	Plan ID	Yes	Plan number used to identify as-built plan
	Street Name	Yes	If street name is not applicable use a property deposited plan (DP) number
	Street Type	Yes	Qualifier to street name e.g. Crescent, Road, Lane, etc
	Location		Private property, roadway, berm, reserve

Asset Component Type	Asset Attribute Required	Show on plans	Description of Asset Attribute
	Site Plan	Yes	Site plan showing detention area location and contours relative to adjoining properties and receiving watercourse. To show control structure(s) in both plan and elevation and access provision
	Type		e.g. Detention area, wet detention pond, wetland, chamber, etc
	Surface Area	Yes	Surface area at top water level. On the plan, show extent of pond at top water level
	Total Capacity		Total volume of detention area below top water level
	Live Storage Capacity		Volume of detention area between normal water level and top water level
	Top water level	Yes	Level at which spillway becomes operative
	Outlet invert	Yes	Invert level of discharge control pipeline (lower operating level)
	Install Date		Installation date
	Comments		Any pertinent comments
Secondary Flow Path	Plan ID	Yes	Plan number used to identify as-built plan
	Street Name	Yes	If street name is not applicable use a property desposited plan (DP) number
	Street Type	Yes	Qualifier to street name e.g. Crescent, Road, Lane etc
	Location		Private property, roadway, berm, reserve
	Site Plan	Yes	Site plan showing secondary flow path location and contours relative to adjoining properties and receiving watercourse
	Type		e.g. grassed swale, concrete footpath

Asset Component Type	Asset Attribute Required	Show on plans	Description of Asset Attribute
	Surface Width	Yes	Surface width at top water level. On the plan, show extent of secondary flow path at top eater level
	Overflow Level	Yes	RL of point at which overflow into the secondary flow path begins
	Comments		Any pertinent comments such as covered by easement over xxx property title

Wastewater

Asset Component Type	Asset Attribute Required	Show on plans	Description of Asset Attribute
Wastewater Pipeline	Plan ID	Yes	Plan number used to identify as-built plan
	Upstream MH ID	Yes	Use ‘pipe-end ID’ if pipeline is simply blanked-off
	Downstream MH ID	Yes	
	Street Name	Yes	If street name is not applicable use a property deposited plan (DP) number
	Street Type	Yes	Qualifier to street name e.g. Crescent, Road, Lane, etc
	Physical Location		Private property, roadway, berm, reserve, adjoining street
	Pipe Diameter	Yes	Nominal bore
	Pipe Length	Yes	Length from upstream MH to downstream MH
	Pipe Material	Yes	Material and strength classification e.g. uPVC SN16
	Joint Type		e.g. RRJ
	Invert Level Upstream	Yes	Pipe invert level
	Invert Level Downstream	Yes	Pipe invert level
	Service Status	Yes	Abandoned or removed pipelines are required to be identified on as-built records. Show “A” for abandoned pipes, “R” for removed pipes, otherwise leave blank
	Install Date		Installation date
	Comments		Any pertinent comments (particularly water table depth and soil conditions)
Wastewater service connection	Plan ID	Yes	Plan number used to identify as-built plan
	Upstream MH ID	Yes	Use pipe-end ID if pipeline is simply blanked-off
	Downstream MH ID	Yes	

Asset Component Type	Asset Attribute Required	Show on plans	Description of Asset Attribute
	Property ID		Either property number or legal description
	Street Name	Yes	If street name is not applicable use a property deposited plan (DP) number
	Street Type		Qualifier to street name e.g. Crescent, Road, Lane, etc
	Service Pipe Diameter		Nominal bore
	Service Pipe Length	Yes	
	Service Pipe Material		Material and strength classification
	Invert Level at Private End	Yes	Pipe invert level
	Depth at Private End		Depth from ground level to Invert Level
	Eastern Coordinate End 1		Coordinate of upstream end of service connection
	Northern Coordinate End 1		Coordinate of upstream end of service connection
	Eastern Coordinates – Downstream End		If downstream end is not on a manhole or other point asset
	Northern Coordinates – Downstream End		If downstream end is not on a manhole or other point asset
	Distance from left (LB) or right (RB) boundary	Yes	Left-hand or right-hand boundary facing the property from the street
	Distance from front (FB) or back (BB) boundary	Yes	
	Install Date		Installation date
	Comments		Any pertinent comments (particularly water table depth and soil conditions)
Wastewater Manhole	Plan ID	Yes	Plan number used to identify as-built plan
	MH ID	Yes	
	Property ID	Yes	Either property number or legal description adjacent to manhole

Asset Component Type	Asset Attribute Required	Show on plans	Description of Asset Attribute
	Street Name	Yes	If street name is not applicable use a property deposited plan (DP) number
	Street Type	Yes	Qualifier to street name e.g. Crescent, Road, Lane, etc.
	Lid Level	Yes	Top edge and northern part of rim casting
	Invert Level	Yes	Invert level of wetwell
	MH Diameter		Nominal Bore of MH risers
	Eastern Coordinate		Location as per lid level
	Northern Coordinate		Location as per lid level
	Service Status	Yes	Abandoned or removed pipelines are required to be identified on as-built records. Show “A” for abandoned pipes, “R” for removed pipes, otherwise leave blank
	Install Date		Installation date
	Comments		Any pertinent comments (particularly water table depth and soil conditions)

Wastewater Pump Station

Asset Component Type	Asset Attribute Required	Show on plans	Description of Asset Attribute
Pump Station General	Plan ID	Yes	Plan number used to identify as-built plan
	Street name	Yes	If street name is not applicable, use a property deposited plan (DP) number
	Street type	Yes	Qualifier to street name, e.g. Crescent, Road, Lane, etc
	Pump Station Lot Location	Yes	Show the pump station Lot boundary and surround lots and roads, including the accessway up to the Pump Station
	Install Date		Installation date
	Maximum Design Flow Rates		
	Design ADWF		ADWF – average dry weather flow
	Design PWWF		PWWF – peak wet weather flow
Pump Station Wet Well	Location	Yes	Show on a separate pump station site layout plan & cross-section plan at suitable scale
	Rising Main Discharge Point	Yes	Manhole ID
	Rising Main Diameter	Yes	The rising main should appear as an item on the schedule of wastewater pipelines
	Overflow Discharges To	Yes	Refer to the ID of the overflow pipe which should appear as an item on the schedule of wastewater pipelines
	Overflow level	Yes	RL at which overflow begins
	Length	Yes	Internal length dimension of wet well
	Width	Yes	Internal width dimension of wet well
	Diameter	Yes	Internal diameter of wet well (circular wet wells)
	Floor Elevation	Yes	Invert level of chamber
	Ground Elevation	Yes	RL of wet well access covers

Asset Component Type	Asset Attribute Required	Show on plans	Description of Asset Attribute
	Inlet Diameter	Yes	Repeat for each inlet
	Inlet Elevation	Yes	Repeat for each inlet
	Install Date		Installation date
	Comments		Any pertinent comments (particularly water table depth and soil conditions)
Storage Chamber	Location	Yes	Show on a separate pump station site layout plan & cross section plan at suitable scale
	Length	Yes	Internal length dimension of chamber
	Width	Yes	Internal width dimension of chamber
	Diameter	Yes	Internal diameter of chamber (circular chambers)
	Floor Elevation	Yes	Invert level of chamber
	Ground Elevation	Yes	RL of storage chamber access covers
	Inlet Diameter	Yes	Repeat for each inlet
	Inlet Elevation	Yes	Repeat for each inlet
	Install Date		Installation date
	Comments		Any pertinent comments (particularly water table depth and soil conditions)
Valve Chamber	Location	Yes	Show on a separate pump station site layout plan & cross section plan at suitable scale
	Water Supply Backflow Prevention Device		Make & Model
	Rising Main Check Valve		Nominal Bore - Repeat for each valve
	Rising Main Isolation Valve		Nominal Bore - Repeat for each valve
	Eastern Coordinates		Coordinates of chamber centre point
	Northern Coordinates		Coordinates of chamber centre point
	Install Date		Installation date

Asset Component Type	Asset Attribute Required	Show on plans	Description of Asset Attribute
	Comments		Any pertinent comments
Odour Control	Location	Yes	Show on a pump station site layout plan
	Length	Yes	Internal length dimension of chamber
	Width	Yes	Internal width dimension of chamber
	Inlet Diameter	Yes	Repeat for each inlet
	Inlet Elevation	Yes	Repeat for each inlet
	Eastern Coordinates		
	Northern Coordinates		
	Install Date		Installation date
	Comments		Any pertinent comments relating to the type of bio filter media used
Magflow Meter	Location	Yes	Show on a pump station site layout plan or watermain plan if not a pump station project
	Manufacturer	Yes	ABB/Eddress and Hauser etc
	Model Number	Yes	As per manufacturer
	Magflow Serial number		Unique serial number for the meter
	Eastern Coordinates		
	Northern Coordinates		
	Install Date		Installation date
Pumps each (repeat for each pump)	Manufacturer		
	Model Number		
	Performance Curve ID		
	Motor Serial Number		
	Motor Current Rating		Nameplate current in amps
	Motor Power Rating		Nameplate power rating in kW

Asset Component Type	Asset Attribute Required	Show on plans	Description of Asset Attribute
	Eastern Coordinates		
	Northern Coordinates		
	Comments		Any pertinent comments (particularly water table depth and soil conditions)
Level Controls	Manufacturer		
	Model ID		
	Backup Battery Type		
	Start Level		Repeat for each pump
	Stop Level		Repeat for each pump
	High Alarm Level		
	Low Alarm Level		
	Overflow Alarm Level		
	Eastern Coordinates		
	Northern Coordinates		
	Comments		Any pertinent comments
Electrical Cabinet	Location	Yes	Show on a pump station site layout plan
	Pump Overload Setting		Repeat for each pump
	Pump Contactor Type		Repeat for each pump
	Pump Starter Type		Repeat for each pump
	Eastern Coordinates		
	Northern Coordinates		
	Install Date		Installation date
	Comments		Any pertinent comments
Telemetry	RT Brand		
	RT Model		
	Aerial Type		

Asset Component Type	Asset Attribute Required	Show on plans	Description of Asset Attribute
	Micrologix 110 Allen Bradley Module Model		
	Eastern Coordinates		
	Northern Coordinates		
	Comments		Any pertinent comments (particularly water table depth and soil conditions)

Water

Asset Component Type	Asset Attribute Required	Show on plans	Description of Asset Attribute
Water pipeline	Plan ID	Yes	Plan number used to identify as-built plan
	Pipe ID	Yes	Use a pipe numbering system to link individual pipes and related information such as length, diameter, material, coordinates, etc.Pipe ends occur at pipe intersections and when pipe diameter changes
	Pipe Diameter	Yes	Nominal bore
	Pipe Length	Yes	Show pipeline location on the plan and show dimensions to adjacent boundaries
	Laying Depth	Yes	Average depth below ground level to top of pipe
	Pipe Material	Yes	Material and strength classification
	Joint Type		RRJ, gibault, welded etc
	Service Status	Yes	Abandoned or removed pipelines are required to be identified on as-built records. Show “A” for abandoned pipes, “R” for removed pipes, otherwise leave blank
	Eastern Coordinates-End 1		

Asset Component Type	Asset Attribute Required	Show on plans	Description of Asset Attribute
	Northern Coordinates-End 1		
	Eastern Coordinates-End 2		
	Northern Coordinates-End 2		
	Install Date		Installation Date
	Comments		Any pertinent comments (particularly water table depth and soil conditions)
Water Connection Service	Plan ID	Yes	Plan number used to identify as-built plan
	Pipe ID	Yes	Use a pipe numbering system to identify individual pipes if Property ID or Street numbering is not adequate.
	Property ID	Yes	Either property number or legal description
	Street Name	Yes	If street name is not applicable use a property deposited plan (DP) number
	Street Type	Yes	Qualifier to street name e.g. Crescent, Road, Lane, etc
	Service Pipe Diameter		Nominal bore
	Service Pipe Length	Yes	Show pipeline location on the plan
	Service Pipe Material		Material and strength classification
	Eastern Coordinate		Coordinate of customer end of service pipeline i.e. at the service valve or toby
	Northern Coordinate		Coordinate of customer end of service pipeline i.e. at the service valve or toby
	Eastern Coordinates – tapping band		Coordinates of point where service line meets the watermain

Asset Component Type	Asset Attribute Required	Show on plans	Description of Asset Attribute
	Northern Coordinates – tapping band		Coordinates of point where service line meets the watermain
	Toby Lid Level		From middle of toby lid
	Distance from left (LB) or right (RB) boundary	Yes	Distance to customer connection point relative to left-hand or right-hand boundary facing the property from the street
	Meter Installed	Yes	Yes / no response (if yes complete a HCC ‘ Water Meter" form for each installtion
	Install Date		Installation Date
	Comments		Any pertinent comments
Water Valves	Plan ID	Yes	Plan number used to identify as-built plan
	Pipe ID	Yes	Use a pipe numbering system to identify individual pipes if Property ID or Street numbering is not adequate
	Property ID	Yes	Either property number or legal description
	Street Name	Yes	If street name is not applicable use a property deposited plan (DP) number
	Street Type	Yes	Qualifier to street name e.g. Crescent, Road, Lane, etc.
	Valve Size		Nominal bore in millimetres
	Valve Manufacturer		
	Location	Yes	Roadway, berm
	Eastern Coordinate		Coordinate of valve
	Northern Coordinate		Coordinate of valve
	Valve Level		From middle of Valve Lid
	Service Status	Yes	Abandoned or removed pipelines are required to be identified on as-built records. Show “A” for abandoned pipes, “R” for removed pipes, otherwise leave blank.

Asset Component Type	Asset Attribute Required	Show on plans	Description of Asset Attribute
	Install Date		Installation Date
	Comments		Any pertinent comments such as ‘attached to anchor block’
Hydrants	Plan ID	Yes	Plan number used to identify as-built plan
	Pipe ID	Yes	Use a pipe numbering system to identify individual pipes if Property ID or Street numbering is not adequate
	Property ID	Yes	Either property number or legal description
	Street Name	Yes	If street name is not applicable use a property deposited plan (DP) number
	Street Type	Yes	Qualifier to street name e.g. Crescent, Road, Lane, etc.
	Hydrant Size		Nominal bore in millimetres
	Hydrant Manufacturer Location	Yes	Roadway, berm
	Eastern coordinate		Coordinate of hydrant
	Northern coordinate		Coordinate of hydrant
	Hydrant Level		From middle of Hydrant Lid
	Service Status	Yes	Abandoned or removed pipelines are required to be identified on as-built records. Show “A” for abandoned pipes, “R” for removed pipes, otherwise leave blank.
	Install Date		Installation Date
	Comments		Any pertinent comments

Appendix I Checklist for Supporting Information

The following checklist is a summary of the requirements of the ES 2022 and should be used as a prompt to the matters which require certification by a SQEP:

Geotechnical - Site Suitability and Earthworks *(SQEP geotechnical)*

Note - applicable where cut and fill of the site is proposed

Hazard instability zones

- ❒ An opinion stated by a geotechnical specialist as to the stability/suitability of the land and should include the effects from excavation, filling, removal of vegetation, disposal of stormwater & effluent etc.

Hazards - flood hazard exists

- ❒ Determination of flood extent and level in 1% AEP event *(+20%)*
- ❒ What effect it will have on the development and mitigating measures taken to minimise/eliminate effect
- ❒ What effect the development will have on the flooding *(displacement/redirection of flooding etc)*

Development within coastal hazard 1 & 2 zones

- ❒ An assessment of the effect of storm surge, wave run-up etc

Reticulated Sewer

- ❒ Evidence that the proposed reticulation can service the proposed development and any undeveloped land beyond
- ❒ Hydraulic design including capacity and self-cleaning velocities
- ❒ Design of public pump stations and rising mains, including private reticulation, require producer statement design and construction
- ❒ Design of private pump stations and rising mains – require producer statement design and construction
- ❒ Design details of anchor and thrust blocks *(including calculations)*
- ❒ Design details of pipe bridges – needs pre-approval of Wastewater Manager
- ❒ Design of reticulation larger than 150mm, serving more than 250 lots, pump stations, rising mains, above ground works, minimum cover not achieved, siphons etc

- ❒ Specific design and assessment for commercial flows
- ❒ Specific design for curved pipelines
- ❒ Steep grades >7% to be graded out
- ❒ Cleansing velocities achieved. Maximum velocity of 3ms-1 or specific design by SQEP

Reticulated Water

- ❒ Evidence *(calculations, existing pressures/supply etc)* that the proposed reticulation can service the proposed development, and any undeveloped land beyond
- ❒ Evidence that water hammer effects have been considered and appropriate measures included
- ❒ Required pressures and flows can be met from all hydrants and service connections
- ❒ Air release/scour valves/pressure reducing valves approved by Water Services
- ❒ Design details of anchor and thrust blocks *(including calculations)*
- ❒ Details of pump stations booster pumps, control valves, proposed ownership written agreements, reservoirs, make model of pump valves and other equipment – producer statement note
- ❒ Fire risk classifications and calculations to confirm complying fire fighting capacity in terms of SNZ PAS 4509:2008
- ❒ Details of any above ground reticulation, pipe bridges etc *(requires specific design and Water Services approval)*
- ❒ Private booster pumps

Stormwater - Private

- ❒ Evidence that the existing public and/or public reticulation can service the proposed development and any undeveloped land beyond
- ❒ Attenuation meets ES requirements. Calculations/model to support attenuation design. Attenuation devices are serviceable and a producer statement provided including maintenance regime
- ❒ Details of treatment proposed which complies with the District Plan/ES/NRC-WSP
- ❒ Assessment of any wetlands included/proposed

- ❒ Any proposed soakage test in accordance with E2 of the Building Code *(**Note**: no soakage permitted in moderate/high stability areas without Geo-specialist design)*
- ❒ Any soakage proposed is serviceable and silt etc is removed before entering the soakage area
- ❒ Reticulation adequate for 20% AEP event
- ❒ Details of open drains/swales, capacities etc
- ❒ No building over stormwater line or directly alongside without written approval from I & S and specific design
- ❒ Habitable buildings floor heights set 500mm above 1% AEP flood level
- ❒ Commercial buildings floor heights set 300mm above 1% AEP flood event
- ❒ Demonstration of nil effects to surrounding properties as result of development

Stormwater - Public

- ❒ Extent of overland flowpaths from 1% AEP event
- ❒ Level of treatment complies
- ❒ Attenuation meets ES requirements. Calculations/model to support attenuation design
- ❒ Reticulation adequate for 20% AEP event
- ❒ Soakage tests in terms of E1 of the building code for any proposed soakage
- ❒ Any soakage proposed is serviceable. Silt etc is removed before entering soakage area
- ❒ Flood susceptible areas on hazard maps have been assessed and flood level determined for 1% AEP event
- ❒ Demonstration of nil effects to surrounding properties as a result of development
- ❒ Assessment of unstable ground and the effects stormwater will have on it, mitigation measures supplied to enhance stability
- ❒ Water table drains – calculations to confirm capacity
- ❒ Velocity/scour control on steep grades on open drains
- ❒ Cement stabilisation on steep grades

- ❒ Pipe crossings/bridges
- ❒ Calculations to show cesspit size is adequate for design volume
- ❒ Design of treatment devices

Parking and Manoeuvring

- ❒ Plan shows falls and sumps/reticulation/treatment/attenuation calculated to the 1% AEP event
- ❒ Details of complying parking and manoeuvring

Rights of Way/Accessways

- ❒ Private bridges require specific design and building consent
- ❒ Retaining structures require specific design and building consent
- ❒ Subgrade test confirm CBR >7 *(Subgrade >7 requires specific design by SQEP)*
- ❒ Construction of access will not affect overland flowpaths *(up to and including 1% AEP event)*

Roading - Design

- ❒ Geotechnical report on stability of ground if road is designed in moderate/high stability zone
- ❒ Subgrade testing shows CBR>7, no specific design – SQEP to do testing
- ❒ Subgrade testing shows CBR<7 – requires specific design
- ❒ Collector or arterial road requiring specific TOTAL design
- ❒ Speed limit on road >50km/h requiring specific geometric design
- ❒ Intersections with collector or arterial road requiring specific design
- ❒ Roundabout design
- ❒ Street lighting design
- ❒ Bridges, culverts, major watercourses
- ❒ Retaining walls
- ❒ Peer/technical reviews and safety audits
- ❒ Pavement design depending on CBR, type of road etc
- ❒ Surfacing design depending on CBR, type of road etc
- ❒ Surface drainage design

Plan View

- ❒ Proposed road intersection with existing roads with sight distances
- ❒ Street lighting details/layout
- ❒ Details of tapers/turning bays etc

Cross Sections

- ❒ Stormwater treatment
- ❒ Existing levels and finished levels shown, cut/fill etc
- ❒ Steep cuts/fills require CPEng certification

Typical Cross Sections

- ❒ Pavement design if CBR<7
- ❒ Subsoil drainage with geotextiles

Summary of SQEP Certification on EDA

All EDA containing proposed works certified by a SQEP must contain the SQEPs verification for those specific works.

The following schedule of works being certified by the SQEP must be attached to the lodgement letter. The schedule must summarise all works being certified by the SQEP and reference the relevant plan/sheet number, including multiple works presented on a plan and works where the certification is by more than one SQEP.

The SQEP must also clearly identify and certify any aspects of the design that are **not** in accordance with the standard design specified in the ES.

Summary of SQEP Certification			
Engineering Aspect	**Detail of works**	**Plan ref**	**SQEP initials**
Site Suitability			
Earthworks/Compaction design			
Land Instability areas			
Coastal Hazards, Mine zones, Flood zones			
Road and Access			
Roads and Access			
Pavement structural design			
Geometric design			
Surfacing design			
Lighting design			
Bridges and major culverts			
Retaining walls			
Stormwater			
Catchment Analysis			
Overland flow paths (1%AEP)			
Stormwater treatment devices			
Stormwater attenuation structures			
Wastewater			
Gravity reticulation			
Sewer pump stations			
Rising mains			
On-site disposal details			
Community wastewater treatment systems			
Pipe bridges & other structure			
Water			

Summary of SQEP Certification			
Engineering Aspect	**Detail of works**	**Plan ref**	**SQEP initials**
Water booster stations			
Reservoirs			
Pipe bridges & other structures			
Hydraulic design			
Other design matters			

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