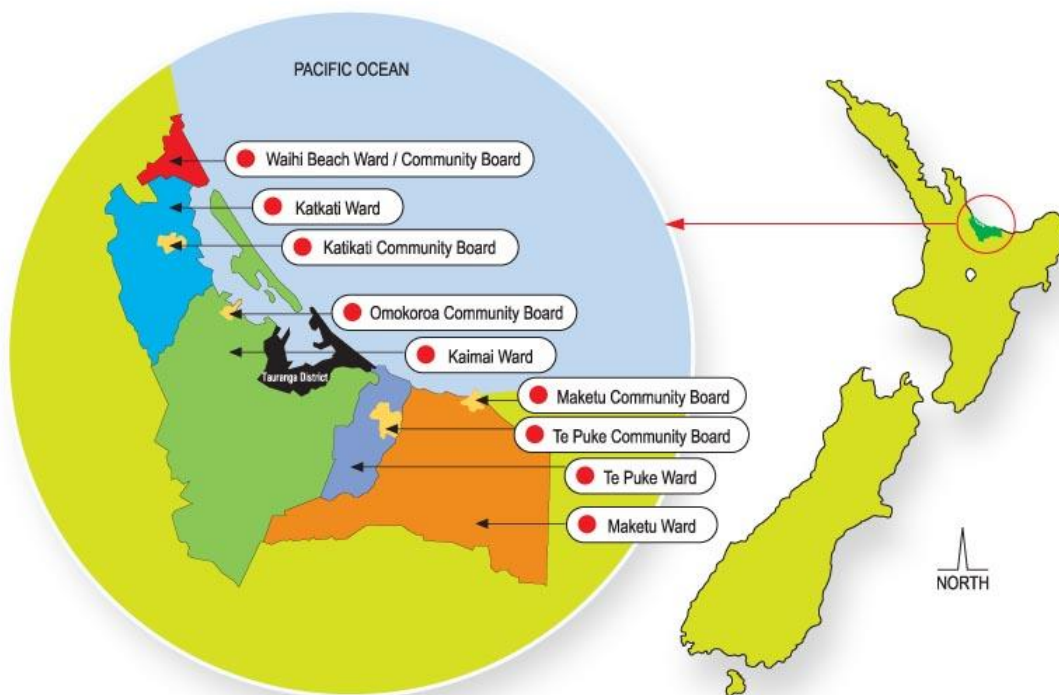


# Western Bay of Plenty District Council UTILITIES AS BUILT DATA SPECIFICATION

December 2014



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## 1. OBJECTIVE OF THE SPECIFICATION

To ensure data is captured on Council's GIS and LoftusIT AMS. This enables plans to be generated and available for location of Utilities in the field. The following method of data supply is required for all As-Built information.

All alterations, upgrades and extensions to Council utilities are required to be signed off by either a Registered Surveyor or a Chartered Professional Engineer. All As Built data are required to be submitted 10 working days before application for the signing off of the 224 Consents Notice.

Failure to provide accurate "as built", may impact on the 224 Consent Notice completion.

All sub division that contains Assets that are to be vested in Council must comply with item 2 of this code.

## 2. DATA SUPPLY

Data will be supplied directly to the Principal Administrative Officer (PAO) and/or the Project Engineer, in two (2) components.

The accuracy of the data supplied is to be +/- 0.1m (100mm) for the X & Y co-ordinates and +/- 0.01 (10mm) for the Z co-ordinate.

- **Hard copy**  
2 sets of clear, legible scale line drawing. A3 size minimum
- **Electronic copy**  
As built data files on:
  - CD, as per specification, or;
  - via email as per specification
  - drawings to be in .pdf

All As Built documentation will consist of at least:

- A plan or set of plans
- An aspatial file
- A spatial file
- A certificate for As Built Drawings
- A benchmark sheet (if applicable)
- A completed job costing sheet
- A check sheet

### 2.1 SCALED LINE DRAWING

The drawing is to show Manhole Lid and Invert Levels for all Sanitary Sewer and Stormwater Pipelines, including pipe sizes and will clearly show within 50m of any connection to council's Utility services or at the discretion of the PAO or Project Engineer:

- All existing surface features i.e. manholes, valves, hydrants, pump stations, flow meters, cesspits, reservoirs, tanks, etc shown with the following criteria: line width at 0.25, grey in colour and to be visible on plot

- Property/lot boundaries, kerb lines and or edge of seal shown with the following criteria: line width at 0.25, grey in colour and to be visible on plot
- All abandoned and or removed pipe work and surface features labelled abandoned or removed shown in yellow
- Enlargements to show clearly how new features connect to existing features (if applicable)
- All new water features are to be shown in blue
- All new stormwater features to be shown in green
- All new wastewater features to be shown in red
- One sheet/drawing or series of sheets/drawings per new utility i.e. water, stormwater & wastewater, these plans to include all existing surface features as above
- One sheet/drawing with all utilities shown on an aerial photo (if practicable)

The drawing will include a title block as it may be used for public enquires as well as for checking the electronic data supply. Also included on all drawing sheets will be a clear and legible Legend of all symbols and line types used.

Details to be included in the title block are:

- Contract/Subdivision Number
- Date Drawn
- Street or Area Location
- Contractors Name
- Scale
- Surveyors Name
- Construction Date
- Drawing Amendment/Issue Number
- The Words "As Built Plans"
- Drawing Number
- Drawing Sheet Size
- North Point/Arrow
- Details of the benchmark the levels are taken from

## **2.2 ELECTRONIC VERSION**

- Shall be sent to the Principal Administrative Officer (PAO) or the Project Engineer either on CD or email
- Specifications, as per item 2.1

### 3. INPUT FILE

When entering the co-ordinates for a curved line feature the distance between points should not exceed 1m or where the line intersects with a house connection.

When entering the co-ordinates for a straight line feature, include any point that the line feature has a change in direction or intersects with a house connection.

The coordinates must be in NZTM 2000 with levels based on the Moturiki VD 1953 Datum.

Within the Western Bay of Plenty District Council region there are two datum's in operation:

1. Moturiki VD 1953 and;
2. Auckland Datum 1946

Basically the cut-off point is at Apata (near Katikati) where a benchmark there (BC 33) has levels shown in both datums.

If the Auckland Datum 1946 is used this will be converted to the Moturiki VD 1953 equivalent.

The above information is required only for Water, Wastewater and Storm water as built data files.

The start and end co-ordinates for a line feature should be repeated for the corresponding point/surface feature at each end of the line.

The tags numbers used for a feature will be applied to the As Built Plan, Spatial and Aspatial files.

Existing feature tags will begin with an EX. e.g. EXWSVA, EXSWMH.

Point features only require 1 set of co-ordinates.

Line features requires at least 2 sets of co-ordinates.

Where a pipe crosses more than one surface type record the surface type that covers the highest proportion of the pipe.

Where a pipe, between 2 point/surface features, is constructed with different joint types record the joint type mostly used for the total length of this pipe.

All existing surface features i.e. manholes, valves, hydrants, pump stations, flow meters, cesspits, reservoirs, tanks, etc are to be included in the Spatial file with their co-ordinates and lid level where applicable.

## 4. MEANS OF COMPLIANCE

Certification by a Chartered Professional Engineer or Licence Cadastral Surveyor that the information supplied on the as built plans is accurate. As Built plans are to be prepared or produced by the office of the Chartered Professional Engineer or Licence Cadastral Surveyor.

The form for Certification is shown on the Appendix F of the specification booklet.

## 5. ATTRIBUTE FILE

### 5.1 APPENDIX A - REQUIRED ENGINEERING SERVICE FEATURES

<b>Sewer</b>	<b>Tag</b>	<b>Line/Point</b>
Sewer House Connection	SSHC	Line
Sewer Pipe	SSPI	Line
Sewer Rising Main	SSRM	Line
Sewer Submain	SSSM	Line
Sewer Junction	SSJN	Point
Sewer Manhole	SSMH	Point
Sewer Pump	SSPU	Point
Sewer Rodding Eye	SSRE	Point
Sewer Treatment Plant	SSTP	Point
Sewer Valve	SSVA	Point

<b>Stormwater</b>		
Stormwater House Connection	SWHC	Line
Stormwater Open Drain	SWOD	Line
Stormwater Pipe	SWPI	Line
Stormwater Rising Main	SWRM	Line
Stormwater Submain	SWSM	Line
Stormwater Box	SWBX	Point
Stormwater Catch Pit	SWCP	Point
Stormwater Inlet	SWCI	Point
Stormwater Outlet	SWCO	Point
Stormwater Head Wall	SWHW	Point
Stormwater Junction	SWJN	Point
Stormwater Manhole	SWMH	Point
Stormwater Pump	SWPU	Point
Stormwater Soak Hole	SWSH	Point
Stormwater Treatment Structure	SWTP	Point
Stormwater Pond	SWPO	Polygon
Stormwater Grass Swale	SWGS	Line
Stormwater Valve	SWVA	Point
Stormwater Rodding Eye	SWRE	Point
Stormwater Floodgate	SWFG	Point

<b>Water</b>		
Water House Connection	WSHC	Line
Water Pipe	WSPI	Line
Water Submain	WSSM	Line
Water Junction	WSJN	Point
Water End	WSEN	Point
Water Fire Hydrant	WSFH	Point
Water Flow Meter	WSFM	Point
Water Manifold	WSMF	Point
Water Pump	WSPU	Point
Water Reservoir	WSRE	Point
Water Source / Intake	WSIN	Point
Water Manifold & Meter	WSMM	Point
Water Treatment Plant	WSTP	Point
Water Valve	WSVA	Point
Water Toby	WSTO	Point
Water Meter	WSME	Point
Water Meter and Backflow	WSMB	Point

## 5.2 APPENDIX B - INPUT FILE FORMAT (SPATIAL)

<b>Feature Type</b>						
Tag	→	WSVA01				
Points	x	→	1852765.94			
	y	→	5837992.98			
	z	→	3.52			
Tag	→	WSPI01				
Lines	x	→	1852765.94	1852764.64	1852762.07	1852759.58
	y	→	5837992.98	5837992.67	5837989.64	5837987.14
	z	→	0	0	0	0
Tag	→	WSFM01				
Points	x	→	1852759.58			
	y	→	5837987.14			
	z	→	4.09			

### 5.3 APPENDIX C - ATTRIBUTE FILE FORMAT (ASPATIAL)

If there is no information (when entering data) for a field e.g: levels on water mains, leave the field blank.

Tag	This corresponds to the feature tag allocated in the Input file.
Feature Type	This is the type of feature; see Feature Type Table in Appendix D
Road Name	Road name eg CAMERON.
Material	This gives the material type; see Appendix D.
Size	This is for the pipe nominal bore diameter in mm; see Size Table in Appendix D.
Class	This is the class of pipe; see Class Type Table in Appendix D
High Invert level	This is the upstream invert level for pipes or the highest invert for manholes
Low Invert level	This is the downstream invert level for pipes or the lowest invert for manholes.
Install Date	This is the date/month/year of construction in full i.e. dd/mm/yyyy.
Manufacturer	Manufacturer of materials.
Ward	This is generally the urban area around the asset; see Ward Table in Appendix D
Surface Type	This is the material above or around the asset; see Surface Type Table in Appendix D
Lid Type	This is the type of lid on manholes etc; see Lid Type Table in Appendix D
Lid level	This is the level above Moturiki Datum (Z)
Shape	This is the shape of manholes etc; see Shape Table in Appendix D
Drop	This is the type of drop in a manhole; see Drop Table in Appendix D
Condition	This is the condition rating of the feature, see Appendix D.
Joint	This is the type of joint used with this type of pipe; see Joint Type Table in Appendix D
Surveyor	This is the name of the surveyor doing the As Built
Survey Date	This is the date the Surveyor collected the As Built details
House/Lot Number	This is the street address or lot number of the property where the feature is located.
Position	This is a description of the surrounding ground around the feature, see Position in Appendix D
Depth	This is the depth of a chamber or manhole from lid to bottom.

See tabulated format

**Note:** LL for stormwater scruffy domes is to be taken on the edge of the top manhole ring not the top of the grilled dome.





5.3.2 FIELDS TO BE SUPPLIED.

Tag	Feature Type	Road Name	Material	Size(mm)	Class	High Invert Level	Low Invert Level	Install Date	Manufacturer	Ward	Surface Type	Lid Type	Shape	Drop	Condition Rating	Joint	Surveyor	Survey Date	House/Lot No	Position	Depth	Lid Level (m)	
SSST																							
SSHC																							
SSPI																							
SSRM																							
SSJN																							
SSMH																							
SSPU																							
SSRE																							
SSTP																							
SSVA																							
SWRE																							
SWHC																							
SWOD																							
SWPI																							
SWRM																							
SWBX																							
SWCP																							
SWCI																							
SWCO																							
SWHW																							
SWJN																							
SWMH																							
SWPU																							
SWSH																							
SWTP																							
SWPO																							
SWGS																							
SWVA																							
SWSD																							
SWFG																							
WSHC																							
WSPI																							
WSJN																							
WSEN																							
WSFH																							
WSFM																							
WSMF																							
WSPU																							
WSRE																							
WSIN																							
WSMM																							
WSTP																							
WSVA																							
WSTO																							
WSME																							
WSMB																							
	To Be Supplied																						
	Not Supplied																						

## 5.4 APPENDIX D - ATTRIBUTE TABLES

### 5.4.1 FEATURE TYPE LOOKUP TABLES

Storm:

#### Stormwater Catch Pit (SWCP)

TYPE	CODE
SINGLE	SI
DOUBLE	DO
TREBLE	TR
QUADRUPLE	QU
SILT TRAP	ST
SOAKAGE PIT	SP
MEGA PIT	ME
SUPA PIT	SU

#### Stormwater Valve (SWVA)

TYPE	CODE
FLAPGATE	FL
KT PUSH/PULL	PP
NON RETURN	NR

#### Stormwater Pipe (SWPI & SWRM) Open Drain & Swale (SWOD & SWGS) Flow Type

TYPE	CODE
Pumped	PU
Gravity	GR
Formed Channel	FC
Creek Flow	CF
Swale	SW

Water:

#### Water Valve (WSVA)

TYPE	CODE
AIR	AI
ALTITUDE	AL
PRESSURE REDUCING	PR
SLUICE	SL
SCOUR	SC
NON-RETURN	NR
NORMALLY CLOSED	NC
UNKNOWN	UN
PRESSURE SUSTAINING	PS
BUTTERFLY	BU
CONTROL	CO

**Water Supply Flow meters (WSFM)**

TYPE	CODE
MAGNETIC	MG
VORTEX	VT
ULTRASONIC	UL
PRESSURE	PR
CORRELATION	CR
ACUFLO	AF
FLUID	FL
ELECTROMECHANICAL	EM
MECHANICAL	ME
CORRELATION	CO

**Water Supply House Connection (WSHC)**

TYPE	CODE
TOBY	TO
METER	ME
MANIFOLD	MF
METER MANIFOLD	MM
METER BACKFLOW	MB

**Sewer:**

**Sewer Valve (SSVA)**

TYPE	CODE
AIR	AI
SCOUR	SC
NON-RETURN	NR
PRESSURE REDUCING	PR
SLUICE	SL
KNIFE	KN
SURGE ANTICIPATOR	SA
AIR-KNIFE	AK
GATE	GA

**Sewer Pipe (SSPI & SSRM) Flow Type**

TYPES	CODE
PUMPED	PU
GRAVITY	GR
TREATED	TR

**5.4.2 MATERIAL LOOKUP TABLES**

**Sewer:**

**Sewer Pipe (SSPI) or Sewer Rising Main (SSRM)  
or Sewer Connection (SSHC) or Sewer Rodding Eye (SSRE)**

FULL NAME	CODE
Polyethylene 100	PE100
Polyvinyl Chloride U	uPVC
Concrete Lined Steel	CLS

**Sewer Manhole (SSMH)**

FULL NAME	CODE
Precast Concrete	PC
Polyethylene	PE
Polyvinyl Chloride U	UP
Fibreglass	FG
Reinforced Concrete	RC

**Storm:**

**Stormwater Pipe (SWPI) or Stormwater Rising Main (SWRM)  
or Stormwater Connection (SWHC) or Stormwater Rodding Eye (SWRE)**

FULL NAME	CODE
Concrete	CO
Nova Flow	NV
Polyethylene	PE100
Polyvinyl Chloride U	uPVC
Polypropylene	PP
Natural	NT
Concrete Lined Mild Steel	CLMS

**Stormwater Manhole (SWMH)**

FULL NAME	CODE
Reinforced Concrete	RC
Precast Concrete	PC
Polyvinyl Chloride U	uPVC
Polyethylene	PE

**Water:**

**Water Pipe (WSPI) or Water Connection (WSHC)**

FULL NAME	CODE
Ductile Iron	DI
Polyethylene 80	PE80
Polyvinyl Chloride U	uPVC
Cement Lined Steel	CLS
Alkathene	ALK

Steel	ST
Polyethylene 100	PE100
Polyvinyl Chloride M	mPVC
Galvanised Steel	GS
Galvinised Iron	GI

**Water Valve (WSVA)**

FULL NAME	CODE
Bronze/Brass	BR
Stainless Steel	SS
Ductile Iron	DI

**5.4.3 SIZE LOOKUP TABLES**

**Sewer:**

**Sewer Pipe (SSPI) or Sewer Rising Main (SSRM)  
or Sewer Connection (SSHC)**

NOMINAL BORE SIZE (mm)
80
100
110
120
140
150
160
175
195
220
225
245
275
300
310
350
375
450
525

**Sewer Manhole (SSMH)**

SIZE
300
375

900
1050
1200

**Storm:**

**Stormwater Pipe (SWPI) or Stormwater Rising Main (SWRM)  
or Stormwater Connection (SWHC)**

<b>NOMINAL BORE SIZE (mm)</b>
100
185
210
225
230
290
300
370
375
450
525
600
675
750
825
1050
1200
1600
1800
2050
2300
3000

**Stormwater Manhole (SWMH)**

<b>SIZE</b>
750
1050
1200
1350

1500
1800
2050

**Water:**

**Water Pipe (WSPI) or Water Connection (WSHC)**

<b>NOMINAL BORE SIZE (mm)</b>
20
25
32
40
50
75
100
150
175
200
225
250
300
350
375
450
600

**Water Valve (WSVA)**

<b>NOMINAL BORE SIZE (mm)</b>
20
25
32
40
50
75
100
150
200
225
250



280
300
350
375
400

#### 5.4.4 WARD LOOKUP TABLES

LOCALITY	CODE
Katikati-Waihi Beach	KWB
Kaimai	KM
Maketu-Te Puke	MTP

#### 5.4.5 SURFACE FEATURES TYPE LOOKUP TABLE:

SURFACE TYPE	CODE
Natural	N
Garden	G
Lawn	L
Footpath	F
Sealed Pavement	S
Asphaltic Conc. Pavement	A
Concrete	C
Special	X
Building	B

#### 5.4.6 MANHOLE LID TYPE LOOKUP TABLE:

LID TYPE	CODE
Cast Iron Heavy Duty	CH
Cast Iron Medium Duty	CM
Concrete	CO
Steel	ST
Grill / Grate	GR
Dome	DO

#### 5.4.7 MANHOLE SHAPE LOOKUP TABLE:

SHAPE	CODE
Circular	C
Square	S

#### 5.4.8 MANHOLE DROP LOOKUP TABLE:

DROP	CODE
Internal	I
External	E
None	N

#### 5.4.9 PIPE, RISING MAIN & CONNECTION CLASS LOOKUP TABLE:

CLASS	CODE
PN 6	PN6
PN 8	PN8
PN 9	PN9
PN 10	PN10
PN 12.5	PN12.5
PN 16	PN16
SN4	SN4
SN8	SN8
SN10	SN10
SN16	SN16
Class B	B
Class C	C
Class D	D
Class X	X
Class Y	Y
Class Z	Z
Low Density	LD
Medium Density	MD
High Density	HD

#### 5.4.10 PIPE & RISING MAIN JOINT LOOKUP TABLE:

JOINT TYPE	CODE
Mortar	M
Lead	L
Flanged	F
Rubber ring/z Joint	R
Welded – solvent/heat	W
Screwed	S
Gibault	G
Butt Weld	B
Compression Fitting	C

#### 5.4.11 PIPE, RISING MAIN, MANHOLE, FIRE HYDRANT & VALVE POSITION LOOKUP TABLE:

POSITION	CODE
Sealed Area/Road	S
Footpath	F
Road Reserve	R
Bridge/Structure	B
Land Reserve	L
Private Property with Easement	E
Private Property without Easement	X

#### 5.4.12 ASSET CONDITION RATING

CONDITION	CODE
Very Good	1
Good	2
Fair	3
Poor	4
Very Poor	5

#### 5.4.13 LOCAL DATUM LOOK UP TABLE

AREA	CODE
MOTURIKI	M

### 5.5 APPENDIX E – MANDATORY FIELDS

#### 5.5.1 ALL FEATURES

Tag, X, Y, Road Name, Install/construction Date, Manufacturer, Ward, Surface Type, Condition Rating, Surveyor, Survey date, Datum.

#### 5.5.2 MANHOLES - (SSMH, SWMH) – ADDITIONAL FIELDS

Material, Size, Lid Type, Shape, Drop, Position, Depth, Lid Level (Z), inlet invert levels, outlet invert level, (inverts on hard copy plans only).

If there are more than 1 pipe leading into a manhole the Inlet invert levels recorded will be noted in a clockwise direction from the Outlet pipe (on hard copy plans only).

### **5.5.3 PIPES & RISER MAINS - (WSPI, SSPI, SSRM, SWPI, SWRM) – ADDITIONAL FIELDS**

Feature Type, Material, Size, Class, High Invert, Low Invert, joint, position, invert levels (stormwater and wastewater only).

### **5.5.4 CONNECTIONS – (SWHC, SSHC, WSHC) – ADDITIONAL FIELDS**

Material, Size, Class, House/Lot Number, depth.

### **5.5.5 VALVES, CATCHPITS, FLOW METERS, INTAKES & RESERVOIRS, PUMPS, RODDING EYES – ADDITIONAL FIELDS**

Feature type, Size, Material, Lid Levels (Z).

Also refer to 6.3.2 Fields to be Supplied spreadsheet.

## 5.6 APPENDIX F – CERTIFICATE FOR AS BUILT DRAWING

This form is not for public drainage or public water mains certification.

# CERTIFICATE FOR AS BUILT DRAWINGS

I, \_\_\_\_\_ Chartered Professional Engineer/ Licence  
Cadastral Surveyor (cross out not applicable) hereby certify that the:

Earthwork  
Public Access-ways  
Right of Way  
Water  
Stormwater  
Other Services

Roading  
Reserve Development  
Common Access Lots  
Wastewater  
Solid-waste

are correctly shown on the attached plans /reference numbers \_\_\_\_\_, prepared by  
subdivision at the property specified below.

I hereby certify that the “as-built” measurements and information as shown hereon were made under my  
Supervision or as noted and are correct to the best of my knowledge and belief.

I also understand that any inaccuracy of data supplied may require additional input from Council and their Asset  
Manager and attract additional charges to the Consent Holder.

Property Description/Title: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Address of Property: \_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
Chartered Professional Engineer/ Licence Cadastral Surveyor

\_\_\_\_\_  
Registration Number

Date: \_\_\_\_\_

## 6.1 AS BUILT CHECK SHEET

(This sheet is to accompany the "As built" contract document at all time)

Contract Name: _____	Contract Number: _____
----------------------	------------------------

<b>Principal Contractor: (Name)</b> _____	<b>Project Engineers or Surveyors (Company name)</b> _____
-------------------------------------------	------------------------------------------------------------

Contact person _____	Contact Person: _____
----------------------	-----------------------

Contact details: _____	Contact details: _____
------------------------	------------------------

**Sub-divisional As Built Plan data received at WBOPDC by Principal Administrative Officer**

Sign \_\_\_\_\_ Date: \_\_\_\_\_

Format	Hard Copy	Original	
	Electronic Copy	Csv	
		Xls	
		Di	
		dxp	
		Pdf	

Capitalisation of Asset	
Asset Capitalised?	YES or NO
Date:	
Officer (Name)	
Officer: (Contact Tel No :)	

**As Built Plan data received by Project Engineer**

Sign \_\_\_\_\_ Date: \_\_\_\_\_

Format	Hard Copy	Original	
	Electronic Copy	csv	
		xls	
		di	
		dxp	
		pdf	

Capitalisation of Asset	
Asset Capitalised?	YES or NO
Date:	
Officer (Name)	
Officer: (Contact Tel No:)	

**Information Flow Processes:**

Flow Processes	Comment	Time Frame required
----------------	---------	---------------------

**Data Forwarded to PSP - ISO**

Date Received _____ Signed: _____	2 working days
Date Sent: _____ Signed: _____	

**Data Returned to WBOPDC for entering onto GIS/AMS**

Date Received: _____ Signed: _____	12 working days
Date Sent: _____ Signed: _____	

**Data Returned to PSP-ISO for checking and signing off from WBOPDC**

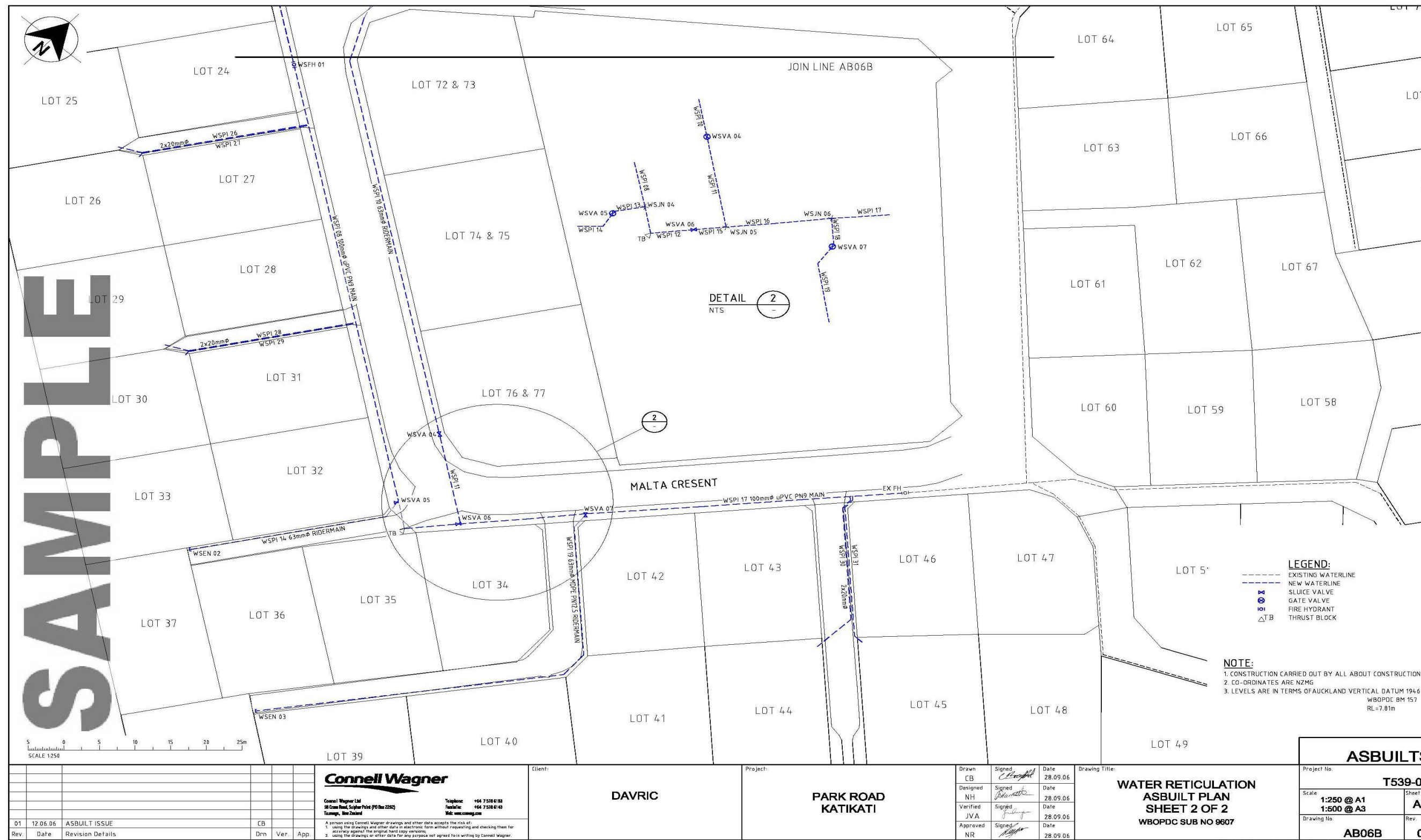
Date Received: _____ Signed _____	5 working days
Date Sent _____ Signed _____	

**As Built plan and other associated information return to Principal Administrative Officer or Project Engineer from PSP – ISO**

Date Received: _____ Signed _____	For Safe Keeping
-----------------------------------	------------------

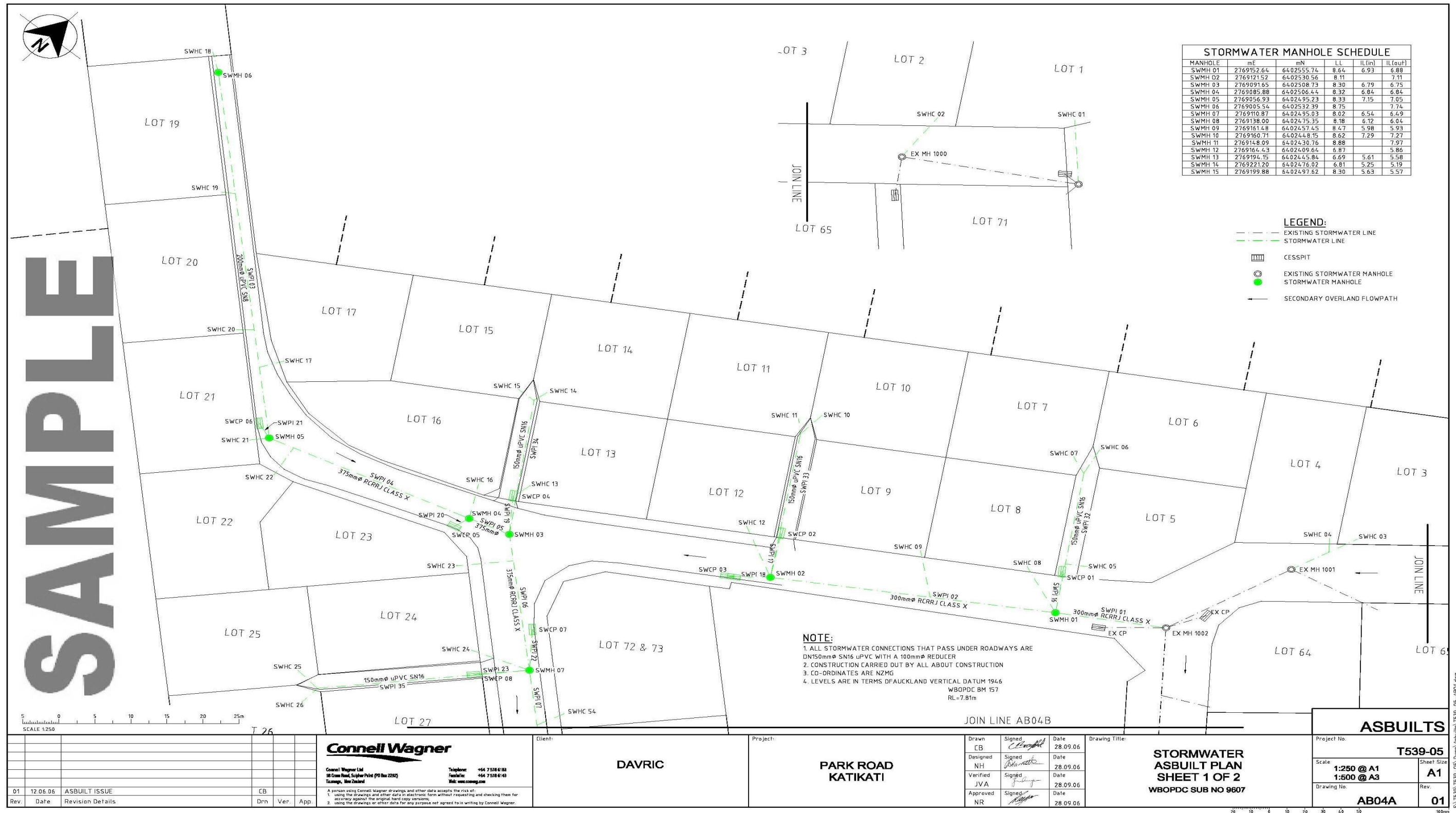
## 7. SAMPLE AS BUILT PLANS – STANDARD CONTRACT

### 7.1 WATER – (SAMPLE KINDLY SUPPLIED BY CONNELL WAGNER)





7.2 STORMWATER – (SAMPLE KINDLY SUPPLIED BY CONNELL WAGNER)



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Client: **DAVRIC**

Project: **PARK ROAD KATIKATI**

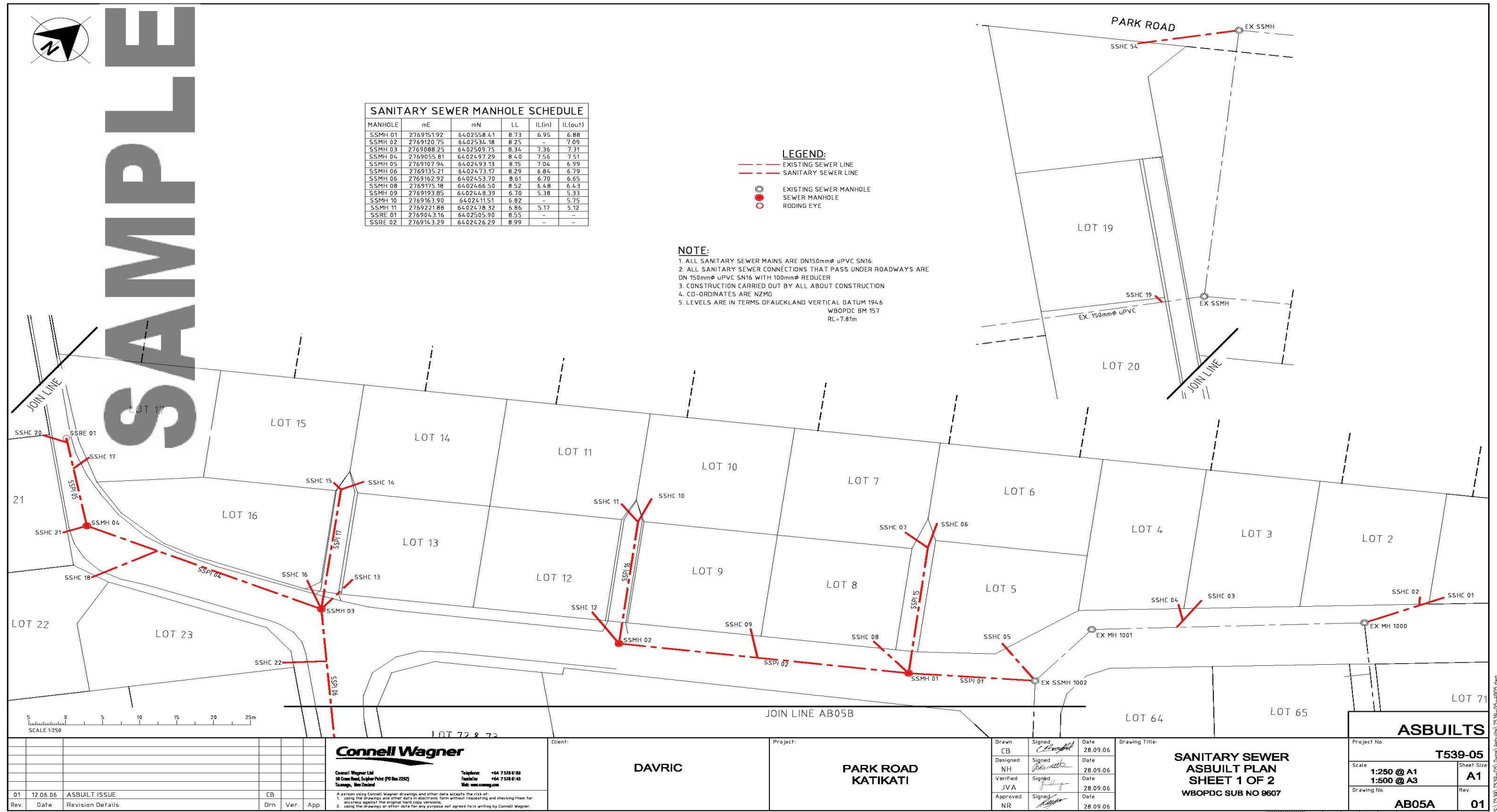
Drawn	Signed	Date
CB	<i>[Signature]</i>	28.09.06
Designed	Signed	Date
NH	<i>[Signature]</i>	28.09.06
Verified	Signed	Date
JVA	<i>[Signature]</i>	28.09.06
Approved	Signed	Date
NR	<i>[Signature]</i>	28.09.06

Drawing Title:  
**STORMWATER ASBUILT PLAN SHEET 1 OF 2**  
 WBOPDC SUB NO 9807

<b>ASBUILTS</b>	
Project No:	<b>T539-05</b>
Scale:	<b>1:250 @ A1 1:500 @ A3</b>
Sheet Size:	<b>A1</b>
Drawing No:	<b>AB04A</b>
Rev:	<b>01</b>



7.3 WASTEWATER – (SAMPLE KINDLY SUPPLIED BY CONNELL WAGNER)



## 8. SAMPLE SPATIAL FILES

### 8.1 WATER

EXWSVA					
1858890.76					
5841039.46					
8.88					
WSPI01					
1858890.76	1858886.06	1858885.94	1858854.88	1858854.76	1858835.08
5841039.46	5841035.78	5841035.68	5841011.43	5841011.34	5840995.95
0	0	0	0	0	0
WSJN01					
1858835.08					
5840995.95					
0					
WSPI02					
1858835.08	1858825.71	1858825.59	1858825.27	1858825.97	
5840995.95	5840988.63	5840988.53	5840988.28	5840979.47	
0	0	0	0	0	
WSVA02					
1858825.97					
5840979.47					
8.37					
WSPI03					
1858825.97	1858825.93				
5840979.47	5840979.16				
0	0				
WSJN02					
1858825.93					
5840979.16					
0					
WSPI04					
1858825.93	1858824.84				
5840979.16	5840979.28				
0	0				
WSJN03					
1858824.84					
5840979.28					
0					

**8.2 STORMWATER**

SWMH01			
1858889.81			
5841031.94			
8.64			
SWPI01			
1858889.81	1858902.05		
5841031.94	5841041.57		
6.88	6.72		
EXMH1002			
1858902.05			
5841041.57			
8.87			
SWMH02			
1858858.71			
5841006.69			
8.11			
SWPI02			
1858858.71	1858876.14	1858889.81	
5841006.69	5841020.84	5841031.94	
7.11	0	6.93	
SWMH03			
1858828.86			
5840984.8			
8.3			
SWPI06			
1858828.86	1858832.62	1858848.12	
5840984.8	5840982.68	5840971.12	
6.75	0	6.54	
SWMH07			
1858848.12			
5840971.12			
8.02			
SWCP07			
1858843.17			
5840976.15			
7.93			
SWPI22			
1858843.17	1858848.12		
5840976.15	5840971.12		
7.17	7.03		
SWCP08			
1858843.43			
5840964.89			
8.29			
SWPI23			
1858843.43	1858848.12		
5840964.89	5840971.12		
7.75	6.65		

**8.3 WASTEWATER**

EXSSMH			
1858733.41			
5841034.31			
9.52			
SSHC54			
1858725.4	1858733.41		
5841022.97	5841034.31		
0	0		
SSMH01			
1858889.08			
5841034.61			
8.73			
SSPI01			
1858889.08	1858902.01		
5841034.61	5841045.89		
6.88	6.74		
EXSSMH1002			
1858902.01			
5841045.89			
8.91			
SSHC05			
1858894.31	1858902.01		
5841047.21	5841045.89		
0	0		
SSMH02			
1858857.94			
5841010.31			
8.25			
SSPI02			
1858857.94	1858872.83	1858889.08	
5841010.31	5841021.93	5841034.61	
7.09	0	6.95	
SSMH04			
1858793.02			
5840973.29			
8.4			
SSPI04			
1858793.02	1858802.77	1858825.46	
5840973.29	5840977.05	5840985.81	
7.51	0	7.36	
SSMH03			
1858825.46			
5840985.81			
8.34			

## 9. SAMPLE ASPATIAL FILES

### 9.1 WATER

TAG	TYPE	ROAD NAME	MATERIAL	SIZE	CLASS	HIGH INV	LOW INV	INSTALL	MANUFACT	LOCALITY	SURFACE	LID TYPE	SHAPE	DROP	CONDITION	JOINT	SURVEYOR	SURVEY DATE	LOT NO	POSITION	DEPTH	LID LEVEL
WSPI01	PR	Cresta	uPVC	100	PN16			1/08/2006	MAR	KK	L				1	R	CW	16/08/2006		R		
WSPI02	PR	Cresta	uPVC	100	PN16			1/08/2006	MAR	KK	L				1	R	CW	16/08/2006		R		
WSPI03	PR	Cresta	uPVC	100	PN16			1/08/2006	MAR	KK	L				1	R	CW	16/08/2006		R		
WSPI04	PR	Cresta	uPVC	100	PN16			1/08/2006	MAR	KK	L				1	R	CW	16/08/2006		R		
WSJN01		Cresta						1/08/2006	MAR	KK	L				1		CW	16/08/2006				
WSJN02		Cresta						1/08/2006	MAR	KK	L				1		CW	16/08/2006				
WSJN03		Cresta						1/08/2006	MAR	KK	L				1		CW	16/08/2006				
WSVA02	SL	Cresta	UP	100				1/08/2006	AVK	KK	L				1		CW	16/08/2006		R		8.37

### 9.2 STORMWATER

TAG	TYPE	ROAD NAME	MATERIAL	SIZE	CLASS	HIGH INV	LOW INV	INSTALL	MANUFACT	LOCALITY	SURFACE	LID TYPE	SHAPE	DROP	CONDITION	JOINT	SURVEYOR	SURVEY DATE	LOT NO	POSITION	DEPTH	LID LEVEL
SWMH01		Cresta	PC	1050				1/08/2006	HUM	KK	A	CH	C	N	1		CW	16/08/2006		S	1.76	8.64
SWMH02		Cresta	PC	1050				1/08/2006	HUM	KK	A	CH	C	N	1		CW	16/08/2006		S	1	8.11
SWMH03		Cresta	PC	1050				1/08/2006	HUM	KK	A	CH	C	N	1		CW	16/08/2006		S	1.55	8.3
SWMH07		Malta	PC	1050				1/08/2006	HUM	KK	A	CH	C	N	1		CW	16/08/2006		S	1.53	8.02
SWPI01	GR	Cresta	CO	300	X	6.88	6.72	1/08/2006	HUM	KK	A				1	R	CW	16/08/2006		S		
SWPI02	GR	Cresta	CO	300	X	7.11	6.93	1/08/2006	HUM	KK	A				1	R	CW	16/08/2006		S		
SWPI06	GR	Malta	CO	375	X	6.75	6.54	1/08/2006	HUM	KK	A				1	R	CW	16/08/2006		S		
SWPI22	GR	Malta	CO	225	X	7.17	7.03	1/08/2006	HUM	KK	A				1	R	CW	16/08/2006		S		
SWPI23	GR	Malta	CO	225	X	7.75	6.65	1/08/2006	HUM	KK	A				1	R	CW	16/08/2006		S		
SWCP07	SI	Malta						1/08/2006	HUM	KK	A				1		CW	16/08/2006				7.93
SWCP08	SI	Malta						1/08/2006	HUM	KK	C				1		CW	16/08/2006				8.29

### 9.3 WASTEWATER

TAG	TYPE	ROAD NAME	MATERIAL	SIZE	CLASS	HIGH INV	LOW INV	INSTALL	MANUFACT	LOCALITY	SURFACE	LID TYPE	SHAPE	DROP	CONDITION	JOINT	SURVEYOR	SURVEY DATE	LOT NO	POSITION	DEPTH	LID LEVEL
SSMH01		Cresta	PC	1050				1/08/2006	HUM	KK	A	CH	C	N	1		CW	16/08/2006		S	1.85	8.73
SSMH02		Cresta	PC	1050				1/08/2006	HUM	KK	A	CH	C	N	1		CW	16/08/2006		S	1.16	8.25
SSMH03		Cresta	PC	1050				1/08/2006	HUM	KK	A	CH	C	N	1		CW	16/08/2006		S	1.03	8.34
SSMH04		Cresta	PC	1050				1/08/2006	HUM	KK	A	CH	C	N	1		CW	16/08/2006		S	0.89	8.4
SSHC05		Cresta	uPVC	150	SN16			1/08/2006	MAR	KK	L				1		CW	16/08/2006	5			
SSHC54		Park	uPVC	100	SN16			1/08/2006	MAR	KK	L				1		CW	16/08/2006	4			
SSPI01	GR	Cresta	uPVC	150	SN16	6.88	6.74	1/08/2006	MAR	KK	A				1	R	CW	16/08/2006		S		
SSPI02	GR	Cresta	uPVC	150	SN16	7.09	6.95	1/08/2006	MAR	KK	A				1	R	CW	16/08/2006		S		
SSPI04	GR	Cresta	uPVC	150	SN16	7.51	7.36	1/08/2006	MAR	KK	A				1	R	CW	16/08/2006		S		



Wastewater Example

Wastewater Costs for Job / Contract:.....

<b>Component</b>	<b>Type / Material</b>	<b>Size</b>	<b>Quantity</b>	<b>Unit Rate \$</b>	<b>Component Total Cost \$</b>
Manhole	round	1050mm	8	3480	13920.00
	round	1200mm	2	4350	8700.00
Rodding Eye	uPVC	100mm	5	727	3635.00
Pipe	uPVC	100mm	160m	140	22400.00
	uPVC	150mm	100m	170	17000.00
	PE	50mm	240m	150	36000.00
<b>Total</b>					<b>101655.00</b>

Stormwater Example

Stormwater Costs for Job / Contract:.....

<b>Component</b>	<b>Type / Material</b>	<b>Size</b>	<b>Quantity</b>	<b>Unit Rate \$</b>	<b>Component Total Cost \$</b>
Manhole	round	1050mm	8	3480	13920.00
	round	1200mm	2	4350	8700.00
Cesspits	single	675 x 450	5	1800	9000.00
	double	1350 x 450	3	3600	10800.00
Pipe	Concrete	300mm	255m	390	99450.00
	Concrete	450mm	100m	490	49000.00
	Concrete	525mm	135m	560	75600.00
	uPVC	225mm	108m	340	36720.00
<b>Total</b>					<b>303190.00</b>

I ..... as the Surveyor / Engineer/ Developers Rep to this job / contract certify that the costing details shown in this document are a true and accurate representation of all costs involved.

Date:.....

Signed:.....