

CIVIL ENGINEERING REPORT

FOR

RETIREMENT VILLAGE SERVICED APARTMENTS

147-153 EDGEWATER DRIVE
PAKURANGA

DCC REF: 496/03

APRIL 2025

- 
- The bottom section of the report features a green background. On the left, the 'dcd' logo is displayed in white, with a stylized mountain range behind it. Below the logo, the company name 'DODD CIVIL CONSULTANTS' is written in bold white capital letters, followed by the tagline 'Down to Earth Personal Service' in a smaller white font. On the right, a list of services is presented in an italicized font, each preceded by a right-pointing triangle symbol. The services listed are: Subdivisions, Land Survey, Land Development, Resource Consents, Project Management, Planning, Structural Engineering, and Environmental Engineering.
- ▶ *Subdivisions*
 - ▶ *Land Survey*
 - ▶ *Land Development*
 - ▶ *Resource Consents*
 - ▶ *Project Management*
 - ▶ *Planning*
 - ▶ *Structural Engineering*
 - ▶ *Environmental Engineering*

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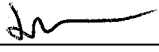
Down to Earth
Personal Service

REPORT DETAILS

CLIENT: A & L Sargeant Ltd
SITE LOCATION: 147-153 Edgewater Drive, Pakuranga
REPORT: Civil Engineering



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1.0 INTRODUCTION

Dodd Civil Consultants has been engaged by A & L Sargeant Ltd to prepare this Civil Engineering Report for a proposed two building, 51-unit retirement village apartment at 147-153 Edgewater Drive, Pakuranga.



Figure 1: Locality Diagram

The purpose of this report is to identify and describe the relevant Civil Engineering and Infrastructural matters associated with the project in support of the Resource Consent Application.

The following matters are addressed herein:

- | | |
|------------------|--|
| 1. Existing site | - site description |
| 2. Earthworks | - basement excavations, sediment control and earthworks management |
| 3. Flooding | - assessment |
| 4. Roading | - crossings, driveway plan and footpaths (excludes traffic) |

- | | |
|-----------------|--|
| 5. Stormwater | - existing situation and proposed servicing and outlet |
| 6. Wastewater | - existing and proposed servicing |
| 7. Water Supply | - existing and proposed servicing (excludes fire protection) |

The proposed Building A will consist of a single level basement with 1 ground level and 5 apartment levels above. The proposed Building B will consist of 1 ground level with 5 apartment levels above. The following diagram summarises the proposed Civil Engineering works involved with the project. Further information regarding earthworks, stormwater, wastewater, and water supply can be found in Sections 3 to 8 of this report.



Figure 2: Civil Engineering Works Summary Diagram

Copies of the underground services plans are available upon request. There are no existing overhead services.

2.0 SITE DESCRIPTION

Please refer to the Topographical Plan, numbers 101 and 102 in Appendix D for site contours information.

The following is a general description of the existing site from a Civil Engineering perspective. More detailed, topic related, descriptions are provided within the respective chapters herein.

The development site consists of numbers 147, 149, 151 and 153 Edgewater Drive which are currently established residential properties with a combined area of 2990m².

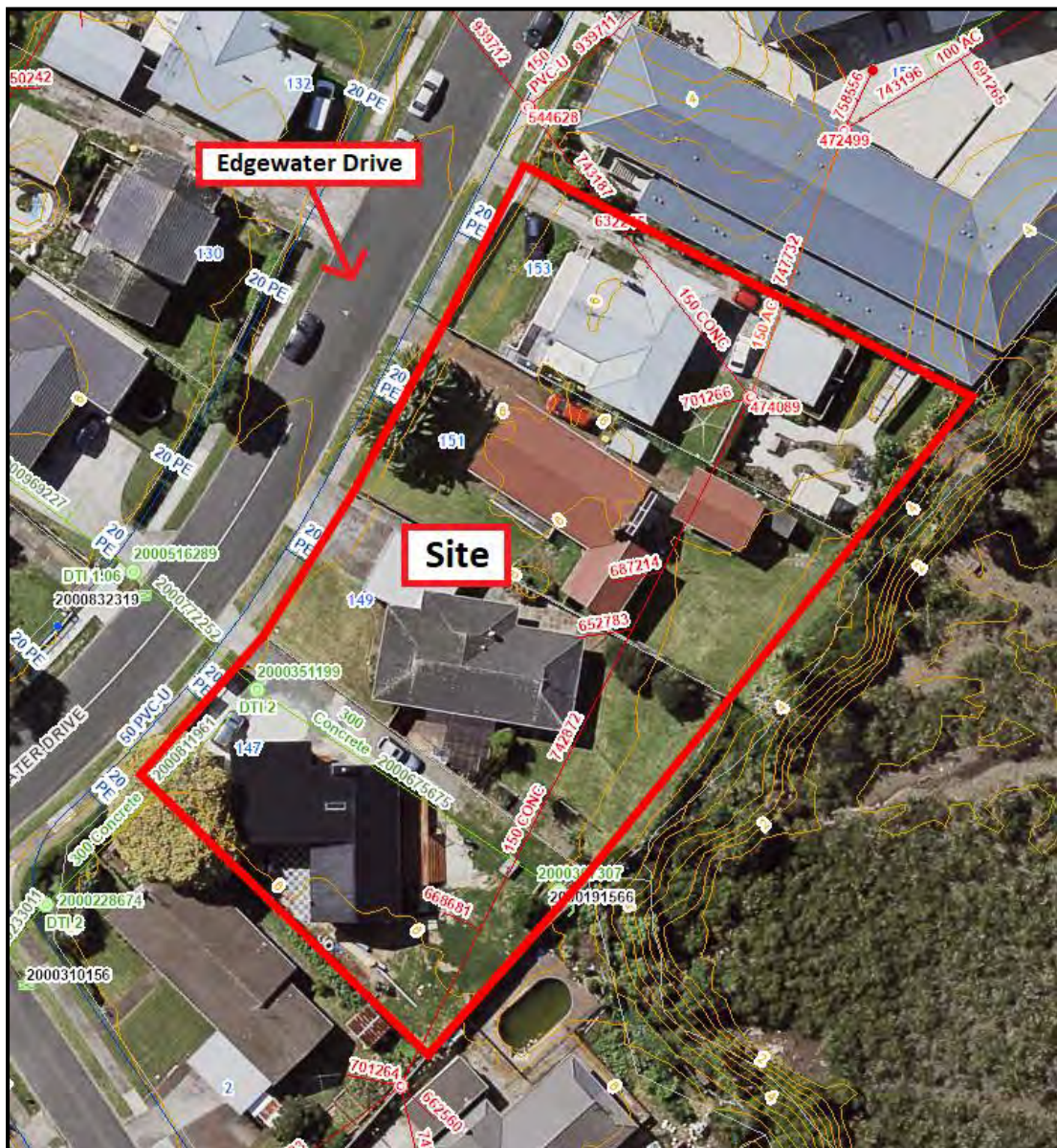


Figure 3: Existing Site Diagram

The landform consists of a slight ridge along the site's central south-west and north-east axis with falls of approximately 0.6m towards Edgewater Drive to the north-west and to the tidal Tamaki River to the south-east. The riverbank adjacent to the south-east boundary then falls away steeply down to the estuarine flats for houses 149 to

153. The riverbank curves away from 147 Edgewater Drive. House 147 borders 4 Susanne Place on its south-east boundary and 2 Susanne Place on its south-west boundary. Both 4 and 2 Susanne Place are residential dwellings.

The Ambridge Hospital is located to the north-east of the site and a residential dwelling is located in the south-west. The immediate downstream receiving environment is the Pakuranga Creek to the south-east of the site. The site fronts onto Edgewater Drive which has a two-lane carriageway (one lane in each direction) with standard berms containing underground services.

The Council's GIS identifies a 150mm diameter wastewater pipe running along the frontage of the site, and a 50mm diameter water pipe in the berm on the north-west side of the site. The wastewater pipe under the site collects flows from upstream of Edgewater Drive and Ambridge Hospital and discharges to a line on the opposite side of the road.

Two stormwater manholes are located on 147 Edgewater Drive that are connected via a 300mm diameter concrete line. The upstream manhole is on the north-west side of the lot and the downstream manhole is located on the south-east side where it discharges stormwater directly into the Pakuranga Creek. A 300mm diameter public concrete pipe feeds into the upstream manhole from the south-west and a 225mm diameter public AC pipe discharges stormwater into it from the north-west direction.

There are no known ground instability issues.

3.0 EARTHWORKS

3.1 Pre-Earthworks Site Conditions

The existing buildings and larger vegetation on the site are to be removed leaving remnant foundations, slabs, fences, drains, services, stumps and minor vegetation as being the site's pre-earthworks condition.

3.2 Proposed Earthworks

Estimated Quantities

- Area of land disturbance	= 3002m ²
- Volume of excavation	= 3754 m ³
- Cut Volume	= 3791 m ³
- Fill Volume	= 36 m ³
- Depth of excavation	= 0m to 4.05m

General

The earthworks operations will involve topsoil stripping and bulk excavation and there will be no significant amounts of filling.

Most of the excavated material will therefore be removed from site. The excavation contractor, when appointed, will be required to nominate appropriate locations for the disposal, tipping and / or placement of the excavated material.

Sediment Control Measures

The excavation will be below the existing ground level, so sediment runoff is expected to be minimal.

The existing vehicle crossings will be used as the stabilised entrances to the site.

During the initial stages of clearing and excavation, the works area will not be inwardly draining therefore a super silt fence will be installed along the south-east boundary of the site to capture and treat run-off. The super-silt fence is to remain on site for the duration of the earthworks.

As the excavations progress the works area will become inwardly draining and a pump-sump will pump discharges to a skip and pump-well before pumping to the ground surface via a silt sock for additional treatment. The stormwater outfall will have a filter sock applied to it for further sediment control.

Stages

The excavations will be carried in three general stages as follows:

- | | |
|---------|---|
| Stage 1 | - Initial excavations to form a platform for the perimeter piling operations. |
| | - Temporary propping and shoring required. |
| Stage 2 | - Excavation of central area for main propping platform |
| | - Partial building construction for permanent support |
| Stage 3 | - Final excavations to basement levels |

Timing

The estimated duration of the earthworks phase of construction is 16 weeks and it is intended that works will be completed within a single earthworks season although they will not be unduly sensitive to being undertaken as winter works if need be.

Traffic

The contractor will be required to develop a Traffic Management Plan as part of the overall Construction Management Plan.

3.3 Special Protection Requirements

Special care and attention will be required regarding the protection of the adjacent coastal environment. This particularly applies to the construction of the stormwater outlets.

Other potential environmental effects such as accidental sediment discharge, noise, dust, mud, and contamination will need to be managed accordingly.

4.0 FLOODING

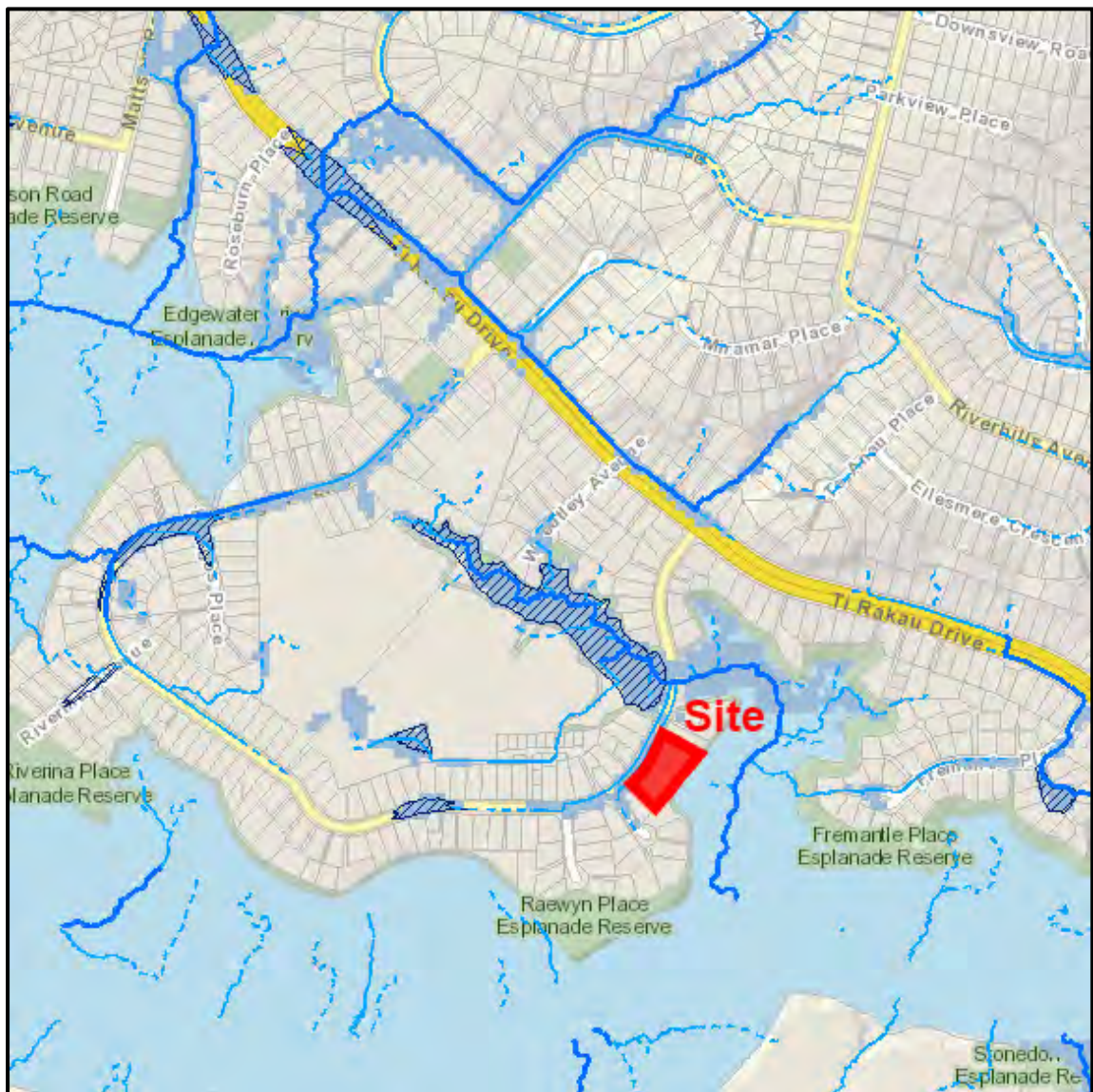


Figure 4: GIS Flooding Diagram

4.1 Onsite Flooding

Council's GIS confirms that the site is not located within a flood plain or a flood prone area. There is an overland flow path along Edgewater Drive which is contained within the road reserve.

The site is located at the south-eastern boundary of the Pakuranga Creek stormwater catchment and has limited upstream catchment and is not subject to flooding or undue surface water flow.

The site has a slight ridge along the central south-west – north-east axis with falls to Edgewater Drive and the Tidal Pakuranga Creek and is therefore not subject to onsite ponding.

Minimum floor levels in accordance with Section E1 of the NZ Building Code are therefore recommended as a minimum for protection against flooding from localised surface water.

The GIS identifies an overland flow path along the Edgewater Drive kerb line adjacent to the site however the attached calculations determine that flows will be contained within the road side channel. The vehicle crossing and entrance ramp will be shaped to prevent runoff from the street from entering the site. A 300mm freeboard above the 100-year flood plain level in the kerb channels will be maintained at the entry and the exit accessways. The proposed driveway is shaped such that should any potential flooding overtop the freeboard at the entry/exit points, this secondary flow will be contained within the accessways and discharge to the estuary over the low point in the rear boundary. Gradients in and around the building are such that stormwater will be directed away from the building perimeter.

4.2 Downstream Flooding

The proposed project will not impact the Pakuranga Creek catchment as stormwater from the development will discharge directly into Pakuranga Creek.

4.3 Coastal Inundation

Please refer to the 4D Environmental Ltd report for Assessment of Coastal Hazards.

The maximum future 1% AEP inundation level for the Waitemata Harbour is commonly set at RL 3.5m which allows for tidal surge and 1.0m of sea level rise. The ground level around the proposed building is sufficiently elevated to be above the level of the 1% AEP storm event under all sea level rise scenarios to the year 2130.

The basement level of 2.1m for Building A will be drained and pumped to the stormwater system. The ground level along the coastal boundary is approximately 4.0m RL and the two proposed building floor levels are both 5.1m RL. The design levels significantly eliminates the potential impact from coastal inundation, as Building A is above the mean high water spring level, however it must be noted that Building A is still below the level of storm tides during extreme events. Therefore, there is potential for future flooding should there be a pathway for stormwater to track back into the basement.

5.0 ROADING

Please also refer to the appended engineering drawings.

The proposed development will not involve any public road works except for the installation of two new vehicle crossings and the removal of the existing vehicle crossing. A Vehicle Crossing application to Auckland Transport will need to be made in due course to enable construction of the new vehicle crossings.

A driveway and carpark are proposed to be constructed around both Buildings A and B. Parking spaces are to be provided for Building A and Building B at ground level. An accessway to the basement parking under Building A will also be provided from Lot 139.

There are no existing road markings or signage that will need to be modified.



Figure 5: Public Road Works Diagram



Figure 6: Proposed driveway and carpark plan

6.0 STORMWATER

Please also refer to the appended engineering drawings and calculations.

6.1 Existing Stormwater

The existing buildings on the site currently discharge stormwater to the street via three kerb outlets which have an estimated combined capacity of 27.3 l/s. This will not be sufficient to service the proposed development which will have a 10 year Average Recurrence Interval (ARI) discharge of 57.5 l/s (unless detention is provided). The stormwater from the kerb outlets then drains north towards the culvert under Edgewater Drive which the GIS indicates is subject to flooding. It is therefore concluded that using the existing kerb outlets will not be the most suitable method for stormwater disposal from the proposed development.

Council's GIS indicates that the nearest existing public stormwater reticulation is located at 147 Edgewater Drive. The line running through 147 Edgewater Drive and discharging into the creek has insufficient capacity.

6.2 Proposed Stormwater

The proposed stormwater disposal method involves constructing new stormwater lines for both Buildings A and B, which will discharge directly into Pakuranga Creek via two newly created outfalls protected with riprap.

The existing outfall servicing the site will be decommissioned due to insufficient capacity. To replace it, two new outfalls will be constructed to accommodate stormwater discharge from the proposed development. Outfall 1 will service Building B, while Outfall 2 will service Building A. Both outfalls, including the immediately upstream pipe network, will be vested as public assets. The new outfalls will comply with, and be covered under, Auckland Council's Network Discharge Consent (NDC).

Building A

Building A will be serviced via private stormwater lines and catchpits. These lines will capture surface runoff and discharges from downpipes and discharge into Pakuranga Creek (Outfall 2). Please refer to the 400 series Engineering Drawings for more information on the stormwater layout around Building A.

A stormwater treatment cartridge system is also proposed to be provided for treatment of contaminated stormwater. The infrastructure proposed for Building A will also capture partial roof water from Building B.

Building B

Roof runoff and surface runoff within the site will be captured via private stormwater lines and catchpits. Stormwater treatment device is also proposed for water quality treatment.

The existing public 300mm diameter stormwater line that currently runs through 147 Edgewater Drive will be abandoned (removed) as it is in poor condition along with the manholes at either end. The upstream manhole will be removed and replaced with a new 1500mm diameter stormwater manhole (SWMH 1-2). Twin 450mm diameter pipes will be installed to replace the 300mm diameter line. The 300mm diameter line was severely under capacity, hence the need to upgrade to twin 450mm diameter pipes.

The private infrastructure and the public line is proposed to discharge into a newly created public outfall (Outfall 1).

Please refer to Appendix B for pipe sizing calculations.

The new connection will not be deep enough to service the basement therefore pumping is required for any internal basement drainage (wash down etc), along with basement subsoil drainage.

The proposed stormwater outlet has been designed in accordance with:

- Clause E1 - Surface Water of the New Zealand Building Code (Building Consent required)
- The Stormwater chapter of the Auckland Council Code of Practice for Land Development and Subdivision
- Auckland Council Technical Report 2013/018 for inlet and outlet design.

The stormwater discharge will also comply with the standards of Chapter E8-Stormwater - Discharge and Diversion of the Auckland Unitary Plan as follows:

- E8.6.1 General Standards; (1) design - per above; (2) scour and erosion - per above; (3) flooding and inundation - none; nuisance - not undue; (5) water quality - clean runoff; (6) effects on aquatic life - no undue effects.
- E8.6.3.1 Discharges within the urban area; (1) No stream environments involved therefore no mitigation required (retention or detention); (2) Stormwater management devices will be provided where necessary to treat "quality" (permeable pavers and SW360 treatment devices for the JOAL).

6.3 Ecological Effects

No additional adverse ecological effects are anticipated to affect the estuary ecosystem as a result of the two new outfalls. While the construction of two outfalls to service the proposed development will result in increased discharge into Pakuranga Creek, this is not expected to have any negative impact on the surrounding waterway. Furthermore, on-site treatment of all paved surfaces will ensure that the quality of stormwater discharge remains compliant with relevant environmental standards.

To specifically address this stormwater discharge, permeable pavers and treatment devices will be used to treat JOAL runoff. Permeable pavers will be installed for parking spaces to increase the permeable surface, and treatment devices downstream of catchpits for the remainder of the JOAL runoff.

The roofing area is not expected to require treatment prior to discharge by virtue of its inert building materials.

The outfall structures have been designed to minimise disturbance to the bed through energy dissipation. Riprap apron has been included for both outfalls to reduce exit velocities in the event of a high-volume discharge event at low tide. This is expected to account for any potential erosion or scouring of the estuary bed.

7.0 WASTEWATER

Please also refer to the appended engineering drawings and calculations.

7.1 Existing Wastewater

The Council's GIS indicates that the site is currently serviced by four 100mm diameter lot connections onto a 150mm diameter public wastewater line that runs through the site, referred to as Line A. Line A also services 39 units upstream to the west of the site. Line B services 35 properties on the opposite side of the road. Line B meets Line A northwards on Edgewater Drive and joins into Line C. Line D services the 18 houses between the end of the Wheatley Avenue cul-de-sac and Edgewater Drive. Line C and Line D join into Line E which services the houses at the closest entrance to Edgewater Drive from Ti Rakau Drive.

Capacity Check

Line A

- calculated capacity = 11.54 l/s, based on 150mm dia, assumed 0.55% grade, $k=1.5\text{mm}$.
- existing PWWF = 3.84 l/s, based on 39 existing dwellings as well as 1.81 l/s from the existing hospital.

Line B

- calculated capacity = 11.54 l/s, based on 150mm dia, assumed 0.55% grade, $k=1.5\text{mm}$.
- existing PWWF = 1.82 l/s, based on 35 existing dwellings.

Line C

- calculated capacity = 22.54 l/s, based on 150mm dia, 2.1% grade, $k = 1.5\text{mm}$.
- existing PWWF = 5.66 l/s, based on 74 existing dwellings as well as 1.81 l/s from the existing hospital.

Line D

- calculated capacity = 11.54 l/s, based on 150mm dia, assumed 0.55% grade, $k=1.5\text{mm}$.
- existing PWWF = 0.94 l/s, based on 18 dwellings.

Line E

- calculated capacity = 11.54 l/s, based on 150mm dia, assumed 0.55% grade, $k=1.5\text{mm}$.
- existing cum. PWWF= 6.60 l/s, based on 92 existing dwellings and hospital.

According to Watercare Services Ltd the site is not located within a Wastewater Restricted Serviceability Zone.

The neighbouring property to the north has had its wastewater line from manhole GIS ID 472499 redirected into the existing manhole GIS ID 544628. This allows for the northern WW pipe abandonment as shown in the Civil Engineering drawings. Note this has yet to be updated on the Auckland Council's GIS.

7.2 Proposed Wastewater

The proposal is to divert the existing wastewater line around the proposed Building A and to provide a new 150mm diameter wastewater connection for the proposed Building A and Building B. This will involve installing a new public manhole over the existing line between Building A and B, constructing the new wastewater main around Building A and connecting it into the existing public pipeline (via a manhole) in Lot 139. The pipes and manhole no longer in use under Building A will be removed. The existing line that enters the site from the northern neighbouring property will be blank capped and sealed at the boundary. Final detailed design will be subject to approval from Watercare Services Ltd.

The new connection will not be deep enough to service the lower portions of the basement therefore pumping will be required for any sanitary fixtures on these levels.

The calculated wastewater discharges for the proposed buildings are as follows:

- ADWF = 0.35 l/s
- ADWF = 30.24 m³/day
- PWWF = 2.36 l/s

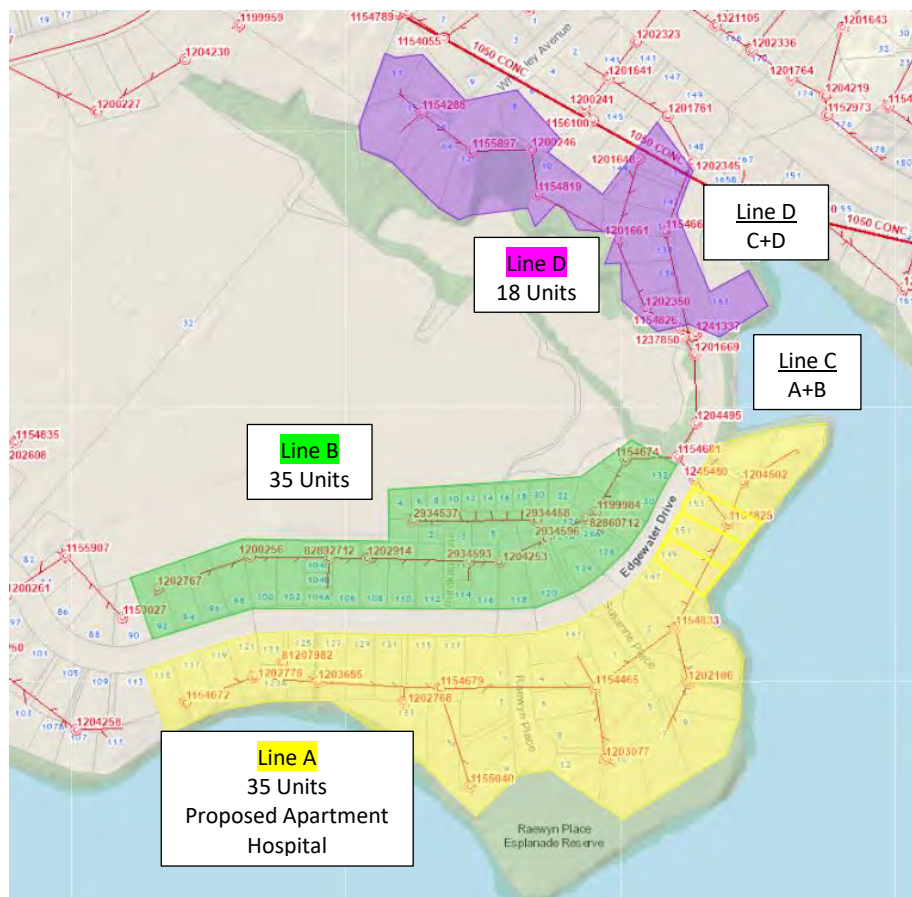


Figure 7: Wastewater Catchment Area

Capacity Check

Line A

- calculated capacity = 11.54 l/s, based on 150 dia, assumed 0.55% grade, $k=1.5\text{mm}$.
- proposed PWWF = 5.99 l/s, based on 35 dwellings, proposed buildings, and existing hospital.

Line B

- calculated capacity = 11.54 l/s, based on 150mm dia, assumed 0.55% grade, $k=1.5\text{mm}$.
- existing PWWF = 1.82 l/s, based on 35 existing dwellings.

Line C

- calculated capacity = 22.55 l/s, based on 150mm dia, 2.1% grade, $k = 1.5\text{mm}$.
- proposed cum. PWWF = 7.81 l/s, based on 74 existing dwellings, proposed buildings, and the existing hospital.

Line D

- calculated capacity = 11.54 l/s, based on 150mm dia, assumed 0.55% grade, $k=1.5\text{mm}$.
- existing PWWF = 0.94 l/s, based on 18 dwellings.

Line E

- calculated capacity = 11.54 l/s, based on 150mm dia, assumed 0.55% grade, $k=1.5\text{mm}$.
- proposed cum. PWWF= 8.75 l/s, based on 88 existing dwellings, proposed buildings and existing hospital.

The existing public wastewater reticulation therefore has sufficient capacity.

8.0 WATER SUPPLY

Council's GIS indicates that there is a 100mm diameter watermain in the berm on the opposite side of Edgewater Drive as well as a 50mm diameter watermain in the berm closest to the site.

The appended watermain pressure and flow test results confirm that adequate firefighting water supply is available in accordance with SNZ PAS 4509:2008 - New Zealand Firefighting Water Supplies Code of Practice, Classification FW2.

The proposal is to service the proposed buildings from the existing water supply lines within the neighbouring property at 155-157 Edgewater Drive. Two separate connections will be made to provide potable water and firefighting flows independently. No upgrade to the watermain is required.

9.0 SAFETY IN DESIGN

Health and Safety issues pertaining to the construction activities required for this development have been considered by the designer. Health and safety are the collective responsibility of the designer, contractor and ultimately the owner.

Refer to Appendix E for the Safety in Design Risk Register.

10.0 CONCLUSION

This report demonstrates that:

- The proposed earthworks can be undertaken in a manner that will not unduly affect the surrounding environment.
- The site or the proposed building will not be unduly affected by flooding.
- Stormwater disposal can be provided and that the proposed stormwater management practices will adequately mitigate potential impacts on the downstream reticulation and receiving environment.
- Wastewater disposal can be provided without unduly affecting the downstream reticulation.
- Potable water supply is adequately available.

It is concluded that the proposed retirement apartment complex can be adequately serviced with utility network infrastructure in accordance with the relevant standards and that there are no civil engineering related issues that will unduly affect the surrounding environment.

This includes compliance with the relevant Auckland Unitary Plan standards in Sections E8, for stormwater discharge, and E12 for earthworks.

APPENDIX A
WASTEWATER CALCULATIONS

Wastewater Calculations

Site



Job Name:	147-153 Edgewater Drive Pakuranga	Job No.:	496/03
Calculations By:	JF	Date:	2/05/2025
Checked By:	NP	Page No.:	1

Discharge Parameters

Per Watercare Services' standards

Average Dry Weather Flow

Residential = 225 litres/person/day

Peak Dry Weather Diurnal Flow

Residential = 675 litres/person/day PF = 3

Peak Wet Weather Flow

Residential = 1500 litres/person/day PF = 6.7

Occupancy Rates

Typical Residential Dwelling =	3 persons
Studio =	1 persons
1 Bedroom Apartment =	2 persons
2 Bedroom Apartment =	2 persons
2+ Bedroom Apartment =	3 persons
3 Bedroom Apartment =	4 persons

Existing Site

Type	No Units	No Persons	ADWF (l/s)	PDWDF (l/s)	PWWF (l/s)
Res Dwelling	4	12	0.03	0.09	0.21
Existing Totals	4	12	0.03	0.09	0.21

Proposed Site

Apartments	No Units	No Persons	ADWF (l/s)	PDWDF (l/s)	PWWF (l/s)
1 bedroom	10	20	0.05	0.16	0.35
2 bedroom	12	24	0.06	0.19	0.42
2+ bedroom	23	69	0.18	0.54	1.20
3 bedroom	6	24	0.06	0.19	0.42
Employees	10	10	0.03	0.08	0.17
Proposed Total	61	137	0.38	1.15	2.56

Discharge Increase

	No Units	No Persons	ADWF (l/s)	PDWDF (l/s)	PWWF (l/s)
Increase	57	125	0.35	1.05	2.36

Wastewater Calculations

Network Capacity Check Existing



Job Name:	147-153 Edgewater Drive Pakuranga	Job No.:	496/03
Calculations By:	JF	Date:	2/05/2025
Checked By:		Page No.:	1

Discharge Parameters

Per Watercare Services' standards
(refer also to the attached catchment plan)

Peak Wet Weather Flows

Residential =	1500 litres/person/day PWWF	
=	0.017 litres/person/second PWWF	
Hospital =	0.270 litres/second ADWF	PF = 6.7
=	1.809 litres/second PWWF	
Proposed development =	2.360 litres/second PWWF	

Occupancy Rates

Average residential unit = 3 persons

Downstream Wastewater Capacity Check

Refer to attached Wastewater Catchment Plan, Rev 1
Min gradient = 0.55 % assumed for all pipes
Pipe ks factor = 1.5 mm (Coleboooke- White)

Line	Ctmnt	Units	PWWF l/s	Cum. PWWF l/s	Pipe dia m	Gradient %	Capacity l/s	Velocity m/s
A	A	39	2.03					
	Hospital		1.81	3.84	0.150	0.55	11.54	0.65
B	B	35	1.82	1.82	0.150	0.55	11.54	0.65
C	A+B			5.66	0.150	0.55	11.54	0.65
D	D	18	0.94	0.94	0.150	0.55	11.54	0.65
E	C+D			6.60	0.150	0.55	11.54	0.65

Adequate Capacity Confirmed

Wastewater Calculations

Network Capacity Check Proposed



Job Name:	147-153 Edgewater Drive Pakuranga	Job No.:	496/03
Calculations By:	JF	Date:	2/05/2025
Checked By:	NP	Page No.:	2

Discharge Parameters

Per Watercare Services' standards
(refer also to the attached catchment plan)

Peak Wet Weather Flows

Residential =	1500 litres/person/day PWWF	
=	0.017 litres/person/second PWWF	
Hospital =	0.270 litres/second ADWF	PF = 6.7
=	1.809 litres/second PWWF	
Proposed development =	2.360 litres/second PWWF	

Occupancy Rates

Average residential unit = 3 persons

Downstream Wastewater Capacity Check

Refer to attached Wastewater Catchment Plan, Rev 1

Min gradient = 0.55 % assumed

Pipe ks factor = 1.5 mm (Coleboooke- White)

Line	Ctmnt	Units	PWWF l/s	Cum. PWWF l/s	Pipe dia m	Gradient %	Capacity l/s	Velocity m/s
A	A Prop site Hospital	35	1.82 2.36 1.81	5.99	0.150	0.55	11.54	0.65
B	B	35	1.82	1.82	0.150	0.55	11.54	0.65
C	A+B			7.81	0.150	2.10	22.55	1.28
D	D	18	0.94	0.94	0.150	0.55	11.54	0.65
E	C+D			8.75	0.150	0.55	11.54	0.65

Adequate Capacity Confirmed

APPENDIX B

STORMWATER CALCULATIONS

DEPTH-DURATION-FREQUENCY Climate Change - Rainfall Depth (mm) & Intensity (mm/h)

(using Daily Rainfall Depth maps TP108 with climate change adjustments)



Job Name:	Ambridge Rose Retirement Village	Job No.:	496/03
Calculations By:	JF	Date:	29/04/2025
Checked By:	N ^o	Page No.:	1 of 1
File:	4-25 TP108 Rainfall Depth ARC ARI maps11.xlsx	Rev.:	A

ARI	AEP - Design Catchment Maps: Appendix A of TP108	24hr
2	0.5	77
5	0.2	116
10	0.1	139
20	0.05	162
50	0.02	194
100	0.01	215

Table 4.1: Percentage Increase in 24-hour Design Rainfall Depth
(inclusive of climate change as per Auckland Council SW CoP Version 4 dated March 2024)

API	AEP	Percentage increase in 24hr design rainfall depth due to future climate change - 2.1°	Percentage increase in 24hr design rainfall depth due to future climate change - 3.8°
2	50%	15.1	27.4
5	20%	16.4	29.6
10	10%	17	30.8
20	5%	17.2	31.2
50	2%	17.6	31.9
100	1%	18.1	32.7



Rainfall Depth (mm)

Duration/ARI	24hr (2.1°)	24hr (3.8°)
2 yr (50%)	88.63	98.10
5 yr (20%)	135.02	150.34
10 yr (10%)	162.63	181.81
20 yr (5%)	189.86	212.54
50 yr (2%)	228.14	255.89
100 yr (1%)	253.92	285.31

Table 2: Ratio to convert 24-hour Rainfall Depth to Intensities

Duration	24hr without climate change	24hr with climate change allowances
10min	67.5	69.4
20min	51.9	53.2
30min	42.8	43.7
1hr	30.3	30.8
2hr	20.5	20.8
6hr	10.5	10.6
12hr	6.8	6.8
20hr	4.2	4.2

Rainfall Intensity (mm/h)

	10min	20min	30min	1hr	2hr	6hr	12hr	24hr
2 yr (50%)	61.5	47.1	38.7	27.3	18.4	9.4	6.0	3.7
5 yr (20%)	93.7	71.8	59.0	41.6	28.1	14.3	9.2	5.7
10 yr (10%)	112.9	86.5	71.1	50.1	33.8	17.2	11.1	6.8
20 yr (5%)	131.8	101.0	83.0	58.5	39.5	20.1	12.9	8.0
50 yr (2%)	158.3	121.4	99.7	70.3	47.5	24.2	15.5	9.6
100 yr (1%)	176.2	135.1	111.0	78.2	52.8	26.9	17.3	10.7

STORMWATER PIPE CAPACITY DESIGN

10 Year 10 Minute Storm Event - PROJECT AREA with 2.1 deg climate adjustment



Job Name:	Ambridge Rose Retirement Village - Pakuranga					Job No.:	496/03		
Calculations By:	MS					Date:	17/04/2025		
Checked By:	NP					Page No.:	1		
File:	4-15 SW Pipe Capacity - MS.xlsx					Rev.:	C		
Q=CIA		C=varies		i = 109.20 mm/hr		3.0333E-05		(m/sec)	
Pipe ks factor =		1.5 mm		From ARI maps - with climate adjustment (DCC 4-25)					
Pipe ID From/ To	Ctmnt no	C	Area m ²	Flow l/s	Cum. Flow l/s	Pipe dia m	Gradient %	Capacity l/s	Velocity m/s
Collector pipes to outfall									

NEW SWMH 1-1-2 to SWMH 1-1-1	Building B (4 Downpipes)	0.9	450	12.29	12.29	0.150	1.00	15.56	0.88
NEW SWCP 1-1-4 to SWMH 1-1-1	Exit way Rooding	0.85	500	12.89	12.89	0.150	1.00	15.56	0.88
NEW SWMH 1-1-1 to SWMH 1-1	Building B Roof + Driveway				25.18	0.225	1.00	45.82	1.15
NEW SWMH 1-2 to SWMH 1-1	Upstream West			483.10	241.55	0.450	1.00	287.69	1.81
NEW SWMH1-1 to outfall 1	Upstream Catchment				254.14	0.450	1.00	287.69	1.81

NEW SWCP 2-2-2 TO NEW SWMH 2-2	Entry way Driveway	0.85	500	12.89	12.89	0.150	1.00	15.56	0.88
NEW SWMH 2-3 TO NEW SWMH 2-2	Building A & B (2 Downpipes each)	0.9	450	12.29	12.29	0.150	1.00	15.56	0.88
NEW SWMH 2-2 TO NEW SWMH 2-1	Building A & B Roofs + Entry Way Driveway	0.9	150	4.10	29.27	0.225	1.00	45.82	1.15
NEW SWMH 2-1-1 TO NEW SWMH 2-1	Half of Building A	0.9	330	9.01	9.01	0.150	1.00	15.56	0.88
NEW SWMH 2-1 TO NEW Outfall 2	Upstream Catchment				38.28	0.225	1.00	45.82	1.15

OUTFALL CALCULATION - AUCKLAND COUNCIL Calculation Sheet



Job Name:	Ambridge Rose Retirement Village	Job No.:	496/03
Calculations By:	MS	Date:	24/08/2022
Checked By:	Nf	Page No.:	1 of 1
File:	4-04 ARC Outfall Calc1 49603.xlsx	Rev.:	0

Outfall Calculation

Pipe Depth m

Froude number

$$F_o = \frac{v}{(g \times d_p)^{0.5}}$$

Equation 20

Gradient (as %)

Where;

v = velocity of flow in pipe, m s⁻¹
g = gravitational acceleration, 9.81 m s⁻²
d_p = depth of flow in pipe, m

V = m/s

Fo =

Froude Number

ds m

Use 140mm dia rock

Width m

Use 2mm wide

La m

Use 4300mm apron length

Da m

Use 280mm bed depth

For Outlet 1 with Twin 450mm dia pipes

OUTFALL CALCULATION - AUCKLAND COUNCIL Calculation Sheet



Job Name:	Ambridge Rose Retirement Village	Job No.:	496/03
Calculations By:	MS	Date:	25/09/2023
Checked By:	NP	Page No.:	1 of 1
File:	4-04 ARC Outfall Calc1 49603.xlsx	Rev.:	1

Outfall Calculation

Pipe Depth m

Froude number

$$F_v = \frac{v}{(g \times d_p)^{0.5}}$$

Equation 20

Gradient (as %)

Where;

v = velocity of flow in pipe, m s⁻¹
g = gravitational acceleration, 9.81 m s⁻²
d_p = depth of flow in pipe, m

V= m/s

Fo =

Froude Number

ds m

Use 60mm dia rock

Width m

Use 700mm wide

La m

Use 1860mm apron length

Da m

Use 120mm bed depth

For Outlet 2 with 225mm dia pipe

APPENDIX C

WATERMAIN TEST RESULTS



NOVA FLOWTEC SERVICES LTD
HYDRANT TESTING SPECIALISTS

E: info@novaflowtec.co.nz
T: 09 444 8375 F: 09 444 8458
PO Box 241, Albany Village, Auckland 0755
www.novaflowtec.co.nz

31st January 2018

A & L Sargeant Ltd
PO Box 58247
Botany
Auckland

RE: Firefighting Water Supply at 149-153 Edgewater Drive

Attention: Allan Sargeant

Dear Allan,

Nova Flowtec Services were engaged to conduct a FW3 hydrant flow test for the proposed development at the above address.

The testing was conducted on Friday 26th January at 1.05pm.

The object of the testing was to prove that there is sufficient water for firefighting purposes.

Requirements:

In order to meet the FW3 minimum requirements of PAS 4509: 2008, 25Lps is required within 135m and an additional 25Lps is required within 270m of the development.

This being a total of 50Lps at a minimum residual pressure of 100kPa.

Results:

During testing the minimum requirement was exceeded with 71.7Lps at 220kPa being recorded.

Please find the results table and the hydrant map on the following page.

Should you have any questions please do not hesitate to contact me.

Kind Regards

Jason Goodwin
Technical Manager

FW3 Water Classification Test

	Hydrant One	Hydrant Two	Hydrant Three	Total Flow (Lps)	Pressure (kPa)
Flow (Lps)				0	980
Flow (Lps)	26.6			26.6	780
Flow (Lps)	27.2	26.0		53.2	340
Flow (Lps)	21.0	20.8	29.8	71.7	220
Date & Time:	Friday 26 th January 2018 at 1.05pm				
Site Address:	149-153 Edgewater Drive				
Full Flow Result:	71.7Lps at 220kPa				

Hydrant Map



Mains Flow and Pressure Curve

Hydrant locations: [Edgewater Drive](#)

Date: [26th January 2018](#)

Time: [1.05pm](#)

Flow: [Hydrants 1, 2 & 3](#)

Residual pressure: [Residual kPa](#)

Maximum flow result: [4300Lpm at 220kPa](#)

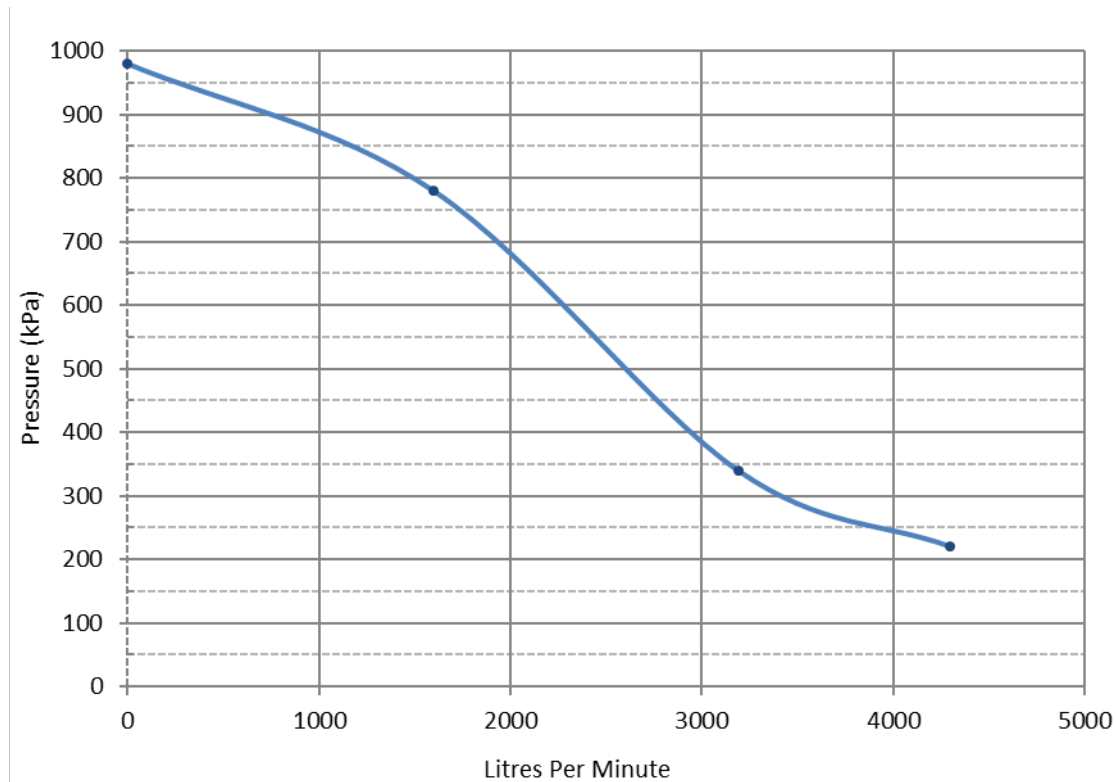
Gauge Calibration Cert(s): [GCN8200, GCN7198, GCN4667 & GCN3776](#)

Test Supervisor: [Edward Middleton](#)

Data:

Flow (Lpm)	Pressure (kPa)
0	980
1600	780
3190	340
4300	220

Graph:



Notes: [Nil.](#)

Hydrant Map: [See page 2](#)

Report end



NOVA FLOWTEC SERVICES LTD
HYDRANT TESTING SPECIALISTS

E: info@novaflowtec.co.nz
T: 09 444 8375
PO Box 241, Albany, Auckland 0752
www.novaflowtec.co.nz

2nd September 2022

A&L Sargeant Ltd.
PO Box 58247, Botany
Auckland 2163

RE: Firefighting Water Supply at 147-153 Edgewater Drive, Pakuranga

Attention: Allan Sargeant

Dear Allan

Nova Flowtec Services were engaged to conduct a FW2 hydrant flow test for the proposed development at the above address.

The testing was conducted on Thursday 1st September 2022 at 10:30am.

The object of the testing was to prove that there is sufficient water for firefighting purposes.

Requirements:

In order to meet the FW2 minimum requirements of PAS 4509: 2008, 12.5Lps is required within 135m and an additional 12.5Lps is required within 270m of the development.

This being a total of 25Lps at a minimum residual pressure of 100kPa.

Results:

During testing the minimum requirement was exceeded with 56.6Lps at 280kPa being recorded.

Please find the results table and the hydrant map on the following page.

Testing was also carried out to assist with the sprinkler system design. You can find this on Page 3.

Should you have any questions please do not hesitate to contact me.

Kind Regards

Melanie Keane
Testing Manager

FW2 Water Classification Test

	Hydrant One	Hydrant Two	Total Flow (Lps)	Hydrant Three Pressure (kPa)
			0	980
Flow (Lps)	37.7		37.7	610
Flow (Lps)	27.5	29.1	56.6	280
Date & Time:	Thursday 1 st September 2022 at 10:30am			
Site Address:	147-153 Edgewater Drive, Pakuranga			
Full Flow Result:	56.6Lps at 280kPa			

Hydrant Map



Mains Flow and Pressure Report

Hydrant locations: Edgewater Drive, Pakuranga

Date: 1st September 2022

Time: 10.40am

Flow: Hydrants 3 and 2

Residual pressure: Hydrant 1

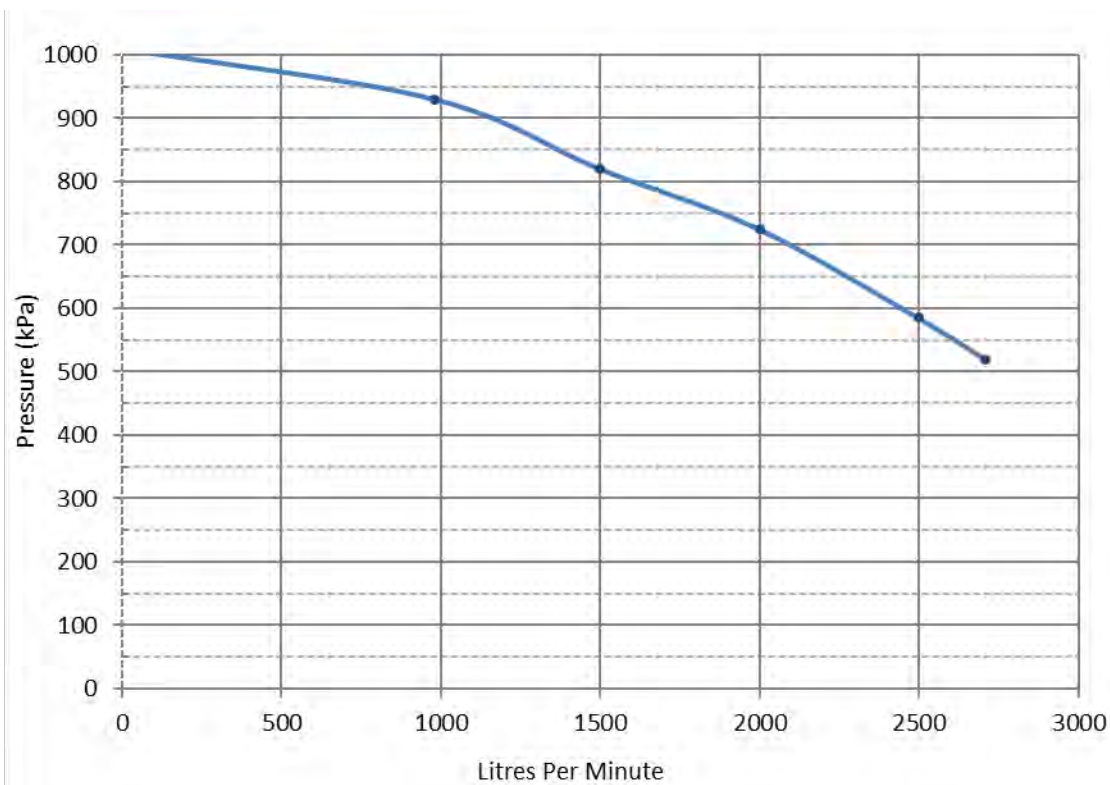
Maximum flow result: 2710Lpm at 520kPa

Test Supervisor: Jason Goodwin

Data:

Flow (Lpm)	Pressure (kPa)
0	1010
980	930
1500	820
2000	725
2500	585
2710	520

Graph:



Notes: The hydrants were flowed to full capacity during testing.

At full flow H3 was 1260Lpm and H2 was 1450Lpm.

Disclaimer: These results indicate the water networks performance on this given date and time.

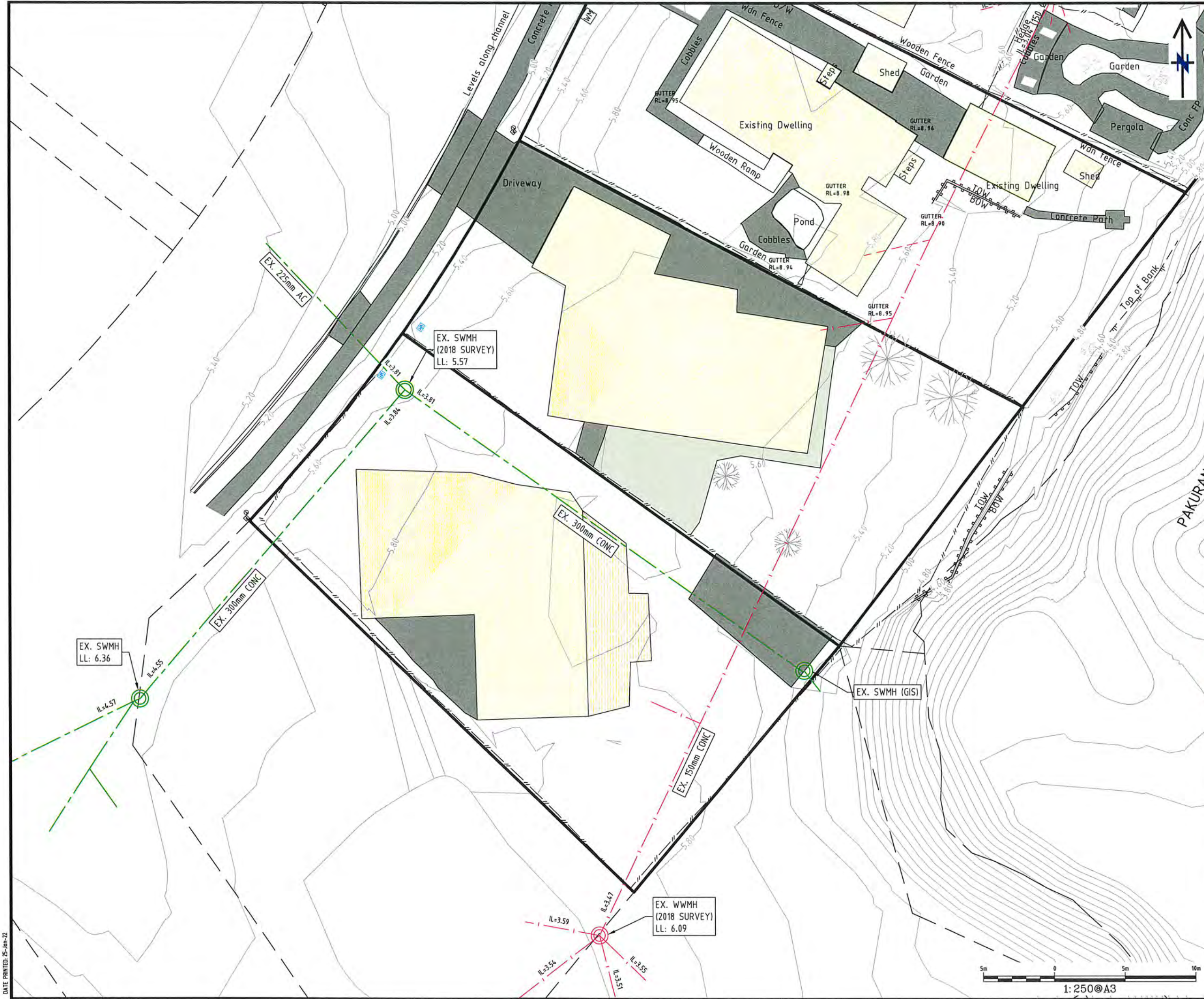
The networks performance is subject to fluctuations.

Hydrant Map: See page 2

Report End.

APPENDIX D

TOPOGRAPHICAL SURVEY PLANS



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Notes:

- Coordinates are in terms of Mount Eden Circuit, Geodetic 2000.
- Levels are in terms of Auckland Vertical Datum 1946
- Contours are at 0.2m intervals.
- Surveyed on January 2018 and January 2022. Both surveys combined together.

LEGEND

- Ex Lot Bdy
- Ex Abutting Bdy
- Ex Fence
- Ex Stormwater
- Ex Wastewater
- Ex Cont
- Ex WW Manhole
- Ex SW Manhole
- Ex Water Meter
- Ex Power
- Ex Telecom
- Ex Building
- Concrete/Cobble
- Paving
- Stone Driveway
- Deck

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Rev	Description	By	Date
A	Topo Survey	MD	21/01/22

	SIGNED	DATE
Surveyed	DCC	01/22
Designed		
Drawn	MD	01/22
Checked		
Approved		1/22

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Subdivisions Land Survey Land Development
Resource Consents Project Management
Planning Structural Engineering
Environmental Engineering

P.O. Box 72-543, 58 Broadway, Papakura, Auckland, Ph: 64-9-2965543
www.doddcivil.co.nz admin@doddcivil.co.nz

PROJECT NAME:
AMBRIDGE ROSE RETIREMENT VILLAGE PAKURANGA
FOR
A&L SARGEANT LTD

SHEET TITLE:
TOPOGRAPHICAL PLAN

Project Number: **49603**

Plan No: **102** Rev: **A**

APPENDIX E

SAFETY IN DESIGN RISK REGISTER

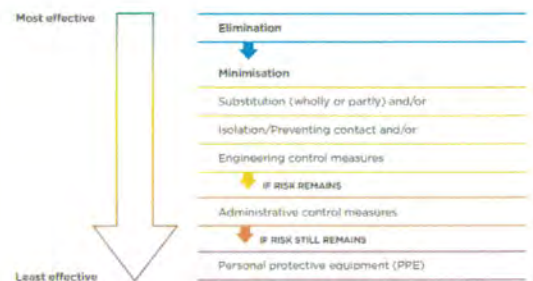
Safety in Design Register

Project:	Ambridge Rose Retirement Village
Project Number:	49603
Author:	Janith Fernando
Reviewer:	Nikhil Prakash
Approved by:	NP
Date:	Apr-25

IDENTIFIED SAFETY RISK						PROPOSED DESIGN TREATMENT				RESIDUAL RISK MANAGEMENT							
Ref.	Risk Area	Risk	Likelihood	Consequence	Risk Score	Design mitigation measures			Control	Likelihood	Consequence	Residual management measures			Likelihood	Consequence	Risk Score
1.0 Construction Risks																	
1.1	Trench collapse	Open trench collapses during construction/installing service (stormwater, wastewater, water supply, etc) and basement	POS	CAT	High	Design stormwater and wastewater drains as shallow as possible.			POS	MAJ	Mod	1. Shore, batter and bench trenches deeper than 1.5m 2. Monitor excavation material and water level 3. Avoid heavy loads within zone of influence 4. Dewater excavation as required			UNL	MIN	Low
1.2	Natural hazards	Wind, rain, flooding, fire and firefighting, emergency routes and exits, access for emergency vehicles	POS	MOD	Mod	Watch weather forecasts			POS	MOD	Mod	Stop work with onset of bad weather			POS	SPU	Low
1.3	Movement of materials	Safe access and egress, traffic management, site security, working under or near suspended materials	LIK	MOD	Mod	Contractor's site management plan			POS	MOD	Mod	Audit contractor's site management plan and make changes where required			UNL	MIN	Low
1.4	Working environment	Confined spaces, heavy lifting, noise and dust, trip hazards, working at height, hazardous materials (cement, road lime, hydrocarbons), working near water, working in and around plant	LIK	MOD	Mod	Contractor's site management plan			LIK	MOD	Mod	Audit contractor's site management plan and make changes where required			UNL	MIN	Low
1.4	Construction in and around water	Risk of drowning or being swept away during construction of outfall	POS	CAT	High	Contractor's site management plan, design outfall as close to the shore as permitted			UNL	CAT	Mod	Stop work with rising water levels, wear appropriate protective equipment			UNL	MIN	Low
2.0 Operational, use or repair risks																	
2.1	OLFP on the JOAL	Risk of slipping	POS	MOD	Mod	Provide catchpits at low points of the JOAL to relieve stormwater runoff			UNL	MOD	Mod	Maintain freeboard from OLFP on road to reduce volume on JOAL			UNL	MIN	Low
2.1	450mm pipe outfall	Confined space and risk of drowning in event of flash flood	UNL	CAT	Mod	Design for barred outlet to prevent entry			UNL	MIN	Low						Low

Controls:

Risk assessment matrix		Likelihood of a hazardous event occurring				
		VUL: Very unlikely	UNL: Unlikely	POS: Possibly	LIK: Likely	VLK: Very likely
Severity of injury/illness	CAT: Catastrophic (eg fatal)	Moderate	Moderate	High	Critical	Critical
	MAJ: Major (eg permanent disability)	Low	Moderate	Moderate	High	Critical
	MOD: Moderate (eg hospitalisation/short or long term disability)	Low	Moderate	Moderate	Moderate	High
	MIN: Minor (eg Medical treatment)	Very low	Low	Moderate	Moderate	Moderate
	SUP: Superficial (eg no treatment required)	Very low	Very low	Low	Low	Moderate



Guidance note

Likelihood		Consequence	
VLK: Very likely	Over 75% expected to happen in most circumstances, possibly frequently, history of frequent occurrence	CAT: Catastrophic	Potential for fatality, permanent injury or effect on long-term health (non-recoverable)
LIK: Likely	50%-75% likely to happen or occur within a one year timeframe	MAJ: Major	Potential for recoverable injuries requiring hospitalisation or non-permanent negative impact on personal health
POS: Possibly	25%-50% likely to happen or occur, possibly occur at least once in a two year period	MOD: Moderate	Potential for recoverable injuries requiring professional medical treatment and resulting in employment absenteeism
UNL: Unlikely	5%-25% Not expect to occur or happen, although potential to do so, Frequency likely over a five to ten year period	MIN: Minor	Potential for recoverable injuries requiring professional medical treatment but with negligible lost time

APPENDIX F

CIVIL ENGINEERING DRAWINGS

AMBRIDGE ROSE RETIREMENT VILLAGE, PAKURANGA

FOR
A&L SARGEANT LTD

49603



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CONTENTS

Plan No.	Title
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200	EARTHWORKS PLAN
201	EROSION AND SEDIMENT CONTROL DETAILS
250	CUT/FILL PLAN
300	SITE PLAN
310	DRIVEWAY LONGSECTION
320	VEHICLE ENTRYWAYS LONGSECTION
400	DRAINAGE OVERVIEW
401-402	STORMWATER PLAN
410-411	STORMWATER LONGSECTION
420	STORMWATER OUTFALL DETAIL
480-481	STORMWATER STANDARD DETAILS
501-502	WASTEWATER PLAN
510	WASTEWATER LONGSECTION
580-581	WASTEWATER STANDARD DETAILS
600	WATERMAIN PLAN OVERVIEW
601-602	WATERMAIN PLAN
690	WATERMAIN STANDARD DETAILS



LOCALITY PLAN

GENERAL

1. Coordinates are in terms of Mount Eden Circuit, Geodetic 2000.
2. Levels are in terms of Auckland vertical datum 1946.
3. These drawings do not necessarily show all existing services. It is the responsibility of the contractor to locate and protect all existing services during the contract period.
4. The Contractor is to liaise with utility service providers regarding the location of existing utility services.
5. Before commencing construction, the contractor is to confirm levels and alignment of existing drains into which new drains will be connected. Any discrepancy with the drawings are to be reported to the Engineer.
6. All connections to existing drains are to be carried out by an Approved Contractor.
7. Contractor shall check any crossing lines for clearance before laying.
8. All lines to be abandoned shall be sealed at each end. Timing of all sealing to be coordinated with Auckland Council.
9. Backfill of drainage lines deeper than 3m is to be compacted and certified. Consent notice to be issued that backfill has been certified.
10. Before commencing construction, the contractor is to confirm levels and alignment of roads into which new roads will be merged. Any discrepancy with the drawings are to be reported to the Engineer.
11. All grassed surfaces and driveway/roadcrossings are to be reinstated to a standard at least equal to the standard that existed before works commenced.
12. Lid levels shown are subject to change.

WASTEWATER

1. All wastewater works are to be carried out in accordance with the latest Watercare Code of Practice for Land Development and Subdivision, including all relevant standard details.
2. All public mains are to be 150mm diameter PVC Class SN16, unless shown otherwise.
3. All wastewater pipelines, except property lateral connections that grade towards a connection point, shall have a minimum cover of 900mm. A graded connection in the public road reserve must have a minimum cover of 450mm at the highest point.
4. Where the minimum cover is not achieved, concrete protection of the pipe is to be provided. If this occurs at a point that has not been shown as such on the drawings, then the Engineer is to be notified.
5. All lines to be bedded with granular bedding (well graded scoria or similar approved), unless shown otherwise.
6. Approved hardfill is to be used in backfilling of all road crossings and vehicle crossings to Auckland Council standards.
7. For wastewater lines laid at grades steeper than 10% (including service connections) the bedding and surround material shall be low grade scoria concrete (7MPa).
8. For lines exceeding a grade of 20% anchor blocks shall be located at pipe joints, not exceeding 6m spacing.
9. All manholes up to 3m deep are to have a minimum internal diameter of 1050mm. The manhole diameter shall be increased to 1200mm for all manholes greater than 3m deep, unless shown otherwise. Refer to watercare standards for landing platforms for manholes over 6m deep.
10. Manhole covers shall comply with Watercare's material supply standards. All manhole lids shall be watertight HN-HO-72 (Heavy duty) with a minimum 600mm clear opening.
11. 150mm diameter pipes that do not terminate in a manhole must be terminated with a 100mm diameter on a 150mm diameter London Junction and blank cap.
12. Refer to all relevant longsections for details of London Junction lengths from manholes.
13. Stubs from manholes are to be min. of 2.0m long.
14. All lot connections and leads are to be 100mm diameter PVC Class SN16, unless shown otherwise.
15. All lot connections shall be constructed with a ramped riser to within 1.0m of ground level.
16. The position of all blank caps on lot connections are to be staked by the Contractor.
17. Easement required where private rising mains cross neighboring properties.
18. All Mh's and leads to be set out to the coordinates shown on the plans.
19. Contractor shall confirm connection point inverts match design any difference shall be relayed to the Engineer before work starts.

WATER

1. All watermain installations to be carried out in accordance with the latest Watercare Services Limited Code of Practice for Land Development and Subdivisions, including all relevant standard drawings.
2. Power and telecom services are to be piloted prior to directional drilling/thrusting.
3. All intersecting water, sewer and stormwater lines are to be piloted prior to directional drilling/thrusting of the new watermain.
4. Open cut trenching will be permitted with the Engineers approval where drilling/thrusting is not considered a practical option (refer standard details attached for trench specifications).

STORMWATER

1. All stormwater works are to be carried out in accordance with the latest Auckland Council Code of Practice for Land Development and Subdivision, including all relevant standard details.
2. All public mains are to be 225mm diameter pipes, unless shown otherwise.
3. All pipes with a diameter of 225mm and greater are to be RCRRJ Class 2, unless shown otherwise.
4. The minimum cover to the top of the pipe is to be 1000mm in the road reserve, and 600mm in all other areas.
5. Where the minimum cover is not achieved, concrete protection of the pipe is to be provided. If this occurs at a point that has not been shown as such on the drawings, then the Engineer is to be notified.
6. All lines to be bedded with granular bedding (well graded scoria or similar approved), unless shown otherwise.
7. Approved hardfill is to be used in backfilling of all road crossings and vehicle crossings to Auckland Council standards.
8. Where gradients of pipes are between 10% and 20%, pipelines are to be laid from downstream to upstream, with sockets facing upstream and shall be bedded in low strength concrete (7MPa).
9. Where gradients of pipes are in excess of 20%, pipelines are to be laid from downstream to upstream with sockets facing upstream and anchor blocks installed. A protective/compressible membrane is to be wrapped around the pipeline for the length of the anchor block at the concrete interface. Spacing between anchor blocks are not to exceed 6m, measured centre to centre.
10. All manholes are to have a minimum internal diameter of 1050mm, unless shown otherwise.
11. All manholes are to have a minimum fall through the base of the manhole of 50mm.
12. Where the outlet diameter at a manhole is greater than the inlet diameter, the minimum fall through the manhole is to be no less than the difference in diameter of the two pipes, in which case the pipes are to be aligned soffit to soffit.
13. Manhole covers are to be hinged with a clear opening of at least 600 mm diameter and are to be ductile iron. The class of manhole covers and frames are to be minimum AS 3996 Class D, or heavy-duty, in all areas.
14. All stormwater branch lines are to be 150mm PVC Class SN16, unless shown otherwise.
15. 150mm diameter pipes that do not terminate in a manhole must be terminated with a 100mm diameter on a 150mm diameter London Junction and blank cap.
16. Refer to all relevant longsections for details of London Junction lengths from manholes.
17. Stubs from manholes are to be min. of 2.0m long.
18. All lot connections and leads are to be 100mm diameter PVC Class SN16, unless shown otherwise.
19. All lot connections shall be constructed with a ramped riser to within 1.0m of ground level.
20. The position of all blank caps on lot connections are to be staked by the Contractor.
21. All catchpit leads are to be 225mm diameter, unless otherwise stated.
22. All catchpit leads are to have a minimum cover of 900mm to allow clearance for services installation.
23. All double catchpit leads are to have a minimum pipe diameter of 300mm, unless otherwise specified.
24. All catchpit leads are to be Class 4 pipes.
25. Pipes outside of the proposed road reserve have not been designed for construction traffic loadings. The Contractor is to notify the Engineer if different construction roads are to be used as the pipe class may need to be changed.
26. Contractor shall confirm connection point inverts match design. Any difference shall be relayed to the Engineer before work starts.

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Scale: NOT TO SCALE

Notes:

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A	FOR RC	MS	24/04/25
Rev	Description	By	Date
		SIGNED	DATE
Surveyed	EASDALE/DODD		01/18
Designed	MS		06/24
Drawn	MS		06/24
Checked			
Approved			



Subdivisions Land Survey Land Development
Resource Consents Project Management
Planning Structural Engineering
Environmental Engineering

P.O. Box 72-543, 58 Broadway, Papakura,
Auckland, Ph: 64-9-2965543
www.doddcivil.co.nz admin@doddcivil.co.nz

PROJECT NAME:

**AMBRIDGE ROSE
RETIREMENT VILLAGE
PAKURANGA**
FOR
A&L SARGEANT LTD

SHEET TITLE:

NOTES

Project Number: **49603**

Plan No: **100** Rev: **A**

NOTES:
EXCAVATION IS BELOW EXISTING GROUND LEVEL, IT IS THEREFORE ANTICIPATED POTENTIAL SEDIMENT RUNOFF IS MINIMAL. ENGINEER TO DIRECT SILT CONTROL MEASURES ONSITE AS REQUIRED.

SEDIMENT CONTROL DEVICES TO BE LOCATED ON SITE TO SUIT EXCAVATIONS.

GROUND WATER FLOWS ARE ANTICIPATED TO BE MINIMAL.

**FOR RESOURCE
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Notes:

1. Refer to DWG: 100 for general notes.
2. Contours are at 1m intervals.

LEGEND

	Ex Lot Bdy
	Prop Lot Bdy
	Ex Abutting Bdy
	Extent Of Works
	Ex Contour
	Prop Contour
	Prop Silt Fence

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C	LEVELS AMENDED	MS	24/04/25
B	SOUTH OUFALL	RW	09/02/24
A	-	RW	-
Rev	Description	By	Date

	SIGNED	DATE
Surveyed	EASDALE/DODD	-
Designed		
Drawn	RW	03/22
Checked		
Approved		4/25

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PROJECT NAME:

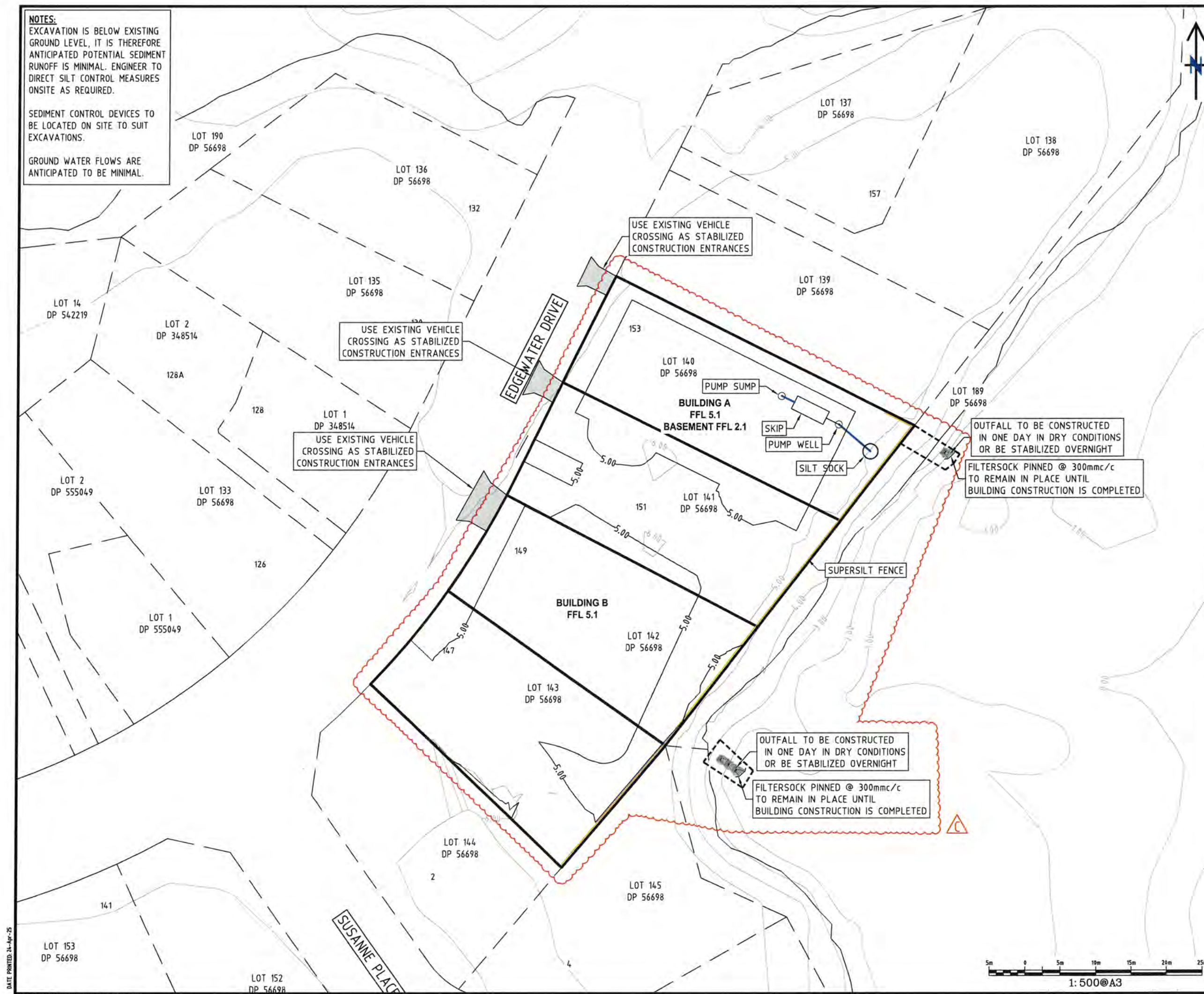
**AMBRIDGE ROSE
RETIREMENT VILLAGE
PAKURANGA**
FOR
A&L SARGEANT LTD

SHEET TITLE:

**EARTHWORKS
PLAN**

Project Number: **49603**

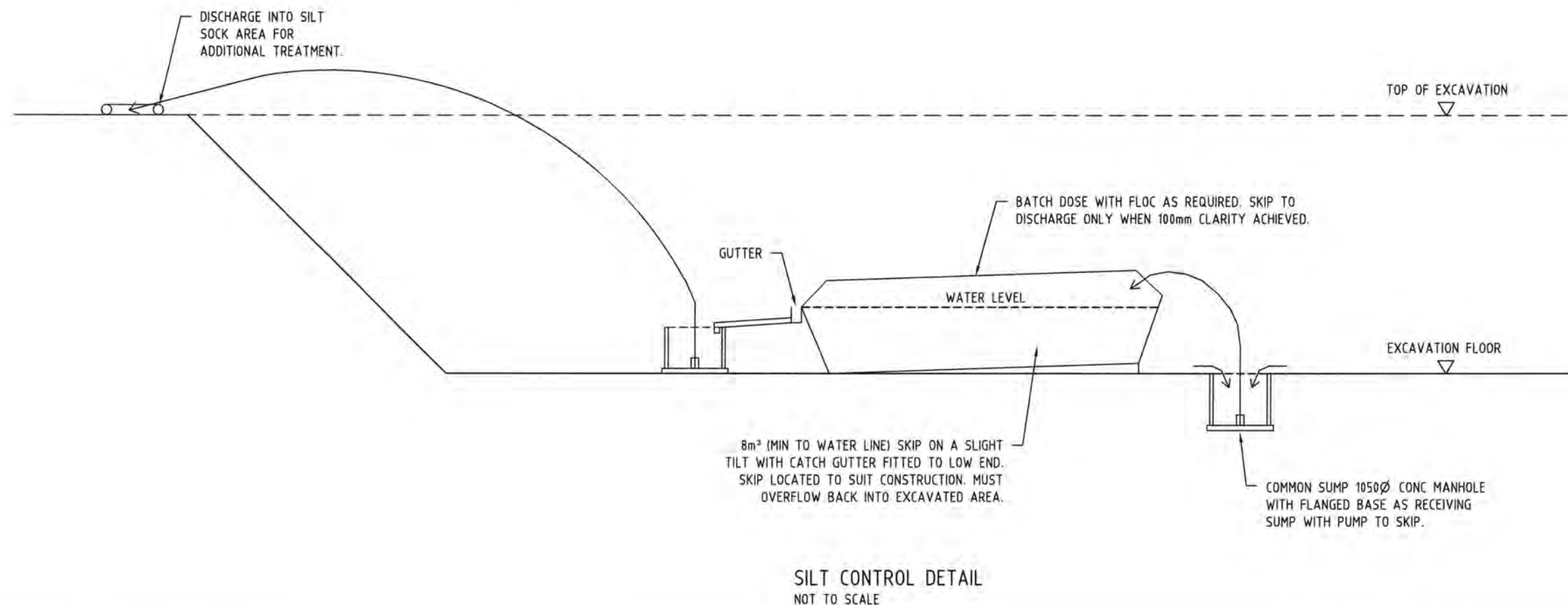
Plan No: **200** Rev: **C**



Notes:

1. Refer to DWG: 100 for general notes.

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Plan No: **201** Rev: **B**

**FOR RESOURCE
CONSENT APPROVAL
(NOT FOR CONSTRUCTION)**

Notes:

1. Refer to DWG: 100 for general notes.
2. Contours are at 0.1m intervals.
3. Volume surface compare stripped topsoil surface to proposed subgrade surface.
4. Driveway subgrade level 350mm below finished driveway level. Building subgrade level 300mm below finished floor level. Footpath subgrade level 250mm below finished Footpath level.
5. Volumes are for consenting purposes only as volumes may vary to what is shown.

EARTHWORKS VOLUMES

Cut Vol: 3791m³
Fill Vol: 36m³
Net Vol: 3754m³ (cUT)
Area: 3002m²

LEGEND

---	Ex Lot Bdy
---	Prop Lot Bdy
---	Ex Abutting Bdy

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C	LEVELS AMENDED	MS	23/04/25
B	OLFP C/F	RW	18/11/22
A	RC	RW	29/04/22
Rev	Description	By	Date
	SIGNED	DATE	
Surveyed	EASDALE/DODD	-	
Designed			
Drawn	MS	04/25	
Checked			
Approved		4/25	



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PROJECT NAME:

**AMBRIDGE ROSE
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SHEET TITLE:

**CUT/FILL
PLAN**

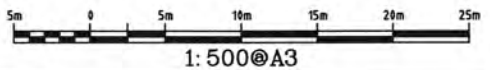
Project Number: **49603**

Plan No: **250** Rev: **C**



Cut/Fill Table

Number #	Minimum Elevation	Maximum Elevation	Color
1	-4.05	-3.50	Dark Blue
2	-3.50	-3.00	Light Blue
3	-3.00	-2.50	Black
4	-2.50	-2.00	Dark Red
5	-2.00	-1.50	Red
6	-1.50	-1.00	Light Red
7	-1.00	-0.50	Pink
8	-0.50	0.00	Orange
9	0.00	0.41	Green



**FOR RESOURCE
CONSENT APPROVAL
(NOT FOR CONSTRUCTION)**

Notes:

1. Refer to DWG: 100 for general notes.
2. Contours at 1m intervals.
3. FFL 150mm above ground level.

LEGEND

	Ex Lot Bdy
	Ex Abutting Bdy
	Ex Contour
	Prop Contour
	Prop Buildings
	Prop Pavement
	Permeable Pavers
	Prop Retaining Wall

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D	LEVELS AMENDED	MS	23/04/25
C	LEVELS ADDED	RW	18/11/22
B	EXIT 300mm FB	RW	16/05/22
A	RC	RW	12/05/22
Rev	Description	By	Date

	SIGNED	DATE
Surveyed	EASDALE/DODD	-
Designed		
Drawn	RW	04/22
Checked		
Approved		4/25

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PROJECT NAME:

**AMBRIDGE ROSE
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FOR
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SHEET TITLE:

SITE PLAN

Project Number: **49603**

Plan No: **300** Rev: **D**



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(NOT FOR CONSTRUCTION)

Notes:

1. Refer to DWG: 100 for general notes.
2. Contours at 1m intervals.
3. FFL 150mm above ground level.

LEGEND

	Ex Lot Bdy
	Ex Abutting Bdy
	Ex Contour
	Prop Buildings
	Prop Pavement

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C	LEVELS AMENDED	MS	24/04/25
B	EXIT 300mm FB	RW	16/05/22
A	RC	RW	12/05/22
Rev	Description	By	Date
		SIGNED	DATE
Surveyed	EASDALE/DODD		-
Designed			
Drawn	RW		04/22
Checked			
Approved			4/25



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PROJECT NAME:

**AMBRIDGE ROSE
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PAKURANGA**
FOR
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SHEET TITLE:

**DRIVEWAY
LONGSECTION**

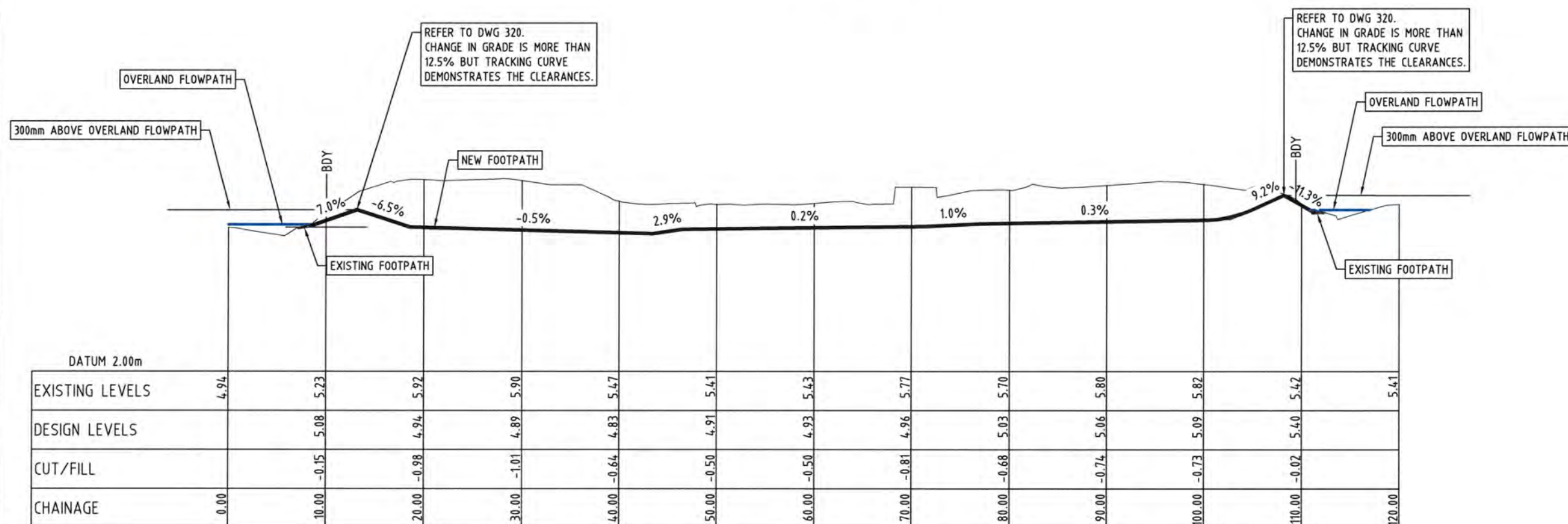
Project Number: **49603**

Plan No: **310**

Rev: **C**

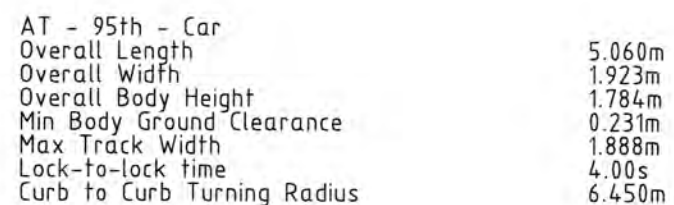


DRIVEWAY ALIGNMENT PLAN
SCALE 1:500 @ A3



DRIVEWAY LONGSECTION
SCALE 1:500 HORI 1:100 VERT @ A3

Notes:



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PROJECT NAME:
**AMBRIDGE ROSE
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FOR
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SHEET TITLE:
VEHICLE ENTRYWAYS
LONGSECTION

Project Number:	49603	
Plan No:	320	Rev: C



**FOR RESOURCE
CONSENT APPROVAL
(NOT FOR CONSTRUCTION)**

Notes:
1. Refer to DWG: 100 for general notes.
2. Contours at 1m intervals.
3. MH lid levels shown are approximate only.

LEGEND

	Ex Lot Bdy
	Ex Abutting Bdy
	Ex Contour
	Ex Stormwater
	Ex Wastewater
	Prop Stormwater
	Prop Wastewater
	Previously Abandoned Pipe
	Pipe to be Removed
	Ex/Pr SW Manhole
	Ex/Prop WW Manhole
	WW Connection
	Prop Buildings
	Prop Pavement
	Prop Landscape Areas
	Secondary Overland Flow Path

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G	SW UPDATES	RW	09/02/24
F	DRAINAGE UPDATES	RW	01/02/24
E	EPA	RW	28/03/23
D	DRAINAGE UPDATES	HS	04/10/22
Rev	Description	By	Date

	SIGNED	DATE
Surveyed	EASDALE/DODD	-
Designed		
Drawn	RW	04/22
Checked		
Approved		4/25

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PROJECT NAME:
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SHEET TITLE:
**DRAINAGE
OVERVIEW**

Project Number: **49603**

Plan No: **400** Rev: **H**



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(NOT FOR CONSTRUCTION)**

- Notes:
1. Refer to DWG: 100 for general notes.
 2. Contours at 1m intervals.
 3. MH lid levels shown are approximate only.

LEGEND

	Ex Lot Bdy
	Ex Abutting Bdy
	Ex Stormwater
	Ex Wastewater
	Prop Stormwater
	Prop Wastewater
	Previously Abandoned Pipe
	Pipe to be Removed
	Ex Manhole to Remove
	Ex/Pr SW Manhole
	Ex/Prop WW Manhole
	WW Connection
	SW Connection
	Prop Buildings
	Prop Pavement
	Secondary Overland Flow Path
	Permeable Pavers

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G	SW AMENDED	MS	23/04/25
F	SW AMENDED	MS	10/10/23
E	SEA LEVEL	RW	05/05/23
D	DRAINAGE UPDATES	HS	04/10/22
Rev	Description	By	Date
Surveyed	EASDALE/DODD	-	-
Designed	MS	09/23	
Drawn	RW	04/22	
Checked			
Approved			

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PROJECT NAME:
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SHEET TITLE:
**STORMWATER PLAN
SHEET 1**

Project Number: **49603**

Plan No: **401** Rev: **G**

Scale: 1:250@A3

FOR RESOURCE CONSENT APPROVAL (NOT FOR CONSTRUCTION)

Notes:

1. Refer to DWG: 100 for general notes.
2. Contours at 1m intervals.
3. MH lid levels shown are approximate only.

LEGEND

	Ex Lot Bdy
	Ex Abutting Bdy
	Ex Stormwater
	Ex Wastewater
	Prop Stormwater
	Prop Wastewater
	Previously Abandoned Pipe
	Pipe to be Removed
	Ex Manhole to Remove
	Ex/Pr SW Manhole
	Ex/Prop WW Manhole
	WW Connection
	SW Connection
	Prop Buildings
	Prop Pavement
	Secondary Overland Flow Path
	Permeable Pavers

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Rev	Description	By	Date
H	SW AMENDED	MS	23/04/25
G	SW UPDATES	RW	09/02/24
F	SW AMENDED	MS	10/10/23
E	SEA LEVEL	RW	05/05/23
Rev	Description	By	Date
Surveyed	EASDALE/DODD	-	-
Designed	MS	09/23	
Drawn	RW	04/22	
Checked			
Approved			4/25

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PROJECT NAME:

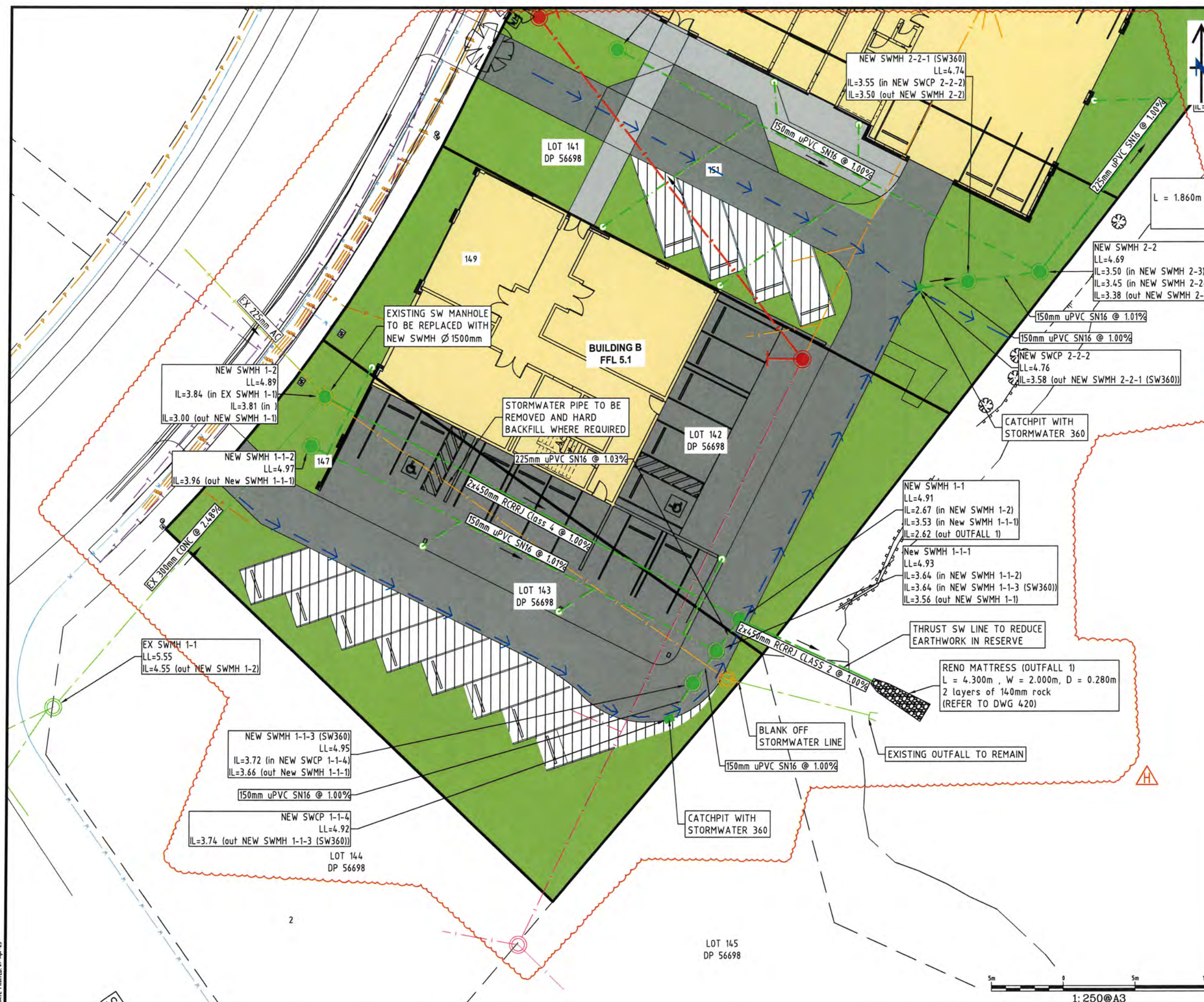
**AMBRIDGE ROSE
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FOR
A&L SARGEANT LTD

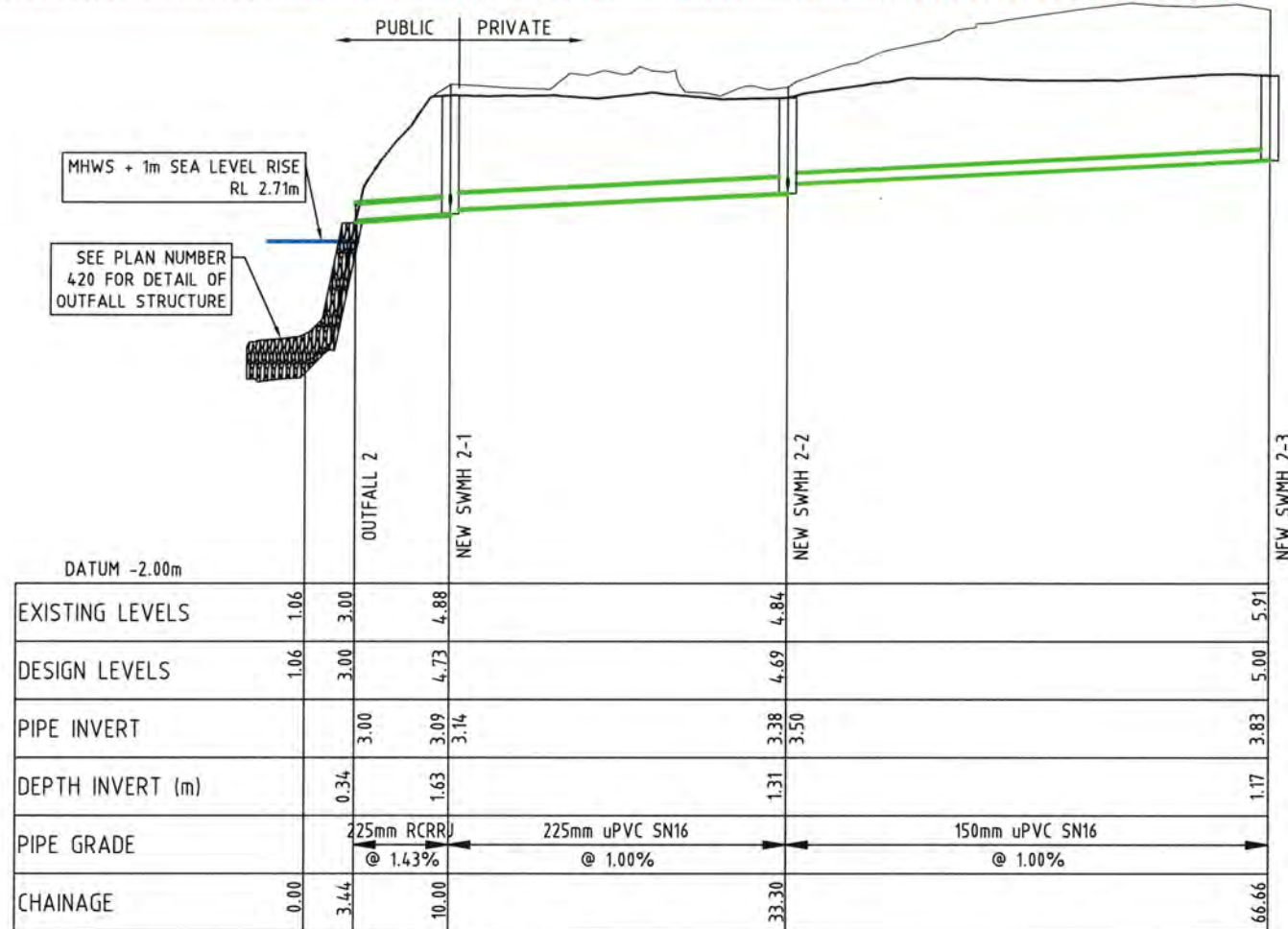
SHEET TITLE:

**STORMWATER PLAN
SHEET 2**

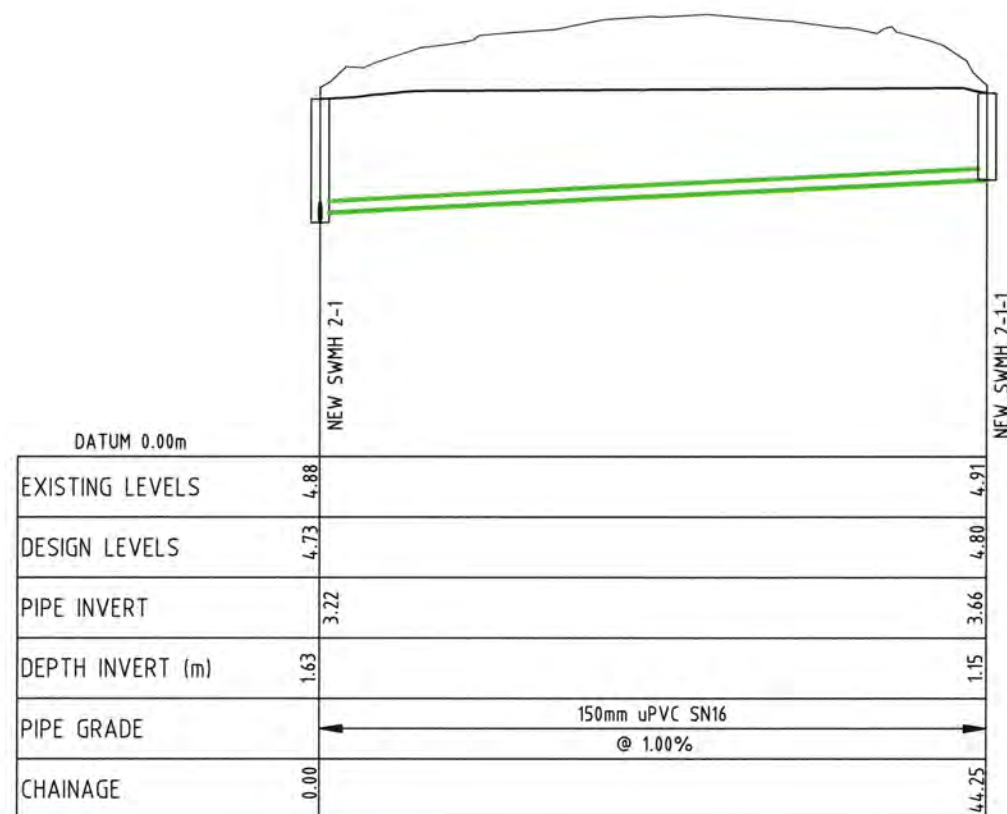
Project Number: **49603**

Plan No: **402** Rev: **H**





STORMWATER LONGSECTION 1
SCALE 1:500 HORI 1:100 VERT @ A3



PRIVATE STORMWATER LONGSECTION 2
SCALE 1:500 HORI 1:100 VERT @ A3

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(NOT FOR CONSTRUCTION)**

Notes:

1. Refer to DWG: 100 for general notes.
2. Contours at 1m intervals.
3. MH lid levels shown are approximate only.

LEGEND

	Ex Lot Bdy
	Prop Lot Bdy
	Ex Ground Profile
	Finished Ground Profile
	Ex Stormwater
	Prop Stormwater

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F	SW AMENDED	MS	23/04/25
E	SW AMENDED	MS	10/10/23
D	SEA LEVEL	RW	05/05/23
C	DRAINAGE UPDATES	HS	04/10/22
Rev	Description	By	Date

	SIGNED	DATE
Surveyed	EASDALE/DODD	-
Designed	MS	09/23
Drawn	RW	03/22
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PROJECT NAME:

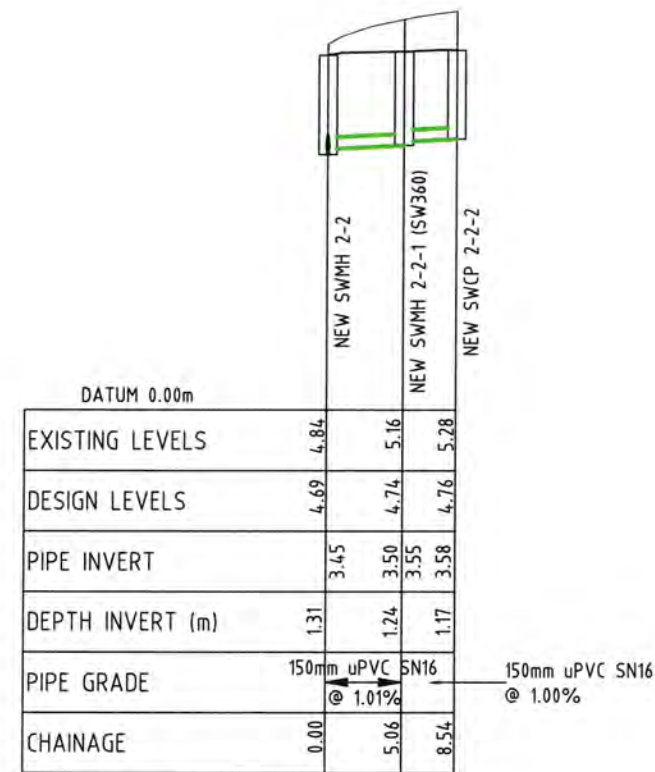
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SHEET TITLE:

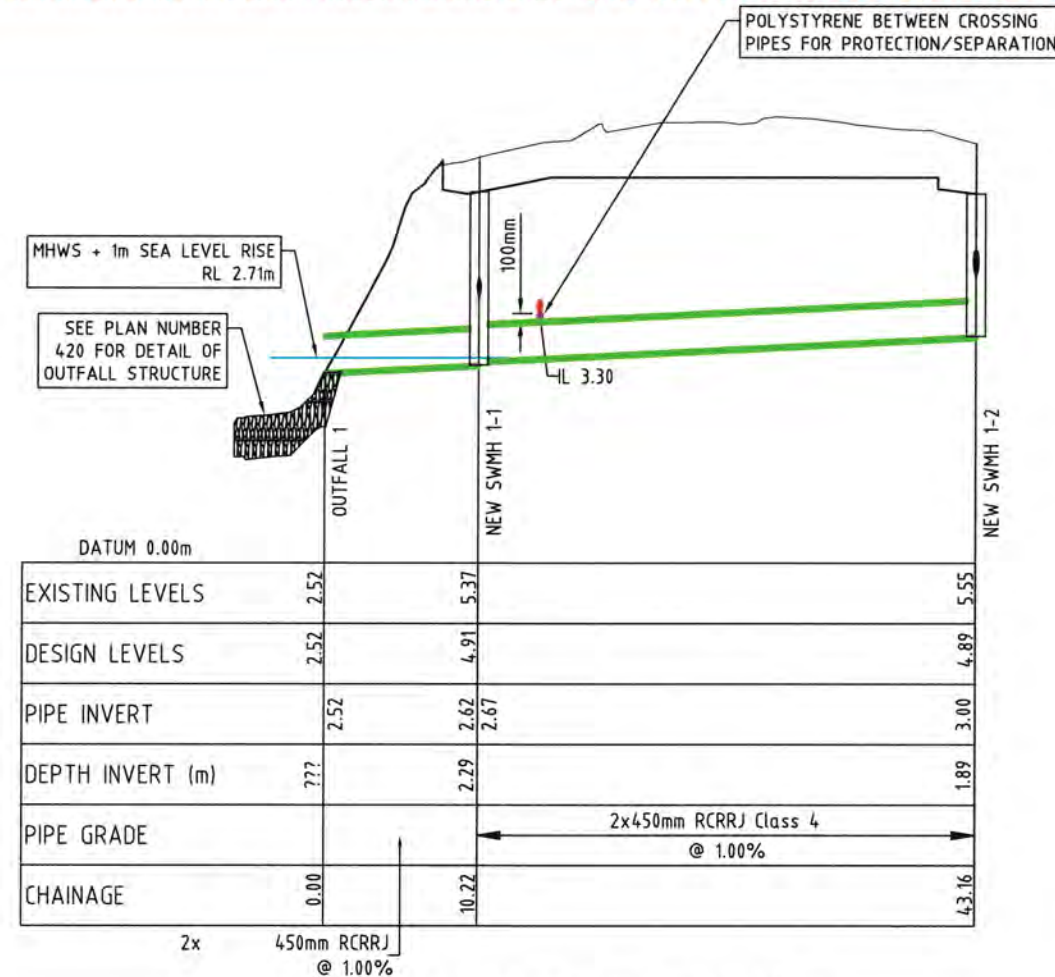
**STORMWATER
LONGSECTION 1**

Project Number: **49603**

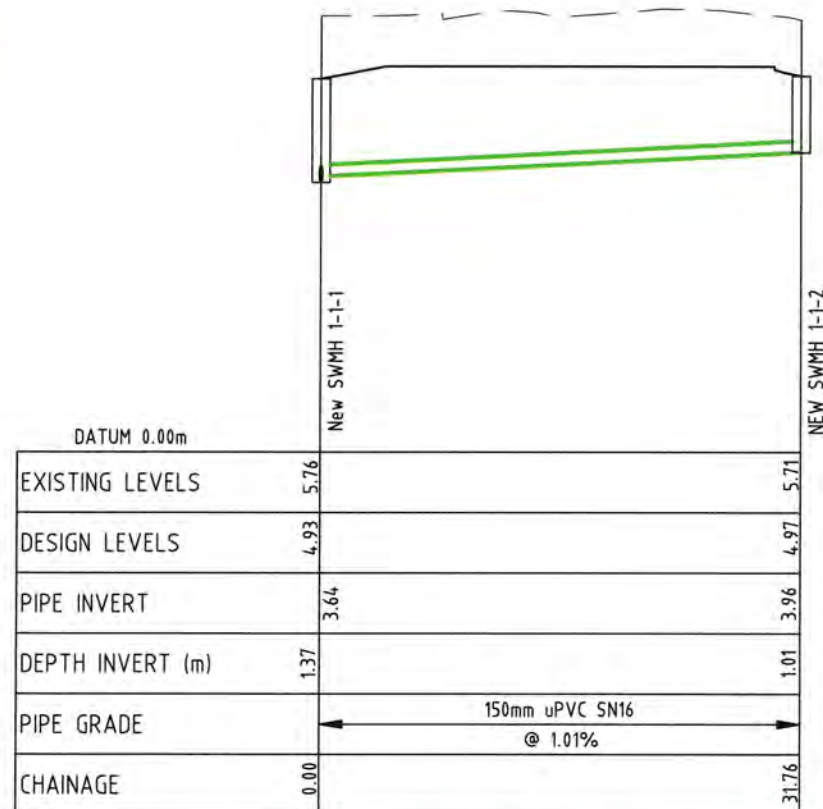
Plan No: **410** Rev: **F**



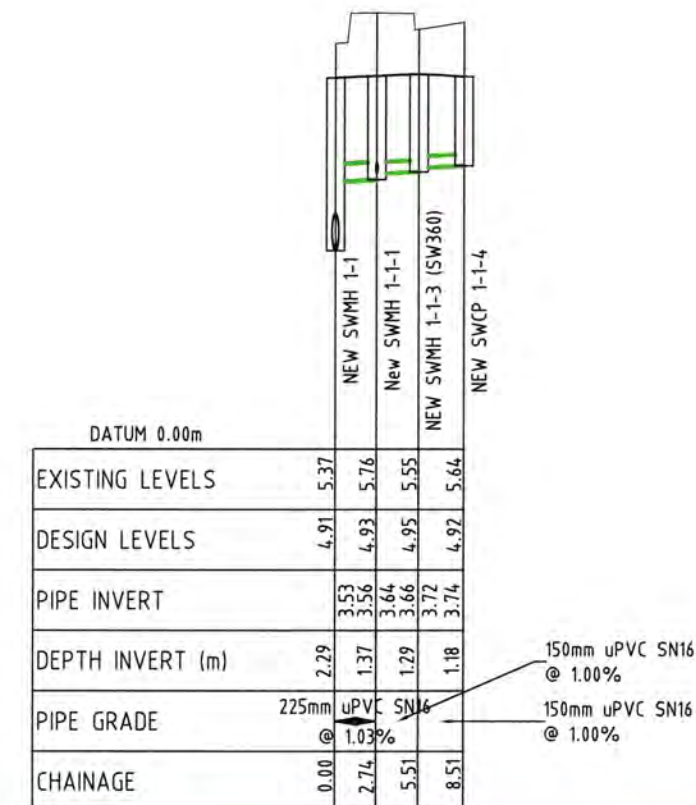
PRIVATE STORMWATER LONGSECTION 3
SCALE 1:500 HORI 1:100 VERT @ A3



PUBLIC STORMWATER LONGSECTION 4
SCALE 1:500 HORI 1:100 VERT @ A3



PUBLIC STORMWATER LONGSECTION 5
SCALE 1:500 HORI 1:100 VERT @ A3



PUBLIC STORMWATER LONGSECTION 6
SCALE 1:500 HORI 1:100 VERT @ A3

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Notes:

1. Refer to DWG: 100 for general notes.
2. Contours at 1m intervals.
3. MH lid levels shown are approximate only.

LEGEND

	Ex Lot Bdy
	Prop Lot Bdy
	Ex Ground Profile
	Finished Ground Profile
	Ex Stormwater
	Prop Stormwater

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E	SW AMENDED	MS	23/04/25
D	SW AMENDED	MS	10/10/23
C	SEA LEVEL	RW	05/05/23
B	s92 UPDATES	RW	30/08/22
Rev	Description	By	Date

	SIGNED	DATE
Surveyed	EASDALE/DODD	-
Designed	MS	09/23
Drawn	RW	03/22
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SHEET TITLE:

**STORMWATER
LONGSECTION 2**

Project Number: **49603**

Plan No: **411** Rev: **E**

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Notes:

1. Refer to DWG: 100 for general notes.

LEGEND

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E	SW AMENDED	MS	23/04/25
D	SW AMENDED	MS	10/10/23
C	SEA LEVEL	RW	05/05/23
B	s92 UPDATES	RW	30/08/22
Rev	Description	By	Date

	SIGNED	DATE
Surveyed	EASDALE/DODD	-
Designed	MS	09/23
Drawn	RW	03/22
Checked		
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PROJECT NAME:

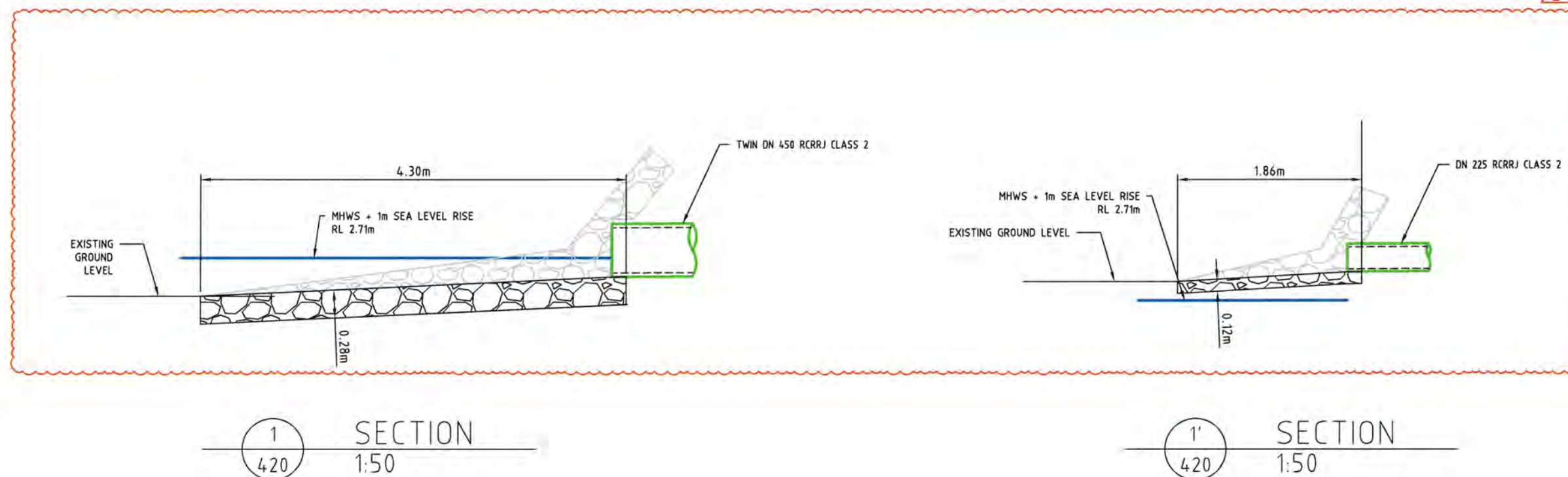
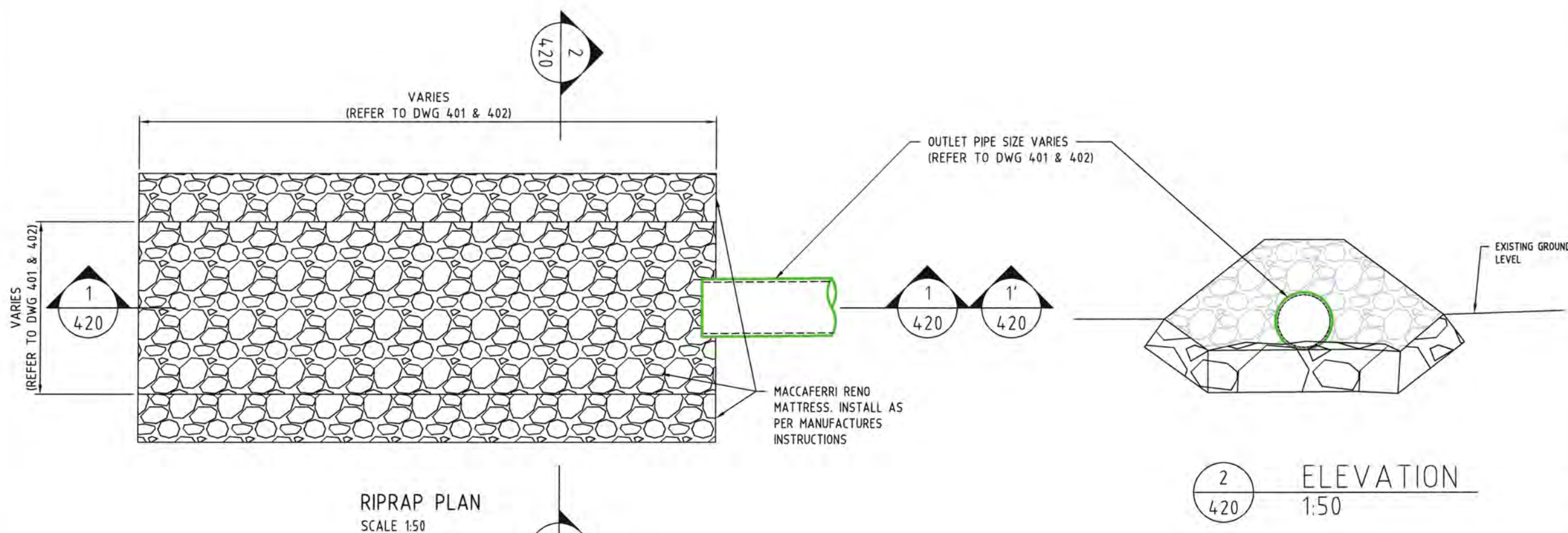
**AMBRIDGE ROSE
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SHEET TITLE:

**STORMWATER
OUTFALL DETAIL**

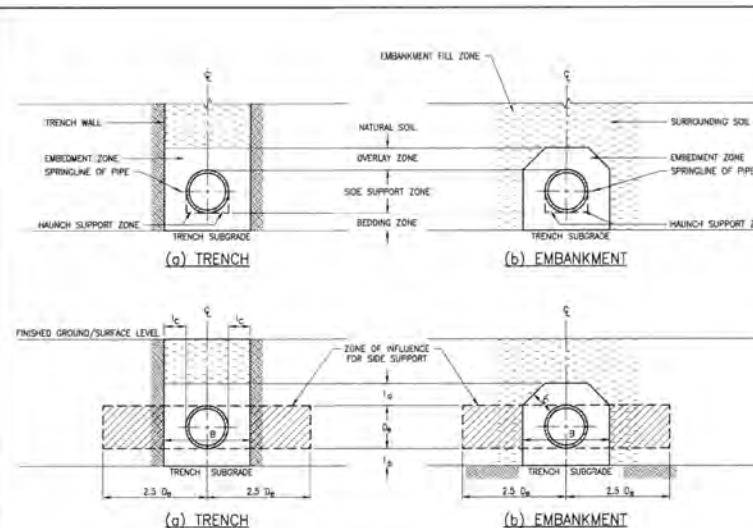
Project Number: **49603**

Plan No: **420** Rev: **E**



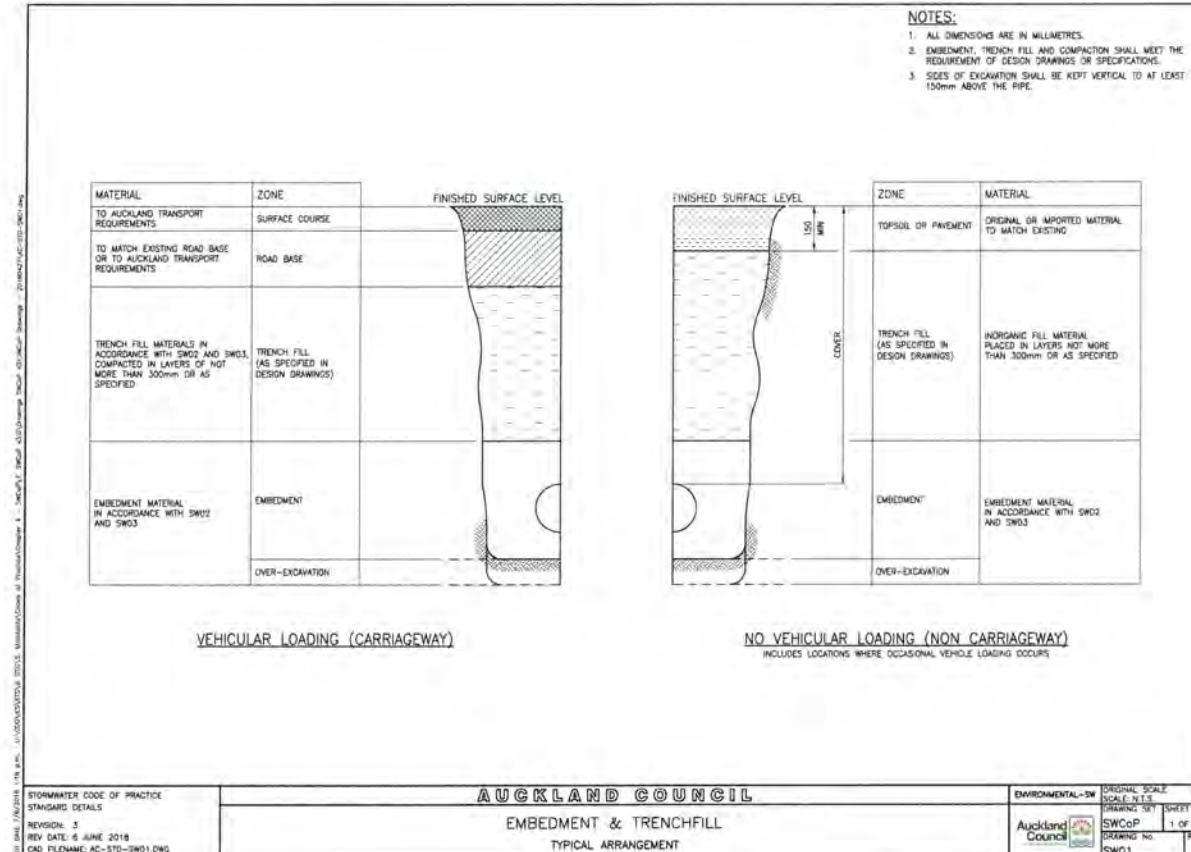
Notes:

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH SW01.
2. FLEXIBLE PIPES INCLUDES PVC, DWP, PP AND PE.
3. PLACEMENT OF EMBEDEMMENT, TRENCHFILL & COMPACTION SHALL MEET THE REQUIREMENTS OF DRAWINGS AND SPECIFICATIONS.
4. EXCAVATE OR COMPACT TRENCH FLOOR TO PROVIDE A FLAT FIRM BASE TO SUPPORT BEDDING MATERIAL AND MINIMIZE PIPELINE SETTLEMENT. REPLACE EXCAVATED MATERIAL WITH SUITABLE GRANULAR MATERIAL FOR BEDDING.
5. ENSURE THAT THE BEDDING IS DEEP ENOUGH SO THAT PIPE JOINT PROJECTIONS (SOCKETS, FLANGES) DO NOT TOUCH THE TRENCH FLOOR (SEE DETAIL BELOW).
6. BEDDING MATERIALS SHALL BE GAP/SAP < 12.
7. THIS DRAWING IS BASED ON AS/NZS 3725 PART 2: 2002 "BURIED FLEXIBLE PIPELINES & INSTALLATION" AND REPRODUCED WITH THE PERMISSION OF STANDARDS NEW ZEALAND.

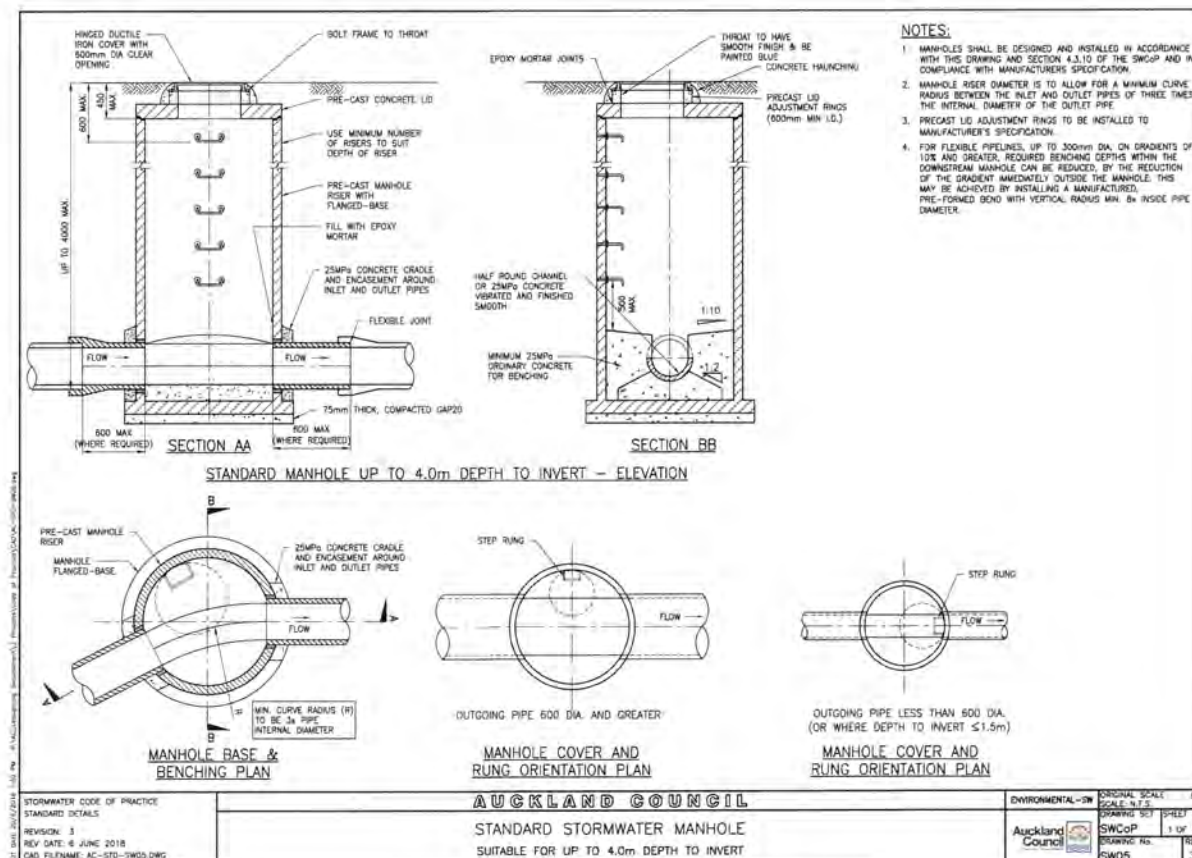


MINIMUM EMBEDEMMENT ZONE DIMENSIONS				
D _p (mm)	MINIMUM DIMENSION (mm)			
	l _b	l _c	l _a	B=D _p +2l _c
75 ≤ D _p ≤ 150	75	100	100	275 - 350
150 ≤ D _p ≤ 300	100	150	150	450 - 600
300 ≤ D _p ≤ 450	100	200	150	700 - 850
450 ≤ D _p ≤ 900	150	300	150	1050 - 1500
900 ≤ D _p ≤ 1500	150	350	200	1600 - 2200
1500 ≤ D _p ≤ 4000	150	0.25D _p	300	2250 - 6000

DEFINITIONS OF SYMBOLS USED:
 B TRENCH WIDTH
 D_p EXTERNAL DIAMETER OF PIPELINE
 l_b DEPTH OF BEDDING UNDER BARREL OF PIPELINE
 l_c MINIMUM DISTANCE BETWEEN SPRINGLINE OF PIPE AND PERMANENT SIDE OF TRENCH
 l_a MINIMUM DEPTH OF COVER OVER SOFTS OF PIPELINE



AUCKLAND COUNCIL				
EMBEDEMMENT & TRENCHFILL				
TYPICAL ARRANGEMENT				
STORMWATER CODE OF PRACTICE STANDARD DETAILS REVISION: 3 REV DATE: 6 JUNE 2018 CAD FILENAME: AC-ST0-SW01.DWG	ENVIRONMENTAL-SW Auckland Council SW01	ORIGINAL SCALE SCALE: N.T.S. DRAWING SET SWCoP DRAWING NO. SW01	1 OF 1 SHEET	3



1. MANHOLES SHALL BE DESIGNED AND INSTALLED IN ACCORDANCE WITH THIS DRAWING AND SECTION 4.3.10 OF THE SWCoP AND IN COMPLIANCE WITH MANUFACTURER'S SPECIFICATION.
2. MANHOLE RISER DIAMETER IS TO ALLOW FOR A MINIMUM CURVE RADIUS BETWEEN THE INLET AND OUTLET PIPES OF THREE TIMES THE INTERNAL DIAMETER OF THE OUTLET PIPE.
3. PRECAST LID ADJUSTMENT RINGS TO BE INSTALLED TO MANUFACTURER'S SPECIFICATION.
4. FOR FLEXIBLE PIPELINES, UP TO 300mm DIA. ON GRADIENTS OF 1:10 AND GREATER, REQUIRED BENCHING DEPTH WITHIN THE DOWNSLOPE MANHOLE CAN BE REDUCED, BY THE REDUCTION OF THE GRADIENT IMMEDIATELY OUTSIDE THE MANHOLE. THIS MAY BE ACHIEVED BY INSTALLING A MANUFACTURED, PRE-FORMED BEND WITH VERTICAL RADIUS MIN. 8x INSIDE PIPE DIAMETER.

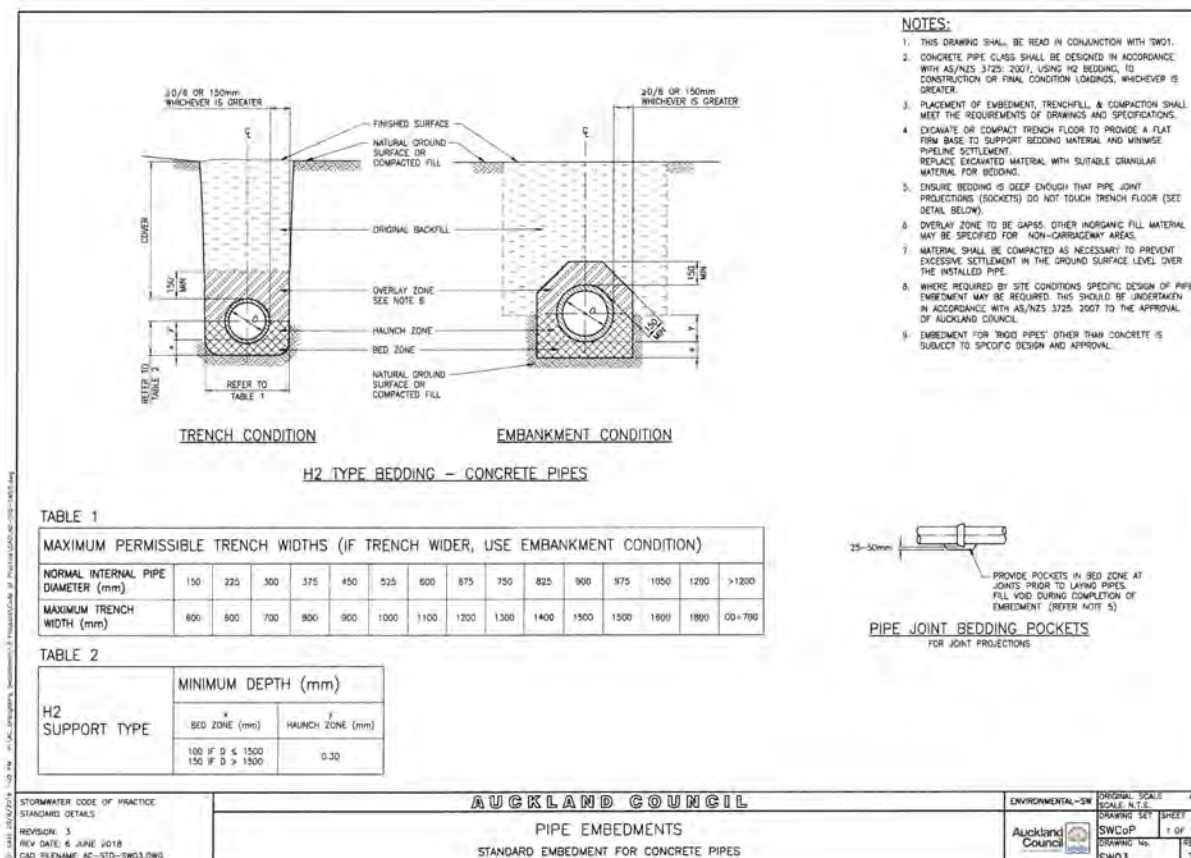


TABLE 1 MAXIMUM PERMISSIBLE TRENCH WIDTHS (IF TRENCH WIDER, USE EMBANKMENT CONDITION)												
NORMAL INTERNAL PIPE DIAMETER (mm)	150	225	300	375	450	525	600	675	750	825	900	>1200
MAXIMUM TRENCH WIDTH (mm)	800	800	700	800	900	1000	1100	1200	1300	1400	1500	OD=700

TABLE 2 H2 SUPPORT TYPE		
MINIMUM DEPTH (mm)		
BED ZONE (mm)	HAUNCH ZONE (mm)	
100 IF D ≤ 1500	0.3D	
150 IF D > 1500		



AUCKLAND COUNCIL				
PIPE EMBEDMENTS				
STANDARD EMBEDEMMENT FOR CONCRETE PIPES				
STORMWATER CODE OF PRACTICE STANDARD DETAILS REVISION: 3 REV DATE: 6 JUNE 2018 CAD FILENAME: AC-ST0-SW03.DWG	ENVIRONMENTAL-SW Auckland Council SW03	ORIGINAL SCALE SCALE: N.T.S. DRAWING SET SWCoP DRAWING NO. SW03	1 OF 1 SHEET	3

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PROJECT NAME:
**AMBRIDGE ROSE
RETIREMENT VILLAGE
PAKURANGA**
FOR
A&L SARGEANT LTD

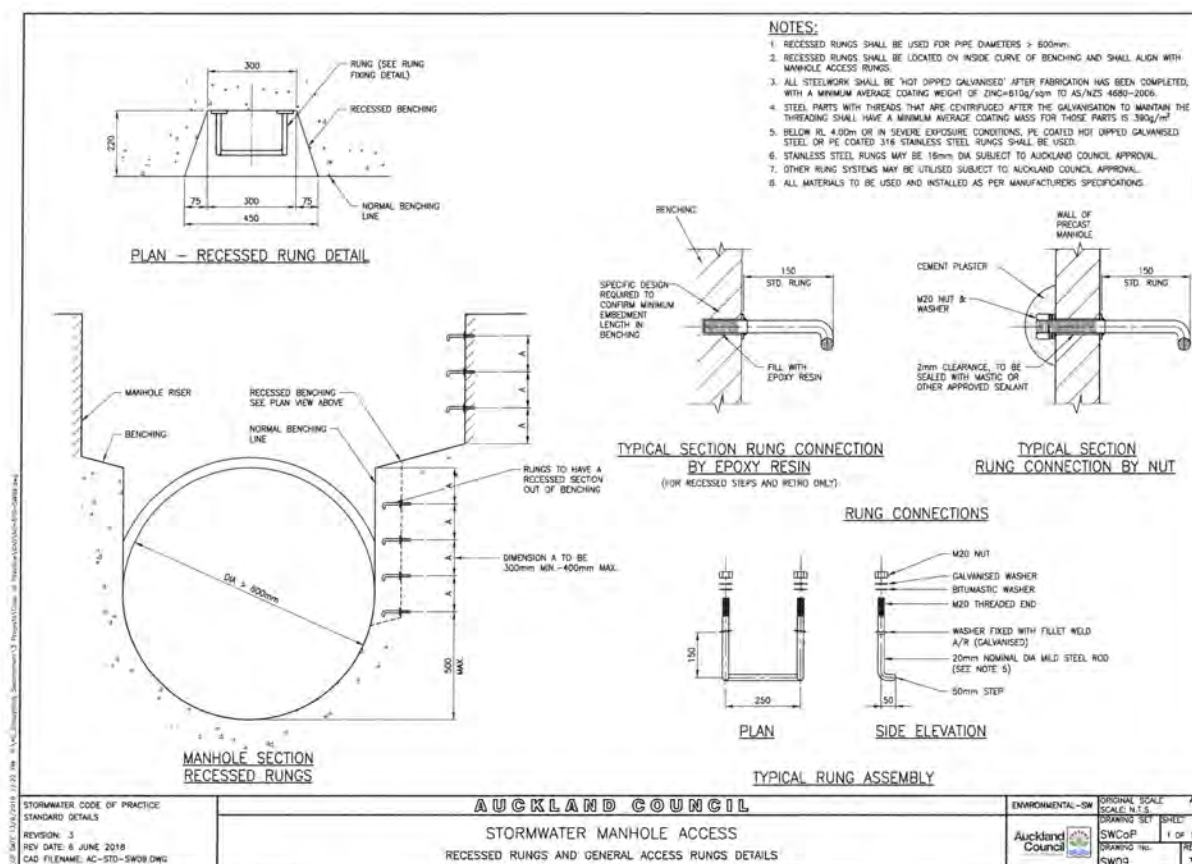
SHEET TITLE:
**STORMWATER
STANDARD DETAILS**

Project Number: **49603**

Plan No: **480** Rev: **B**

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Notes:



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PROJECT NAME:
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PAKURANGA**
FOR
A&L SARGEANT LTD

SHEET TITLE:
**STORMWATER
STANDARD DETAILS**

Project Number: **49603**

Plan No: **481** Rev: **B**



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- Notes:
- 1. Refer to DWG: 100 for general notes.
 - 2. Contours at 1m intervals.
 - 3. MH lid levels shown are approximate only.

LEGEND

	Ex Lot Bdy
	Ex Abutting Bdy
	Ex Contour
	Ex Stormwater
	Ex Wastewater
	Prop Stormwater
	Prop Wastewater
	Previously Abandoned Pipe
	Pipe to be Removed
	Ex/Pr SW Manhole
	Ex/Prop WW Manhole
	WW Connection
	SW Connection
	Prop Buildings
	Prop Pavement
	Secondary Overland Flow Path
	Permeable Pavers

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D	DRAINAGE UPDATES	RW	01/02/24
C	EPA	RW	28/03/23
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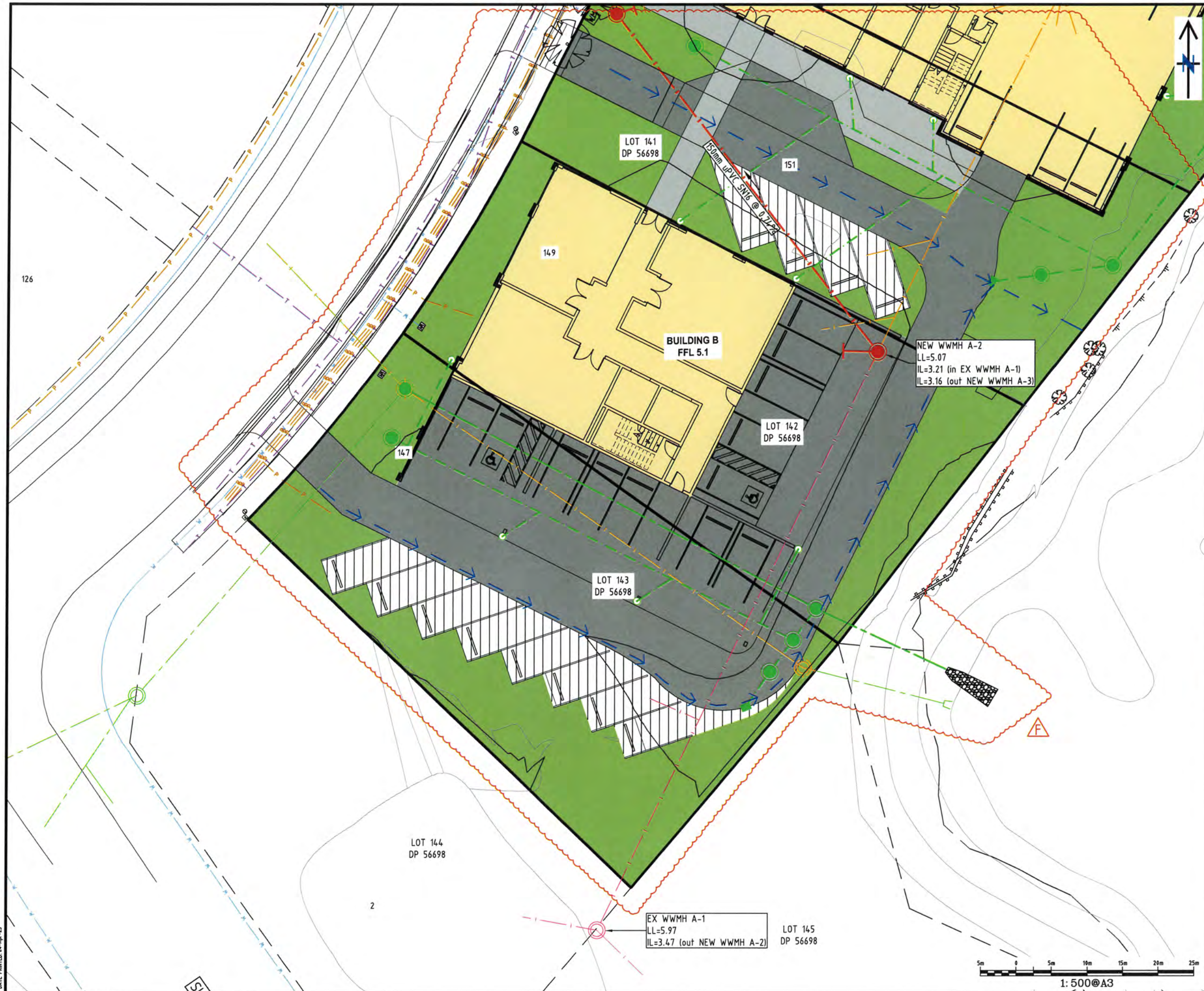
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PROJECT NAME:
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SHEET TITLE:
**WASTEWATER PLAN
SHEET 1**

Project Number: **49603**

Plan No: **501** Rev: **F**



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- Notes:
- 1. Refer to DWG: 100 for general notes.
 - 2. Contours at 1m intervals.
 - 3. MH lid levels shown are approximate only.

LEGEND

	Ex Lot Bdy
	Ex Abutting Bdy
	Ex Contour
	Ex Stormwater
	Ex Wastewater
	Prop Stormwater
	Prop Wastewater
	Previously Abandoned Pipe
	Pipe to be Removed
	Ex Manhole to Remove
	Ex/Pr SW Manhole
	Ex/Prop WW Manhole
	WW Connection
	SW Connection
	Prop Buildings
	Ex Buildings
	Secondary Overland Flow Path
	Permeable Pavers

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D	DRAINAGE UPDATES	RW	01/02/24
C	EPA	RW	28/03/23
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PROJECT NAME:
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SHEET TITLE:
**WASTEWATER PLAN
SHEET 2**

Project Number: **49603**

Plan No: **502** Rev: **F**

DATE PRINTED: 24-Apr-25

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Notes:

1. Refer to DWG: 100 for general notes.
2. MH lid levels shown are approximate only.

LEGEND

	Ex Ground Profile
	Finished Ground Profile
	Ex Wastewater
	Prop Wastewater

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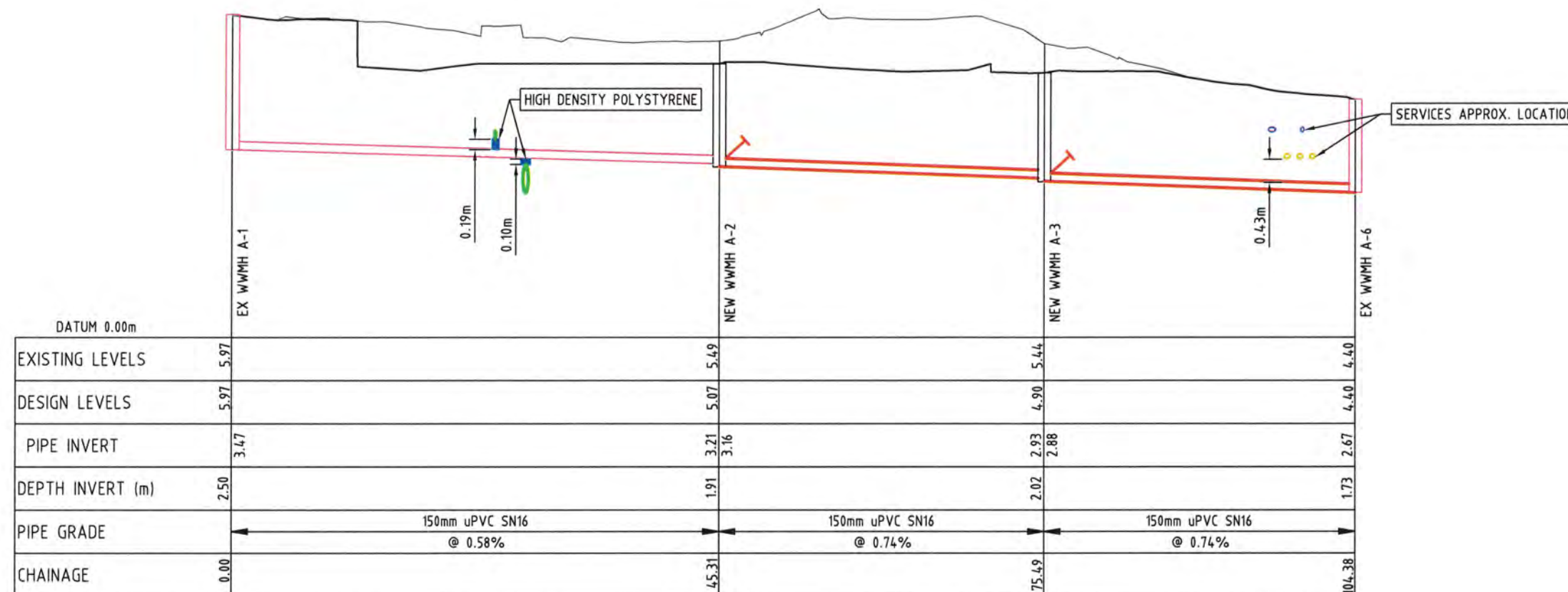
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SHEET TITLE:

**WASTEWATER
LONGSECTION**

Project Number: **49603**

Plan No: **510** Rev: **D**



WASTEWATER LONGSECTION A
SCALE 1:500 HORI 1:100 VERT @ A3

GENERAL CONSTRUCTION NOTES

STANDARDS RELATING TO WORKS

Works shall be carried out to the requirements of the Health & Safety at work in Employment Act 2015

Works shall be completed to Watercare Construction Standards.

MANUFACTURERS SPECIFICATIONS

Materials shall be installed to the Manufacturers requirements unless otherwise specified.

WELDING & FIXINGS

All steelwork shall be workshop fabricated.

Steelwork and fixings shall be hot-dip galvanised to AS/NZS 4680 unless otherwise stated.

A Nickel anti-seize free of copper, lead, sulphides, chlorides & carbons (graphite) shall be used on bolts.

REINFORCING STEEL

Reinforcing shall be centrally placed with the specified minimum cover.

Bends shall be cold formed.

JOINT SEALS

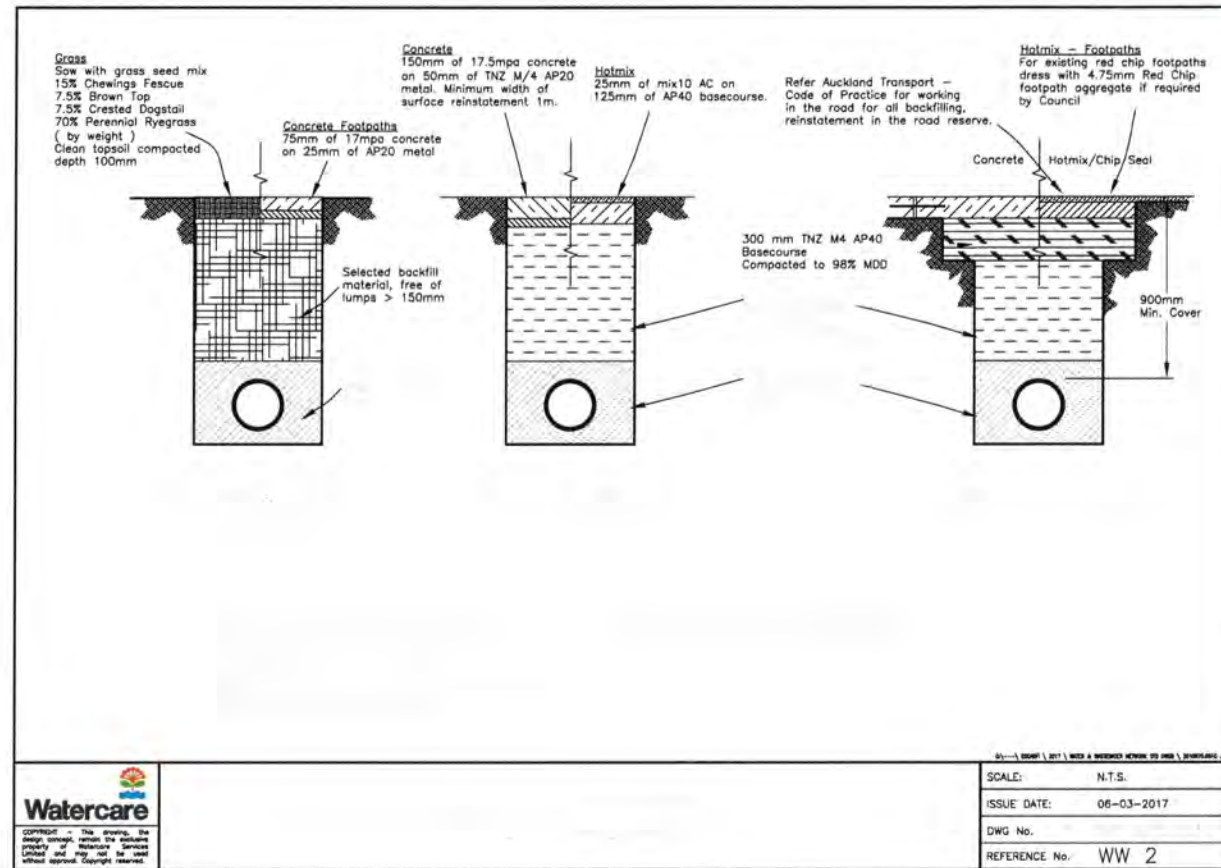
Flanges : Per WSL Material Standard.

Manhole Joints : Concrete manhole with flexible joint seal such as rubber or butyl.
All joints must be externally wrapped with an accepted tape wrapped system.
Alternative materials to suppliers' specifications.



GENERAL CONSTRUCTION NOTES

SCALE: N.T.S.
ISSUE DATE: 13-07-2018
DWG No. 2010070.002D
REFERENCE No. WW 1



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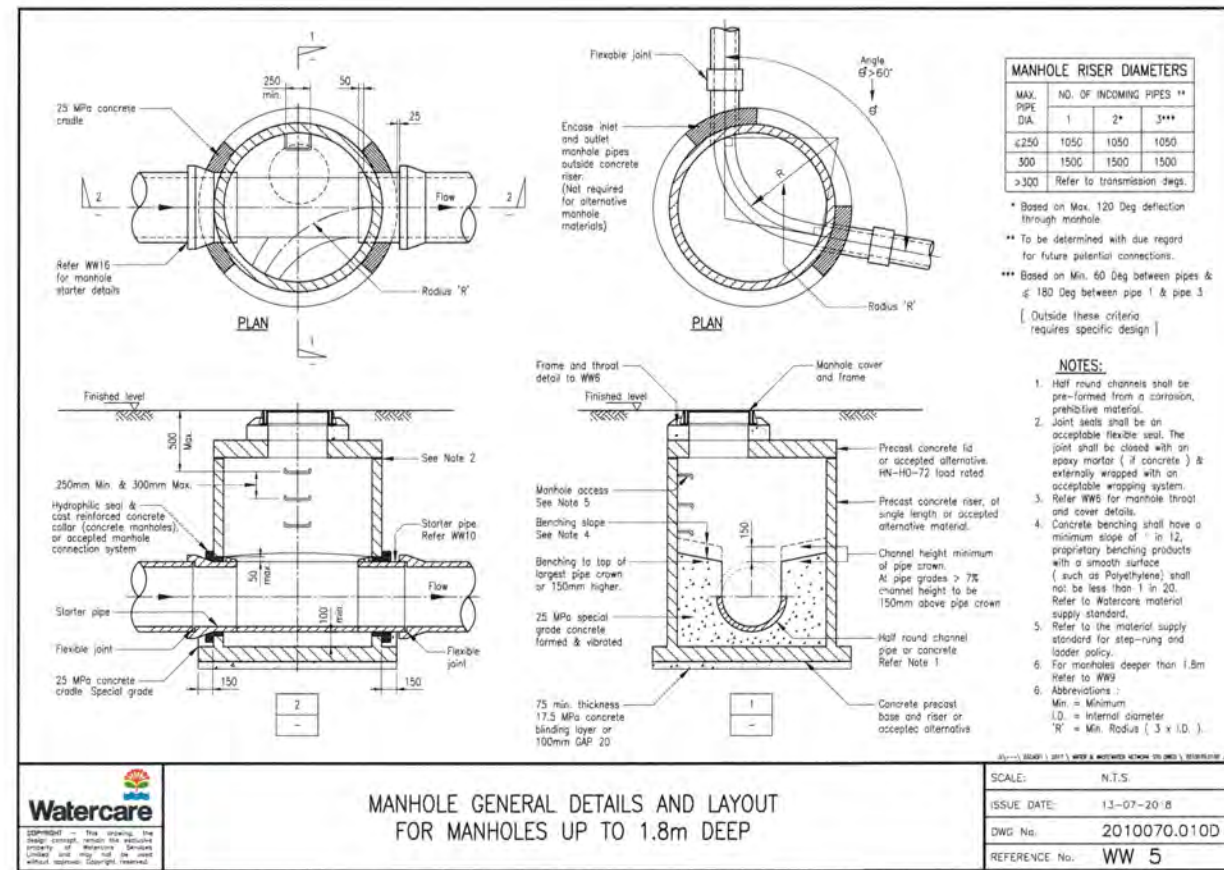
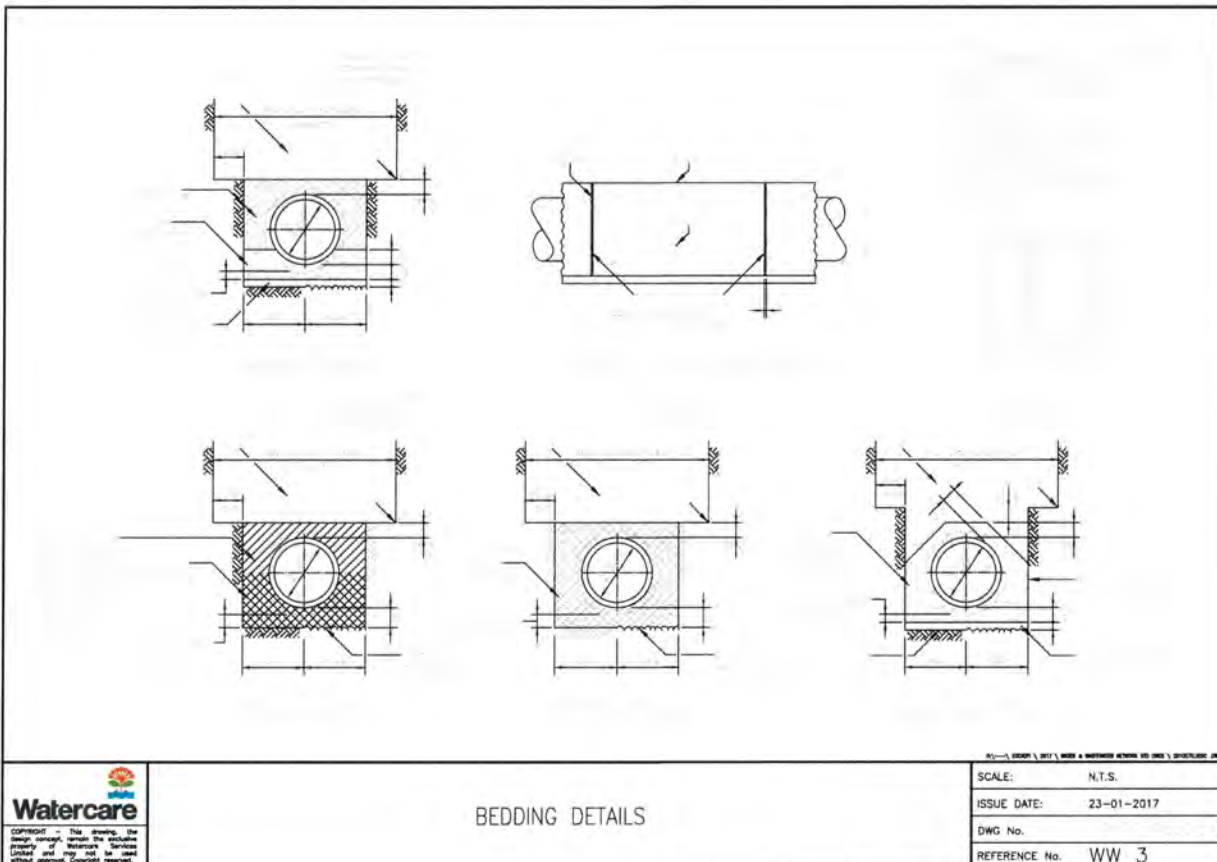
PROJECT NAME:

**AMBRIDGE ROSE
RETIREMENT VILLAGE
PAKURANGA**
FOR
A&L SARGEANT LTD

SHEET TITLE:
**WASTEWATER
STANDARD DETAILS**

Project Number: **49603**

Plan No: **580** Rev: **B**



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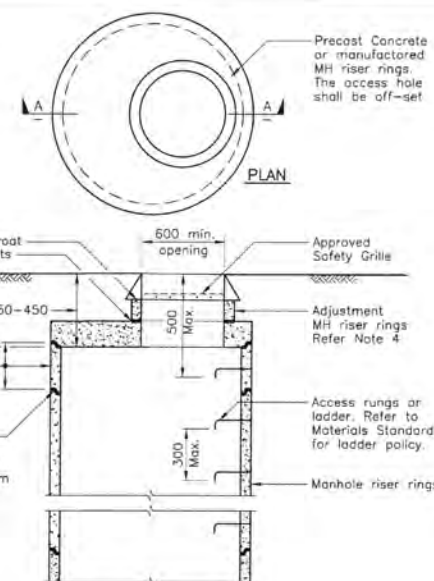
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FOR
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SHEET TITLE:

WASTEWATER
STANDARD DETAILS

Project Number: 49603

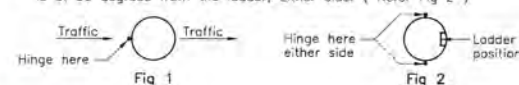
Plan No: 581 Rev: B



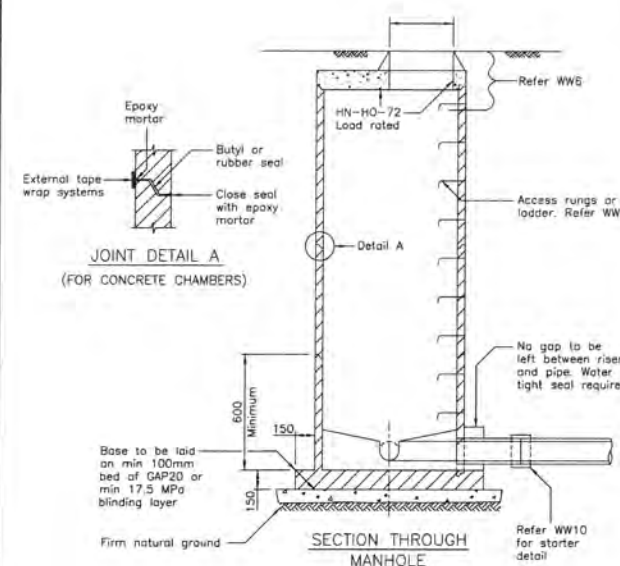
TYPICAL SECTION A-A
THROUGH MANHOLE

NOTES:

1. Lid supplied to HN-HO-72 loading and compliance certified.
2. When the throat depth is greater than 450mm, a new manhole riser is required with a new adjustment ring.
3. Refer drawing WW9 for manholes deeper than 1.8m.
4. Refer drawing WW7 for sloping ground.
5. Refer drawing WW5 for manhole details.
6. Approved Safety Grille below access manhole cover.
7. Manhole covers in the road shall be constructed so that the cover hinge is facing the oncoming traffic. (Refer Fig 1)
8. For all other covers the orientation should be so that the cover hinge is at 90 degrees from the ladder. Either side. (Refer Fig 2)



Watercare	TYPICAL MANHOLE THROAT AND COVER DETAILS
SCALE: N.T.S.	REFERENCE No: WW 6
ISSUE DATE: 13-07-2018	
DWG No: 2010070.029C	



Notes:

1. Refer to WW5 for general details.
2. Channel through manhole to be lined.
3. All manhole openings must be cut.
4. For droppers refer to WW13.
5. The manhole diameter shall be increased to minimum internal 1200mm for all manholes greater than 3.0 metres deep.
6. For manholes > 6.0 metres deep the minimum internal diameter shall be 1500mm.
7. Refer WW6 for manhole throat and cover details.
8. Manholes greater than 6m deep must be installed with landing platforms. Refer drawing in (Transmission drawing set)

Watercare	MANHOLES > 1.8m DEEP
SCALE: N.T.S.	REFERENCE No: WW 9
ISSUE DATE: 13-03-2017	
DWG No: 2010070.012D	

Notes:

1. Refer to DWG: 100 for general notes.
2. Contours at 1m intervals.

	Ex Lot Bdy Ex Abutting Bdy Ex Watermain Prop Watermain Ex/Pr Sluice Valve Ex/Pr Peat Valve Ex/Pr Fire Hydrant Ex/Pr Air Valve Ex/Pr Water Meter Ex/Pr Water Meter Bank
---	---

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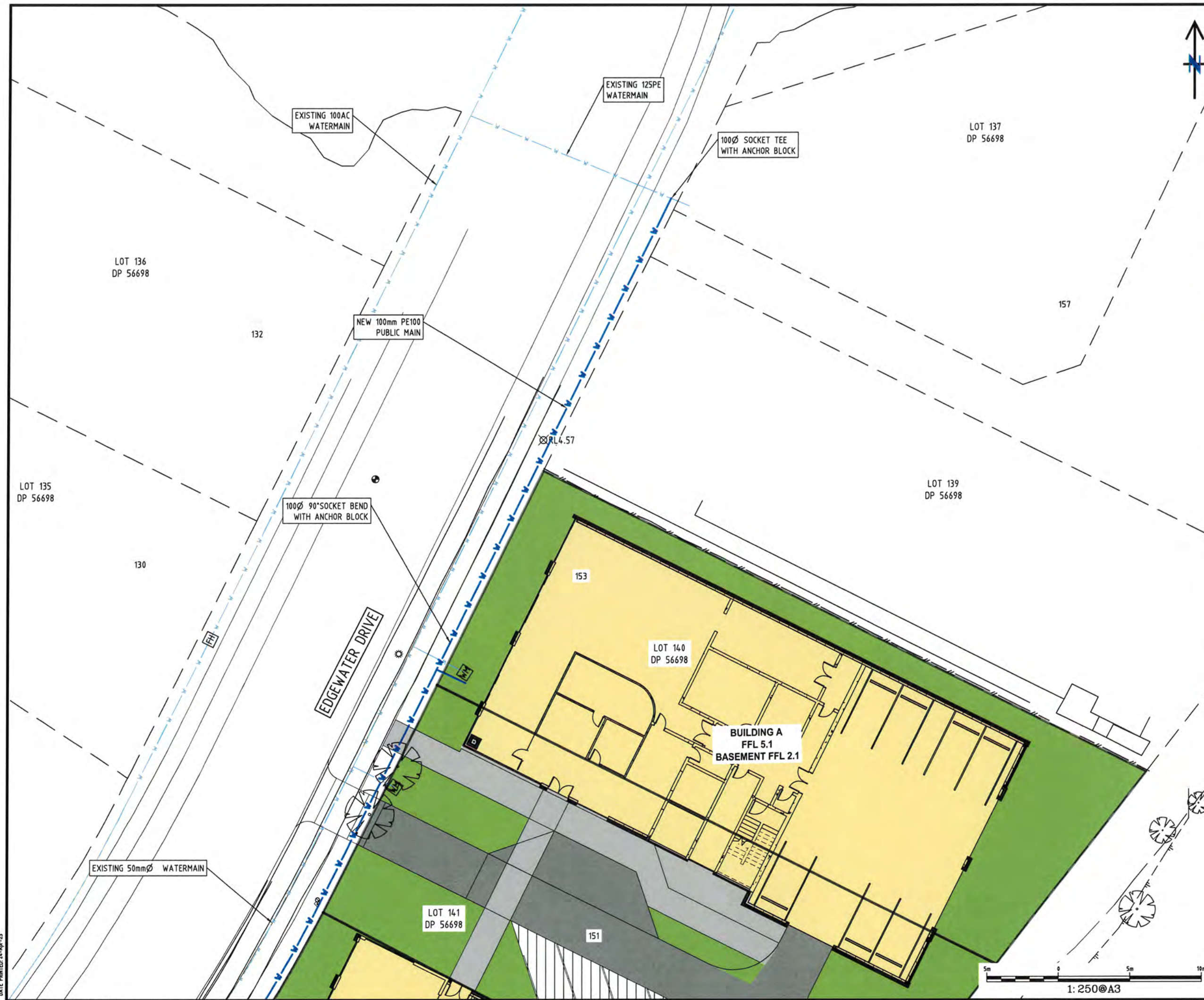
PROJECT NAME:
**AMBRIDGE ROSE
RETIREMENT VILLAGE
PAKURANGA**
FOR
A&L SARGEANT LTD

SHEET TITLE:

**WATERMAIN PLAN
OVERVIEW**

Project Number:	49603	
Plan No:	600	Rev: A





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(NOT FOR CONSTRUCTION)**

Notes:
1. Refer to DWG: 100 for general notes.

LEGEND	
	Ex Lot Bdy
	Ex Abutting Bdy
	Ex Watermain
	Prop Watermain
	Ex/Pr Sluice Valve
	Ex/Pr Peat Valve
	Ex/Pr Fire Hydrant
	Ex/Pr Air Valve
	Ex/Pr Water Meter
	Ex/Pr Water Meter Bank

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PROJECT NAME:

**AMBRIDGE ROSE
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SHEET TITLE:
**WATERMAIN PLAN
SHEET 1**

Project Number: **49603**

Plan No: **601** Rev: **B**

DATE PRINTED: 24-Apr-25

PATH: F:\PROJECTS\49603\DWG\601 WM 49603.DWG



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Notes:
1. Refer to DWG: 100 for general notes.

LEGEND	
	Ex Lot Bdy
	Ex Abutting Bdy
	Ex Watermain
	Prop Watermain
	Ex/Pr Sluice Valve
	Ex/Pr Peat Valve
	Ex/Pr Fire Hydrant
	Ex/Pr Air Valve
	Ex/Pr Water Meter
	Ex/Pr Water Meter Bank

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PROJECT NAME:
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SHEET TITLE:
**WATERMAIN PLAN
SHEET 2**

Project Number: **49603**
Plan No: **602** Rev: **B**

DATE PRINTED: 24-Apr-25

PATH: F:\PROJECTS\49603\DWG\601 WM 49603.DWG

GENERAL CONSTRUCTION NOTES

STANDARDS RELATING TO WORKS

Works shall be carried out to the requirements of the Health & Safety at Work in Employment Act 2015

Works shall be completed to Watercare Construction Standards.

MANUFACTURERS SPECIFICATIONS

Materials shall be installed to the Manufacturers requirements unless otherwise specified.

WELDING & FIXINGS

All steelwork shall be workshop fabricated.

Steelwork and fixings shall be hot-dip galvanised to AS/NZS 4680 unless otherwise stated.

A Nickel anti-seize free of copper, lead, sulphides, chlorides & carbons (graphite) shall be used on bolts.

REINFORCING STEEL

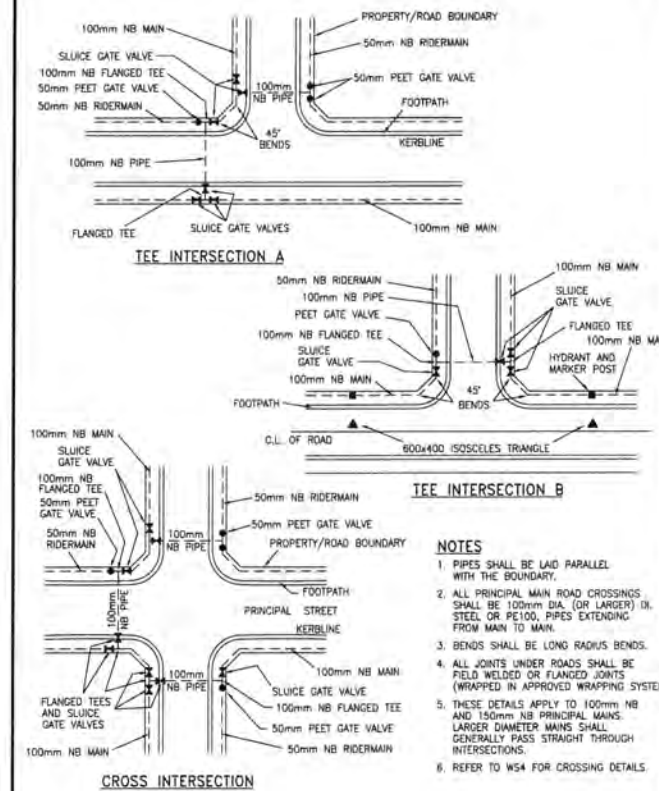
Reinforcing shall be centrally placed with the specified minimum cover.

Bends shall be cold formed.

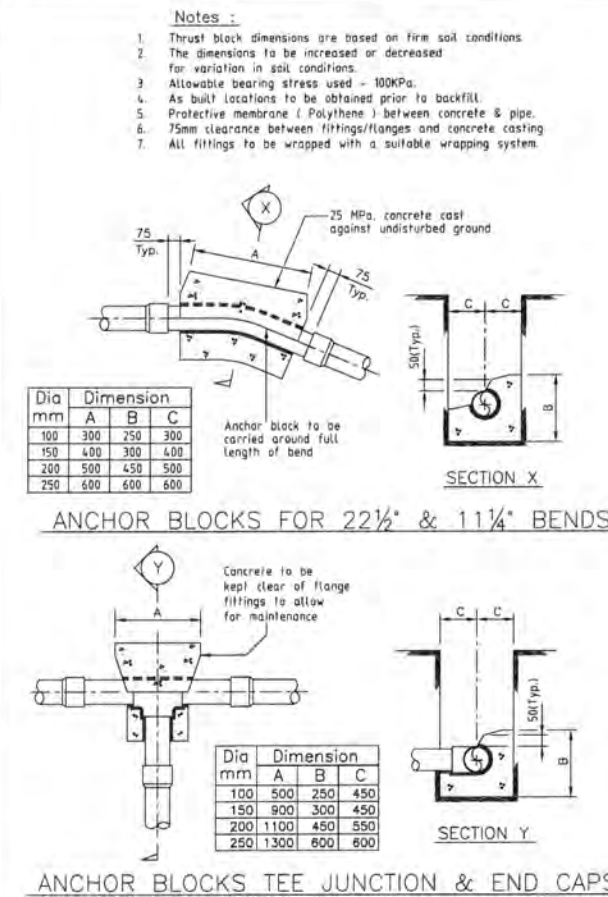
JOINT SEALS

Couplings & Flanges: Per WSL Material Standard.

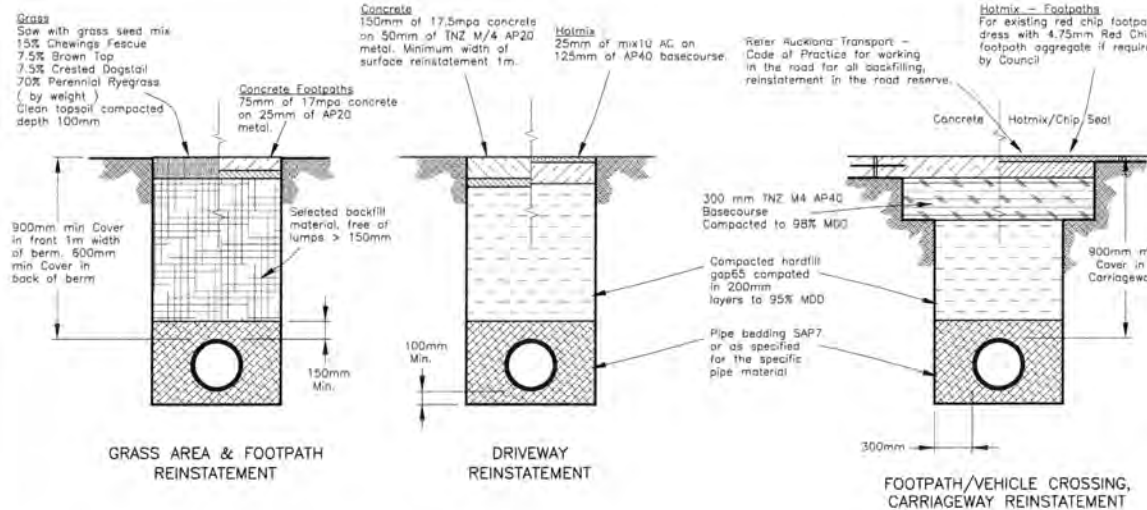
Concrete joints around pipe penetrations through chambers shall be made with a suitable hydrophilic sealant to the manufacturer's requirements. Concrete repair shall be reinforced and box-cast to prevent cracking from sealant forces.



TYPICAL WATERMAIN INTERSECTION LAYOUT

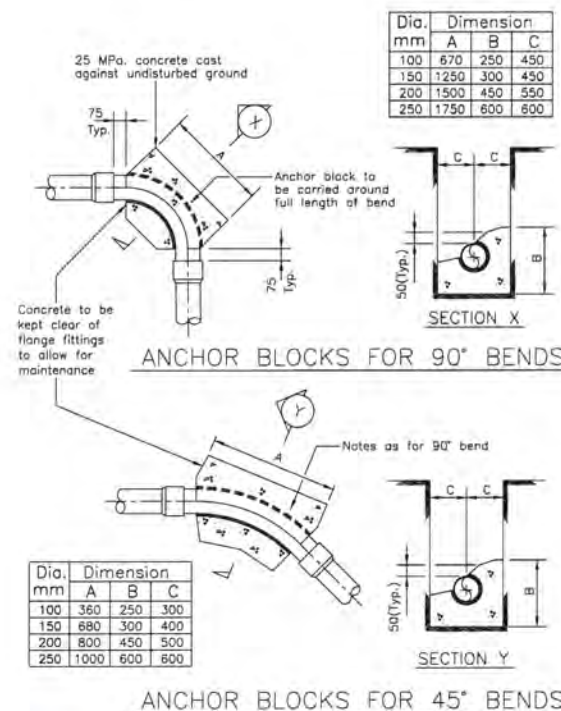


ANCHOR BLOCK DETAILS FOR 22 1/2° & 11 1/4° BENDS AND TEE JUNCTION



TYPICAL TRENCH REINSTATEMENT AND BEDDING DETAILS FOR WATER SUPPLY

- Notes:**
1. Thrust block dimensions are based on firm soil conditions.
 2. The dimensions to be increased or decreased for variation in soil conditions.
 3. Allowable bearing stress used - 100KPa.
 4. As built locations to be obtained prior to backfill.
 5. Protective membrane (Polythene) between concrete & pipe.
 6. 75mm clearance between fittings/flanges and concrete casting.
 7. All fittings to be wrapped with a suitable wrapping system.



ANCHOR BLOCK DETAILS FOR 90° & 45° BENDS

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PROJECT NAME:

AMBRIDGE ROSE RETIREMENT VILLAGE PAKURANGA
FOR
A&L SARGEANT LTD

SHEET TITLE:

WATERMAIN STANDARD DETAIL

Project Number: **49603**

Plan No: **690** Rev: **A**