Carrs Drive, Yamba

—

Pressure Sewer System

Design Summary Report

Rev 0
August 2023

Water Innovation Partners
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Australia 1300 088 555
New Zealand 0800 756 543
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Document Control Sheet

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2 Provincial Crescent
Shepparton VIC 3630

T 1300 088 555
E info@aquatecenviro.com

aquatecenviro.com
Aquatec Fluid Systems | ABN 94 114 944 026

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2 Provincial Crescent
Shepparton VIC 3630

T 1300 088 555
E info@aquatecenviro.com

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1 Introduction

Aquatec Fluid Systems (AQT) has been engaged by Manage Design Engineer (MDE) to prepare a concept pressure sewer system (PSS) design suitable to service the residential subdivision at Carrs Drive, Yamba, NSW 2464.

The following paragraphs provide a summary of the design assumptions and methodology.

1.1 Background

Clifton Yamba Land is currently undertaking works to establish a new residential estate, located along Carrs Drive. The development consists of 14 stages. Due to the landscape of the site, it has been determined that a pressure sewer solution is desirable to collect and transfer sewage to a nearby rising main.

Figure 1 – Carrs Drive, Yamba Site Overview – Source: Google Earth

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Shepparton VIC 3630

T 1300 088 555
E info@aquatecenviro.com

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2 Design Framework

The PSS design has been developed in conjunction with the following codes:

- *WSA 07–2007 Pressure Sewerage Code of Australia Version 1.1*
- *WSA 02–2014 Gravity Sewerage Code of Australia Version 3.1*

The following supplied documents have also been utilised throughout design:

- *Clarence Valley Council West Yamba Development Servicing Plan Sewerage Services – Prepared by GHD, dated: October 2020*
- *Earthworks Plan Drawing – Prepared by MDE, dwg no: D14, sheet 14 of 45, rev: 0, dated: September 2022*
- *Clifton Yamba Staging Plan Drawing – Prepared by Mark Shapiro Architects, dwg no: DA1003, rev: A, dated: September 2022*
- *Clifton Yamba Communal Facilities Floor Plan Drawing with Markup – Dwg no. DA2001, received: 28 July 2023*

2.1 Pressure Sewer Network

A pressure sewer network has been established, consisting of 22 planned pump stations that serve different regions within the proposed development through an internal gravity network. Discharge from the new pressure sewer system will be directed into an existing sewer rising main along Carrs Drive. Details of the existing rising main were not available at the time of writing thus this assessment will provide pumping capacities of the proposed PSS to be further confirmed with existing networks at a later stage.

2.2 Sewer Loadings

The hydraulic design has been based on an ADWF of 180 L/EP/day with an expected 2.625 EP/ET for residential connections, per council requirements. The communal facility sewer load has been estimated in accordance to WSA02 and assumes a commercial sewer loading rate of 75 EP/ha .Total flow from the current development on average is calculated to be approximately 11 kL/d.

Pump ID	ET	EP	ADWF (kL/d)
PS1	13.5	47.3	8.51
PS2	13.5	47.3	8.51
PS3	4.5	15.8	2.84
PS4	5.25	18.4	3.31
PS5	6.75	23.6	4.25
PS6	12	42	7.56
PS7	3	10.5	1.89

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PS8	3	10.5	1.89
PS9	12	42	7.56
PS10	7.5	26.3	4.73
PS11	9	31 .5	5.67
PS12	7.5	26.3	4.73
PS13	9	31.5	5.67
PS14	12	42	7.56
PS15	12	42	7.56
PS16	N/A	44	7.91
PS17	5.25	18.4	3.31
PS18	3	10.5	1.89
PS19	3	10.5	1.89
PS20	6.75	23.6	4.25
PS21	10.5	36.8	6.62
PS22	3	10.5	1.89
Total	**162**	**611**	**11.0**

Table 1 - PSS Sewer Loading

2.2.1 Wet Weather Flows

Although this design does not explicitly address wet weather flows, the inclusion of storage capacity within each pump station ensures the system's ability to effectively manage any potential inflow and infiltration in the drainage line in the future.

The sealed and pressurised nature of the PSS effectively prevents infiltration from entering the property discharge lines or reticulation pipework. However, it is important to acknowledge the potential for inflow and infiltration to occur through illicitly connected downpipes or through cracks and joints in the property drainage system. Given that this is a new development, it is assumed that sufficient supervision during the construction phase will prevent such incidents from happening.

2.3 Pressure Sewer Units

A hydraulic analysis has been performed based on the installation of Aquatec Duplex OGP pump stations. This design is not guaranteed or valid for installation of any other technology or product.

2 Provincial Crescent
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3 Hydraulic Analysis

In order to conduct the hydraulic analysis, the proposed pipe network has been divided into numbered segments, as illustrated in the segment plan layout drawing. For analysis purposes, the property sewers have been assumed to be configured as depicted on the drawing. The connectivity, upstream and downstream levels, lengths, and number of pump connections for each segment are recorded on a data sheet for input to the hydraulic model.

3.1 Peaking Factor

For the anticipated development a peaking factor of 3.0 has been applied to daily flows to estimate loadings during the peak hour. Given the short total daily pumping time of individual pump stations, the number of pumps operating concurrently is normally a small proportion of those in the system even during peak flow periods.

3.2 Probability Method

A spreadsheet model was used to analyse the hydraulic performance of the proposed pressure sewer network, simulating its behaviour during peak flow times.

The probability of any pump operating at a particular point in time is readily calculated based on the assumed pump rate, daily volume to be pumped and peaking factor appropriate to the time of day. The probability of any number of pumps operating simultaneously in a pipe segment can be calculated based on the number of pumps located upstream of that point. Statistical analysis has been undertaken to determine the number of pump units expected to be operating through each pipe segment at peak hour flows. Network design is then based on catering for the 90%ile case during peak hour.

The above methodology results in the design case being for up to four pumps to be operating simultaneously within the system during peak hour at one time.

3.3 Analysis Results

The hydraulic analysis shows that the network performs satisfactorily under the design loads. Results of the hydraulic analysis are shown on Appendix A.

3.3.1 Line Sizing

A reticulation network has been sized based on design flows developed by the spreadsheet model, consisting of DN50, DN63, and DN90 pipework of PE100 PN16 as shown in Appendix B – Reticulation Design Drawings.

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Shepparton VIC 3630

T 1300 088 555
E info@aquatecenviro.com

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3.3.2 Scouring Velocity

The pump flow rates, and operating pressures fall within an acceptable range for all scenarios, with typical pump discharge rates of approximately 1.75 L/s depending on the time of day and operating pressure at each pump station location. Moreover, the pipe velocities consistently exceed the minimum desirable value of 0.6 m/s for significant durations throughout the day.

3.3.3 Pumping Capacity

To achieve the minimum scouring velocity throughout the system of 0.6 m/s, a flow rate of at least 1.22 L/s is necessary. To achieve the specified flow rates using the OGP pumps, the total pump head required should not exceed 46m. Based on the calculations provided in Appendix A, it is determined that the proposed units have a pump head buffer of 23.2m for downstream losses to still achieve self-scouring flows.

The system may still operate at higher pumping head rates however, if the minimum required pump heads fall within a range of 46m to 62m, self-scouring flows cannot be achieved, necessitating periodic flushing of the mainline.

3.3.4 Septicity Control

WSA-07 categorises the risk of septicity in accordance with the systems detention time. A detention time of less than 4 hours is considered a low-level risk, 4 - 8 hours is categorised as a medium-level risk, and 8+ hours is classified as a high-level risk.

The peak average detention time is approximately 1.7 hours while the weighted average detention time is approximately 0.6 hours. This weighted average detention time is considered acceptable and not likely to cause odour problems.

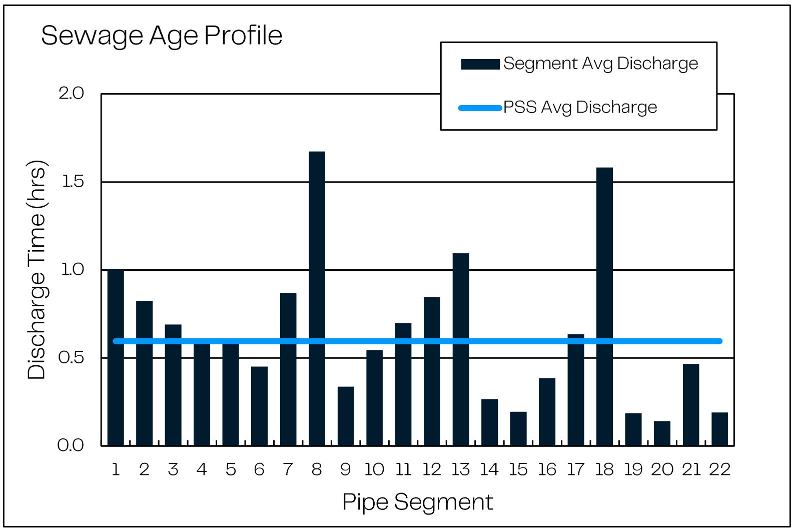

Figure 2 – Sewage Age Profile

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3.3.5 Water Hammer

Pressure surges or water hammer is an occurrence due to the abrupt deceleration of liquid in a pipeline. Fast-closing valves or pump trips can both be catalysts for water hammer. This can lead to large transient forces being sent through a pipeline from the point of flow disruption. While subsequent waves may cause noise and vibration, the initial transient wave represents the worst case mechanically.

Factors such as flow velocity, pipe length, material rigidity, and valve closure speed contribute to water hammer issues.

According to WSA-07 guidelines, surge and fatigue analyses are not necessary for PE pipeline systems. Since the PSS utilises PE pipes, water hammer is not a concern and does not require additional transient assessments.

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T 1300 088 555
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4 Air Management

Air can enter a PSS via entrapment in macerated sewage or at relief points in the system. Once inside the network, the entrapped air will localise at high points, where it will accumulate until the flow velocity becomes adequate to force the air downstream and out of system. Depending on the profile of a PSS's mainline different levels of air accumulation will occur, which when in excess can lead to operational disruptions of the system if not adequately assessed.

4.1 Walski Factor Analysis

To determine if a PSS has sufficient flow to move air pockets downstream a Walski Factor Analysis has been completed which examines the forces exerted on an air pocket.

Based on the Walski factor analysis no air valves will be required to move air pockets along the pressure sewer mainline, as sufficient velocity is achieved.

4.2 Steady State Analysis

According to WSA-07 guidelines vacuum breaks are required in PSS's where pressures of absolute zero can be experienced.

To assess potential negative pressures a steady state analysis has been completed to produce an indicative profile and hydraulic grade line (HGL) for the system. (Note the profile has been based on an assumed pressure main alignment and the finalised alignment is to be completed by others.)

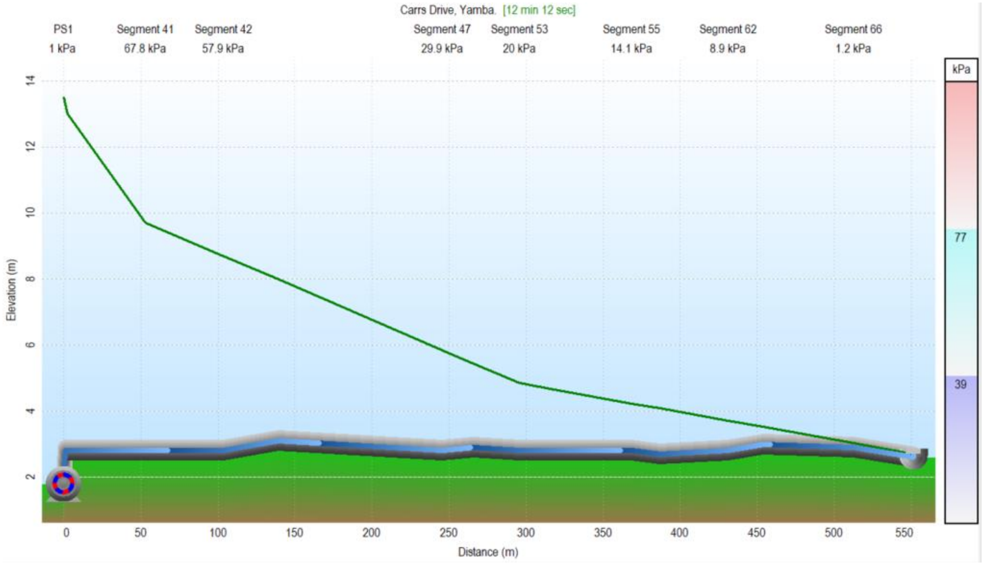

Figure 3 – Carrs Drive, Yamba HGL

Based on the above profile and HGL vacuum breaks will not be required for this system.

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5 Reticulation Equipment

A layout plan of the proposed network including the indicative location of all required Isolation Valves, Flushing Points, and Boundary Connection kits are attached in Network Plan Layout Drawing found in Appendix B – Reticulation Design Drawings.
Further details of all Reticulation equipment can also be found in Appendix C – Product Drawings.

5.1 Isolation Valves

Isolation valves are proposed to be installed as shown in the Network plan layout and are located on the upstream side of branches and the connection point to the existing gravity network.

Per WSA-07 guidelines Isolation Valves are required to be installed at intervals not greater than 500m or 30 service connections and at both ends of bridges or areas of unstable ground.
Isolation Valves are also recommended immediately upstream of the connecting discharge point to allow for ease of maintenance.

5.2 Flushing Points

Flushing Points are proposed to be installed as shown in the Network plan layout and are located at the upstream extremities of the pressure sewer mainlines.
According to WSA-07 guidelines, Flushing Points should be placed at any location where there are multiple upstream connections, with intervals not exceeding 500 meters.

5.3 Boundary Connection Kits

Boundary Connection Kits (BCK) comprise of an isolation valve, check valve and pump out tee. The nominal location for boundary connection kits is assumed for analysis purposes and are shown on the drawings. In practice the boundary kits may be installed at the most convenient location to suit the development as it occurs without affecting the validity of the hydraulic analysis.

5.4 Air Release & Vacuum Break Valves

The entrapped air within a PSS consists of a mixture of air and sewage gases, which can also lead to potential odour issues when released into the surrounding environment.

As per section 4 of this report "Air Management" it has been identified that this system should not require the need for air valves.

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5.5 Control Panel

The system will be operated by an OmniSmart, smart pump control panel with all required starting, operation, protection and inbuilt monitoring equipment.

All control equipment will be mounted inside a remote mounted, lockable, weatherproof enclosure.

5.6 System Storage

For private pump stations Aquatec generally recommend 24 hours of average dry weather flow (ADWF) emergency storage to be allowed for within each unit. Less storage is permissible at the client's discretion.

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Summary

The design work carried out during the development of the pressure sewer system design has shown the following:

- The required pipe sizes throughout the development that adequately services the design case.

- Aquatec Duplex OGP pump stations will be employed to service the development.

- For an unrestricted system the calculated peak sewage age in the system is approximately 1.7 hours (with a low septicity risk), while the average sewage age is 0.6 hours (low septicity risk).

- Based on the average and peak sewage ages, it appears that odour control or dosing measures may not be required for an unrestricted system.

- Using an indicative vertical alignment of the pressure sewer system, no air valves are necessary for the system's successful operation.

- The Pressure Sewer System (PSS) design is based on the current development lot numbering and layout. Any changes to these aspects will necessitate a review of the current design.

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E info@aquatecenviro.com

aquatecenviro.com
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Appendix A – Calculation Sheets

2 Provincial Crescent
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T 1300 088 555
E info@aquatecenviro.com

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Data Sheet

Project Location:	Carrs Drive, Yamba
Project Name:	Carrs Drive, Yamba - Pressure Sewer System

Design References

Parameter	Value	Unit	Reference
Residential Conversion Rate	2.625	EP/ET	Clarence Vallet Council West Yamba DSP - October 2020
Commerical Conversion Rate	75	EP/ha	WSA 02-2014 Gravity Sewerage Code of Australia Version 3.1
ADWF	180	L/EP/d	WSA 02-2014 Gravity Sewerage Code of Australia Version 3.1
Min. Velocity	0.6	m/s	WSA 07-2014 Pressure Sewerage Code of Australia Version 1.1

LATERAL SEGMENT "L"	*PIPE SEGMENT NUMBER*	*FLOWS INTO SEGMENT*	*No. OF EP*	*UPSTREAM RL OF SEGMENT*	*RL of LOW PUMP in SEGMENT*	*DOWNSTREAM RL OF SEGMENT*	*PIPE LENGTH (METRE)*
L	1	40	47.3	2.80	1.80	2.80	1.50
L	2	41	47.3	2.80	1.80	2.80	2.20
L	3	42	15.8	2.80	1.80	2.80	2.20
L	4	43	18.4	3.10	2.10	3.10	1.20
L	5	61	23.6	3.20	2.20	3.20	2.00
L	6	46	42.0	2.90	1.90	2.90	2.00
L	7	45	10.5	2.80	1.80	2.80	2.00
L	8	44	10.5	2.80	1.80	2.80	2.00
L	9	48	42.0	2.90	1.90	2.90	2.00
L	10	52	26.3	2.80	1.80	2.80	2.00
L	11	51	31.5	2.80	1.80	2.80	2.00
L	12	50	26.3	2.60	1.60	2.60	2.00
L	13	49	31.5	2.80	1.80	2.80	2.00
L	14	54	42.0	2.80	1.80	2.80	2.00
L	15	55	42.0	2.80	1.80	2.80	2.00
L	16	58	44.0	2.70	1.00	2.70	40.11
L	17	57	18.4	2.90	1.00	2.90	1.50
L	18	56	10.5	2.80	1.00	2.80	2.50
L	19	60	10.5	3.00	1.00	3.00	1.50
L	20	63	23.6	3.00	1.00	3.00	10.50
L	21	64	36.8	2.80	1.00	2.80	1.50
L	22	65	10.5	2.90	1.00	2.90	1.50
	40	41		2.80	1.00	2.80	50.40
	41	42		2.80	1.00	2.80	50.40
	42	43		2.80	1.00	3.10	35.71
	43	47		3.10	1.00	2.80	106.70
	44	45		2.80	1.00	2.80	50.40
	45	46		2.80	1.00	2.90	50.40
	46	47		2.90	1.00	2.80	32.00
	47	48		2.80	1.00	2.90	20.30
	48	53		2.90	1.00	2.80	29.90
	49	50		2.80	1.00	2.60	47.20
	50	51		2.60	1.00	2.80	50.40
	51	52		2.80	1.00	2.80	50.40
	52	53		2.80	1.00	2.80	101.80
	53	54		2.80	1.00	2.80	22.30
	54	55		2.80	1.00	2.80	50.40
	55	59		2.80	1.00	2.70	18.10
	56	57		2.80	1.00	2.90	58.30
	57	58		2.90	1.00	2.70	58.20
	58	59		2.70	1.00	2.70	53.20
	59	62		2.70	1.00	2.80	44.20
	60	62		3.00	1.00	2.80	11.00
	61	60		3.20	1.00	3.00	57.20
	62	63		2.80	1.00	3.00	22.80
	63	66		3.00	1.00	2.90	58.80
	64	65		2.80	1.00	2.90	62.80
	65	66		2.90	1.00	2.90	39.40
	66	0		2.90	1.00	2.60	39.00

Legend

Data Input Cells

CALCULATION TABLE

PIPING SUMMARY DATA
(Includes laterals)

Pipe Size	Total Length (m)
16	0
20	0
25	0
32	0
40	0
50	709.11
63	395.21
75	0
90	255.6
110	0
125	0
140	0
160	0
180	0
200	0
225	0
250	0
280	0
315	0
355	0

DETAILED HYDRAULIC CALCULATIONS
NOT FOR CONSTRUCTION

1. This Design Aid has been prepared for the development of preliminary pipe sizing only.
2. Designers should satisfy themselves as to the adequacy & application of results from use of this Design Aid
3. Aquatec Fluid Systems does not represent that this Design Aid contains sufficient analysis for the preparation of Designs for Construction of works.
4. Adopted Design flows based on Probability Method to meet 90%ile load @ Peak Hour.

Legend
- Data Input Cells
- Optional Data Input Cells
- Data Reference from Data Sheet
- Provided Data

Project Location: Carrs Drive, Yamba
Project Name: Carrs Drive, Yamba - Pressure Sewer System

Litres/EP/Day =	180
Peaking Factor =	3
Approx flow per pump =	1.75
Nominal Minimum Pipe Velocity =	0.60
Pipe Class =	PN16
Pipe Material =	PE100
HW Const =	130

Weighted Average HRS to Discharge = 0.60

	PIPE SEGMENT NUMBER	FLOWS INTO SEGMENT	NUMBER OF (EP)	ACCUM EP	MAX SIMULT. PUMPS	UPSTREAM RL OF SEGMENT	RL of LOW PUMP SEGMENT	DOWNSTREAM RL OF SEGMENT	PIPE LENGTH (METRE)	DESIGN FLOW (L/S)	PIPE OD (MM)	PIPE ID (MM)	DESIGN VELOCITY (M/S)	FRICTION FACTOR (M/100M)	FR LOSS THIS PIPE (METRE)	DOWNSTREAM HGL (METRE)	UPSTREAM HGL (METRE)	UPSTREAM RESIDUAL (METRE)	PUMP HEAD (METRE)	PIPE SEGMENT NUMBER	AVERAGE DAILY FLOW (LITRES)	SEGMENT RETENTION TIME	AVE HRS TO DISCHARGE	AIR WALSKI P	DS AV
L	1	40	47.3	47.3	1	2.8	1.8	2.8	1.5	1.75	50	40.0	1.39	6.37	0.10	22.77	22.87	20.07	21.07	1	8505	0.01	1.00	OK	
L	2	41	47.3	47.3	1	2.8	1.8	2.8	2.2	1.75	50	40.0	1.39	6.37	0.14	19.56	19.70	16.90	17.90	2	8505	0.01	0.83	OK	
L	3	42	15.8	15.8	1	2.8	1.8	2.8	2.2	1.75	50	40.0	1.39	6.37	0.14	18.58	18.72	15.92	16.92	3	2835	0.02	0.70	OK	
L	4	43	18.4	18.4	1	3.1	2.1	3.1	1.2	1.75	50	40.0	1.39	6.37	0.08	17.88	17.96	14.86	15.86	4	3308	0.01	0.60	OK	
L	5	61	23.6	23.6	1	3.2	2.2	3.2	2.0	1.75	50	40.0	1.39	6.37	0.13	12.29	12.42	9.22	10.22	5	4253	0.01	0.59	OK	
L	6	46	42.0	42.0	1	2.9	1.9	2.9	2.0	1.75	50	40.0	1.39	6.37	0.13	17.84	17.97	15.07	16.07	6	7560	0.01	0.45	OK	
L	7	45	10.5	10.5	1	2.8	1.8	2.8	2.0	1.75	50	40.0	1.39	6.37	0.13	21.05	21.18	18.38	19.38	7	1890	0.03	0.88	OK	
L	8	44	10.5	10.5	1	2.8	1.8	2.8	2.0	1.75	50	40.0	1.39	6.37	0.13	24.26	24.39	21.59	22.59	8	1890	0.03	1.68	OK	
L	9	48	42.0	42.0	1	2.9	1.9	2.9	2.0	1.75	50	40.0	1.39	6.37	0.13	14.37	14.50	11.60	12.60	9	7560	0.01	0.34	OK	
L	10	52	26.3	26.3	1	2.8	1.8	2.8	2.0	1.75	50	40.0	1.39	6.37	0.13	14.25	14.38	11.58	12.58	10	4725	0.01	0.55	OK	
L	11	51	31.5	31.5	1	2.8	1.8	2.8	2.0	1.75	50	40.0	1.39	6.37	0.13	15.23	15.36	12.56	13.56	11	5670	0.01	0.70	OK	
L	12	50	26.3	26.3	1	2.6	1.6	2.6	2.0	1.75	50	40.0	1.39	6.37	0.13	18.45	18.57	15.97	16.97	12	4725	0.01	0.85	OK	
L	13	49	31.5	31.5	1	2.8	1.8	2.8	2.0	1.75	50	40.0	1.39	6.37	0.13	21.45	21.58	18.78	19.78	13	5670	0.01	1.10	OK	
L	14	54	42.0	42.0	1	2.8	1.8	2.8	2.0	1.75	50	40.0	1.39	6.37	0.13	11.69	11.81	9.01	10.01	14	7560	0.01	0.27	OK	
L	15	55	42.0	42.0	1	2.8	1.8	2.8	2.0	1.75	50	40.0	1.39	6.37	0.13	10.37	10.50	7.70	8.70	15	7560	0.01	0.20	OK	
L	16	58	44.0	44.0	1	2.7	1.0	2.7	40.1	1.75	50	40.0	1.39	6.37	2.55	13.29	15.85	13.15	14.85	16	7914	0.15	0.44	OK	
L	17	57	18.4	18.4	1	2.9	1.0	2.9	1.5	1.75	50	40.0	1.39	6.37	0.10	17.00	17.10	14.20	16.10	17	3308	0.01	0.64	OK	
L	18	56	10.5	10.5	1	2.8	1.0	2.8	2.5	1.75	50	40.0	1.39	6.37	0.16	20.71	20.87	18.07	19.87	18	1890	0.04	1.60	OK	
L	19	60	10.5	10.5	1	3.0	1.0	3.0	1.5	1.75	50	40.0	1.39	6.37	0.10	8.65	8.74	5.74	7.74	19	1890	0.02	0.20	OK	
L	20	63	23.6	23.6	1	3.0	1.0	3.0	10.5	1.75	50	40.0	1.39	6.37	0.67	6.93	7.60	4.60	6.60	20	4253	0.07	0.17	OK	
L	21	64	36.8	36.8	1	2.8	1.0	2.8	1.5	1.75	50	40.0	1.39	6.37	0.10	10.84	10.93	8.13	9.93	21	6615	0.01	0.47	OK	
L	22	65	10.5	10.5	1	2.9	1.0	2.9	1.5	1.75	50	40.0	1.39	6.37	0.10	6.84	6.93	4.03	5.93	22	1890	0.02	0.20	OK	
	40	41	0.0	47.3	1	2.8	1.0	2.8	50.4	1.75	50	40.0	1.39	6.37	3.21	19.56	22.77	19.97		40	8505	0.18	1.00	OK	
	41	42	0.0	94.5	1	2.8	1.0	2.8	50.4	1.75	63	51.0	0.86	1.95	0.98	18.58	19.56	16.76		41	17010	0.15	0.82	OK	
	42	43	0.0	110.3	1	2.8	1.0	3.1	35.7	1.75	63	51.0	0.86	1.95	0.70	17.88	18.58	15.78		42	19845	0.09	0.67	OK	
	43	47	0.0	128.6	1	3.1	1.0	2.8	106.7	1.75	63	51.0	0.86	1.95	2.08	15.80	17.88	14.78		43	23153	0.23	0.59	8.46	
	44	45	0.0	10.5	1	2.8	1.0	2.8	50.4	1.75	50	40.0	1.39	6.37	3.21	21.05	24.26	21.46		44	1890	0.80	1.65	OK	
	45	46	0.0	21.0	1	2.8	1.0	2.9	50.4	1.75	50	40.0	1.39	6.37	3.21	17.84	21.05	18.25		45	3780	0.40	0.85	OK	
	46	47	0.0	63.0	1	2.9	1.0	2.8	32.0	1.75	50	40.0	1.39	6.37	2.04	15.80	17.84	14.94		46	11340	0.09	0.45	27.55	
	47	48	0.0	191.6	2	2.8	1.0	2.9	20.3	3.50	63	51.0	1.71	7.04	1.43	14.37	15.80	13.00		47	34493	0.03	0.36	OK	
	48	53	0.0	233.6	2	2.9	1.0	2.8	29.9	3.50	63	51.0	1.71	7.04	2.11	12.27	14.37	11.47		48	42053	0.03	0.33	32.01	
	49	50	0.0	31.5	1	2.8	1.0	2.6	47.2	1.75	50	40.0	1.39	6.37	3.01	18.45	21.45	18.65		49	5670	0.25	1.09	25.00	
	50	51	0.0	57.8	1	2.6	1.0	2.8	50.4	1.75	50	40.0	1.39	6.37	3.21	15.23	18.45	15.85		50	10395	0.15	0.84	OK	
	51	52	0.0	89.3	1	2.8	1.0	2.8	50.4	1.75	63	51.0	0.86	1.95	0.98	14.25	15.23	12.43		51	16065	0.15	0.69	OK	
	52	53	0.0	115.5	1	2.8	1.0	2.8	101.8	1.75	63	51.0	0.86	1.95	1.99	12.27	14.25	11.45		52	20790	0.24	0.54	OK	
	53	54	0.0	349.1	3	2.8	1.0	2.8	22.3	5.25	90	73.0	1.25	2.60	0.58	11.69	12.27	9.47		53	62843	0.04	0.30	OK	
	54	55	0.0	391.1	3	2.8	1.0	2.8	50.4	5.25	90	73.0	1.25	2.60	1.31	10.37	11.69	8.89		54	70403	0.07	0.26	OK	
	55	59	0.0	433.1	3	2.8	1.0	2.7	18.1	5.25	90	73.0	1.25	2.60	0.47	9.90	10.37	7.57		55	77963	0.02	0.19	10.21	
	56	57	0.0	10.5	1	2.8	1.0	2.9	58.3	1.75	50	40.0	1.39	6.37	3.71	17.00	20.71	17.91		56	1890	0.93	1.56	OK	
	57	58	0.0	28.9	1	2.9	1.0	2.7	58.2	1.75	50	40.0	1.39	6.37	3.71	13.29	17.00	14.10		57	5198	0.34	0.63	26.73	
	58	59	0.0	72.8	1	2.7	1.0	2.7	53.2	1.75	50	40.0	1.39	6.37	3.39	9.90	13.29	10.59		58	13111	0.12	0.29	OK	
	59	62	0.0	506.0	4	2.7	1.0	2.8	44.2	7.00	90	73.0	1.67	4.43	1.96	7.94	9.90	7.20		59	91074	0.05	0.17	OK	
	60	62	0.0	34.1	1	3.0	1.0	2.8	11.0	1.75	50	40.0	1.39	6.37	0.70	7.94	8.65	5.65		60	6143	0.05	0.17	15.68	
	61	60	0.0	23.6	1	3.2	1.0	3.0	57.2	1.75	50	40.0	1.39	6.37	3.64	8.65	12.29	9.09		61	4253	0.41	0.58	26.58	

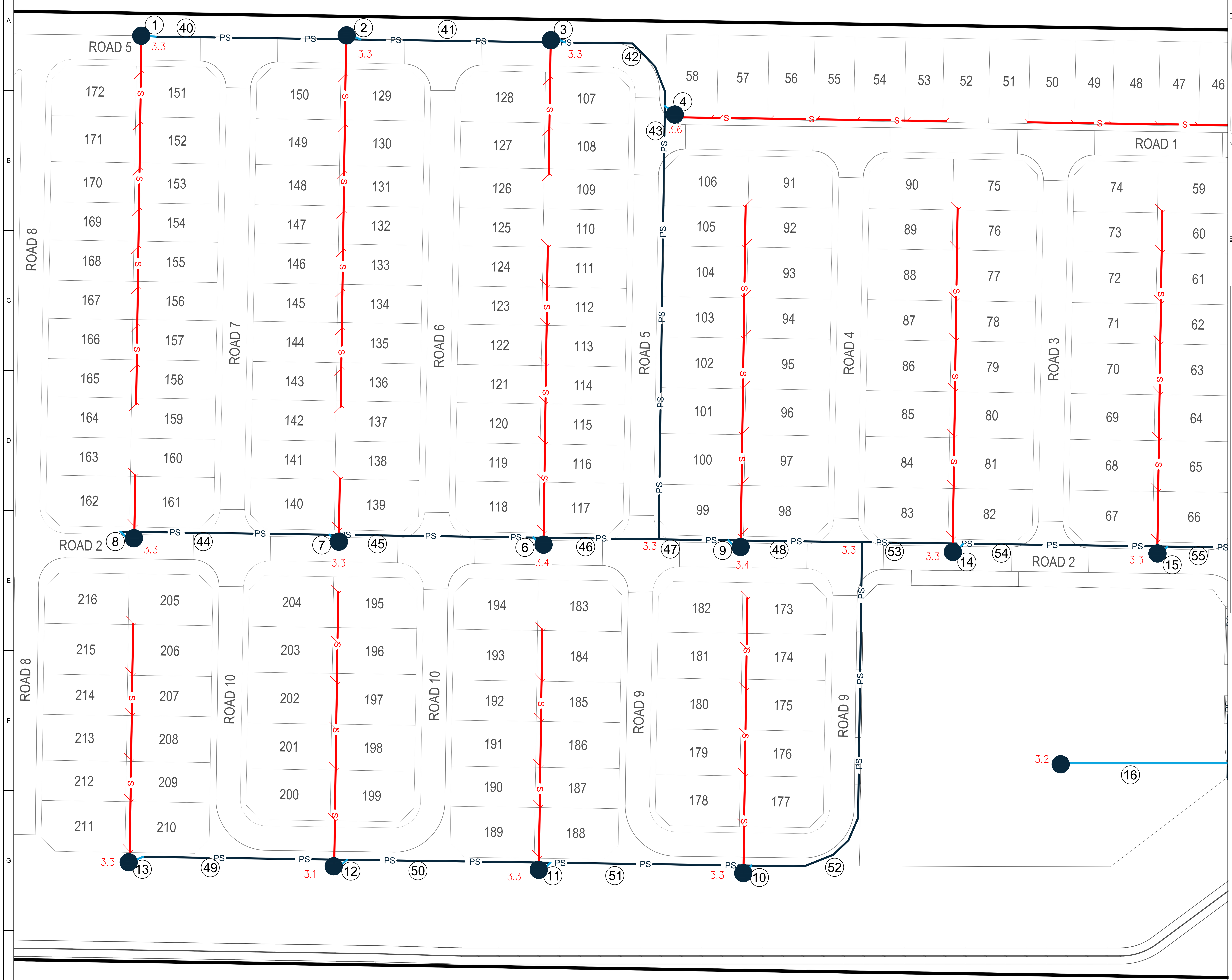
PIPE SEGMENT NUMBER	FLOWS INTO SEGMENT	NUMBER OF (EP)	ACCUM EP	MAX SIMULT. PUMPS	UPSTREAM RL OF SEGMENT	RL of LOW PUMP SEGMENT	DOWNSTREAM RL OF SEGMENT	PIPE LENGTH (METRE)	DESIGN FLOW (L/S)	PIPE OD (MM)	PIPE ID (MM)	DESIGN VELOCITY (M/S)	FRICTION FACTOR (M/100M)	FR LOSS THIS PIPE (METRE)	DOWNSTREAM HGL (METRE)	UPSTREAM HGL (METRE)	UPSTREAM RESIDUAL (METRE)	PUMP HEAD (METRE)	PIPE SEGMENT NUMBER	AVERAGE DAILY FLOW (LITRES)	SEGMENT RETENTION TIME	AVE HRS TO DISCHARGE	AIR WALSKI P	DS AV
62	63	0.0	540.1	4	2.8	1.0	3.0	22.8	7.00	90	73.0	1.67	4.43	1.01	6.93	7.94	5.14		62	97216	0.02	0.12	OK	
63	66	0.0	563.7	4	3.0	1.0	2.9	58.8	7.00	90	73.0	1.67	4.43	2.61	4.33	6.93	3.93		63	101469	0.06	0.09	26.46	
64	65	0.0	36.8	1	2.8	1.0	2.9	62.8	1.75	50	40.0	1.39	6.37	4.00	6.84	10.84	8.04		64	6615	0.29	0.46	OK	
65	66	0.0	47.3	1	2.9	1.0	2.9	39.4	1.75	50	40.0	1.39	6.37	2.51	4.33	6.84	3.94		65	8505	0.14	0.18	OK	
66	0	0.0	611.0	4	2.9	1.0	2.6	39.0	7.00	90	73.0	1.67	4.43	1.73	2.60	4.33	1.43		66	109974	0.04	0.04	16.32	

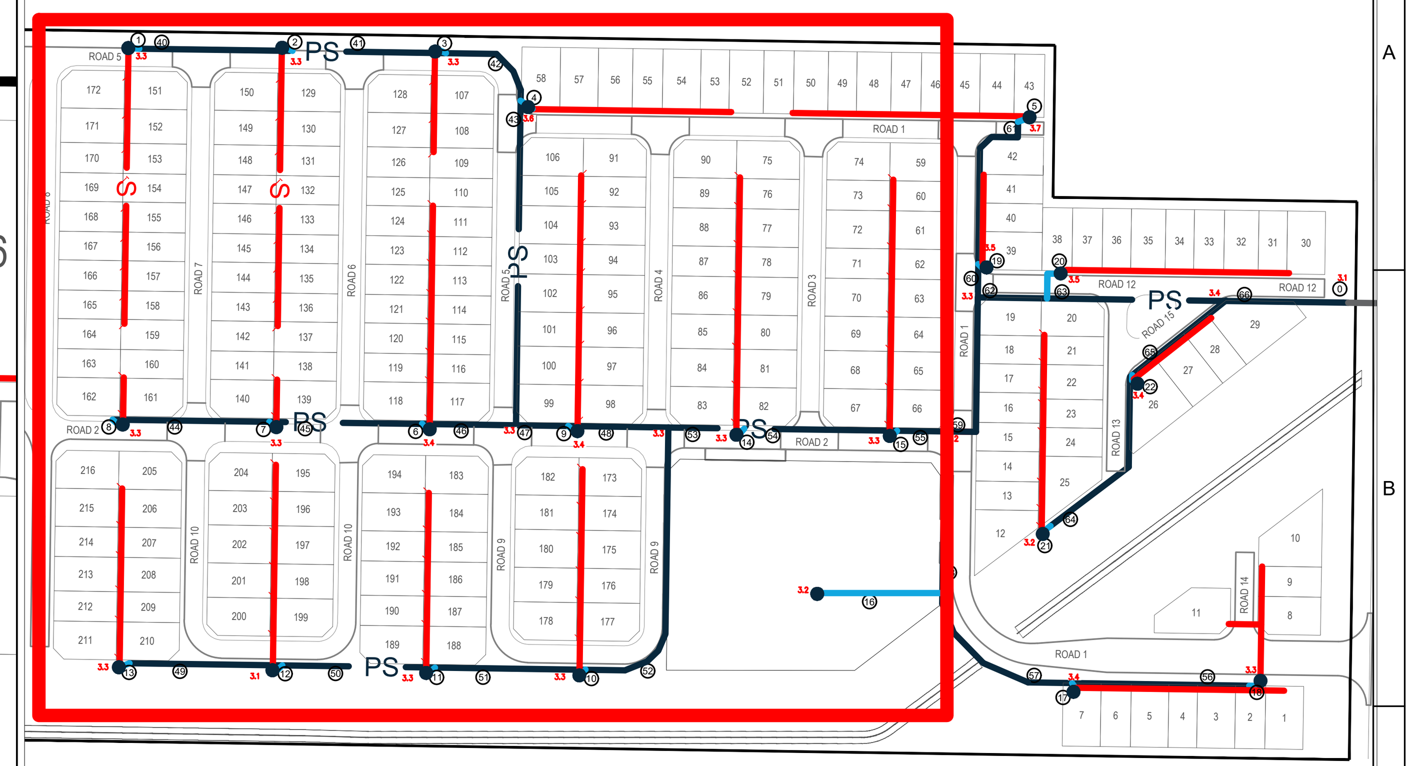
Appendix B – Reticulation Design Drawings

2 Provincial Crescent
Shepparton VIC 3630

T 1300 088 555
E info@aquatecenviro.com

aquatecenviro.com
Aquatec Fluid Systems | ABN 94 114 944 026





LEGEND:

●	PUMP STATION LOCATION
40 — PS — PS —	PRESSURE SEWER PIPE SEGMENT
1 — PS — PS —	ON PROPERTY SEGMENT
— S — S —	GRAVITY SEWER
— PS — PS —	EXISTING RISING MAIN

REV	REVISION DETAILS	DRN	CKD	APP	DATE	REF. NUMBER	REFERENCE DOCUMENT
0	ISSUED FOR REVIEW	C	SL	IA	09/08/23		

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2 Provincial Crescent, Shepparton VIC 3630
T 1300 088 555 / E info@aquatecenviro.com

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Scale 1 500

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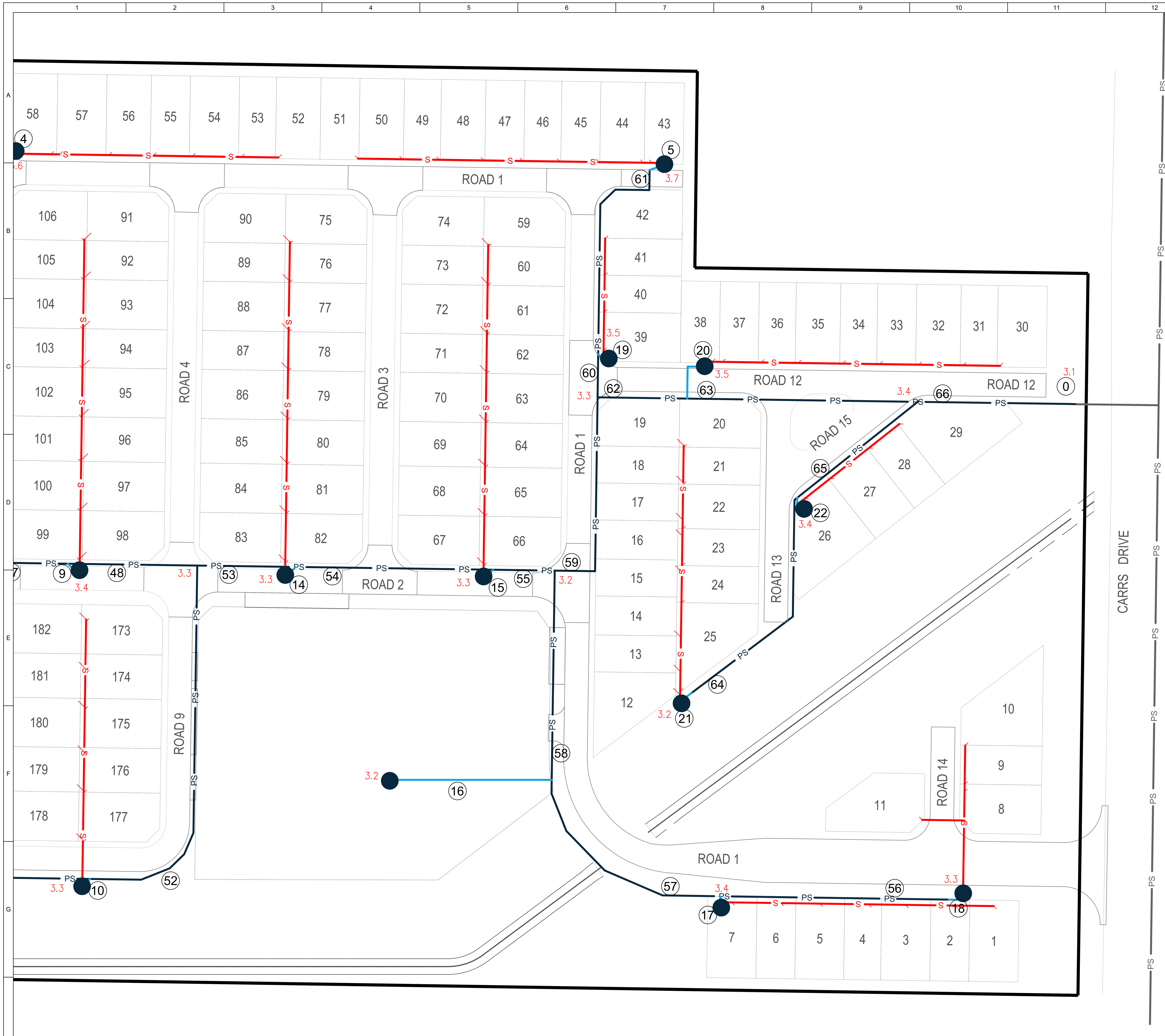
Original Size A1

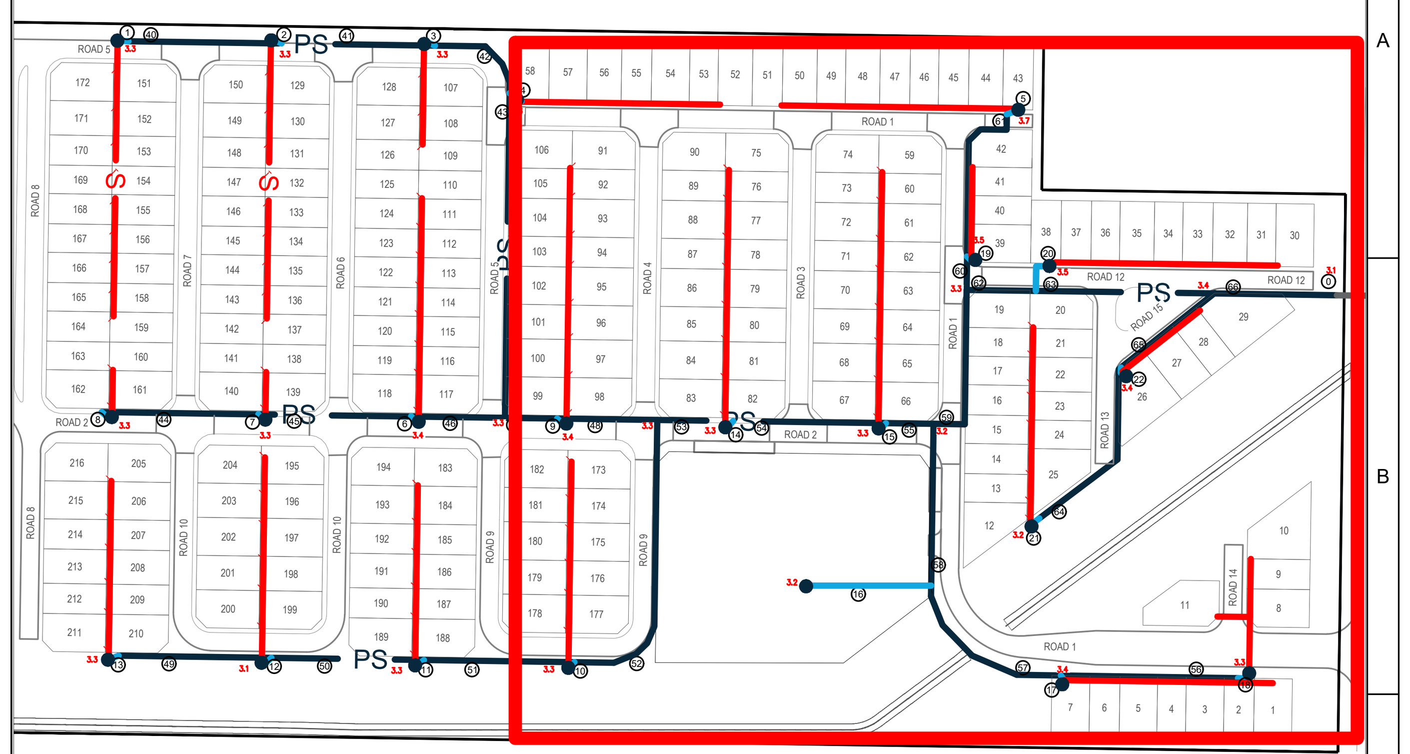
Client

Project Carrs Drive, Yamba - Pressure Sewer System

Title Segment Plan Layout - Sheet 1 of 2

Project Number | Customer Submission Status | Drawing Number | 0 Revision





LEGEND:

PUMP STATION LOCATION

PRESSURE SEWER PIPE SEGMENT (40, PS)

ON PROPERTY SEGMENT (1, PS)

GRAVITY SEWER (S)

EXISTING RISING MAIN (PS)

REV	REVISION DETAILS	DRN	CKD	APP	DATE	REF. NUMBER	REFERENCE DOCUMENT
0	ISSUED FOR REVIEW	C	SL	IA	09/08/23		

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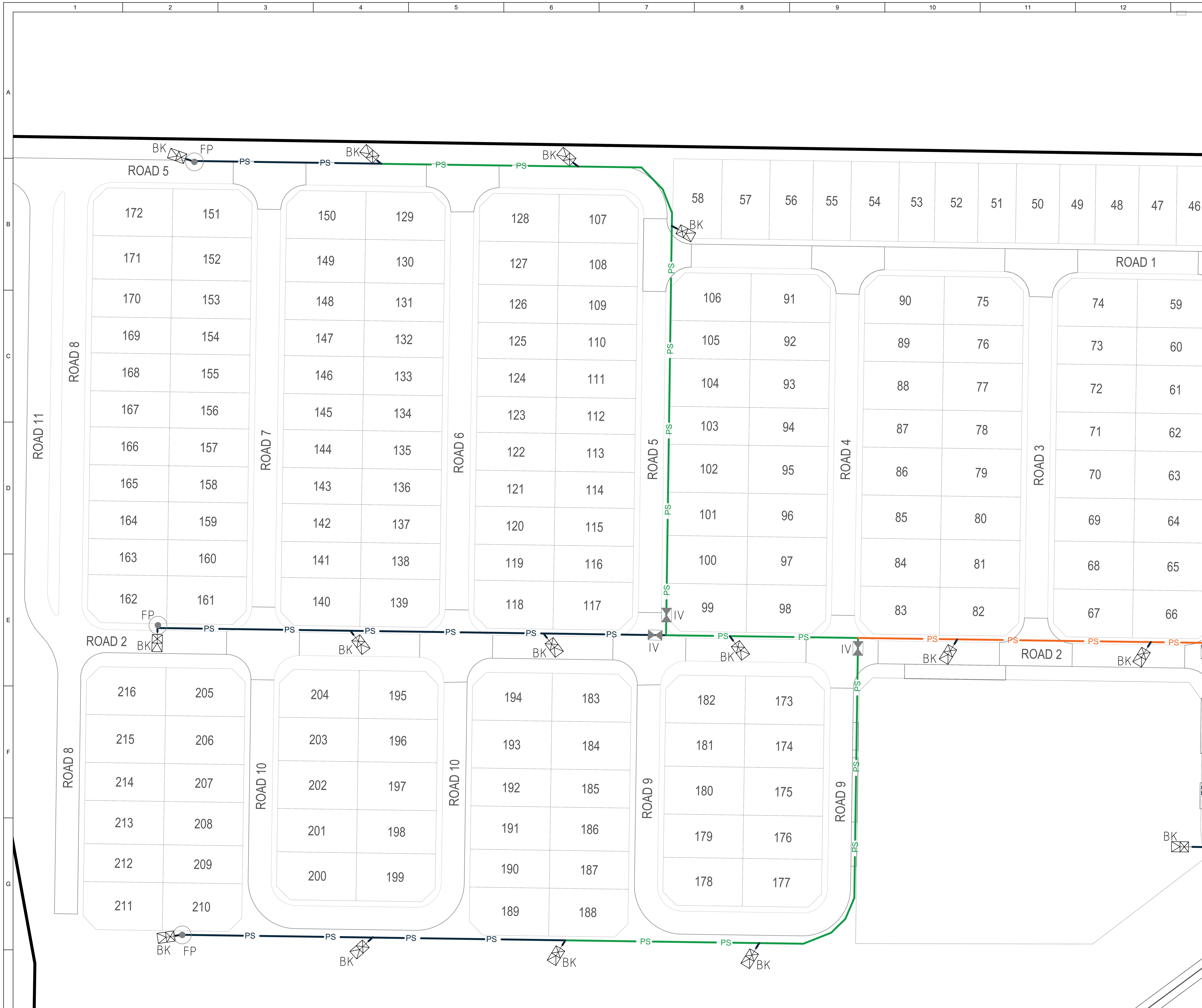
Client

Project Carrs Drive, Yamba - Pressure Sewer System

Title Segment Plan Layout - Sheet 2 of 2

Project Number	Customer Submission Status	Drawing Number	Revision
			0

Plot Date: 10/08/2023 Plotted by: Scott Lewis Cad File No: \\dcserver\CompanyShares\Design - Projects\15 Pressure Sewer\03 AUS\Carrs Drive, Yamba\02. Design\Carrs Drive, Yamba Drawings - R0i.dwg



NOTES:

1. DESIGN BASED ON INSTALLATION OF AQUATEC PRESSURE SEWER PUMP UNIT, AND IS NOT GUARANTEED VALID FOR INSTALLATION OF ALTERNATIVE SYSTEMS.
2. NO MODIFICATION SHALL BE MADE TO THE DESIGN WITHOUT EXPRESS APPROVAL IN WRITING OF THE DESIGNER.
3. ALL LPS PIPE TO BE PE100PN16 BLACK.
4. PRESSURE SEWER PIPELINES ARE SHOWN AT INDICATIVE OFFSETS ONLY. OFFSETS TO BE CONFIRMED AT TIME OF INSTALLATION BY THE SUPERVISING ENGINEER.
5. BOUNDARY KIT LOCATIONS SHOWN ON DRAWING ARE INDICATIVE ONLY AND SHALL BE CONFIRMED AT TIME OF INSTALLATION BY THE SUPERVISING ENGINEER.
6. PRESSURE SEWER PIPES TO BE INSTALLED IN ACCORDANCE WITH THE PRESSURE SEWERAGE CODE OF AUSTRALIA WSA 07-2007 -1.1
7. BOUNDARY CONNECTION KITS SHALL BE INSTALLED IN ACCORDANCE WITH WSA 07-2007-1.1 DWG PSS-1102 AND AQUATEC FLUID SYSTEMS DWG PE.SS.BC.STD.T7
8. ISOLATION VALVES SHALL BE INSTALLED IN ACCORDANCE WITH WSA 07-2007-1.1 DWG PSS-1005 AND AQUATEC FLUID SYSTEMS DWG IV.STD.T1.SS.
9. FLUSHING POINTS SHALL BE INSTALLED IN ACCORDANCE WITH WSA 07-2007-1.1 DWG PSS-1006 AND AQUATEC FLUID SYSTEMS DWG PE.FP.STD-T2

LEGEND:

PS	PROPOSED DN40 PRESSURE SEWER
PS	PROPOSED DN50 PRESSURE SEWER
PS	PROPOSED DN63 PRESSURE SEWER
PS	PROPOSED DN90 PRESSURE SEWER
IV	PROPOSED ISOLATION VALVE
FP	PROPOSED FLUSHING POINT
BK	PROPOSED BOUNDARY KIT
S	GRAVITY SEWER
PS	EXISTING RISING MAIN

REV	REVISION DETAILS	DRN	CKD	APP	DATE	REF. NUMBER	REFERENCE DOCUMENT
0	ISSUED FOR REVIEW	C	SI	IA	09/08/23		

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2 Provincial Crescent, Shepparton VIC 3630
T 1300 088 555 / E info@aquatecenviro.com

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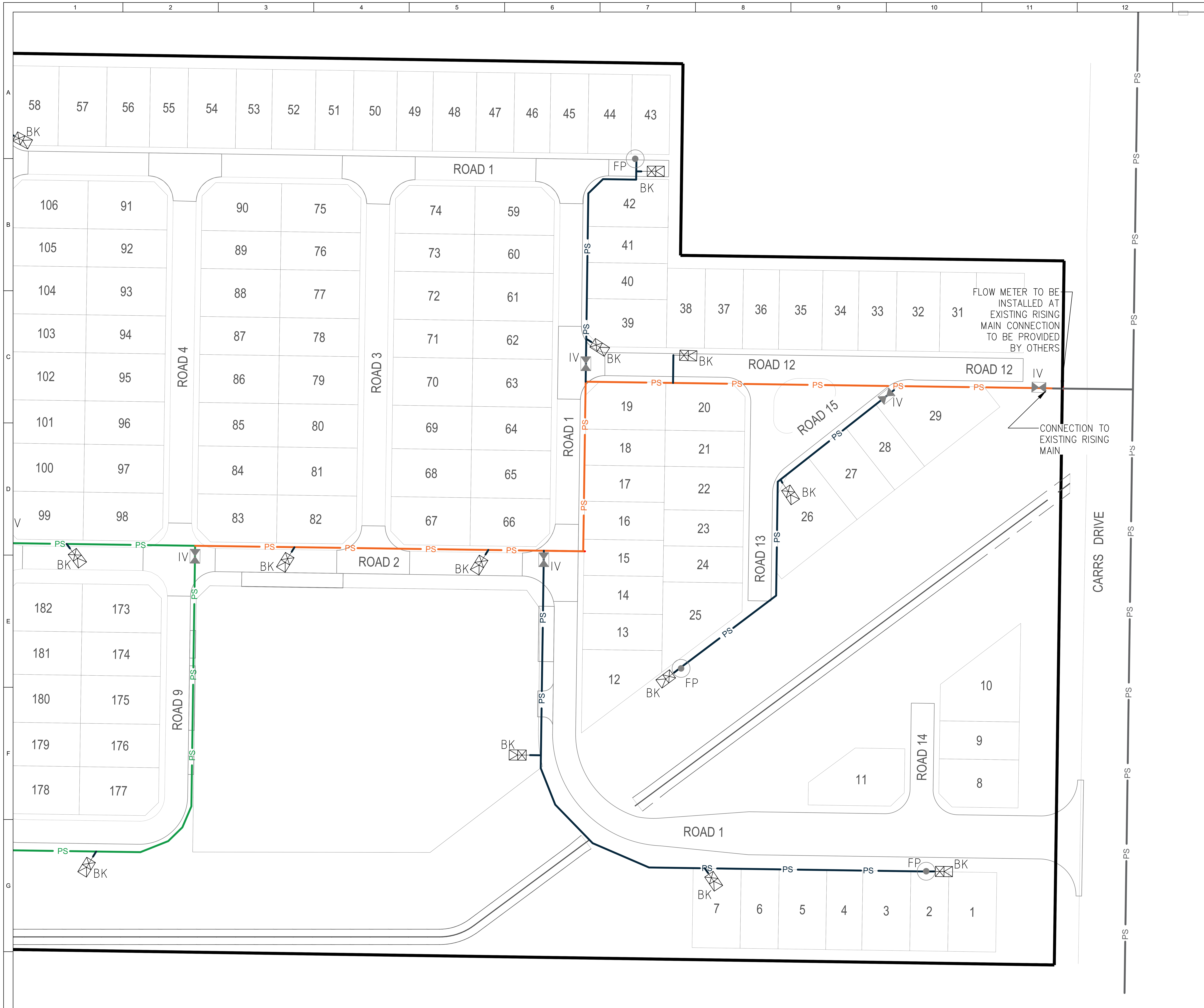
Client

Project Carrs Drive, Yamba - Pressure Sewer System

Title Network Plan Layout - Sheet 1 of 2

Project Number	Customer Submission Status	Drawing Number	Revision
			0

Plot Date: 10/08/2023 Plotted by: Scott Lewis Cad File No: \\dcserver\CompanyShares\Design - Projects\15 Pressure Sewer\03 AUS\Carrs Drive, Yamba\02. Design\Carrs Drive, Yamba Drawings - R0i.dwg



NOTES:

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9. FLUSHING POINTS SHALL BE INSTALLED IN ACCORDANCE WITH WSA 07-2007-1.1 DWG PSS-1006 AND AQUATEC FLUID SYSTEMS DWG PE.FP.STD-T2

LEGEND:

- PS — PROPOSED DN40 PRESSURE SEWER
- PS — PROPOSED DN50 PRESSURE SEWER
- PS — PROPOSED DN63 PRESSURE SEWER
- PS — PROPOSED DN90 PRESSURE SEWER
- IV — PROPOSED ISOLATION VALVE
- FP — PROPOSED FLUSHING POINT
- BK — PROPOSED BOUNDARY KIT
- S — GRAVITY SEWER
- PS — EXISTING RISING MAIN

REV	REVISION DETAILS	DRN	CKD	APP	DATE	REF. NUMBER	REFERENCE DOCUMENT
0	ISSUED FOR REVIEW	C	SI	IA	09/08/23		

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Original Size A1

Client

Project Carrs Drive, Yamba - Pressure Sewer System

Title Network Plan Layout - Sheet 2 of 2

Project Number | Customer Submission Status | Drawing Number | Revision 0

Plot Date: 10/08/2023 Plotted by: Scott Lewis Cad File No: \\dcserver\CompanyShares\Design - Projects\15 Pressure Sewer\03 AUS\Carrs Drive, Yamba\02. Design\Carrs Drive, Yamba Drawings - R0i.dwg

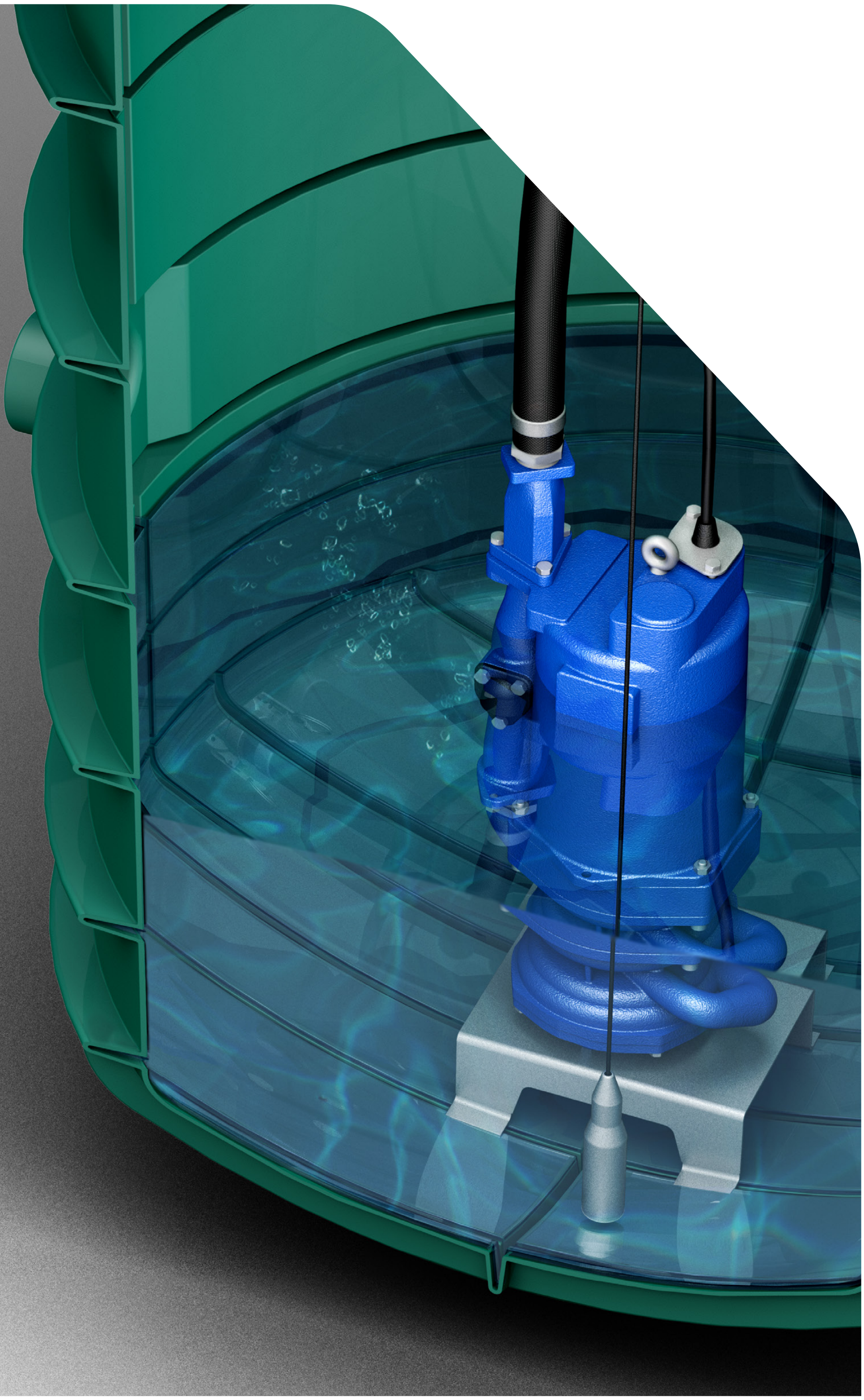
Appendix C – Product Drawings

Aquatec OGP+ Pump

Centrifugal 2-Stage Omni Grind Plus+

The Aquatec Omni Grind Plus+ is a 2-Stage Centrifugal design capable of heads up to 60 metres and flows to 1.8 litres per second.

The OGP is a superior pump with less wearing parts that require replacement or maintenance. It combines the high head capabilities of a turbine pump with the long life of a centrifugal grinder pump making the Omni Grind Plus+ the best choice for commercial and industrial pressure sewer applications.



Water Innovation Partners

T 1300 088 555
aquatecenviro.com

Aquatec OGP+ Pump

Uniquely Designed & Engineered

Designed & Engineered for

— Domestic
— Commercial
— Industrial

Superior Performance

— Patented 2-Stage pump design provides continuous high head capability without affecting pump life.
— Provides higher flows for commercial and industrial applications.
— Outlasts progressive cavity pumps by 6 times in extended wear tests.
— Less wearing parts
— Recessed vortex impellers

Efficient

— Can be used in any existing pressure sewer system which has been designed for use with progressive cavity pumps.
— 1.5kW, 230 or 400 volt, 50Hz continuously rated motor.

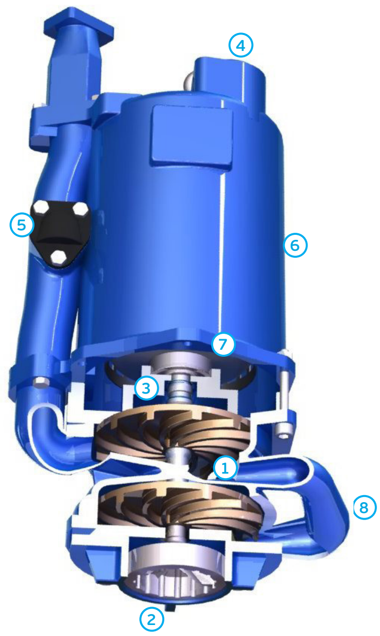
Long Life

— The OGP+ is a centrifugal grinder pump which are recognised for their reliable and trouble free operation. The OGP+ is a 2-Stage centrifugal design which provides twice the head of a single stage centrifugal.
— Exclusive Slicerator™ has superior grinding action which eliminates jams.
— Recessed impellers creates a vortex action, approximately 10% of the particles come into contact with the impeller, minimising component wear.
— 2-Stage design allows pump to run continuously at high or low heads with no damage.
— Extended wear tests up to 60 years of operation.
— Silicon carbide mechanical seals fitted to the OGP+ are excellent for coastal areas with high sand infiltration.
— Oil filled motor for superior cooling.
— Built in, automatic resetting overload protection extends motor life.

Extensively Tested Reliability & Capabilty

NSF / ANSI 46 Challenging Material

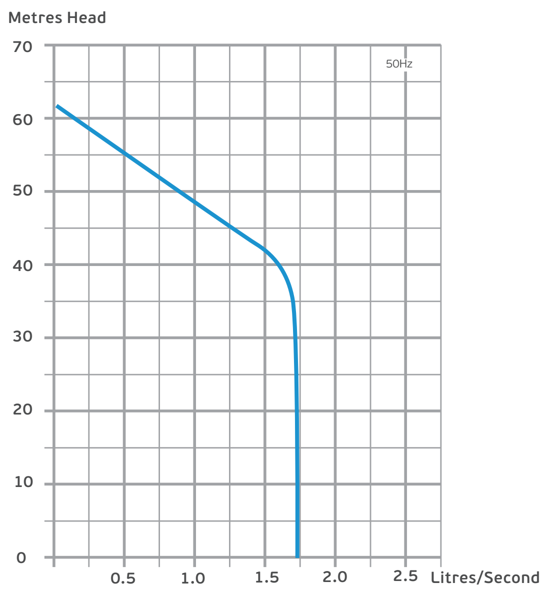
Toilet tissue	✓
Facial tissue	✓
Filter tip cigarette	✓
Egg	✓
Paper towel	✓
Personal hygeine products	✓
8 oz. chlorine laundry bleach	✓
Cotton swab w/ plastic stick	✓
Large disposable diaper	✓
Adhesive bandage, wrapper	✓
Dental floss, 12 inches	✓
8 oz, alkali drain cleaner	✓
Handi-Wipe or equivalent	✓
4 oz. liquid animal fat	✓
One pair large panty hose	✓
Wet cloth diaper	✓
Toothbrush	✓
Wood pencil	✓
Plastic table utensil	✓
Metal bottle cap	✓
HDPE bottle cap	✓
Metal car toy	✓
Crushed 8oz drinking glass	✓



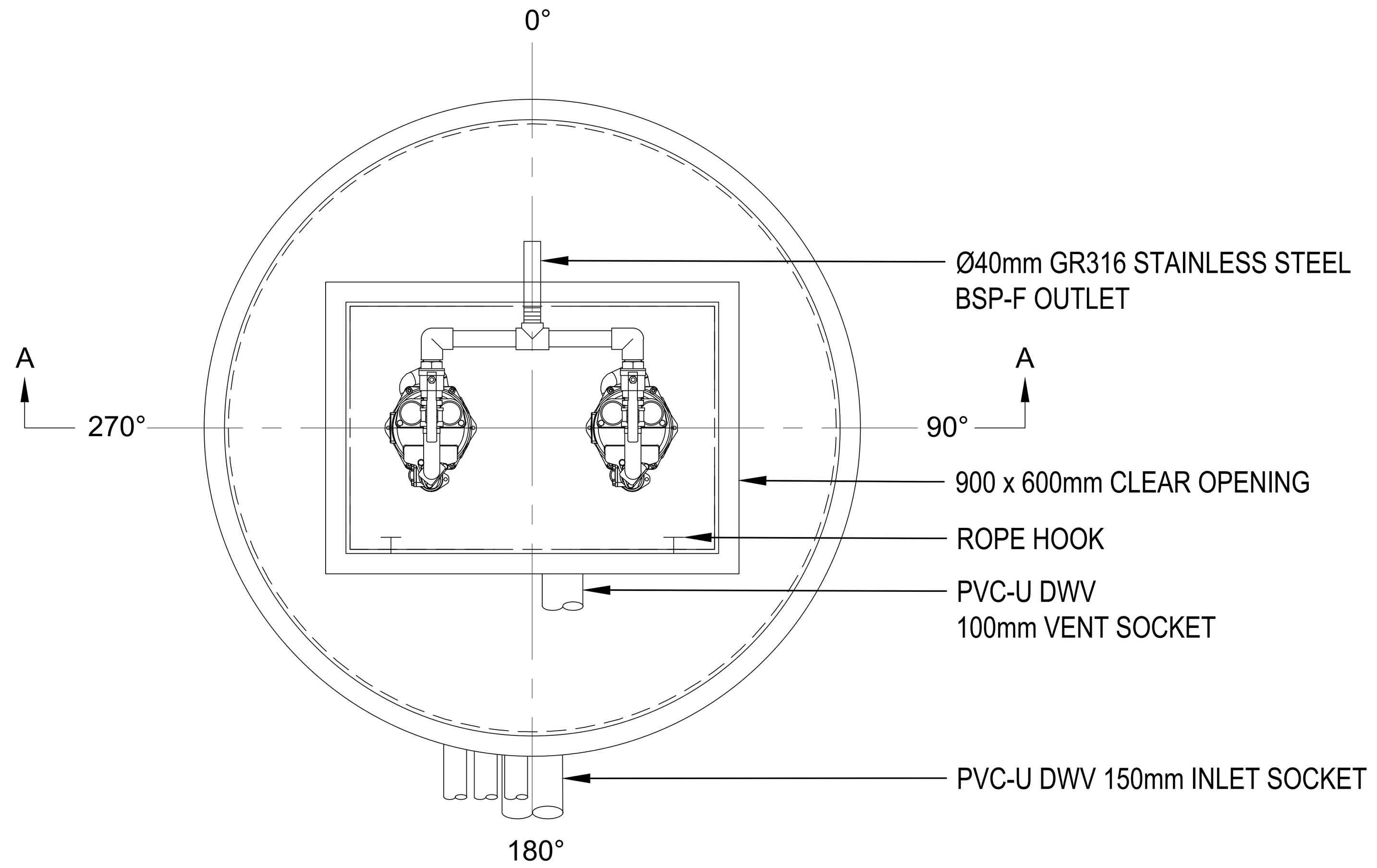
Aquatec OGP+ Features & Benefits

1. 2-Stage recessed vortex impellers for solids handling and high head performance.
2. Exclusive Slicerator™ -The staggered slicing action of the grinder eliminates clogging with particularly troublesome objects.
3. Long life silicon carbide mechanical seal.
4. Quick disconnect cord.
5. Inbuilt anti-syphon and check valves.
6. Oil filled motor with overload protection.
7. Angular contact bearings 100,000 hour L-10 rating.
8. Interstage passage.

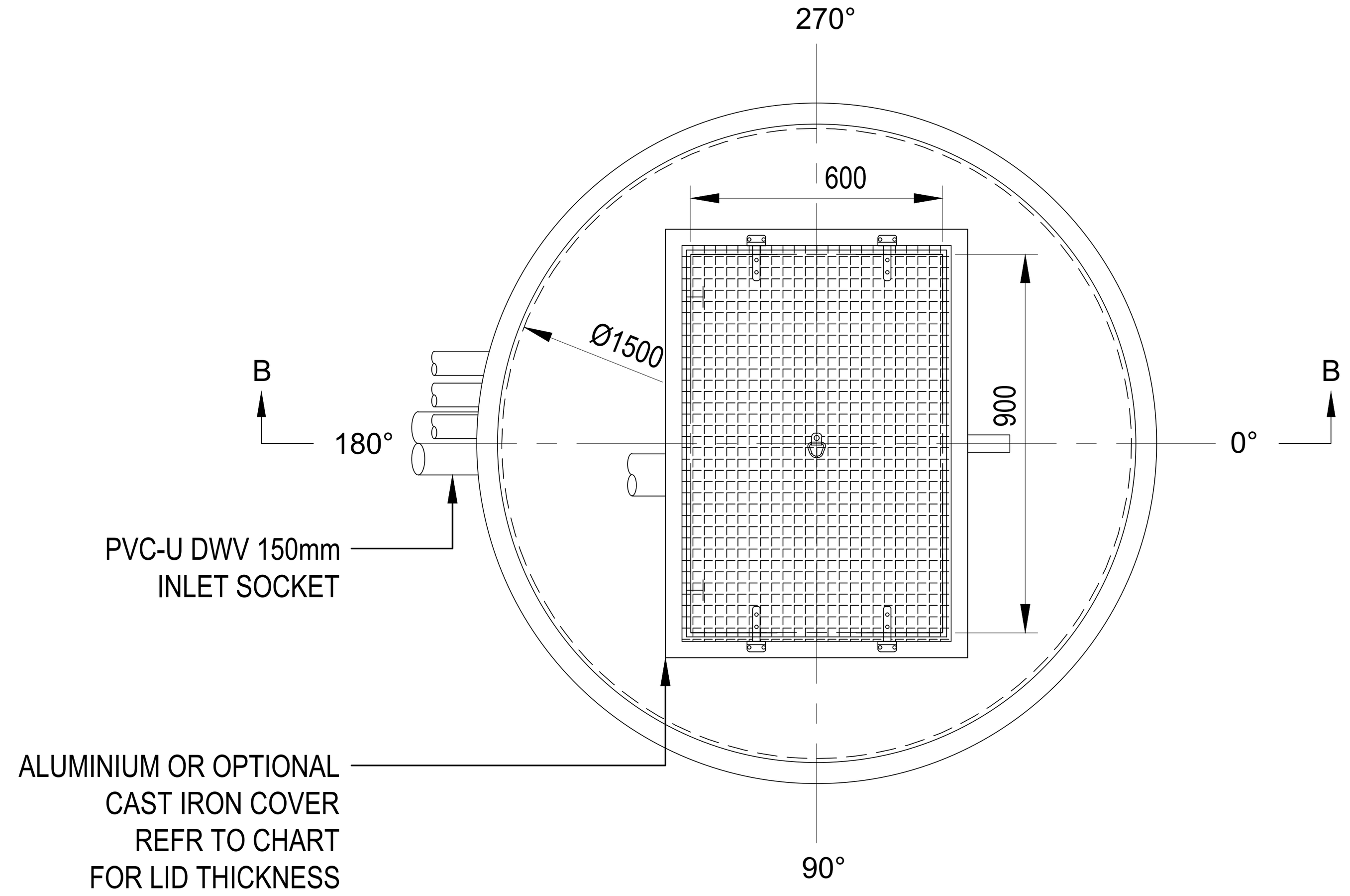
Performance Curve



LID RATING	LID THICKNESS
CLASS A	125mm
CLASS B	55mm
CLASS D	105mm



PLAN VIEW - LID REMOVED
SCALE 1:15



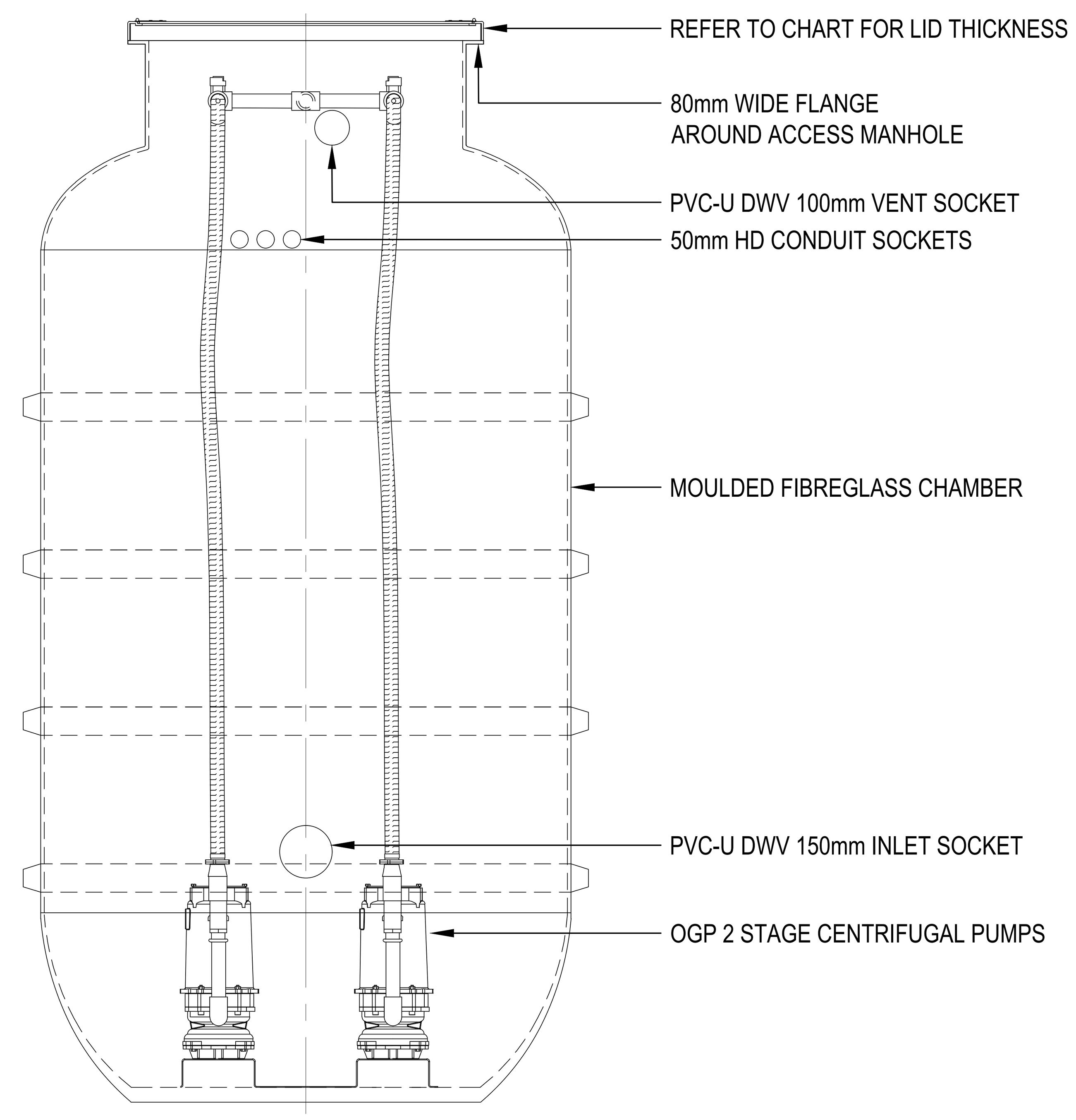
PLAN VIEW
SCALE 1:15

TANK SPECIFICATION

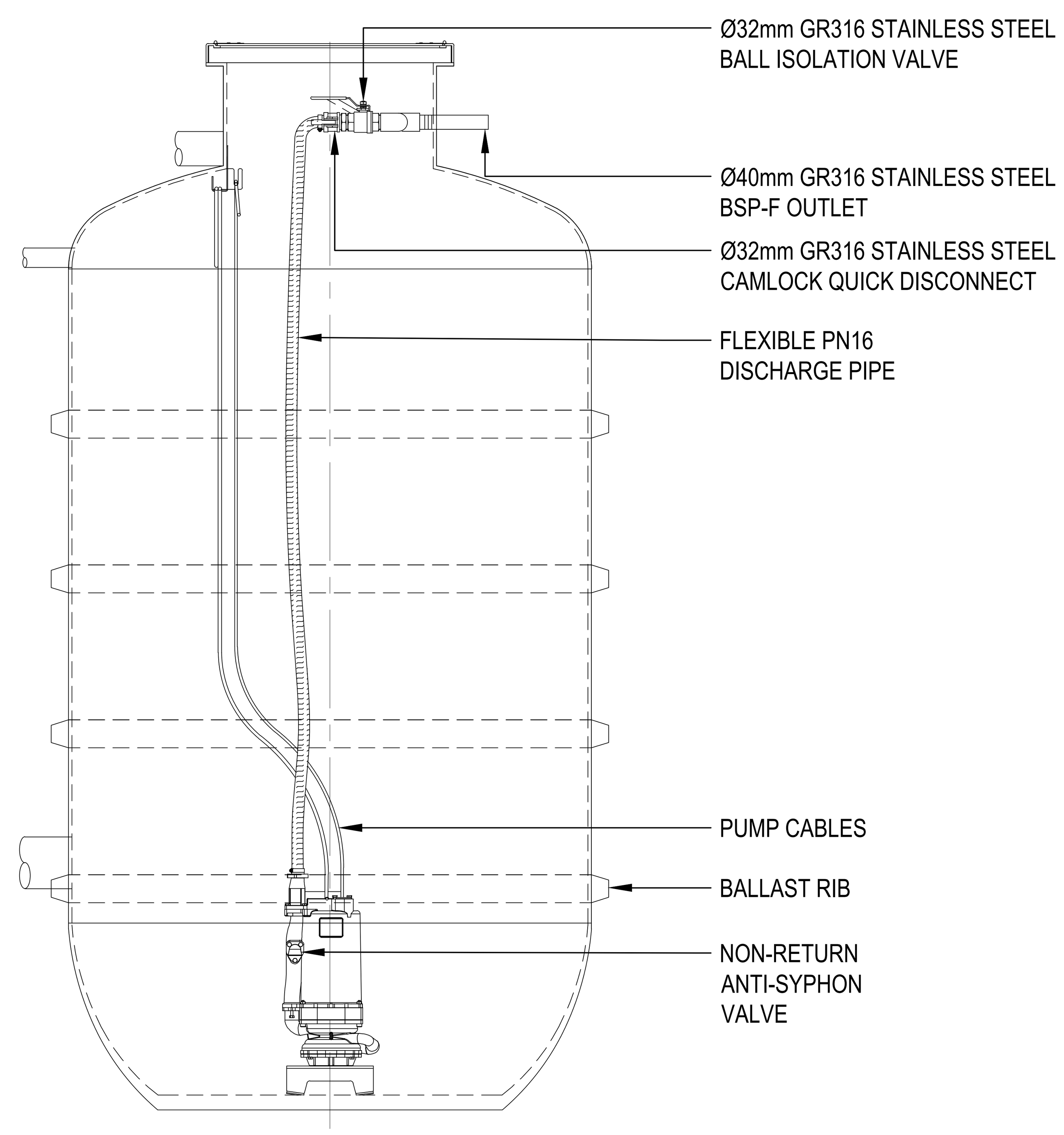
DESIGN SPECIFICATION	
TOTAL VOLUME	TBC kL
DESIGN TEMPERATURE	45°C
CONTENTS	SEWER
CORROSION ALLOWANCE	3mm CORROSION BARRIER
SPECIFIC GRAVITY	1.0t/m³
STRUCTURE	FILAMENT WOUND
MATERIAL SPECIFICATION	
SHELL	GRP
ENDS	GRP
MANHOLE	GRP
SURFACE FINISHES	
INTERNAL COATING	CHEMICAL RESISTANT RESIN
EXTERNAL COATING	ISOPHTHALIC FLOWCOAT
COLOUR	MIST GREEN

NOTE:

1. HEAVY DUTY (ENGINEERED FOR FULL WATER TABLE)



SECTION A - A
SCALE 1:15



SECTION B - B
SCALE 1:15

0 300 600 900 1200 1500mm
SCALE 1:15 mm

REV	REVISION DETAILS	DRN	CKD	APP	DATE	REF. NUMBER	REFERENCE DOCUMENT
P1	ISSUED FOR CLIENT REVIEW	SL			11/08/23		

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www.aquatecenviro.com
ABN - 94 114 944 026
2 Provincial Crescent, Shepparton VIC 3630
T 1300 088 555 / E info@aquatecenviro.com

AQUATEC

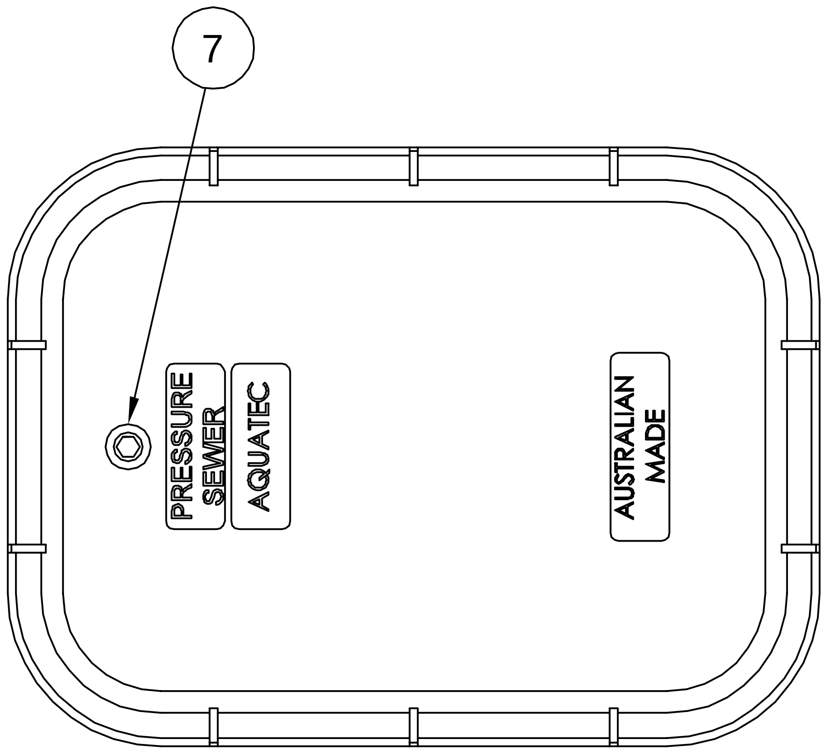
Drawn	CV
Checked	YH
Approved	TS
Scale	AS SHOWN

This Drawing must not be used for Construction unless signed as Approved

Original Size: A1

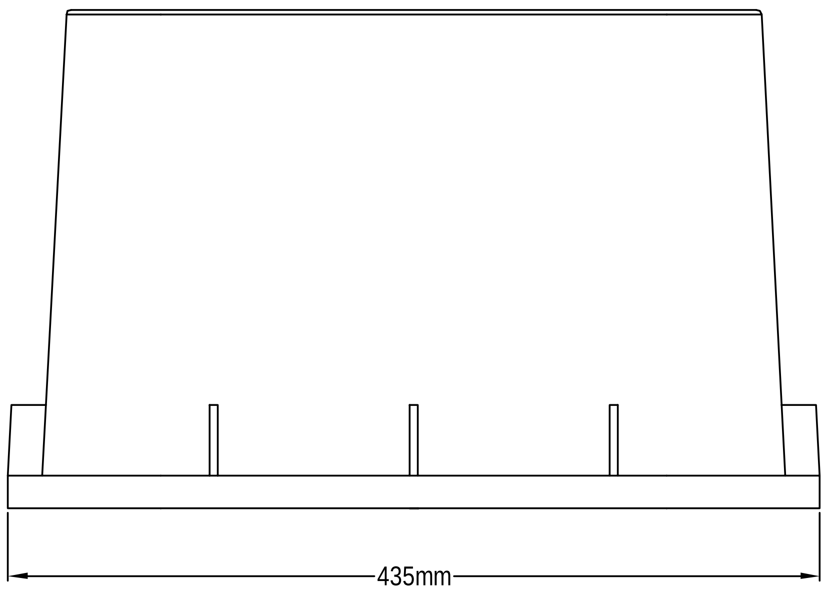
Client: PRESSURE SEWER PUMP UNIT
Project: DUPLEX OGP
JOB: FREE STANDING MODEL
Title

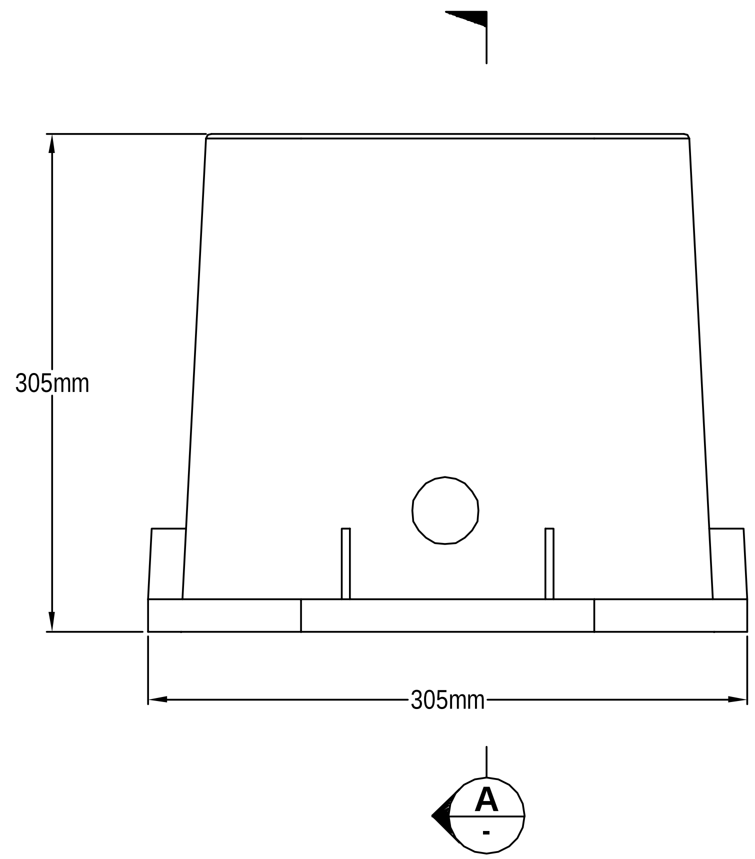
Project Number	Customer Submission Status	Drawing Number	Revision
F.D.O.FS	ISSUED FOR REVIEW (IFR01)	F.D.O.FS	P1

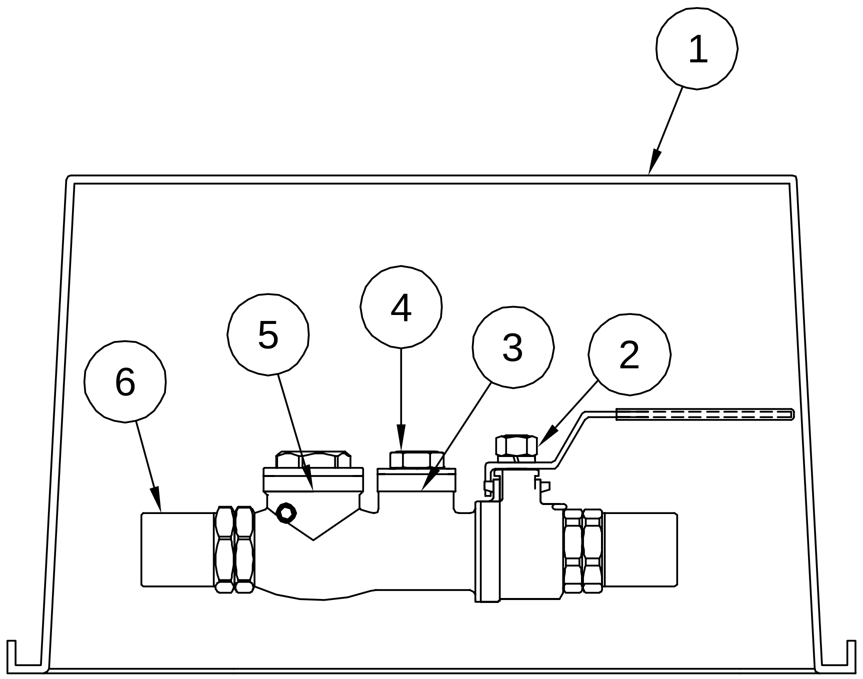


	FITTING SCHEDULE
1	POLYETHYLENE PIT WITH COVER, CLASS A
2	GR316 S/S BALL VALVE, FULL BORE
3	GR316 S/S PUMP OUT TEE
4	GR316 S/S PLUG
5	GR316 S/S SWING CHECK VALVE, FULL BORE
6	PE MALE THREAD ADAPTER
7	GR316 S/S BOLT

NOTE:
- FITTINGS 2 to 5 ARE A ONE PIECE VALVE ASSEMBLY
- ITEM 6 ALSO AVAILABLE IN BRASS AND 316 S/S







SECTION A -

REV	AMENDMENT	APP	DATE
C	AMENDED FOR ISSUE	BMA	08-03-19
B	AMENDED FOR ISSUE	JDS	31-05-18
A	GENERAL REVISION	LHH	28-03-17

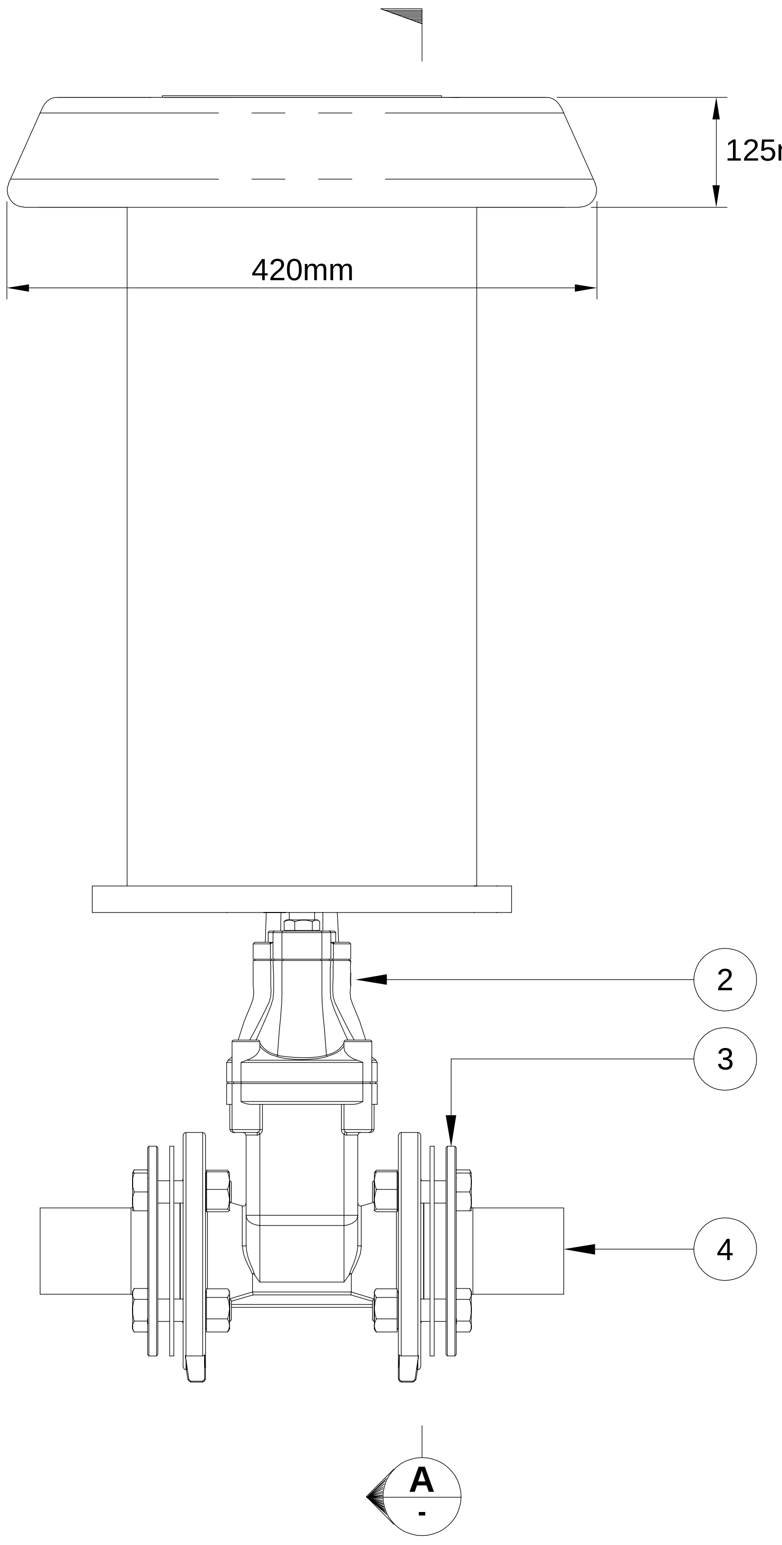
Aquatec Fluid Systems PTY LTD / ABN - 94 114 944 026
2 Provincial Crescent, Shepparton VIC 3630
T 1300 088 555 / E info@aquatecenviro.com.au

AQUATEC

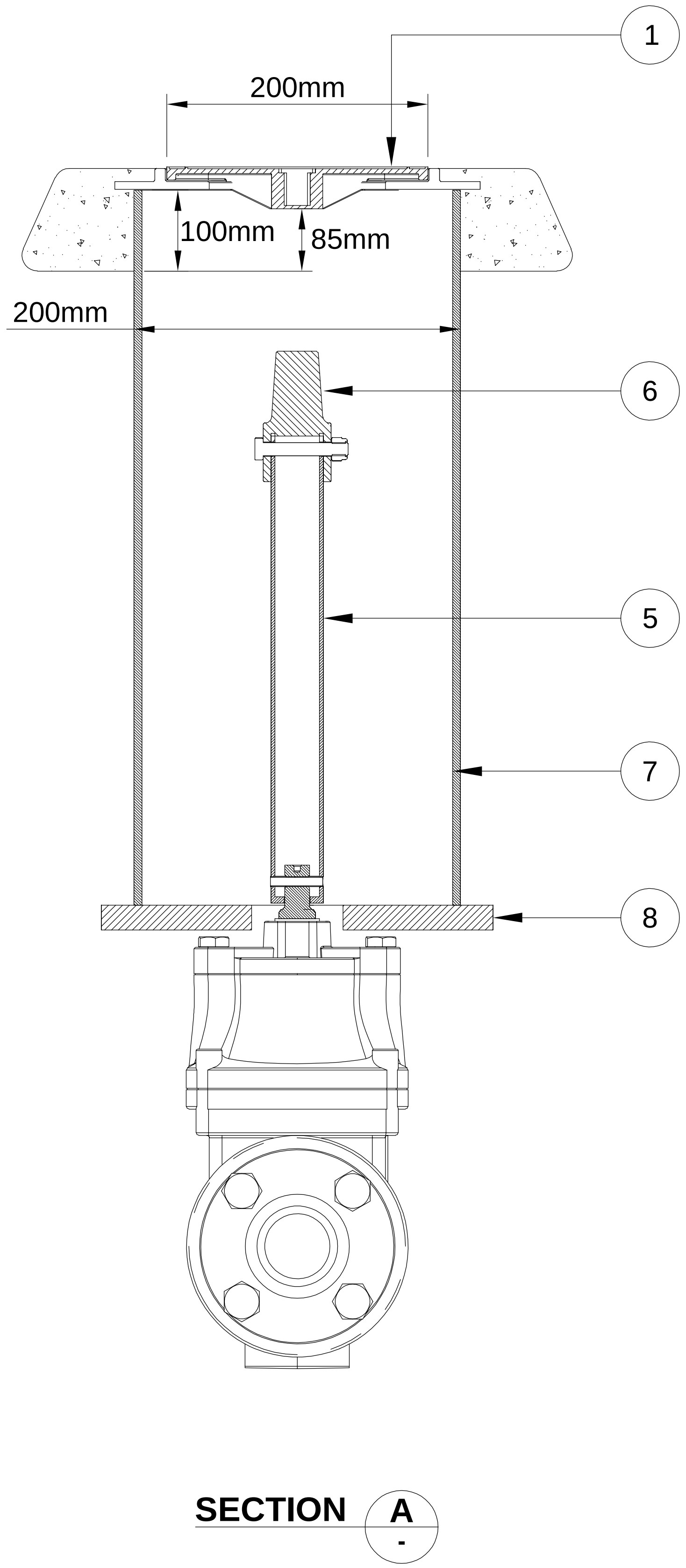
Designed - AQT
Drawn - JDS/BMA
Approved - LHH
Scale - NTS @ A1

AQUATEC
BOUNDARY CONNECTION ASSEMBLY
TYPE 7

Drawing No.	Revision	File Location / Name
PE.SS.BC.STD-T7	C	



NOT TO SCALE

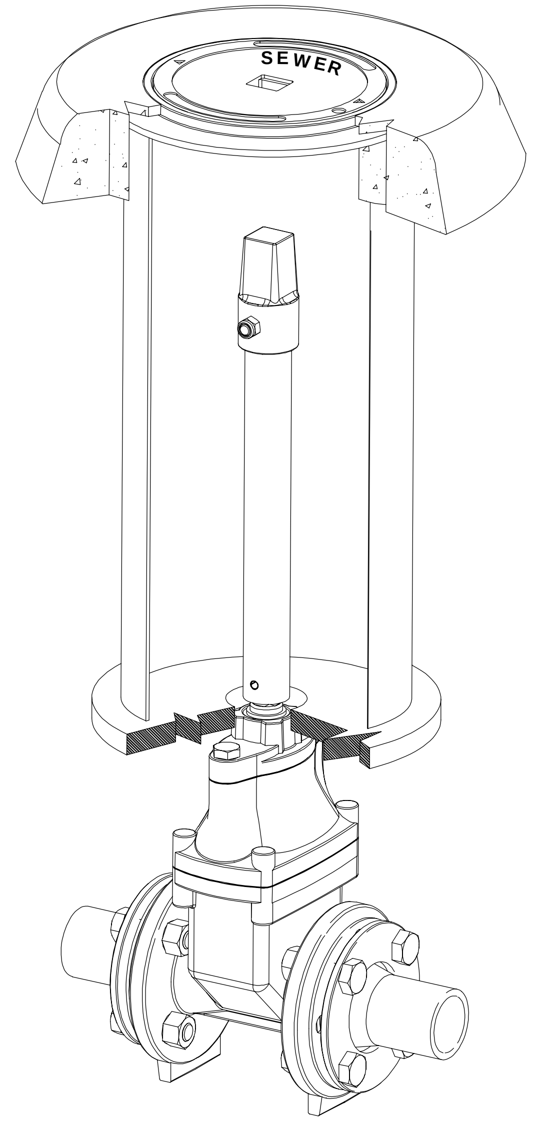


SECTION A -

NOT TO SCALE

NOTES:

1	CAST IRON TWIST LOCK COVER IN CONCRETE SURROUND
2	FUSION BONDED, EPOXY COATED & RESILIENT SEATED ISOLATION VALVE
3	GR316 S/S BACKING RING AND BOLTS
4	POLYETHYLENE LONG SPIGOT STUB
5	GR316 S/S EXTENSION SPINDLE (OPTIONAL)
6	FUSION BONDED EPOXY COATED STEEL EXTENSION SPINDLE CAP
7	PVC PIPE (BY OTHERS)
8	HARDWOOD BASE (BY OTHERS)



REV	AMENDMENT	BY	APP	DATE
A	GENERAL REVISION	JG	TS	22/11/2021

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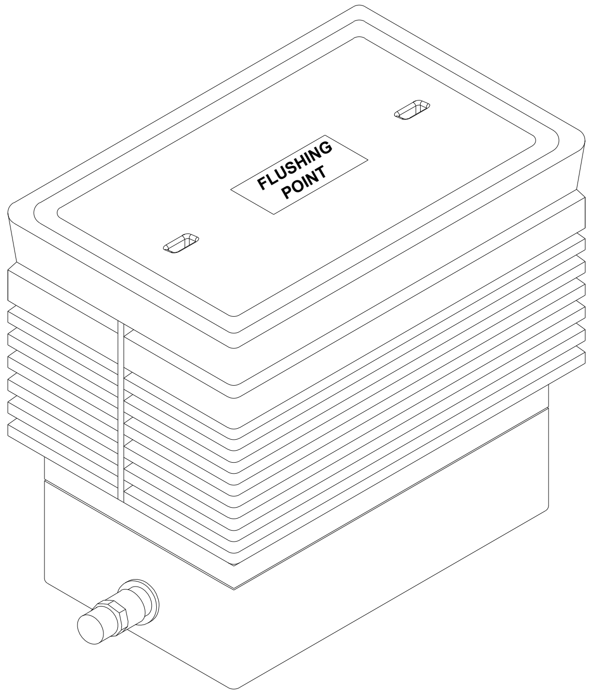
AQUATEC

Designed - AQT
Drawn - KWJ
Approved - LHH

AQUATEC
ISOLATION VALVE ASSEMBLY

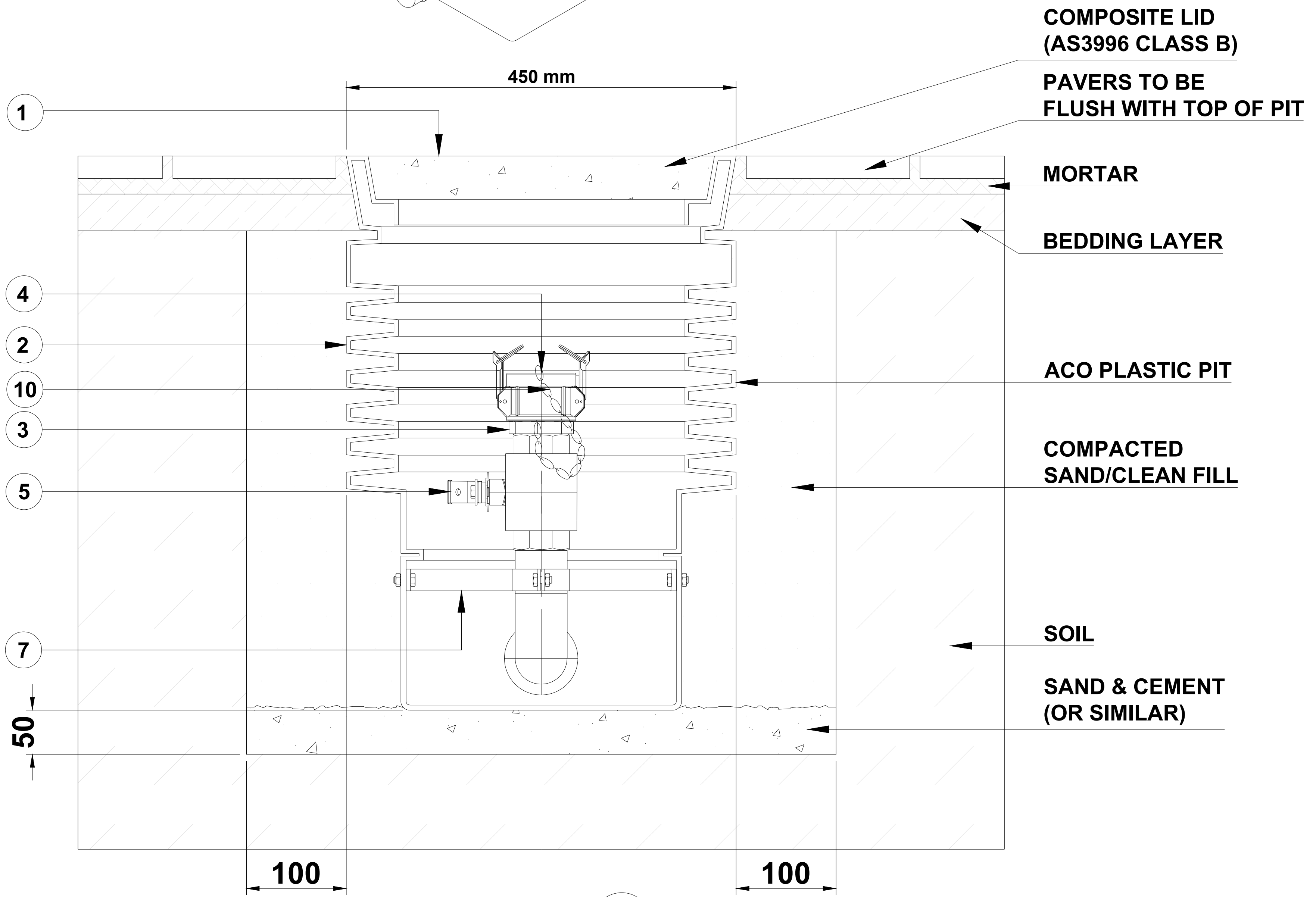
Scale - NTS @ A1

Drawing No.	Revision	File Location / Name
IV.STD.T1.SS	A	

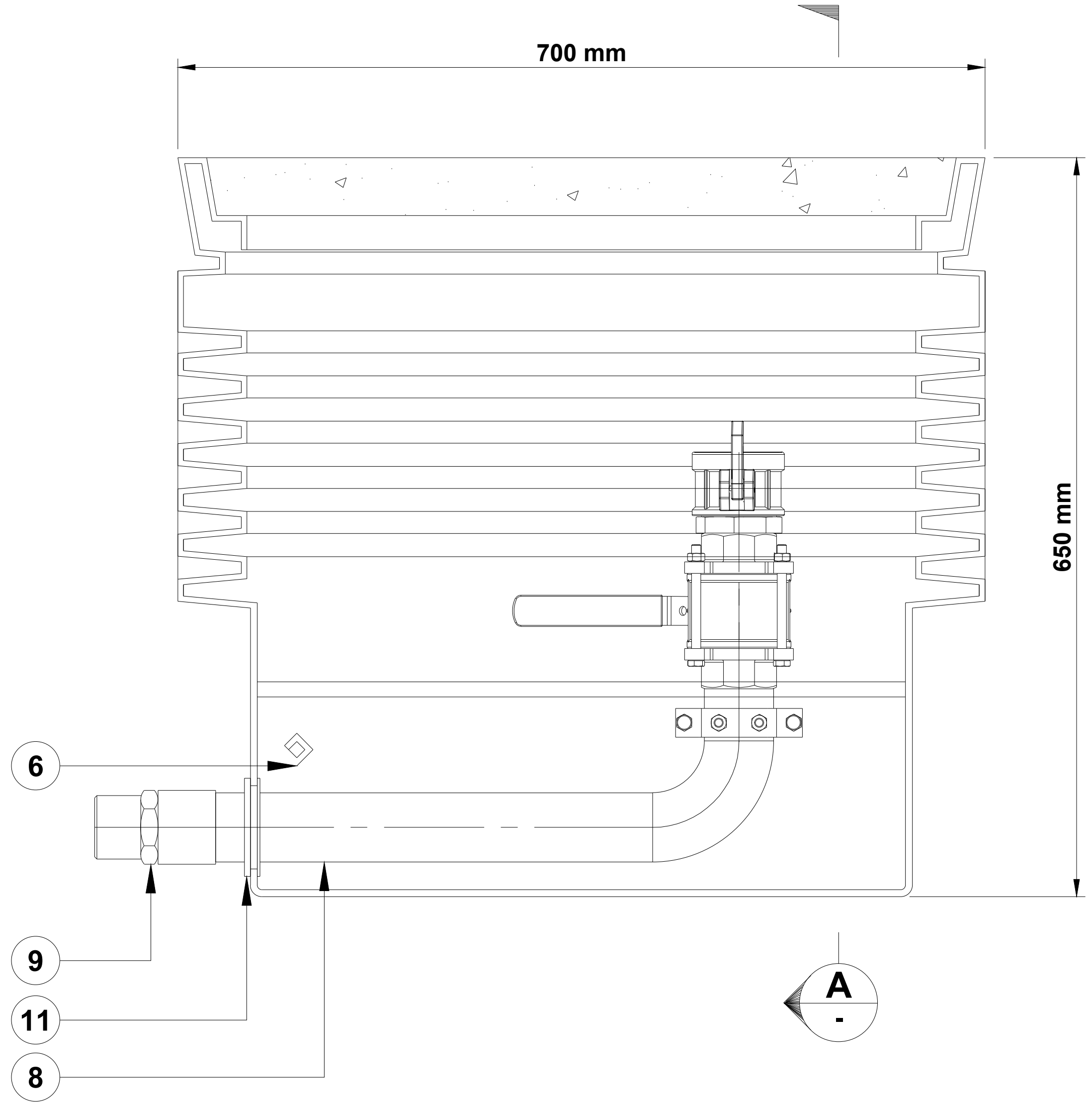


NOTES:

1	COMPOSITE 'CLASS B' COVER TO SUIT (AS3996)
2	POLYETHYLENE PIT
3	POLYETHYLENE MALE CAMLOCK
4	POLYETHYLENE FEMALE CAMLOCK DUST CAP
5	GR316 S/S BALL VALVE, FULL BORE, LOCKABLE EYELET
6	GR 316 S/S TRACER WIRE (BY OTHERS)
7	GR316 S/S PIPE SUPPORT BRACKET
8	GR316 S/S PIPEWORK
9	POLYETHYLENE TRANSITION COUPLER (CONNECTION BY CIVIL CONTRACTOR)
10	GR316 S/S CHAIN
11	RUBBER UNISEAL
12	FITTINGS & MATERIALS TO BE IN ACCORDANCE WITH AUSTRALIAN STANDARDS



SECTION A -



REV	AMENDMENT	BY	APP	DATE
B	GENERAL REVISION	SL	HH	17/02/23
A	GENERAL REVISION	JDS	IS	20/02/14

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2 Provincial Crescent, Shepparton VIC 3630

T 1300 088 555 / E info@aquatecenviro.com.au

AQUATEC

Designed - AQT
Drawn - SL
Approved - HH
Scale - NTS @ A1

AQUATEC

FLUSHING POINT ASSEMBLY

TYPE 2

Drawing No.	Revision	File Location / Name
PE.FP.STD-T2	B	

AQUATEC

OmniSmart Controller

—

Water Innovation Partners

—

Australia 1300 088 555
New Zealand 0800 756 543
> aquatecenviro.com


The ultimate range in pump control

How our 'Smarts' in OmniSmart Benefit You:

Protects and enhances the life of your pump by:

— Monitoring the motor current and mains voltage to ensure these remain within the safe operating ranges
— Preventing excessive starts and long run times, extending the life of your pump
— Limiting excessive 'idle-time', consequently reducing the potential of seizing and the need for unscheduled maintenance
— Protecting your pump against dry running, thereby preventing damage to pump
— Giving an over pressure protection in case of a blocked pipe or excessive pressures in the reticulation network.

Protects and maintains the reticulation system by:

— Creating daily 'flushing waves' which scour the inside of the pipe, preventing slime build-up and eliminating unnecessary maintenance and potential blockages
— Prioritises operation in a 'controlled' state after power failure, based on the effluent levels in each tank or by staggering 'pre-set' on times, which automatically turns pumps on. This controls the start-up sequence and minimises excessive pressures in the reticulation caused by all pumps starting up together in an 'uncontrolled' state
— Improves flow and minimises retention issues through diurnal (daily) flow modification, by staggering operation and storing effluent in tanks with the flow being metered out on a timed basis
— Over pressure protection to prevent damage to pipework, joins, and valves.

Our promise is to save you costs by:

— Being able to upgrade and/or reconfigure the OmniSmart in the future if your requirements or desires change
— Having the ability to diagnose faults and correct them remotely without attending site
— Giving you event history to help identify problems or long-term trends such as additional water costs through leaking taps etc.
— Giving you the choice to only operate at designated periods of the day, to provide you the ability to:
    a. Choose a cheaper power tariff (time of day) or self-consuming solar power alternative
    b. Avoid downstream infrastructure upgrades due to capacity issues - all of which has to be funded.

OmniSmart Feature Matrix

Features	500	1000A	1000B	6000A	6000B	6000C
Certified to all Australian and New Zealand Standards	●	●	●	●	●	●
Key lockable IP66 polycarbonate enclosure	●	●	●	●	●	●
Backing plate for easy mounting on wall or post	●	●	●	●	●	●
90Db audible alarm with automatic mute	●	●	●	●	●	●
External mute button for audible alarm	●	●	●	●	●	●
Single Pump Control	●	●	●	●	●	●
High-level alarm (low voltage) LED strobe light	●	●	●	●	●	●
Automatic and manual pump modes	●	●	●	●	●	●
Microprocessor based operation with upgradeable firmware	●	●	●	●	●	●
LED system status indication	●	●	●	●	●	●
Compatible with level switches or hydrostatic transducer	+	●	●	●	●	●
Back up high level switch compatible	●	●	●	●	●	●
Adjustable Over Pressure Protection	●	●	●	●	●	●
Motor current monitoring and protection for both low and high amps	+	●	●	●	●	●
Brown out/Low voltage protection		●	●	●	●	●
High voltage protection		●	●	●	●	●
Real time Clock (date and time)		●	●	●	●	●
Pump protection from Anti-seize, excessive run time and motor starts		●	●	●	●	●
Adjustable pump and alarm activation points		●	●	●	●	●
Adjustable Alarm delays		●	●	●	●	●
Internal memory with status history (last 4000+ events including motor state, adjustable fluid levels granularity, configurational changes and alarms)		●	●	●	●	●
USB Plug and Play administration interface and history		●	●	●	●	●
SCOP Compatible for improved system health and diurnal curve flattening.		●	●	●	●	●
Controller behaviour and activation based on time of day		●	●	●	●	●
Adjustable start delay after power failure based on fluid levels		●	●	●	●	●
Automatic scouring, time delay, and storage modes		●	●	●	●	●
Output to control external devices		●	●	●	●	●
Battery Backup for Alarms, fluid levels, history, and telemetry/SMS.		•	●	●	●	●
Hours run and pump start counter *		*	●	●	●	●
Backlit LCD screen for system status, diagnostics and liquid level			●	•	•	•
Telemetry/SCADA RS485 and RS232 MODBUS				●	•	•
Telemetry/SCADA 3G Cellular and DNP3					●	•
Telemetry/SCADA WiFi/Ethernet and DNP3						●
SMS notifications, remote diagnostics, pump control and set point control/ adjustment					●	•
Email Alarm notifications					●	●
FTP support of historical event data transfer					●	●
LPWAN/IoT Integration				•	•	•

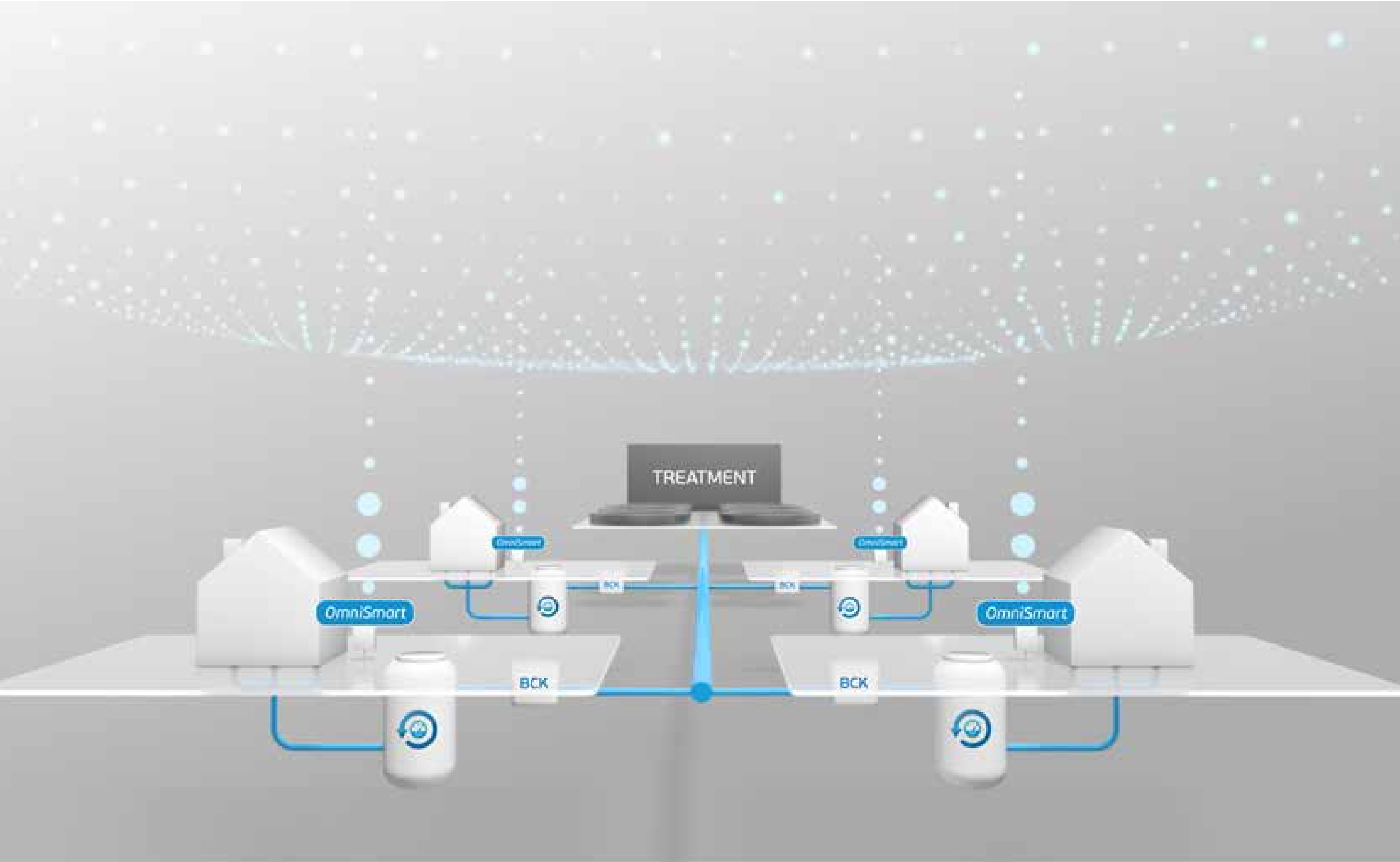
Note: Designed for use with most technology manufacturers' equipment (retrofittable)

● Standard
• Optional
* Available via USB on 1000A
+ Level switches and high amp protection only

Driving innovation

"We are living in a world which is becoming more and more connected, with the vast majority of homes globally having access to the internet. The IoT (Internet of Things) is opening up functionality which has previously only been allocated to big SCADA platforms and large Water Authorities, due to the cost and complexity of infrastructure. Now, the value proposition for councils, developers, body corporates, and even home owners themselves has increased through IoT. With IoT's ability to receive fault notifications and provide performance analytics from assets to gain system efficiencies, reduce maintenance costs and provide remote visibility, it has become a simple and affordable reality."

Bruce Seeley
CEO, Aquatec



Flexibility

Upgrades

Aquatec's OmniSmart controller is adaptable to suit the requirements of any project. This includes the ability to be upgraded to replace existing control panels within a sewer network, which may be failing or do not provide an upgrade path for the asset owner.

Firmware

The OmniSmart's firmware is fully configurable in every way. As your needs change over time, new firmware can be loaded to support additional functionality and hardware modules. As settings are locally saved, communications failure does not affect operation.

Cellular Modem

The addition of a cellular modem (via a simple plug-in card) allows the OmniSmart to directly connect to the internet or a Corporate WAN (Wide Area Network). Furthermore, this enables the OmniSmart to SMS alerts to you if there is ever an issue, while allowing you to SMS instructions or changes to the unit.

WiFi

The OmniSmart's optional WiFi module can connect to a local WiFi access point, to send fault notifications and receive instructions or updates remotely. This may be through the connected home or another network within range.

Ethernet

The OmniSmart Ethernet module allows a physcial wired connection to a network or the internet. This gives higher reliability in areas of poor wireless connection for example, or where you wish to connect it to a fibre modem.

Remote Capabilities

SCADA

The standard OmniSmart Controller has inbuilt 'smarts' for localised analysis and decision making. It is easily upgradable to become an edge device within your SCADA network by simply inserting a plug-in module. This has the benefits of reducing demand on both your network and SCADA servers, improving response times while still giving you realtime operational and management capabilities. As an edge device, the OmniSmart also continues to give you all the benefits of an optimised reticulation network, even during loss of communication or SCADA system outages. The OmniSmart also supports remote upgrade of its firmware via DNP3.

Internet of Things (IoT)

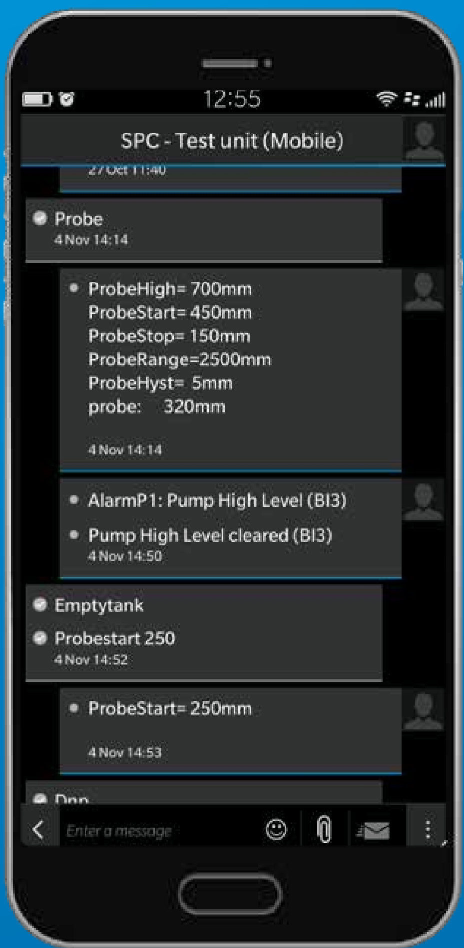
The OmniSmart can connect to a LPWAN (Low Powered Wide Area Network) base station many kilometres away, to send notifications of fluid level changes and/or issues onsite. This data is then on-forwarded to a secure IoT platform in the cloud, which can be fed into your SCADA system via DNP3 as if it were a traditional RTU.

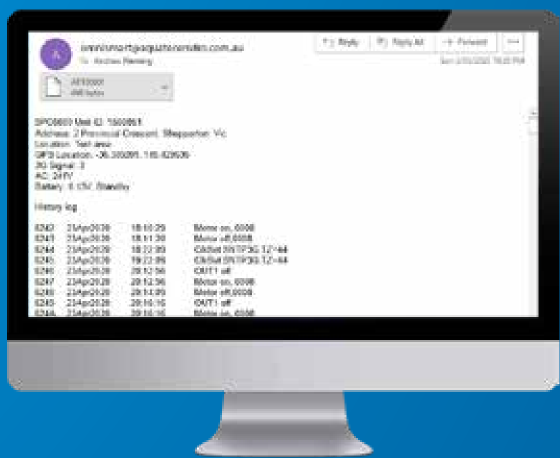
SMS/Email

The OmniSmart supports two way SMS communication for fault notification along with remote diagnostics, adjustment and rectification. It can also email faults directly to your job management system to automate ticket issuing and prioritisation. The OmniSmart also has the ability to produce nightly historical exports via email for in-depth reporting and analytics.

File Transfer Protocol (FTP)

The OmniSmart transfers historical events to your FTP site at defined intervals, for automated phasing into your data warehouse. This gives you near real time data for reporting and analytics without the need of a SCADA system. OmniSmart supports CSV, tab delimited, and XML data file formats. The OmniSmart also supports remote upgrade of its firmware via FTP.





OmniSmart Multi Pump Controllers

As part of our product innovation and development, Aquatec have utilised the ground-breaking OmniSmart technology to incorporate multiple pump control for commercial and industrial applications. This includes the Duplex, Triplex and Quadplex pump control systems. In fact, the OmniSmart Multi is capable of operating up to five pumps in single or three phase, up to a maximum of 60 Amps per pump.

The OmniSmart Multi has evolved and advanced from the Simplex (single pump) control panel hardware, in order to leverage the same level of intelligence and expandability, and is cross-compatible with any single pump controller in an existing sewer network. As with the Simplex version, the OmniSmart Multi provides a seamless upgrade path to accommodate future requirements for telemetry or 'smart' functions.

The OmniSmart Multi controller includes:

— Individual Auto/Off/Manual switches
— Pump Current Sensing per phase, and phase failure detection
— Pump-specific Over Pressure Protection
— Ability to be supplied as a free-standing switchboard with mains metering functionality
— Numerous pump exercising algorithms to give multiple options for pump selection, such as duty/standby, pump prioritisation, longest idle time, total number of starts, total run hours etc.
— Compatibility with all types of level controls
— Configurable inputs for pump faults, such as thermal or moisture ingress detection
— Pump protection from lock rotor, excessive run time and excessive motor starts
— Backlit LCD screen for system status, fault diagnostics and liquid level visualisation
— USB Plug and Play administration interface and history

AQUATEC

aquatecenviro.com

Australia 1300 088 555

New Zealand 0800 756 543

> admin@aquatecenviro.com

Aquatec Fluid Systems