

**GOULBURN VALLEY WATER
GUIDELINES FOR PRESSURE SEWER**

Table of Contents

GOULBURN VALLEY WATER	1
1. PURPOSE	3
2. Definitions	3
3. Background	5
4. Selection Criteria	6
5. Ownership of PSS Infrastructure	6
5.1 Corporation	6
5.2 Property Owner	6
6. Operational Arrangements	6
6.1 Terms and Conditions	6
6.2 Property Owner Manual	7
6.3 Customer Charter	7
7. Installation of Reticulation Infrastructure	8
7.1 New Developments	8
7.1.1 New Customer Contributions	8
7.1.2 Future Installation of Pressure Sewer Units	8
7.1.3 Intervening Properties	8
7.2 Existing Developed Properties	9
7.3 Odour Control	9
7.4 Alignment of pressure sewer mains	9
8. Installation of On-Property Assets	9
8.1 Properties in New Developments	9
8.2 Existing Developed Properties	11
9. Operation and Maintenance Cost Arrangements	11
9.1 General Operation and Maintenance	11
9.2 Damage to On-Property Assets	12
10. Sharing of On-Property Assets	12
11. Relocation of On-Property PSS Assets	12
12. Change of Ownership	12
13. PSS Infrastructure Components	13
13.1 Reticulation Network	13
13.2 On-Property Assets	13
13.2.1 Gravity Property Drain	13
13.2.2 Submersible Pump Assembly	13
13.2.3 On-Property Discharge Pipe	16
13.2.4 Boundary Valve Kit	16
14. References	16
15. Appendices	16
16. Document Control	17



1. PURPOSE

The purpose of this document is to provide guidelines for the selection and implementation of a Pressure Sewer System, to service residential, commercial/industrial properties and public/community facilities within the Corporation's supply region.

2. DEFINITIONS

- PSS Pressure Sewer System
- GVW Goulburn Valley Region Water Corporation (the Corporation)
- Reticulation Infrastructure Components of the PSS external to the property, including:
 - Pressure sewer lateral;
 - Pressure sewer pipeline (reticulation);
 - Tapping or connection point
 - Air valve and scour assemblies;
 - Outfall connection to gravity sewer.
- On-Property Assets Components of the PSS on the property, including:
 - Pump unit and associated electrics;
 - Property discharge line
 - Boundary Valve Kit
 - Telemetry connection (optional)(Refer to Figures 1 and 2 following)

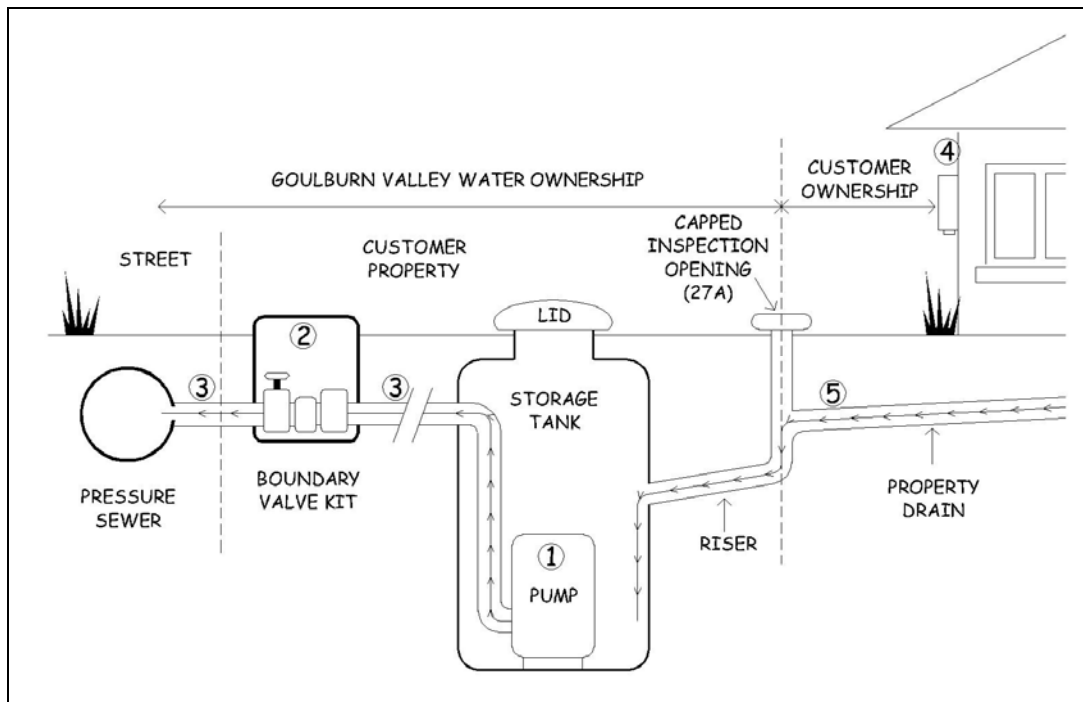


Figure 1 - Typical Pressure Sewer System – Domestic Application

Legend

1. Pumping Unit

This includes a small pump, storage tank and level monitors which are all installed underground so that only the top of the storage tank (or lid) is visible.

If required, a pressure sensor may also be fitted to the discharge pipeline and linked to the control panel to help control the operation of the pump.

Whilst it will be site specific, GVW would prefer for the pump unit to be located at the front of properties for ease of future access for maintenance and repair.

2. Boundary Valve Kit

Ensures that wastewater which is already in the pressure sewer cannot re-enter the property and enables maintenance staff to isolate individual properties from the system in the event of an emergency.

3. Property Service Line

This is a small diameter pipe which connects the pumping unit on the property to the pressure sewer in the street.

4. Control Panel

This is a small box which is mounted to the wall of the house (property) containing all the electrical controls for the pumping unit including both the audible and visual alarm systems.

Capacity is to be provided for the installation (now or in future) of telemetry and pressure sensor. This may require the installation of a suitable antenna.

5. Property Drain

This is the drainage pipework connecting the discharge from the dwelling to the pump system. It is the responsibility of the property owner to install and maintain this pipework up to the capped Inspection Opening (I/O) in accordance with AS3500 and the Victorian Plumbing Regulations 1996.

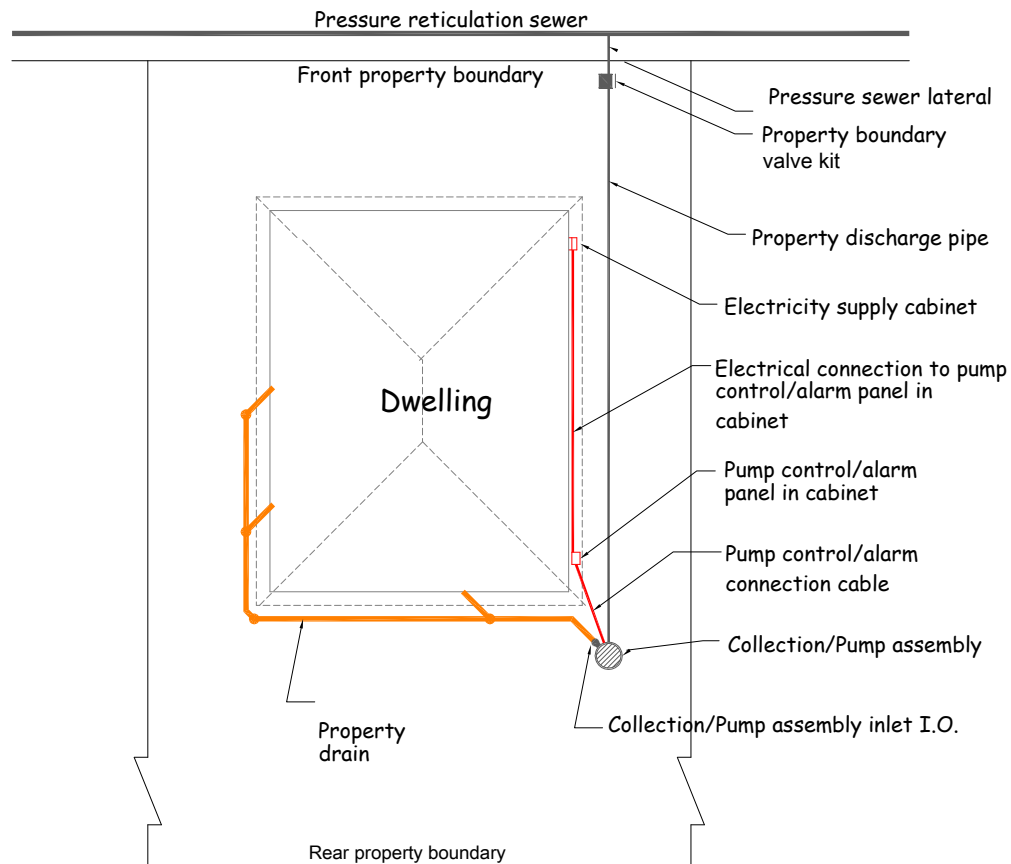


Figure 2: Plan View of On-Property Assets

3. BACKGROUND

Conventional gravity sewers continue to be GVW's preferred option to service properties and pressure sewers will only be used where benefits on a triple bottom line basis can be demonstrated.

A PSS consists of pump assemblies located on individual properties, which discharge sewage into a network of pressure reticulation sewers.

A PSS may be used in a variety of circumstances. However, PSSs tend to be most cost effective in areas with any of the following characteristics:

- Small isolated existing subdivisions;
- Low density development remote from gravity sewer reticulation;
- Hilly or difficult terrain, resulting in small catchments;
- Isolated areas with no natural fall
- Environmentally sensitive areas where the conditions may not favour septic tanks; and
- Regions with poor soil conditions and/or high water tables making the construction of deep gravity sewers, difficult, dangerous and costly.

The adoption of the PSS will provide an alternative to septic tanks if the area cannot be sewerred by traditional gravity reticulation and sewage pump stations.

Whilst it will be site specific, GVW would prefer for the pump unit to be located at the front of each property for ease of future access for maintenance and repair.

4. SELECTION CRITERIA

In the selection of a PSS to service an area the following criteria should be considered:

- The financial, social and environmental impact must be considered at a community and Corporation level and the analysis must clearly demonstrate a “whole-of-life” benefit for a PSS. Factors to be assessed include:
 - The total cost to the developer of providing the pressure sewer system compared with the cost of installing a conventional gravity sewer system;
 - Advantages of providing sewerage services against alternatives such as septic tank systems, including environmental and public health considerations; and
 - The net present cost to the community of the options of providing conventional gravity sewerage (including a GVW standard sewage pump station) and pressure sewer, including construction and maintenance costs.
- The catchment must be clearly defined and the PSS capable of servicing the whole of the defined catchment;
- Selection of a PSS must not jeopardise the ability of servicing upstream catchments.

5. OWNERSHIP OF PSS INFRASTRUCTURE

5.1 *Corporation*

The Corporation will assume ownership of the entire system infrastructure downstream of and including the collection/pump unit and associated electrics as shown in Figures 1 and 2. (The collection/pump assembly includes the capped I/O).

5.2 *Property Owner*

Ownership of the gravity property-drain between the dwelling and I/O at the collection/pump unit will rest with the property owner.

6. OPERATIONAL ARRANGEMENTS

6.1 *Terms and Conditions*

The Corporation will adopt Section 145 of the Water Act to apply service conditions to a development requiring a pressure sewer system and the future connection of the properties within that development. Therefore, individual property owner agreements, easements or Section 173 (Planning and Environment Act 1996) or 17(2)C agreements (Subdivision Act 1988) are not required.

In order to incorporate the relevant terms and Conditions, there must be a formal provision of a notice pursuant to Section 145 of the Water Act 1989. The process for applying for each individual lot to be connected to sewer with a pressure sewer system is:

- The relevant landowner is to apply to GVW for consent to connect to the sewer system using pressure sewer pursuant to Section 145 of the Water Act 1989; and
- GVW, in turn, provides a notice under Section 145 of the Water Act 1989 to the property owner with the Corporation's terms and conditions included.

The Corporation's terms and conditions for servicing with PSS are to be provided to all property owners with the information statement for the property and will also be available from the Corporation's webpage. The Corporation's terms and conditions will include:

- An outline of the responsibilities for both the property owner and Corporation in relation to the operation and maintenance of the on-property assets upstream of the property connection assembly;
- Defining what is expected of each party, the nature of the maintenance arrangements that have been entered into and how access will be gained to the on-property assets; and
- Specifying each party's responsibilities with respect to annual costs, as outlined later in these guidelines.

The Corporation's principles for the terms and conditions include:

- The landowner permits GVW to enter the property to maintain the system as required;
- The owner accepts the installation of the assets on the property including the mounting of control panel and the connection of the pump system to property's power supply; and
- The owner is responsible for protecting the pump system and for any damage caused by the discharge of inappropriate wastes into the pump system.

6.2 *Property Owner Manual*

A Property-Owner Manual will support the terms and conditions included with the notice pursuant to Section 145 of the Water Act 1989.

An operator's manual, standard drawings along with the principles and guidelines for pressure sewer systems will also be available on the GVW webpage.

6.3 *Customer Charter*

The Corporation's customer charter also applies to the terms and conditions of servicing a property with pressure sewer.

In the event of any inconsistency between any of the above documents, the terms and conditions shall prevail.

It has been confirmed with the Essential Services Commission that the Corporation can introduce a new charge, such as a works charge for the future installation of PSS units, within a regulatory period.

7. INSTALLATION OF RETICULATION INFRASTRUCTURE

7.1 *New Developments*

For new developments the installation of all reticulation infrastructure, beyond the property boundary, shall be arranged by the developer, under the terms of the Corporation's Developer Construct Agreement.

Under the terms of the agreement, the developer shall engage an accredited consultant to prepare a feasibility report for the project and undertake the design, documentation and project management of the installation of the works by an accredited contractor.

All costs associated with the installation of this PSS infrastructure, will be the responsibility of the developer.

7.1.1 New Customer Contributions

In addition to the installation costs, the developer shall pay the New Customer Contribution charge, applicable at the time, in respect of all newly created allotments.

7.1.2 Future Installation of Pressure Sewer Units

For GVW to consider lots in a proposed subdivision to "be serviced for sewerage" and consent to compliance being issued a charge must be collected from the developer which recovers the costs of installing the pressure sewer pumping units at some time in the future.

These contributions will be held by GVW until the customers are ready to connect – at which time a suitable contractor accredited with Aquatec to install the pumping unit would be engaged by the owner. GVW will refund costs to the owner once all requirements are satisfied. Please refer to the "Guidelines for Pressure Sewer" for details on requirements for Installation of On-Property Assets. (See *Installation of On-Property Assets*)

The value of the development charge will be dependent upon the then current cost of installation of the on-property assets and the number of properties within the development to be serviced by the PSS.

An allowance of 30% is to be included to cover GVW overheads for internal administration costs to administer the installation process, minor variances in the length of the discharge pipe required and minor fluctuations associated with procurement of the pumps.

An estimate of the costs of supplying and installing a typical unit within the lots for the subdivision is to be provided in the feasibility report by the consultant to enable GVW to determine the contribution amount for the development to cover costs of future installation.

7.1.3 Intervening Properties

Where reticulation infrastructure, installed by the developer, fronts properties outside the development that could benefit from the works, the owners of those properties will not be under an obligation to contribute to the cost of the works but shall be entitled to connect to the works (at their cost) in due course.

The developer is encouraged however to negotiate with intervening landowners to seek their cooperation in contributing to the cost of the works.

7.2 Existing Developed Properties

If a PSS is to be implemented to service a single or group of existing developed properties, the reticulation infrastructure installation arrangements shall be the same as those for a new development under a Developer Construct Agreement between the Corporation and the property owner(s).

The complete cost of installation of the works will be the responsibility of the individual property owner, in the case of a single property, or by the group of property owners, by mutual agreement, in the case of a group of properties.

A New Customer Contribution charge will be applicable to each property to be serviced by the PSS, but payment of the charge, by each individual property owner, will be deferred until each property connects to the system.

For any intervening properties likely to benefit from the works, the same arrangements as for new developments apply and they are not required to contribute to the costs of the rising main.

Also as with new developments, the instigator of the works is encouraged to negotiate with intervening landowners to seek their cooperation in contributing to the cost of the works.

7.3 Odour Control

All feasibility reports submitted are to address the generation of odour from the pressure sewer system and provide approved engineering solutions, at the developer's expense, to mitigate any odours. This may also include a contribution to the ongoing maintenance of these systems.

To assist with odour control, the preferred discharge point for a pressure sewer main is to be directly into the wet well of an existing sewage pump station.

7.4 Alignment of pressure sewer mains

Pressure sewer mains are to be located in road reserves or public land only – the sewer reticulation main cannot be constructed through private land. The only pipe allowed through private land is the property service line within the property being “sewered”.

8. INSTALLATION OF ON-PROPERTY ASSETS

The installation of all on-property assets shall be the responsibility of the property owner.

8.1 Properties in New Developments

For newly developed properties, the status of the provision of sewer to the property at the time of application for each property to connect is:

- The developer has installed the pressure sewer pipeline that fronts the property and it is connected to the GVW sewer reticulation system;

- The developer has paid both the New Customer Contribution and the contribution to GVW for the future installation of the pressure sewer unit on the property by the owner;
- The property is regarded as a serviced property by GVW and as such the property will attract a service availability charge for sewer services.
- GVW's information statement provided for the sale of the property to a prospective owner will have indicated that the property is to be serviced by a pressure sewer system when connected to the sewer in the future; and
- The status of the property connection should be identified on the Corporation's Aquarate and GIS systems as being a vacant lot, pressure sewer terms and conditions applying, with the status of charges previously paid for New Customer Contribution and development charges.

To arrange for the installation of the pressure sewer unit and connection to the Corporation's sewer reticulation system the following is required:

- The property owner shall arrange a quote for the installation of the pressure unit to the Corporation's standard by a contractor (including a licensed plumber and a qualified electrician) that has current installation accreditation with Aquatec;
- The property owner is to apply to GVW for connection to sewer with a pressure sewer system pursuant to Section 145 of the Water Act 1989;
- The property owner provides GVW with a copy of the quote and design for the installation of the pressure sewer unit by a suitable contractor accredited with Aquatec;
- The owner's plumber takes out a Plumbing Industry Commission (PIC) consent number for the installation of the property drains for the property and provides a preliminary design plan showing the proposed location of the dwelling (serviced structure), pump unit, control panel and discharge pipeline.

Upon GVW accepting the quote for installation the Corporation will approve connection to sewer to proceed.

The property owner is responsible for the installation of the property drain between the dwelling and the PSS collection pump assembly, which is to be installed by a licensed plumber in accordance with AS3500 and the Corporation's requirements.

To finalise the connection of the property to sewer and arrange payment to the pressure sewer contractor the following is to be provided to GVW:

- Invoice for the final costs for the installation of the pressure sewer system within the property; and
- An as constructed drainage plan showing the location of all internal drains, pump unit, control panel, discharge line and property boundary kit. This is to include provision of tie distances, depths, off set distances, structure outlines, property boundaries, etc, to enable location of all pipework and fixtures in the future.

Upon receipt of this information, GVW will in turn:

- Issue a notice under Section 145 of the Water Act 1989 to the property owner which includes the Corporation's terms and conditions for connecting to sewer with pressure sewer; and
- Arrange payment to the contractor and approve connection of the property.

The isolation valve in the boundary connection kit is not to be opened until this process is finalised.

8.2 Existing Developed Properties

For existing developed properties, the property owner shall arrange the installation of the on-property PSS assets, at the cost of the property owner.

The property owner is required to apply to GVW for connection to sewer with a pressure sewer system pursuant to Section 145 of the Water Act 1989.

The installation of the on-property PSS assets shall be performed by a contractor (including a licensed plumber and a qualified electrician) that has current installation accreditation with Aquatec.

As there would not have been any previous contribution to the cost of installation of on-property assets by a developer, the Corporation will not contribute to the cost of the on-property works.

The Corporation does require the submission of a preliminary design plan showing the proposed location of the dwelling (serviced structure), pump unit, control panel and discharge pipeline with the request for connection to sewer. This is to be reviewed and endorsed prior to GVW approving connection to sewer with a pressure sewer system.

The Corporation will, in turn, issue the property owner a notice under Section 145 of the Water Act 1989 which includes the Corporation's terms and conditions for connecting to sewer with a pressure sewer system.

The property owner will also be responsible for the installation of the property drain between the dwelling and the PSS collection pump assembly, which is to be installed by a licensed plumber in accordance with AS3500 and the Corporation's requirements. Requirements include the submission of a drainage plan detailing all the property drains, the location of the PSS and the discharge pipeline to the property boundary.

9. OPERATION AND MAINTENANCE COST ARRANGEMENTS

9.1 General Operation and Maintenance

General operation and maintenance costs associated with the PSS will be borne by the Corporation.

As stated in GVW's terms and conditions the property owner is responsible for the cost of supplying power and maintenance of the property's electrical system sufficient to operate the pump.

The Corporation will levy sewerage service fees and sewage disposal charges on PSS customers in the same manner as customers connected to a gravity sewer system.

9.2 *Damage to On-Property Assets*

The property owner will reimburse the Corporation for the full cost incurred by it in repairing damage to PSS assets installed on the property, caused by the property owner or people other than the Corporation or its agents acting on its behalf.

10. SHARING OF ON-PROPERTY ASSETS

All residential and commercial properties shall have separate on-property assets upstream of the property boundary box. The Corporation will not allow the sharing of on-property assets for residential and commercial properties.

The Corporation however, will consider the sharing of pump units for unit type developments. The ownership, loadings, subdivision easements, reserves, etc, need to be included in the feasibility report provided for the proposal.

11. RELOCATION OF ON-PROPERTY PSS ASSETS

A property owner must obtain the written approval of the Corporation before any PSS assets are relocated and GVW consents to the issuing of a PIC number. This will require the submission of a preliminary design plan showing the proposed relocation works required, including dwelling (serviced structure), pump unit, control panel and discharge pipeline.

The Corporation will not contribute financially to the cost of any relocation.

The relocation is to be completed by a contractor (including a licensed plumber and a qualified electrician) that has current installation accreditation with Aquatec, in accordance with the installation instructions.

An as constructed drainage plan showing the location of all internal drains, pump unit, control panel, discharge line and property boundary kit is to be provided by the plumber at the completion of the works. This is to include provision of tie distances, depths, off set distances, structure outlines, property boundaries, etc, to enable location of all pipework and fixtures in the future.

12. CHANGE OF OWNERSHIP

The Corporation will indicate in any Information Statement for a property connected to a PSS:

- That the property is serviced by a PSS;
- That Special Conditions of Connection apply to the property, including the Owner's responsibility for on-going power costs;
- That these terms and conditions will bind any subsequent owner of the property; and
- Where more information about the respective rights and responsibilities of the property owner and of the Corporation can be found.

13. PSS INFRASTRUCTURE COMPONENTS

A PSS consists of reticulation network infrastructure and on-property assets as described in the GVW product manual for pressure sewer systems.

The main features of the design and construction of these systems include:

13.1 Reticulation Network

The reticulation network has the following components:

- Pressure reticulation mains comprising PN16 PE100 HDPE pipe to provide a completely sealed network.

The pipe shall be installed with a cream coloured detectable marker tape, in accordance with Clause 18.10 of WSA 07-2007-1.1. The tape shall be laid immediately above the pipe embedment for open trench construction and taped to the pipe at 2-metre intervals for trenchless construction.

- Isolation valve, air valve and flushing point assemblies to manage the operation and maintenance of the network.
- Marker posts shall be installed at all valve and flushing point assemblies and at all changes of direction of the reticulation main.
- The sewer reticulation main cannot be constructed through private land. The only pipe allowed through private land is the property service line within the property being “sewered”.

13.2 On-Property Assets

13.2.1 Gravity Property Drain

A gravity property-drain from the dwelling/building to upstream of the pump assembly.

The drain shall comply with AS3500 and the Victorian Plumbing Regulations 1996 and have a flexible connection to the upstream side of the pump assembly, in accordance with the pump supplier’s recommendations, and an inspection shaft.

13.2.2 Submersible Pump Assembly

A pump assembly, comprising one or more submersible pumps (depending on the requirements of the property) housed in a moulded polyethylene pit.

The pump(s) outlet shall be fitted with a non-return valve, isolating valve and a quick coupling for disconnection. All components shall be contained within the pump well.

Whilst it will be site specific, GVW would prefer for the pump unit to be located at the front of each property for ease of future access for maintenance and repair.

The pump(s) shall be fitted with appropriate disconnection and lifting facilities, so removal of the pump(s) shall be possible without the need for confined space entry.

The pump and system components available for use are defined in the GVW Product Manual for Pressure Sewer. In general the pump assembly shall be:

- Fitted with an alarm system, which is activated by a high-level alarm switch and which provides both visual and audible warning to the property owner;
- Fitted with a pressure switch to stop the pump operation when the downstream pressure head exceeds 50 metres;
- Wired from a separate RCD circuit breaker on the property switchboard with all wiring complying with AS 3000; and

The control board is to provide option for the future installation of telemetry to enable communication with the GVW SCADA system. This may require an aerial to be fitted to the control board or the side/roof of the building.

Pump Assembly Sizing

- For a standard residential property with a mean daily discharge of <700 litres, a single progressing cavity grinder-pump unit, which has operating parameters between 0.4 litres/sec @ 50 metre head and 0.8 litres/sec @ 10 metre head, housed in a 1,100-litre pit, is considered appropriate.
- For a residential dwelling with high-water usage fixtures such as a spa bath and swimming pool backwash, a 1,500-litre pit should be considered.
- For commercial/industrial and public/community facilities, the mean daily discharge must be assessed and the pump capacity and pit volume selected accordingly.
- *If the daily discharge is significantly greater than 700 litres, a larger capacity pump, which has operating parameters between 1.0 litres/sec @ 50-metre head and 1.8 litres/sec @ 10-metre head, housed in the larger 1,600-litre pit, is considered appropriate.*

Pump Selection

The pump system as described in the GVW Product Manual for Pressure Sewer is only to be an Aquatec Model PPB.OGP (2 stage centrifugal grinder pump).

Pressure Sensors

Pressure sensors are required to be installed on the pump unit when the pressure main discharges into a sewer rising main or large pressures are generated by some pump units in the system (eg. servicing elevated lots). This will enable the pump unit/s to be set to not run against the sewage pump station upstream or when there are excessive pressures in the pressure sewer pipelines.

SCADA

Properties will be required to provide telemetry to enable transmission of alarms to the Corporation's SCADA system when:

- The total discharge of the property or pump system is equivalent or greater than three equivalent tenements;
- The property is located adjacent to an environmentally sensitive area where overflows may cause significant environmental damage (eg. sensitive water source immediately downstream from property);

Further, for public/community facilities that may be located relatively remotely and/or infrequently occupied, consideration in conjunction with the Corporation will be given to the option of alarming the pump station through connection to GVW's SCADA system.

Connection to the GVW SCADA system needs to be considered when selecting the site for the pump station to ensure that alarms and signals can be relayed into the GVW SCADA system.

Flowmeters

For discharges greater than 5 equivalent tenements GVW requires a magnetic flowmeter to be installed on the discharge pipework which is to also be connected to the SCADA system. This will enable remote monitoring of discharge and automation of alarms to detect pump failures and possibly failures in the discharge pressure pipe system.

Flowmeters are required to be installed on the discharge from all commercial and large residential developments. They are also to be installed on the discharge from a long rising main (greater than 1 km) into a sewage pump station. This would comprise a small diameter magnetic flowmeter located in a pit.

Location of Pump Well

The owner is to determine the optimum position for the location of the PSS. Factors to be included in the positioning are:

- Whilst it will be site specific, GVW would prefer for the pump unit to be located at the front of each property for ease of future access for maintenance and repair;
- The pump is to be positioned to be close to the sewer plumbing from the residence/serviced building;
- Pump to be adjacent to power supply meter box to allow simple connection;
- The pump is adjacent to a fence or structure to allow mounting of the vents and control box; and
- The pump can be located so that it is free of vehicular traffic and in a landscaped area.

13.2.3 On-Property Discharge Pipe

The discharge pipe from the pump unit to the boundary connection assembly shall be DN40 PN16 PE 100 HDPE pipe, installed with a cream coloured detectable marker tape, in accordance with Clause 18.10 of WSA 07-2007-1.1.

No easements are required over this pipeline but the owner is to provide a clear and direct alignment for the discharge pipeline to connect to the PSS rising main.

13.2.4 Boundary Valve Kit

A Boundary Valve Kit creates the interface between the on-property assets and the reticulation network.

The assembly includes a DN40 PVC ball valve and DN40 PVC check valve housed within a below-ground polypropylene pit. A DN40 PVC flushing tee is optional to enable flushing of the discharge line.

14. REFERENCES

The following documents were used as references during the compilation of this document:

- Pressure Sewerage Code of Australia WSA 07-2007-1.1
www.wsaa.asn.au/NationalCodes/Pages/NationalCodesList.aspx
- Goulburn Valley Water - Customer Charter
www.gvwater.vic.gov.au/Publications/Charter.asp
- Goulburn Valley Water's Developer Construct Agreement
www.gvwater.vic.gov.au/consultants_&_contractors/Develop_Construct_Manual.asp
- "Using Your Pressure Sewer System – An Owners Manual", Yarra Valley Water
www.yvw.com.au/yvw/Home/WorksInYourArea/Works+explained/Sewer/PressureSewerSystems.htm

These documents are available for download from the relevant organisations web page.

15. APPENDICES

- GVW Pressure Sewer Principles
- GVW Pressure Sewer Product Manual
- GVW Pressure Sewer Checklist
- Standard pressure sewer terms and conditions (**Under development**)
- The Property Owner Manual (**Under development**)

16. DOCUMENT CONTROL

The only controlled copy of this document is the electronic version held on SharePoint.

All hard copies are uncontrolled and the user must ensure that the hard copy being used is the latest version by checking on SharePoint.

Version No.	Date	Description	Prepared by:	Approved by:
1.0	Apr 2008	Original draft issue	W W Smith	N.A.
1.1	May 2008	Amended draft issue	W W Smith	N.A.
1.2	June 2008	Amended draft issue with figures	W W Smith	SDN
1.3	March 2009	Amended with Industrial included	SD Nash	Reviewed L.Goudie
1.4	July 2009	Amended significantly	SD Nash	L.Goudie
1.5	August 2009	Amended slightly	SD Nash	Reviewed L.Goudie
1.6	October 2009	Amended to reflect consultant feedback and legal advice from Russell Kennedy	SD Nash	Pending