

# **Griffith City Council**



## **Pressure Sewerage Technical Specifications**

**SUBJECT: PRESSURE SEWERAGE TECHNICAL SPECIFICATION**

**FILE REFERENCE NO:** Operations/sewerage transport/grinders

**DEPARTMENTAL RESPONSIBILITY:** Engineering

**RELEVANT LEGISLATION:**

**PREVIOUS POLICY NO:** Nil

**ADOPTION DATE :** 26-4-2006

**LAST AMENDMENT DATE:** 15-8-2006

## OBJECTIVE

This document has been created to serve Griffith City Council in its applications of pressure sewerage systems in the following ways:

- Providing the detail required to translate Council's Policy Statement on pressure sewerage into detailed implementation actions.
- To ensure consistency in the application of the pressure sewerage technology in the Griffith area.
- To ensure that where the pressure sewerage technology is implemented there can be an expectation it will work as it should.
- For inclusion in Supply Tenders to specify Council's minimal requirements in terms of the pumping units, design pipe material, etc. for any pressure sewerage system installed in the Griffith area
- For inclusion in Installation Tenders to guide installers and pipe layers on Council minimal requirements in respect to pressure sewerage applications.

This document represents Council's minimum position in respect to pressure sewerage systems. Where Tenders/ Installers/ Pipe layers wish to offer higher standards they will be welcome to submit these to Council for consideration, but any reduced procedures will not be accepted.

Overtime this document may be replaced by specific industry standards on pressure sewerage systems. This however will occur only after Council amends its policy position to accommodate these standards. Therefore this document should be read in conjunction with:

- Council's Pressure Sewerage Policy Statement.
- AS 2128 – 1986  
(As applicable)

If there is any dispute between this document and the Policy Statement, the Policy Statement will be taken as correct. However any such perceived conflict needs to be resolved through Council's Engineering Services area.

## **Intellectual Property**

This document is the intellectual property of Griffith City Council and must not be reproduced in part or whole without expressed permission. It is imperative that any modification be done by persons with a strong knowledge of these pressure systems to avoid errors being made by simply copying documents in part or whole.

# Table of Contents

## 1.0 Introduction

## 2.0 Design

- 2.1 Standard Terminology
- 2.2 On-property Design
- 2.3 On-property Drawings
- 2.4 Reticulation Design
- 2.5 Reticulation Zones
- 2.6 Reticulation Drawings
- 2.7 Single Technology per Development
- 2.8 Bill of Quantities
- 2.9 Standards and Regulations
- 2.10 Spa's
- 2.11 Swimming Pools
- 2.12 Choice of Valves
- 2.13 Discharge Point to Council Sewers
- 2.14 Odour Control
- 2.15 Council Design Services
- 2.16 Installation of Pumping Units on Public Property
- 2.17 Designing for Highly Fluctuation Loads
- 2.18 Flushing Points
- 2.19 Flushing Programs

## 3.0 Pump Unit Details

- 3.1 Pump Duty Points
- 3.2 Grinder Units
- 3.3 Alarm Control Panel and Alarm Switches
- 3.4 Electrical Connections
- 3.5 Hydraulic Connections
- 3.6 Generator Options
- 3.7 Serial Numbers

## 4.0 Pipes

- 4.1 Residential Pipe Materials
- 4.2 Reticulation Pipe Materials
- 4.3 Pipe colours
- 4.4 Joining the Pipes
- 4.5 Marking the Pipes
- 4.6 Pipe Embedment
- 4.7 Trench Fill
- 4.8 Valves and Fittings
- 4.9 Testing of Mains

## 5.0 On the Property Installation

- 5.1 Basic Layout
- 5.2 Installation of the Pumping Unit

- 5.3 Installation of the Property Delivery Line
- 5.4 Installation of the Alarm/Control Panel
- 5.5 Connection of the Pump to the Property Power Board
- 5.6 Household Audit (Existing Homes)
- 5.7 Multiple Dwellings/ Non Residential Properties
- 5.8 Separate Greywater and Blackwater Lines
- 5.9 Testing Procedures – General
- 5.10 Time Limits for Carrying Out Works On Property (Existing House)
- 5.11 Consultative Process (Existing House)
- 5.12 Maintenance Covenant
- 5.13 Homeowner Manual

## 6.0 Testing Procedures

- 6.1 The On-Property Test
- 6.2 Commissioning of the Pumps
- 6.3 Handover to Council
- 6.4 Reticulation Mains
- 6.5 The On-Property Works
- 6.6 New Homes – Testing for Debris in Lines

## 7.0 Information to be Provided to Council

- 7.1 Reticulation Mains
- 7.2 Residential Information
- 7.3 Information Files

## 8.0 Attachments

- 8.1 EGL Boundary Kit
- 8.2 EGL Flushing Kit
- 8.3 Pressure Pump Site Diagram
- 8.4 Typical house Connection Details
- 8.5 Pressure Sewer System Main Details
- 8.6 Typical Road Crossing and Alignment
- 8.7 Pressure Sewer Main Connection to Manhole
- 8.8 Pipe Embedment and Trench Fill
- 8.9 Pump Performance Curve
- 8.10 Alarm Panel Details

## 1.0 INTRODUCTION

Griffith City Council has included Pressure Sewerage Systems, amongst its list of acceptable technology alternatives to provide sewerage services in the Griffith City Area. It is initially intending to use this technology to provide sewerage services to some of its existing city areas that are serviced by existing on site systems. Council however will also explore other options for the use of this technology as set out in the Council Pressure Sewerage Policy Statement and that document should be read before attempting to use this Technical Specification.

This specification has been developed by Council to ensure that where pressure sewerage systems are allowed under Council planning provisions, there is consistency in the use of this technology, and that the sought after goals for this scheme are achieved. Any persons wanting to adopt this technology will therefore be required to demonstrate that their applications meet the requirements laid out in this document.

Council have chosen EOne pressure sewerage pumping unit to be the basis of any pressure sewerage system used in the Griffith area. In this manner it can have some confidence that the scheme will work in the desired application and the Technology Supplier remains liable for the adequacy of their system.

This document has been prepared to set out Council's specific requirements in relation to pressure sewerage systems that it wants the Technology Supplier and the System Installer/Pipelayer to meet. This includes:

- Design Procedures
- Pipe Materials to be Used
- Installation Procedure for the Pump and Pumping Stations
- Installation Procedure for the Reticulation Mains
- Testing of the Pumps and Reticulation Systems
- Alarms and Controls
- Warranties
- Handover Procedures
- Maintenance Agreement Details
- Information Packages to be Provided

For the purposes of Council's Policy Statement, a pressure sewerage system is defined herein as comprising:

- An individual pumping unit usually installed on each property and draining that individual property. Such pumping units having been specifically designed for pressure sewerage applications and have been approved by regulatory bodies for that purpose.
- A grinder unit incorporated into these units to permit the use of smaller diameter pipes for both the household connection and the system reticulation mains.

- The pump is to be installed underground in the storage vessel provided, as part of the overall pumping unit.
- Connection of these pumping units to Council's pressure sewerage reticulation system.
- Valving that allows the property to be isolated from the system and to also provide flow protection, preventing flow from other properties entering into the individual system under pressure.
- A reticulation system operating under pressure and capable of supporting a number of such individual pumping units, in conveying the domestic sewerage to the nominated discharged point.
- A reticulation system specifically designed for pressure sewerage application including isolation valves and system flushing points.
- An alarm system to warn residents and Council that the pumping unit has failed and to allow maintenance within an acceptable timeframe to ensure both an acceptable public health and environmental outcome.
- A formal maintenance arrangement, which further secures and exceeds the minimum acceptable environmental and public health outcomes and is acceptable to the regulatory bodies in these areas.

Council will not be liable for any incorrect interpretation of this policy, nor the supporting technical specification in the installation of the pressure sewerage system. If there is any uncertainty in relation to the application of this policy then clarity must be sought from Griffith City Council's Engineering Department. Council will not be liable for any installations that are constructed without approval.



## 2.0 DESIGN

Correct design of both the reticulation mains and the on-property assets is considered critical to the successful installation and operation of pressure sewerage systems. Accordingly Council requires that anyone designing pressure systems for installation in the Griffith City Area has some direct experience with the designing of these pressure sewerage systems. Council may require that the design be checked by the relevant Technology supplier or a designer approved by Council.

In general the intent of any pressure sewerage system installed in Griffith City Region will be to:

- Remove all sewerage in a safe and reliable manner from the property and transport it to the sewage treatment plant or designated discharge point in the existing reticulated sewerage system.
- Ensure that the pipelines are scoured clean by moving the sewage at an appropriate velocity.
- Ensure the sewage is not too old, by the time it reaches the treatment facility, such that it creates either process difficulties in the treatment of the sewage or the generation of odours in the receiving system.
- Ensure that the pump's duty head is not exceeded as a result of excessive frictional losses in the pipe system, when added to the natural static head on the pump. Accordingly the design of the reticulation system should provide indicative pressures at a number of the properties being served to allow a pressure contour to be extrapolated.
- Minimise any inconvenience to the on-property resident (where the pressure system is being used to service an existing development/ town/ village/individual home).

The design of the systems must demonstrate how all of these requirements have been achieved, when it is submitted to Council. Furthermore as a total design, both the cumulative effects of the on-property design and the reticulation design need to be taken into account in determining the design pump head. There is therefore a need to test some of the on-property units connected to the system at the end of the installation phase, to determine if the design parameters are correct, or if a possible problem exists. The design pressure shown on the plans and the extrapolated contours will allow for this checking to occur.

Council will in the initial years of adopting this technology have a design service available from the Technology Supplier, to assist those wanting to explore this sewerage option in Griffith City area. Whilst use of the service is not a compulsory requirement, it is certainly recommended.

The following sections set out Griffith City Council's minimal requirements in relation to the design of pressure sewerage systems in the Griffith City Council Area.

## **2.1 Standard Terminology**

For the purposes of consistency, Attachment 1 of this document sets out a number of standard terms that are used to describe the installation and the design aspects attached to pressure sewerage systems throughout this document. If there are any other terms that the reader does not understand, then they should contact Council's Engineering Services Department.

## **2.2 On-Property Design**

This is design of the work done on the private residential property from the Boundary Kit to (and including) the installation of the pumping unit. The design limits for the on-property works will be to the inlet to the pumping unit. the household drainage inlet). It will include any inlet pipe deviations required to divert the previous house drainage lines into the new pumping station. Typically this design will involve:

- The installation of a pumping unit
- The electrical connection to the household power board.
- The construction of the property delivery line
- The installation of the control /alarm panel
- All works required to make the pump operational
- Site Specific Requirements

In the case of existing homes, a preliminary audit of the house's electrical and plumbing systems will be required before design work can commence. This audit is to identify what work (if any) is required to bring these existing services up to the relevant standards, before the pressure sewerage system can be installed.

A fundamental requirement of the on-property design process is that it is to be carried out in consultation with the property owner/s, or their nominated representative and there is to be no exception to this. Where possible the reasonable needs of the property owners are to be accommodated in the design and typically these might include moving the pipeline route or the position of the pumping unit.

This auditing and consultation is to result in a formal house layout plan, which when constructed will be kept by Council as a record of where the sewerage system is on the property.

The general requirements applying to the on-property design are:

- The typical residential design will be based upon a standard unit that will be purchased by Council and installed by an accredited installer, no standard unit will be typically used in cases where
  - The property being serviced is non-residential.
  - The host soils are rock or it is difficult to install a new standard unit. In these cases a squatter unit may, for example, be installed in the hole of the existing on site system.
  - Other site specific needs. However unless there are specific reasons Council will be reluctant to depart from the use of a standard unit.
- A non standard sized tank will be supplied to accommodate the needs of the property where these exceed what a standard unit is capable of.
- The design for the property will not occur until the property's building application has been approved and construction has commenced.
- The property owner must be given sufficient prior notice of the meeting with the Designer and the meeting is to occur on the property, for which the design is intended.
- The fundamental design and installation goal is to cause the minimum possible disturbance to the persons living on the property, or about to move onto the property in terms of:
  - The location of the pumping station and the proposed route of the property delivery line.
  - The equipment used for the installation works.
  - The time taken to install the pressure system.
  - Working on the property just the one time (i.e. no repeated visits in the short term if possible).
  - Future household extensions
- All pipelines are to be laid approximately 1.0m from the side and or rear property boundaries and their route is to run parallel to that boundary.

Where the properties are large and this requirement is unreasonable, the property delivery line will be laid essentially perpendicular to the reticulation mains, but should essentially be a straight line. It will be laid in a position sympathetic with the current property usage.

- The design head for the pump on the property, when operational, should not exceed the designed duty point detailed later in this specification.
- Where the property has no residential dwelling on it and when the pressure sewerage system's reticulation mains are being constructed, a boundary kit will be installed and this should be located, without compromising the future use of the property.
- The pumping station must be installed within a direct line of site of the pressure sewerage alarm/control panel.
- The electrical connection for the pumping unit is to be on a separate circuit to the rest of the household electrical connections.
- Where there are unique features to the property, such as inground structures or prized gardens, the property delivery line can be laid along a route agreed with the property owner. In general the main should be laid so as to not compromise future household extensions.
- One tank per property is to be used for residential applications of pressure sewerage, but the one tank can service more than one building providing it has sufficient capacity. Where more than one building is being served Council will determine the size of the unit to be used.
- Where the property has separate Greywater and Blackwater pipelines, the pumping unit will be laid on the Blackwater connection and the Greywater is to be run into the tank.

If there is insufficient gradient to allow this to happen the designer should in the first instance, explore if the preferred technology supplier has a longer (deeper) storage vessel. If this solution cannot be made to work, then a second standard pumping unit is to be installed.

- When the property has multiple dwellings, the pumping station should be installed as close as practical to the building that has the power board located on it. Where there is more than one power board then it should be located as close as practical to the dwelling discharging the majority of the flow contributions on the property that is equipped with a power board.
- For industrial/ commercial properties that generate large volumes of wastewater) multiple pump arrangements (per pumping station) and/ or multiple pumping stations are to be used and the Technology Supplier will provide details on the appropriate units to be used for these applications.
- An overflow relief gully (ORG) is required to be fitted to each pumping unit in accordance with the NSW Plumbing Code, to prevent internal overflows. This is to be included by the property owner's plumber, and it must not be covered once the pump is operational. It will also include an inspection opening as appropriate.

In flood prone areas (i.e. inside the 1 in 100 year floodplain) the overflow relief gully is to be designed to incorporate a lid to eliminate the entry of flood water into the pressure sewerage system, during such events.

- For properties with large spas or swimming pools, special arrangements will be required to prevent these triggering an alarm or an overflow by exceeding the sewerage pumping unit's high level alarm or capacity. These will be accommodated on a case by case basis, but some of the design provisions in relation to these are set out in sections 2.10 & 2.11.
- The alarm panel must be fixed either to the wall of the house shed or garage or on a stand alone post, provided by Council. It must be at a level that is a minimum of 400mm above the 1 in 100 year flood level, where applicable.
- Where the property is impacted by the 1 in 100 year flood level, the venting of the pumping station is to be provided to a minimum of 400mm above the designated flood level.
- The boundary kit is to be a maximum of 1.0 metres inside the property boundary and to be on the same side of the property as the property delivery line (where this is known). There is a need to link with the on-property designs, in the reticulation construction.

### **2.3 On-property Drawings**

Following the initial meeting with the property owner, the Designer is to prepare a drawing of the proposed on-property layout. This drawing at minimum must show the following:

- Location of the pumping unit, relative to the dwellings, including tie lengths to any suitable reference points.
- The pipeline route, including ties at any change of direction, in the pipeline.
- The location of the boundary kit.
- The location of the overflow relief gully.
- A unique number relating this drawing to the reticulation drawings.
- Any unique features in the house, which have impacted the design such as gardens/ structures.
- Any proposed directional drilling and the approximate depths of lines.

The layout drawing is to be in plan view only as it will be assumed the property main will be minimum depth.

It is intended that this property layout drawing will become the property Work as Executed (WAE) drawing, providing that there are minimal variations to the design. It should also be in an electronic format compatible with Council's GIS system.

## 2.4 Reticulation Design

The following general principles will apply to any pressure sewerage reticulation design.

- The mains are to be designed to achieve a minimum velocity of 0.6 m/s, for self cleaning purposes.
- The total head requirement on the pumps (static plus friction losses) should not exceed 45m and preferably not exceed 40m. Pipe diameters should be sized to achieve this and the above self cleansing velocity.
- The diameter of the pipes should ensure that sewage is stored in the pipelines for the minimal time possible. Ideally the sewage should be no older than 12 hours when it reaches the sewage treatment plant and should have spent no more than six to eight hours in the pressure sewerage lines.
- All valves and other fittings should be of a type recommended by the Technology Suppliers as appropriate for their particular technology. It is recognised that some technology suppliers have very clear preferences here and that these fittings will not be recognised as a reason for any non performance of the system.
- The main pipeline will be laid in a fixed Council allocation in the foot path or as approved by Council.
- All road crossings of sealed roads are to be constructed, using directional drilling techniques.
- The reticulation mains are to include a number of flushing points, to allow the mains to be kept clean, particularly during the construction phase or initial development of a subdivision. These fittings should be appropriate for the purpose and at a minimum include the features set out in section 2.18 of this Specification.

These should be located to effectively assist with cleaning the lines and minimising odour generation.
- The reticulation system must incorporate a number of designated isolating valves of a type approved by the Council, (to ensure they are compatible with the pumping units.). These are to be arranged to facilitate any repairs to the reticulation system that might be required at a latter date.(see section 4.8)
- The reticulation system may require the use of air valves and details in respect to their use (or non use) must be provided to Council with the proposed design. These also should be of a type nominated by the Technology Supplier (to ensure they are compatibly with the pumping units). The issue of the release of odours from these needs to be noted in the design with sufficient notes on this aspect provided for Council to draw reassurance this will not prove to be a significant problem.

- The mains should, where practical, cross other services, particularly inground services, at as close to right angles as can be practically achieved.
- The mains are to be laid at the minimum depth specified later in this document (section 4 and attached diagrams), except where particular requirements make this impossible.
- An additional non-return valve is to be used where a road crossing to service the property, is required. This valve should be located as near to the pipe joint and there should be no pipe joints under the sealed road area.

It is intended that all properties will be connected to the reticulation mains at the time of the construction of the reticulation mains where this can be achieved. This property connection will be from the reticulation mains to (and including) the Boundary Kit, which will be located just on the individual property. Where there is a vacant lot the location of the Boundary Kit is to be agreed with the property owner or Developer, as per the requirements of section 2.2.

Design calculations showing the friction losses and the estimated static heads for the pumps are to be included in any submission to Council on the proposed installation of pressure sewerage systems. Council may require that some reticulation main sizes are increased if it believes the heads on the pumps are likely to be too high. These design calculations will be checked by field testing as set out in section 4.8

There must be no alterations to reticulation pipe sizes, (as shown on the design layout) once the plans are approved without a full certification of the changes by the system designer. These alterations need to be noted on the plans with a countersignature by the Designer.

Pipe designs are to be based upon commercially available pipe sizes and delays in delivery will not be an acceptable reason for altering any pipe sizes.

Another critical aspect of the design is the location of a suitable discharge point into an existing reticulation system, where the pressure sewerage system does not discharge directly to the sewage treatment plant. In these instances the Designer is to provide with the designs a set of peak flow loadings that includes normal diurnal maximums to be expected and any peak flows that might occur after a significant power failure. Council will then identify a suitable manhole or pumping station for the pressure sewerage system to discharge into. If there are difficulties finding a suitable discharge point, based upon peak loads only, a retention structure with a fixed discharge may be used. This structure will need to be designed by the System Designer along with any odour control equipment that might be required.

## **2.5 Reticulation Zones**

Where the design is for large ongoing developments/ subdivisions, the design should be carried out in designated zones, leading away from the connection point (or discharge point) to the existing sewerage systems. These zones will be defined by the connection/ discharge point(s) and a series of isolation valves, or dead end lines that allow a discrete area to be isolated.

## **2.6 Reticulation Drawings**

The reticulation drawings must, as a minimum, show the following:

- Location and route of all pipelines in plan view (indicating the location, relative to the property boundary where these mains are laid in a different alignment from the standard Council allocation).
- Pipe sizes and pipe class
- The location of other services in close proximity, where these are known, and where these may need to be crossed.
- The location of any proposed flushing points, isolating valves, air valve, etc.
- Reference to any survey pegs that mark the pipelines proposed location.
- Any non standard pumping units to be used in the areas covered in the plan.
- Sections to be directionally drilled.
- Proposed pipe depth (as per section 4.1)
- The location of lateral spurs to connect properties.
- Boundary of any zones (where applicable).
- A unique number and references to the property design drawings.
- Formal notification of any amendments to the plan
- Nature of host soils expected, such as soil, rock, sand, water charged ground. The design drawing has no need for a long section and this information should be in the drawing notes.

Ultimately these design drawings will become the Work as Executed drawings for the reticulation system and will be amended to record:

- Actual Length of Main laid
- Directionally Drilled Sections
- Any deviation to pipeline route
- Actual host soils encountered
- Depths of pipeline
- Actual location of all fittings and markers.
- Lateral Spurs
- Location (approximate) of any marker posts to be used, to show the location of the pipelines.

The drawing shall be in an electronic format compatible with Council's GIS system and should, in paper format, be of a scale that is easily read by the naked eye.



## **2.7 Single Technology/ Development**

Within each specific development for which a design has been created, the Designer needs to clearly specify that the design is based on EOne pressure pumping units.

## **2.8 Bill of Quantities**

Accompanying every reticulation design there should be a list of quantities that should set out the following:

- Lengths and sizes of pipelines.
- Numbers of isolating valves and sizes.
- Number of air release valves and sizes
- Number of non return valves
- Number of valve boxes/ boundary kits
- Number of pumping units
- Number of flushing points
- Any special material or fittings required
- Number and nature of any non standard pumping units. (Details of the units will be left for the on property design.)

This will be used to organise materials where many of these are being provided by Council. Where the design is for an existing area or an extension of the current sewered area, then this bill of quantities will be used for the schedule of rates in the installation contract.

## **2.9 Standards and Regulations**

All designs for pressure sewerage systems and the associated house connections will be carried out in accordance with the NSW Plumbing Code (as applicable to local government) and the relevant Australian Standards. If those carrying out the design believe there is any conflict with these and Council's Technical Specification then these matters should be raised to the attention of Council's Engineering Services and their nominated Project Manager for the project.

Similarly, all designs will need to accommodate any local (Council) planning requirements and the Designer is expected to visit the site and determine these requirements, as well as any likely resident concerns.

## **2.10 Spa's**

The size of (volume contained) the spa will essentially determine what is required to discharge from the spa without fear of setting off the high level alarm in the Alarm/Control panel or generating overflows from the Overflow Relief Gully.

**Spa's with less than 250 litres in normal operating volume:** These require no special provisions to be made and as such they can be treated as a standard household water using appliance.

**Spas between 250 litres and 700 litres capacity in normal operating volume:** These may require that some additional measures be fitted to the pumping unit to avoid system alarms annoying neighbours unnecessarily. Typically these could involve the following and will be dealt with on a case by case basis, with the property owner to be advised by Council's Engineering Services staff on what is the preferred option.

- Time delays to the alarm switch
- Restricting the discharge rate of the Spa into the pressure unit.
- Other approved measures.

**Spas with a normal operating volume in excess of 700 litres:** These will require that differing flow restriction devices be added to the system. Typically these will involve the following and will be dealt with on a case by case basis, with the property owner to be advised by Council's Engineering Services staff on what is the preferred option

- Providing some form of upstream storage with a limited discharge rate to more closely match that of the pressure sewerage unit.
- Providing a larger pressure sewerage storage unit.
- Time delays on the alarm.
- Other approved measures.

**Spas with a backwash facility:** These will be dealt with the same as for a swimming pool.

An alternative to the above might be to regulate the outlet of the spa to limit the flowrate that can be discharged from the spa. Where such an arrangement is permanently installed this might overcome the need for any of the actions above, but it will mean that the spa will take longer to empty.

## **2.11 Swimming Pools**

The intention here will be to provide sufficient storage when the discharge from the pool backwash pump exceeds 0.45l/s, and the pump operates for sufficient time to fill the pressure sewerage pumping station to a level, that causes an alarm to be generated. An additional storage with a controlled discharge of less than 0.45l/s will be placed between the pool's discharge pump and the sewerage pumping station in these instances, unless the pool pump's discharge can be regulated to below 0.45l/s.

The interconnection of the swimming pools into the property system will be designed on a case by case basis, but all property owners will need to provide to Council the following information to allow for any modification of the sewerage pumping unit

- Pump backwash/ discharge rate in L/s.
- Duration of time the backwash is operated for.
- What arrangements will the owner make to empty the pool, if it ever becomes necessary to do that.

Council also has a strong preference that cartridge filters be used in all new pools to avoid sand getting into the pumping units but if this is not possible then sand filters may be used.

## **2.12 Choice of Valves**

Any proponent of a pressure sewerage system should include in their design only those valves suitable for use with the pressure sewerage system.

## **2.13 Discharge Point to Council Sewers**

Typically the discharge from the pressure sewerage system will be to one of the following:

- A sewage treatment plant
- A pumping station in gravity reticulation systems.
- A manhole in the gravity reticulation system.(see typical details on attachment 8.7)
- Direct discharge into a rising main, but this discharge point is generally not favoured.

The pressure system needs to be discharged to a point where the receiving system has sufficient capacity to receive the peak discharges from the pressure sewerage systems and transport it to the sewage treatment plant. This termination or discharge point may have been specified by Council, based upon flow details provided to them or on their own calculations.

## **2.14 Odour Control**

Where there are unique system features, such as where long rising mains to the treatment plant exist, or the actual need for control storage devices etc have been determined, then the Designer (for the pressure sewage system) must detail all odour control arrangements to be used. Council has currently installed ferrous chloride

chemical dosing systems and odour scrubbers to minimise and treat odours. Any required system will need to be based on the individual circumstances, however:

- They should be consistent with other Council odour control arrangements, but only if they are effective.
- They need to be effective for the particular circumstances
- Details of any chemicals storages that need to be provided. Council will require that such system can operate for in excess of 1 month without the need to top up any chemicals used.

## **2.15 Council Design Services**

Council requires that all new pressure sewerage reticulation be designed and/or checked by an 'approved' designer.

Council has access to a suitably qualified designer to check intended designs for Council or applications in the case of new subdivision. This service is available at a set hourly rate to others and Council can provide contact details to any persons wishing to procure this service.

Use of this service to design a pressure sewerage system is not compulsory for Developers but is recommended. Council will however directly retain these designers to carry out the design of any extension to the existing sewerage zone to accommodate on-property (or services of properties) that are having problems with the pressure systems.

Council will retain a list of accredited installers, who are qualified to carry out on property designs for new homes.

## **2.16 Installation of Pumping Units on Public Property**

Where the pumping units are to be installed on what is public land, the lids to be these structures are required to be locked in place to prevent entry by non-authorised personnel. A standard Council master keyed lock is to be used to achieve this.

Alternative to this is the use of special bolts that cannot be readily removed without a special tool.

The preferred method of securing these lids needs to be discussed with the Council engineering department before commencing to install any units.

## **2.17 Designing for Highly Fluctuating Loads**

Where the loads on the pumped mains, particularly rising mains may fluctuate considerably during the year the designer needs to give effective consideration to the use of dual and different sized mains to carry the pumped sewerage. Typical examples of this type of application will be caravan parks and camping areas, where the populations will seasonally vary considerably as well as for special events.

A small rising main can in these instances be adopted for small winter type discharges with a larger main that can be used singularly or in tandem for high loads. Both

mains should be capable of being isolated from the pumping arrangements at any particular time.

## **2.18 Flushing Points**

. For all Griffith pressure sewerage reticulation system applications a flushing point needs to include the following as a minimum:

- The flushing point is to be accommodated in a valve box capable of accommodating trafficable loads given the main will be in the footpath area.
- The flushing point should have an isolating valve so that the flushing point can be turned off when not in service.
- Connections to the flushing point should be through camlock connectors.
- The flushing point needs to have some form of protection device for the reticulation system should the tanker inadvertently move off whilst it is still connected to the flushing point.
- An approved flushing pit by EGL is shown in Attachment 8.2

## **2.19 Flushing Program**

This program effectively is about how often the above flushing points need to be used and the nature of the usage. For example when they are used is it for flushing water through the system or the extraction of sewage from the system. Any pressure sewerage design needs to include a flushing program that sets out the frequency of any flushing that must be carried out to ensure the system remain viable.

Flushing programs are particularly critical in new developments/ subdivisions where the pressure system will struggle until the development of the subdivision reaches that critical or minimal number of homes connected that make the overall design work effectively. Accordingly any new development submission must include the following in relation to the flushing program that will be applied to the subdivision:

- The frequency of flushing, based on the number of houses connected at any time, within the subdivision being served. A table format will be required to provide a guide to maintenance activities. If the flushing requirements for the subdivision are too onerous then Council may refuse handover until they become less onerous.
- The Designer's signature must be attached to the enclosed flushing program in the Development Application stating that the program has been designed by them.
- The minimal numbers that the design for the subdivision has been based upon.

- Subdivision estimated growth rate that has been assumed i.e. the time span till when this minimum number of connected homes will be reached

Where homes are being connected whilst the construction activity is still occurring, the Constructor/ Pipelayer will be responsible for all flushing activities until handover has been accepted by Council who will then take over responsibility for Flushing.

### 3.0 PUMPING UNIT DETAILS

The pumping unit is the core element of the pressure sewerage systems and as such needs to be dealt with separately and in detail. The pumping unit is defined as comprising the following elements.

- EOne Grinder Pump
- HDPE Storage Vessel
- Alarm System
- Pump System
- Pump Protection Switches
- Electrical Connections

#### 3.1 Pump Duty Points

Within the operational areas of Griffith City, the pump shall be designed to meet the following duty points.

- Maximum Head = 45m
- Flowrate = 0.45l/s

#### 3.2 EOne Grinder Units

##### Technical Specification – GP 2010i 710 x 2000

Item	Feature
<b>1. Pump/motor unit</b>	
1.1 Manufacturer	Environment One Corporation
1.2 Make/Model of Unit	GP 2010i 710 x 2000 submersible grinder pump 710 mm barrel diameter 2000 mm height
1.3 Detailed Description	The pump is a custom designed ,integral, vertical rotor pump of the progressing cavity type with grinder mechanism attached immediately below the pumping elements
1.4 Pump inlet shroud	130mm Diameter
1.5 Shredder ring	Ground /hardened stainless steel ring

1.6 Motor Specification	0.75 kW,4-pole ,1425 RPM , 240 volt,50 Hertz, single phase,aircooled,capacitor start (for high starting torque).induction run
1.7 Rated Power,kW	0.75 kW
1.8 Rated number of start per hour	At least 60 per hour
1.9 Rated Current, Amp	6.8 amps at full load
1.10 Starting Current	26.4 amps ,capacitor start
1.11 Power Factor	0.2 at no load 0.69 at full load
1.12 Over-pressure protection measures	Multiple protection of the pump and the pipe network: <ul style="list-style-type: none"> <li>2 The stator design – M3 stator that limits the pressure by design to a maximum level of about 120m – protects pipe network</li> <li>2 IN the motor – automatic reset, integral thermal overload protector incorporated into the motor – protects motor</li> <li>2 In the control housing on the pump – automatic reset , current/heat sensing device in the control housing – protects stator and motor</li> </ul>
1.13 Speed	1425 RPM
1.14 Shaft material	One-piece stainless steel
1.15 Rotor material	Through-hardened, highly polished, precipitation hardened stainless steel .No plating
1.16 Stator material	Ethylene propylene synthetic elastomer
1.17 Cutter material	Grinder wheel and shredder ring- Hardened stainless steel cutter bars
1.18 Rotating seal face material	Mechanical Type 21 shaft seal to prevent leakage between the motor and the pump.



	The seal is a stationary ceramic seat and carbon rotating surface with faces precision lapped and held in position by stainless steel spring.
1.19 Stationary seal face material	Stationary ceramic seat and carbon rotating surface with faces precision lapped
1.20 Spring	Stainless steel spring
1.21 Secondary seal material	No required due to high performance of single seal
1.22 Discharge piping and valving	Combination discharge check valve and anti-siphon valve – flapper type. Flexible discharge hose.304 grade stainless steel discharge valve
1.23 Restart after power failure	In the control housing on pump – automatic reset, current / heat sensing device in the control housing. This device not only protects the stator and the motor against over pressure , but facilitates “soft restart” or “phased restart” when power is restored.
1.24 Pump stand	Stainless steel
1.25 Energy Requirements	750w motor (intermittent),11.5w heater, (continuous),average pumping rate 0.6 L/s
1.26 Noise	One would virtually have to be outside, standing quietly beside the unit as it started or stopped to notice any sound.
1.27 Predicted durability	EOne pumps are designed for at least a 25 year life. Many reference site show that pump life exceeds the expected life span
1.28 Pump Testing	The EOne pump was tested by NSW Department of Fair Trading for compliance with Australian Standard AS3350 for electrical compliance.

2. Control System	
2.1 Alarm and control System-description	<p>Pressure switches. Non-fouling wastewater level detection for controlling pump operation shall be accomplished by monitoring the pressure changes in an integral air-bell -level sensor connected to a pressure switch. The level detection device has no moving parts in direct contact with e wastewater. High-level sensing is accomplished by a separate air-bell sensor and pressure switch of the same type.</p> <p>To assure reliable operation of the pressure sensitive switched, each core is equipped with a breather assembly, complete with a suitable means to prevent accidental entry of water into the motor compartment.</p>
2.2 Power / alarm cable description	<p>The grinder pump is furnished with a length of 6 conductor 14 gauge ,type SJOW cable,pre-wired and water and watertight.</p> <p>NEMA 6P electrical quick disconnect (EQD) for easy electrical disconnection</p>
2.3 Alarm panel description	<p>Alarm/disconnect panel suitable for wall or pole mounting .The NEMA 4X enclosure is manufactured of thermoplastic to assure corrosion resistance. The enclosure includes a hinged, padlockable cover, secured dead front and component knockouts.</p> <p>For each core ,the panel contains one(1) 15 amp, double pole circuit breaker for the power circuit and one (1) 15 amp single pole circuit breaker for the alarm circuit.</p> <p>The panel contains terminal blocks, integral power bus, push to run feature and a complete alarm circuit. The panel is equipped with red alarm light and audible alarm (86 dB) with “push to silence” button.</p>
2.4 Pump overload protection	Inherent protection against running overloads or locked rotor conditions for

	the pump motor are provided by the use of an automatic-reset, integral thermal overload protector incorporated into the motor.
--	--

<b>3. Performance</b>	
3.1 Pressure at duty point	Pump duty varies depending on the location of pump throughout the system. Please refer to pump curve
3.2 Pump capacity and head	0.74 L/S @0 m to 0.49 L/S @ 45 m

<b>4. Tank Details</b>	
4.1 Material	Polyethylene Tank – for rugged reliability. Factory pressure –tested for infiltration and exfiltration free installation
4.2 Storage above alarm level	423 L
4.3 Storage between “ON” and “ALARM”	146 L
4.4 Active (operating volume)	26 L
4.5 Storage at bottom water level	56 L
4.6 Total Tank volume	660 L
4.7 Ballast retaining flange	Yes
4.8 Coning of bottom to induce self cleansing “swirl”	Sufficient vortex action is provided to scour the tank free of deposits or sludge banks which would impair the operation of the pump
4.9 Inlet grommet	Location flexible .Drilled in the field for maximum flexibility.

5. Cover	
5.1 Cover	Low – Profile cover with bolt down points. Aesthetically pleasing. Provides easy access for service while blending with surroundings.
5.2 Venting	Integral vent in the lid

6. Certification	
6.1 Equipment and Material Certificates	NSW Dept of Health approval Australian Standards pump and panel approval Underwriters Laboratories Inc listing National Sanitation Foundation listing (NSF)

### 3.3 Alarm/Control Panel and Alarm Switches

As per attached specification

### 3.4 Electrical Connections

All electrical connections are to be carried out in accordance with AS 3500 and must be carried out by an appropriately qualified electrician.

The Installer should also check with Country Energy, as the energy supplier to the area to determine if they have any unique requirements in relation to pressure sewerage systems in the proposed location.

### 3.5 Hydraulic Connections

The home's plumbing is to be tested in accordance with the NSW Plumbing Code prior to connection to the pumping unit. The plumber will then need to attest in the supporting document that the house lines meet this requirement.

For existing homes a preliminary audit will be required to ensure they are not just fit for purpose but also that there are no upstream cross connections with the on-property stormwater system that might allow stormwater inflow into the pressure sewerage system.

For new homes the lines need to be flushed to ensure no construction debris is in the lines before connecting it to the pumping unit.

### **3.6 Generator Options**

It is not anticipated that there will be any prolonged power outages that should require special connections for frequent generator operation in Griffith City. However the pumping units should be capable being connected to a generator in an unexpected emergency.

### **3.7 Serial Numbers**

The pump has a serial number, which shall be recorded in the property installation information and work as executed drawings during the commissioning process.

## **4.0 PIPES**

### **4.1 Residential Pipe Materials**

The property delivery lines for all Griffith City Council applications shall be:

- 32mm internal diameter polyethylene (PE) pipe.
- Class 16 pipe and black in colour.
- Occur in long rolls such that in most cases the only joints on the property should be to the pumping station and to the boundary kit.
- Laid at the depths set out in design drawing and specification.

### **4.2 Reticulation Pipe Materials**

The reticulation mains for all pressure sewerage systems in Griffith City Council pressure sewerage systems are to be:

- Of varying diameter (50mm – 125mm) polyethylene pipes. When and if larger sizes become available in longer rolls, these will also be considered.
- Class 16 Pipe materials (unless otherwise stated in dedicated areas.)
- 100m as the minimum lengths of the pipe rolls.
- Readily available in the commercial market place so that additional lengths can be purchased for repair or extension purposes.
- Capable of being crimped if required to effect repairs.
- Laid at the depths set out in design drawing and specification.

### **4.3 Pipe Colours**

Only black PE pipe is to be used for pressure sewerage systems in Griffith, as this is the Australian Standard for sewerage pipes. Any black pipes with a coloured stripe are not to be used under any circumstances.

### **4.4 Joining the Pipes**

All pipes are to be joined by electro fusion techniques in accordance with the manufacturer's requirements. Those carrying out pipe joining, are to be appropriately qualified, capable of demonstrating their experience with this technique and have the right equipment to affect the welds. Council will inspect the quality of the welds and will witness the welding processes from time to time. Council will also consider butt welding of the pipes by persons with the appropriate qualifications, equipment and experience.

### **4.5 Marking the Pipes**

The location of pressure sewerage pipes are to be marked in the following manner:

- Reticulation pipelines are to have concrete markers installed at 200 metre intervals on straight sections of pipeline or at any significant change of direction. In general these markers are to be:
  - 600 (L) x 300 (W) x 150mm (D).
  - Must have the letters PS professionally stamped in the middle of the markers.
  - The letters to be 150mm minimum in height.
  - The letter indications are to be at least 15mm deep.

Alternatively a metal marker plate as set out below can be recessed flush with the concrete surface rather than having the stamped letters.

- Residential properties are to use a small marker plate affixed to boundary fences. The marker plate is to be 150mm (L)x 100 mm (W) with the letter PS in black against a white background. The letters are to be a minimum 75mm in height. The marker plates are to be made of a resilient metal, with the background made up of a minimum standard of class 2 reflective material.
- Tracer wire, (capable of being energised) is to be laid in the trench for both the reticulation and residential pipe materials. In the on-property works the tracer wire should be extended to end at the power board and boundary kits. The wire should be laid near to the pipe or alongside the pipe so that 350mm minimum cover is achieved,
- Pipes are to be laid at the standard depth. Where the main is laid at depths greater than the standard depth, this will be marked clearly on the reticulation plan with actual depths set out in a column in the notes section of the plan on an attached addendum.
- A brightly coloured marker tape is to be laid 250mm above the top of the pipe. This marker tape should indicate that there is a pressure sewerage system below it.

#### 4.6 Pipe Embedment

The minimum and maximum depths of service connection pipework shall be in accordance with Table 4.1

Table 4.1  
Minimum and Maximum Cover

Loading condition	Minimum cover m	Maximum cover m
Not subject to vehicle loading	0.30	1.2
Subject to vehicular loading-		
a) no carriageway;	0.45	1.2
b) sealed carriageways;	0.60	1.2
c) un-sealed carriageways	0.75	1.2

#### 4.6.1 General

Provide embedment and support of the type shown in the design drawings and Specification.

Place embedment material uniformly along and around the whole length of the pipe barrel, couplings and other appurtenances in manner to ensure uniform density of the side support (including haunch support) and overly with no distortion, dislodgment or damage to the pipeline.

Ensure that the depth of bedding material below the pipe collar is not less than 50% of the minimum bedding specified for the pipe.

Where the sewer is supported on concrete, do not place overly material until the concrete has obtained its initial set.

#### 4.6.2 Embedment Materials

Use embedment materials that:

- (a) Comply with maximum particle sizes in table (4.6.1)
- (b) Comply with the Purchase Specification for embedment materials as nominated in the Design Drawings or Specification.

**Table 4.6.1**  
**Maximum Particle Size**

<b>Pipe Size DN</b>	<b>Maximum particle size mm</b>
$\leq 100$	10
$>100$ to $\leq 160$	14
$>160$	20

#### 4.6.3 Compaction of Embedment

Following placement, compact embedment material to achieve the specified density and to uniformly support the pipe. Compact in layers to achieve the specified density uniformly throughout the depth of each layer and the degree of compaction specified in drawings and specification.

### 4.7 Trench Fill

#### 4.7.1 General

Place trench fill as specified .Use appropriate methods of compaction to achieve the compaction requirements of the Design Drawings and Specification.

Avoid impact sewer during placement of the trench fill material.

Do not place trench fill material within 24 h of placing embedment or encasement concrete, or longer period if shown in the Design Drawings or Specification.



Raise the fill evenly around MH and MS risers and compact in shallow layers to avoid unbalanced lateral loading.

Take special care to prevent displacement of access cover assemblies or supports. Correct any deficiencies of trench filling exposed by settlement.

#### **4.7.2 Material Requirements**

The trench fill material shall be comply with e Specification and relevant Design Drawings. Where the filled trench will be subjected to traffic loading, the fill material shall comply with the requirement of the road owner. In the absence of directive, use one of the following:

- (a) Compaction sand; or
- (b) Fine crushed rock; or
- (c) 75 mm crushed rock.

#### **4.7.3 Compaction of Trench Fill**

Compact trench fill material in layers to achieve the required density uniformly through out the depth of each layer. Where settlement of the finished surface is to be controlled, use a fill material that can be compacted to the required high degree of compaction.

Do not commence mechanical compaction of fill material directly above the pipe until the total depth of cover above the pipe is adequate to prevent damage to the main.

The dept hof fill material required before mechanical compaction can be used depends on the type pf compaction device.

### **4.8 Valves and Fittings**

The valves and fittings to be in the Griffith City pressure sewerage reticulation and on-property applications need to be:

- Compatible with PE pipe and the class of pipe used.
- Readily available in the commercial market place
- Be of a type recommended by the Technology Supplier.
- Comply with the relevant Standards for valves and fittings.

Valves and fittings supplied by EGL are approved by Council.

### **4.9 Testing of Mains**

#### **4.9.1 General**

Mains shall be pressure tested in accordance with this sub-clause in order to detect excessive leakage and defects in pipeline including joints, thrust and anchor blocks.

#### **4.9.2 Pre-Testing Procedures**

Test pressures shall not exceed the design safety factor for the material and compressed air testing shall not be permitting for pressure pipe.

Pre-testing procedures include the following:

- a. All required temporary and permanent thrust blocks shall be in place and all concrete adequately cured.
- b. All bolted joints shall be left exposed to allow for re-tensioning during or after testing.
- c. Compacted embedment and backfill shall be placed to leave exposed all joints, service connections and valve wherever practicable.
- d. Safety barriers shall be placed where required.
- e. The test duration shall be planned to 15 minutes or no more 45 minutes.
- f. The test equipment shall be placed in position and checked for satisfactory operation.
- g. The pump shall be of adequate size to raise and maintain the test pressure.  
*A pump that is too small may increase the test duration or too large it may be difficult to control the pressure.*
- h. Two calibrated test gauge shall be used to cross check gauge accuracy.
- i. The pipeline shall filled from the lowest point making sure all air is removed at high point appurtenances e.g. air release valve ,hydrant etc;  
*A firm foam swab may be used ahead of the fill water to assist air removal especially where the pipeline undulates. Extract the swab at the high point hydrant or washout.*
- j. The test section shall be left to stabilise overnight for at least 2-3 hours if this is not possible.

#### **4.9.3 Basic pressure test (Visual)**

The visual pressure test procedure shall be as follows:

- a. A test pressure of 1.25 times the maximum operation pressure shall be applied and the test section isolated by closing the high point air release valves and the pump feed valve;
- b. The test section shall be visually inspected for leakage at all joints especially bolted joints, all fittings service connections and ball valves;
- c. Pressure gauges shall be checked to ensure that pressure has not fallen dramatically indicating an undetected leak;
- d. Any detected leak shall be repaired and the section retested;
- e. Where no leak is detected, open high point appurtenances and depressurise to slowly drain the line into an approved waterway and make good all connection points.
- f. The location of the test section, the water temperature, test pressure and duration, the date and test result shall be recorded.

#### **4.9.4 Pressure Test Procedure**

Maximum system test pressure (STP) shall be at least 1.25 the maximum working pressure of pipeline but not to exceed 1.25 times MAOP (maximum allowable working pressure) of lowest rated pipe/fitting in line.

Test the pipeline as follows:

- a. Raise pressure to STP, close off main and allow to settle for at least 12 hours. During this period, pressure will fall as a result of pipe expansion.

- b. Using water of the same temperature as that of pipeline ( $\pm 3\text{ }^{\circ}\text{C}$ ) restore and maintain STP.
- c. Measure and record water volume added at 2h, 3h, 4h and 5 h from start.
- d. Conclude test 5 hours after commencement.

For optimum test protocol, the following tolerances are recommended:

- i. Water volume:  $6\text{ }10D$  litres, where  $D$  = pipe nominal diameter in metres.
- ii. Time: 61 min.
- iii. Pressure: 61 kPa

Suggested tolerances are included even though the current method does not include tolerance. Accordingly, they are included as recommendations only.

- e. Calculate the water volume added between the second and third hour,  $\Delta V_{(3h-2h)}$  and the volume added between fourth and fifth hour  $\Delta V_{(5h-4h)}$ .
- f. Calculate  $V_{all} = 0.14 \cdot L \cdot D \cdot H$

Where:

$V_{all}$  = Volume makeup allowance in litres/hour

$L$  = Test length in km

$H$  = Average test head over pipeline length in metres.

- g. Test passes if  $\Delta V_{(5h-4h)} [0.55 \Delta V_{(3h-2h)} + V_{all}]$ .
- h. Record the location of the test section, the water temperature, test pressure and duration, the date and the test result.

#### 4.9.5 Repair of Leaks

Any failure, defect, visible leakage and/or excessive leakage rate, which is detected during the pressure testing is to be rectified by approved means by the Developer at no cost to Council.

The Developer shall remove and replace all such defects from the main under test by the use of girth joints conforming to the requirements of this specification or other approved repair methods that provides equivalent joint movement and deflection as the original jointing system.

In making good the pipeline no more than two (2) girth joints or approved alternative fittings shall be permitted in any 250 metre section of pipeline under test.

## **5.0 ON THE PROPERTY INSTALLATION**

Pump installation works can only be carried out by appropriately accredited Installers. The certification or accreditation process for these installers is to be provided by the Technology Supplier. On completion of the accreditation, Council will prepare a list of local installers for use by owner's/developers.

### **5.1 Basic Layout**

The overall layout should (as much as can be practically achieved) be a collaborative effort between the Installer and either the property owner or their designated representative. This representative's identity is to be communicated to Council, in writing, by the property owners prior to the meeting.

The basic property system layout will incorporate the following features:

- Pumping Unit
- Property Delivery Line
- Upstream House Drainage Lines
- Connection to the Property Power Board
- Installation of an Alarm/Control Panel
- Connection to the Boundary Kit

The “on-property” Installation is defined as that section from (but not including) the Boundary Kit to the inlet of the pumping unit (on the household side). In general the pumping unit is to be located in a position, as close as practical to the building and within a clear line of sight of the Alarm/Control panel. Where there is more than one building on the site the pumping unit will be located next to the building contributing the greatest flow volume to the pumping unit assuming it is the building which has the power board on it if there is only one such powerboard. This close proximity minimises overall installation costs and will be the basis of any quote provided on installation costs.

### **5.2 Installation of the Pumping Unit**

The pumping unit is to be installed in the following manner and at all times in accordance with the Technology Suppliers approved method:

1. Excavation of hole as per the Technology Suppliers requirements i.e. minimum diameter of hole and depth. Excavation to be via an auger to minimise the on-property damage and auger transport to be rubber tyred.
2. Cut inlet hole into the storage vessel at the desired location.
3. Insert storage vessel in the hole, carrying, not rolling it into place. This should also be done in accordance with the Technology Supplier's requirements.

4. Pour the concrete ballast around the base of the pumping unit in accordance with the Technology Supplier's instructions and ensure the concrete ballast, bonds with the storage vessel material.
5. The pumping unit hole is to be back filled with sand up to a depth of 200mm below the burial level decals.
6. The remaining 200mm is to be filled with an acceptable quality topsoil.
7. The storage unit is to be visually inspected during the installation phase to ensure that no damage has been done to the unit in the transportation and installation process.
8. The pump and inlet/ other pipelines to be installed in the storage vessels in accordance with the Technology Supplier's requirements.
9. The Alarm/Control panel is to be installed on the house/ shed/ garage or on a dedicated post if away from the above (see section 5.4).
10. The Alarm/Control panel to be wired into property power board.
11. The pumps and all electrical connections are to be tested and the unit made operational.
12. Work as Executed information to be compiled and recorded.
13. Final restoration of property.
14. Formal commissioning certificate is to be gained from Council representative who is to be present at the commissioning of all installations.

### **5.3 Installation of the Property Delivery Line**

The property delivery line is to be laid at a depth as detailed in Table 4.1. The route of the property delivery main should be agreed between the Installer/ Designer and the property owner. The route is not to be altered during the installation process unless unforeseen circumstances are encountered, such as underground structures.

The following steps represent the basic acceptable installation process for the Property Delivery Line. Installers wishing to amend this process should gain Council concurrence before proceeding.

The property delivery line is to be installed in the following manner:

1. Confirm layout diagram for the property has the correct pipeline route and is intended for the correct property.
2. Determine if any of the pipeline excavation should involve directional drilling.
3. Mark out the pipeline, cut and remove any high quality turf before commencing trench excavation. If the weather is hot this turf is to be watered, sufficiently often to keep it alive and appropriate for restoration.

4. The pipelines are then excavated to a minimum depth of 450mm plus the external diameter of the pipe.
5. The pipeline is to be installed in the trench and joined by electro-fusion to the length of pipe that is protruding from the pumping station. A tracer tape with wire capable of being energised is to also be installed. It is intended that there be no joint between the Boundary Kit and the pumping station but this will not always be possible.
6. The excavation is to be carried out using rubber tyred trench diggers where possible to minimise disturbance.
7. Pipe Bends or significant changes in direction of the delivery line are to be tied to fixed locations on the properties where possible, for marking on the Work as Executed drawings.
8. Pipelines can be backfilled with the material excavated from the trench where there is no rock or sharp materials in that fill that might puncture the pipeline. Where an alternative excavation technology is used the pipe must be backfilled with sand to 80mm around the pipe.

#### **5.4 Installation of the Alarm/Control Panel**

Set out below is a set of steps which would be regarded as the basic methodology for installing the Alarm/Control panel

1. Agree the location of the Alarm/Control panel with the homeowner, as part of the property installation.
2. Determine if a standalone post is required and if required, obtain one.
3. Determine the 1 in 100 year flood level (if applicable) and mark out a location for the Alarm/Control panel so that the bottom of the panel is a minimum of 500mm above that level.
4. Install the Alarm/Control panel in accordance with the Technology Supplier's instructions and the relevant standards and codes. The Alarm/Control panel is to be in clear site of the pumping unit and preferably no more than 7-8meters away (max 10m). The Alarm/Control panel is then to be connected to the household power board.
5. The connection of the electrical cable to the Alarm/Control panel is to be bottom glanded to prevent moisture entering the Alarm/Control Panel. Refer to the manufactures instructions to ensure the prevention of this moisture into the control panel and if there is any conflict raise this to the attention of the Council Project Manager.
6. Once all connections have been made a protective shield is to be inserted inside the box to allow non electricians to remove the pump with safety for maintenance purposes.

7. The Alarm/Control panel is to be tested both for normal operation of the pump and for the alarm modes.
8. Assuming all test requirements have been met, the Alarm/ Control panel is to be locked and a sticker with the emergency contact numbers is to be affixed to the outside of the box by the Installer.

### **5.5 Connection of the Pump to the Property Powerboard**

The pump is to be connected into the property's power board in accordance with the following:

- The pump is to be installed on a separate circuit to all other household uses. Residents should be capable of isolating all of the other circuits in the house power supplies if so required.
- This connection is to include the connection to Alarm/Control panel, which must be in accordance with the Technology Supplier's requirements. Ideally both should be within a line of site of one another, but that is not always possible.
- The connection should be in accordance with any local energy supplier requirements.
- The household power board must comply with relevant Australian Standards.
- Caution over asbestos in power boards is to be exercised, in accordance with local energy supplier's requirements.

### **5.6 Household Audit (Existing Homes)**

Where the connection is to an existing dwelling, a formal audit should be carried out before the property layout design has been commenced.

The Installer will need to either carry out the work previously identified in the audit or check that the property owner's tradespeople have carried out this work. These audits will need to be carried out by appropriately qualified electricians and plumbers. The Installers Electricians and Plumbers are required to sign off that the final connections are in accordance with both the Technology Supplier's instructions and the relevant Australian Standards for the respective connections.

### **5.7 Multiple Dwellings/ Non Residential Properties**

Design of the on-property works must in these instances be conducted by an experienced designer as indicated in section 2. This will determine either the number of pumping units to be installed and the size of the units to be installed (i.e. single or multiple pumping units).

The installation of these units will in general be in accordance with the general directions of this section excepting:

- Any contractually imposed proposed time limits on site (see section 6.16) will be varied to be more appropriate to the works required.
- The size of the property delivery line and lateral spur may alter.

- Multiple connections to the reticulation system may be used to assist with the internal arrangements.
- All testing should be done concurrently, but it will be possible to progressively connect parts, as their testing is completed.

## **5.8 Separate Greywater and Blackwater Lines**

As part of the property installation for existing homes the initial site investigation will need to determine if there are separate greywater and blackwater lines. These then need to be factored into the design for the property and this should be done by an experienced designer, particularly if multiple units need to be contemplated. It is therefore strongly recommended that any Installer make use of any Council design services for these installations.

The pumping unit should be sited to be able to accept flows from both of these sources. Possibly a second pumping unit might be required in some circumstances, but ideally this should be avoided. At minimum this design needs to be discussed with Council before proceeding to install the dual units.

## **5.9 Testing Procedures – General**

The Installer is to carry out the tests set out in section 6 of this specification on the pumping unit and property delivery line before making the unit operational. A separate commissioning may be required at a latter date. Council has a strong performance that these accredited installers be capable of formally commissioning the pump so that there is no need to revisit the property.

The pumping unit will be tested using the town's water supply. Only after all of the tests have been successfully carried out, is the final connections to be made and the pump made operational. A formal commission certificate is to be issued by Council to verify that the pump is fully operational and as a minimum this certificate shall include:

- A unique number related to the pump's serial numbers.
- Certificate of the pumping unit's serial numbers.
- The property address.
- Date of Commissioning
- Name of the individual carrying out commissioning and their signature.
- Name of the Council Employees witnessing the commissioning.

## **5.10 Time Limits for Carrying Out Works on the Property (Existing Houses)**

All installation work is to be completed within 3 days of the Installer entering the property to carry the installation. This limits any inconvenience to the home owners as result of the installation works. The only exceptions to this 3 day rule are:

- Where weather intervenes and the work cannot be completed within the time frame without incurring damage to the property.



New work should not be commenced if wet weather is likely to occur.

- The pump and/or storage vessel needs to be replaced as it is not performing to specification, and this was not as a result of the installation activities.
- The resident requests additional works on site, and the Installer and resident agree on a new time frame.
- Council's Project Manager insists on sighting some aspect and abnormally, causes a significant delay, due to unforeseen circumstances.

Council's installation contract may include penalties that reduce the payment to the Installer for each day over these time line limits they are in completing the work. The commencement points and finishing points for the on property work will be:

**Commencement:** When Installer's employees arrive at the site or the Installer places any equipment on the site.

**Finish:** After the pumping unit property delivery line is made fully operational and ideally formally commissioned. All plant and equipment removed and the site restored to a satisfactory condition.

### 5.11 Consultative Process (Existing Houses)

The intention of the on-property design is to endeavour to accommodate the property owner's wishes in the design where this can be practically achieved. Thereafter the remaining process is about ensuring the minimum disturbance and inconvenience to the resident on the property for existing homes or delays to the new home owner.

In summary the key elements of the consultative process are:

1. Initial letter to residents (existing homes) or letter in response to an application (new homes) setting out who is to /can be the Installer/ Contractor on the project, plus their contact numbers  
(Letter by Council)
2. Installer to contact the property owner and meet on site to discuss the layout, identify greywater/ blackwater needs etc. (Action Installer)
3. For existing homes the results of any property audits are to be provided to property owner whereafter the property owner must be given at least 10 working days notice to allow them to engage their own tradespeople, if that is the preferred direction.
4. Copy of layout/ installers drawing for property owner's signature.  
(Action Installer)
5. Prior notification (5 days) to resident before works commence on site.  
(Action Installer)

6. Introduce staff to the property resident at the commencement of work and commence work. Provided property resident with 24 hour a day emergency contact numbers.  
(Action Installer)
7. Final inspection of property with resident invited to participate.  
(Action Installer)
8. Hand over a copy of the draft homeowner's manual as well as discussing with the resident the instructions in that document on how to use the system.
9. Emergency contact numbers to be affixed to the Alarm/Control panel.

### **5.10 Maintenance Covenant**

For all new subdivisions a positive covenant will be placed on the property reinforcing Councils access to the property for maintenance purposes and that the property resident abides by the conditions, laid out in the home owner's manual.

For existing properties either a positive covenant can be placed on the property or the residents may enter into a formal Service Agreement with Council. A new service agreement will however be required each time the property changes hands.

Council does not in the first instance propose to take an easement on the property but reserves that right if it has difficulties in gaining access to the units.

### **5.11 Homeowner Manual**

Council will provide each of the Installers with a number of homeowner's manuals, to hand out where the unit has been installed. This manual provides basic instructions on how to use the pressure sewerage system and basic instructions on what to do if an alarm is activated. The Installer should explain the manual to the resident and make them familiar with the emergency and general contact numbers included in the document. They should also clarify what can and cannot be discharged into the pressure sewerage system.

If the Installer requires additional copies of the manual they should approach Council, which will provide these.

An additional more detailed homeowner's manual will be monitored on Council's website and it will include additional information on:

- Modifications to the home.
- Installing spa's/swimming pools.
- What to do in floodplains.

Copies of this will be available at Council as well as on Councils website.

## **6.0 TESTING PROCEDURES**

### **6.1 On-property Test**

All operational tests are to be conducted using town water with the pumping unit being connected to the sewerage system only after these tests have been successfully carried out. The steps required to bring the pumps into operation should be set out in the Technology Supplier's Installation Instructions but over and above those instructions, Council requires the following tests to be performed on all on-property works as the minimum testing for the new pumping units. If the Technology Supplier requires other tests these will be carried out in conjunction with the following:

#### **6.1.1 Leakage Test**

Once the installation is completed the pump storage vessel should be filled to a set (but high) level and then that level should be observed for a minimum period of 2 hours. The system alarm should be switched off during this period. If there is no leakage then the Installer can proceed to the simulated power failure test, set out below.

#### **6.1.2 Simulated Power Failure Test**

It is expected that the leakage test will be conducted immediately before other tests for operational readiness and as such the initial operational tests will commence with the pump storage vessel being filled to a high water level. It will thus be expected that the pump should commence in an alarm mode, as per a power failure scenario, when the alarm is switched on. This will be the first test to determine if the alarms will automatically turn on and then off, as the pump reduces the volume stored in the well.

The time taken for the simulated power failure test is to be included in the time based operational test (Test 3).

#### **6.1.3 A time based operational test**

The pumps will be considered operationally ready when they have successfully operated for a period of one to four hours with a constant inflow rate of around 0.1 to 0.2 l/s (this is the typical inflow from a garden hose operated at reasonable pressure). Such a test should involve several on and off cycles of the pump itself. The variable time period has been included to allow for where there are drought conditions being experienced or there is a lack of water for other reasons. The test may be reduced to just the one hour to minimise any water wastage.

#### **6.1.4 An alarm test**

The Installer will also need to have several large storage containers that can discharge water quickly into the pumping unit's storage vessel, such that the alarm level is exceeded during normal operation. The pumping unit is then to be observed to see if the alarm initially comes on and subsequently if the alarm will automatically shut off after normal pumping levels have been achieved. This cycle may be repeated and be part of the overall four-hour time

based test. Again the number of tests may be lessened by the Council's representative to minimise any wastage of water.

#### **6.1.5 A Pump Protection Test**

The pump is also to be tested against a closed valve to ensure that the pump's safety cut outs are working satisfactorily. This test need be conducted only once and due precautions should be taken against sudden pipe failure.

#### **6.1.6. Visual Inspection:**

This test is the most fundamental of all tests in that it simply requires all parties to keep their eyes open during the installation process and rectify any damage immediately. In addition, before the site is vacated, a final inspection is to make sure the site is clean and that all restoration is complete typically this requires:

- The inlet pipework is to be visually inspected at the exposed connections after a connection has been made to the pumping station to determine if there are any visible leaks in the pipework before backfilling the trench.
- The concrete ring beam has been poured to provide protection against buoyancy and that this has been done as per the Technology Supplier requirements.
- The pumping station is to be examined for possible leaks before backfilling, after structure has been filled with water.
- The pumping station lid is to be checked to insure that after restoration the lid is not sitting in a low point, where rain water may pond. If it is found that this is the case minor re-landscaping is to be carried out to ensure the surface drains away from the pumping station.
- The pumping installation appears stable and unlikely to experience significant erosion or compaction problems.
- All pipelines are to be visually inspected to ensure compaction to natural surface levels has been achieved. The pipelines should then be reinspected to ensure no subsequent settlements at the greater interval of:
  - 50 days after the installation has been completed
  - After significant rainfall (30mm in 2 days) has occurred.

Where any subsequent subsidence is found, it is to be repaired. Once the tests have the approval of the Council's representative, or appointed referee, the Contractor may then interconnect that unit into the household sewerage system, and conduct all household tests.

## **6.2 Commissioning of Pumps**

Whilst the pump may have been made operational, as per section 6.1, the pump will not be deemed to have been fully commissioned until it has been signed by Council's representative.

The Technology Supplier may have their own requirements before they will formally certify the pump is commissioned and any Installer will need to make themselves aware of these requirements and what is required to gain this Commissioning Certificate. Council's preferred position is that once the Installers have done the appropriate accreditation testing they should formally commission the pumping unit to avoid another visit to the site.

The date shown on the Commissioning Certificate will be:

- The commencement date for the inground warranty.
- The commencement date for any defects liability period that might apply to the on-property works.

## **6.3 Handover to Council**

Council will ultimately be responsible for the ongoing maintenance and operation of the pressure sewerage systems in the Griffith Area and certainly those connected to Council's sewerage systems. Thus the pressure sewerage assets need to be formally handed over to Council before it will begin to carry out this maintenance.

Council therefore only wants to take over assets that are fit for the purpose for which they are intended. It therefore has a number of set procedures that it needs to be reassured before it is prepared to formally accept the assets. These procedures are set out below

## **6.4 Reticulation Mains**

Council will accept handover for the reticulation mains for a particular reticulation zone, subject to the following:

- Verification that the mains have been cleaned out.
- Completion of independently verified pressure tests on the reticulation mains that indicate the compliance with both the relevant standards and the designs for the system.
- Verification that the mains as installed are of the design and classes indicated in the design drawings.
- The pump pressures meet the design specifications and the reticulation mains are not recording any significant deviations in pump pressures.
- In new subdivisions where these pressures cannot be confirmed at the time of the reticulation construction handover will be conditional/ provisional on this pump pressure test being achieved at a later date.

- Visual inspection of the pipeline to ensure that they appear to be:
  - Laid in the correct easement
  - Appropriately marked as set out in section 4.5
  - Appropriately compacted.

Where no significant rainfall has occurred, Council may grant provisional handover subject to the Installer being required to make good any subsequent trench subsidence when it does rain. This provision does not relieve the Installer from the normal defects liability work where the installation occurs under contract to Council.

A formal inspection of the pipelines will be part of the handover and this is to confirm:

- All fittings (valves, air valves, flushing points, etc) are in working order.
- A flushing program has been attached to the handover application and all flushing points are working as per the specification.
- All connections to the residential boundary kit are made.
- All Work as Executed information has been provided.
- All information as required in section 7 has been provided to Council.

A handover application needs to be made in writing to Council, indicating exactly what works the Installer/ Developer wants Council to take over and the date they want handover to occur. A minimum of 10 business days notice must be provided to Council, in relation to the handover and Council will endeavour to accommodate the desired handover dates, but will not be constrained by it.

As part of the handover process Council may require the Pipelayer to uncover a section/ or sections of the pipe to confirm.

- It has been laid at the correct depth.
- It has been laid in the correct easements.
- The Household connections have been provided
- The correct pipe has been used.

Council will however endeavour to carry out random audits during the works to ensure that the need for above uncovering are minimised. The reticulation handover can be independent of the property handover and the handover can be done on a zone by zone basis.

## **6.5 The On-Property Works**

Council will accept handover for the on-property delivery line and plumbing unit for a particular property subject to:

- The pump has been made operational as per section 6.1 and has been independently verified in terms of its performance and a commissioning Certificate signed off by Council's representative.
- Pump tests as set out in section 6.2 confirm the unit is performing to the design specifications.
- Confirmation that the alarm panel is installed in an appropriate location, out of any floodplains.
- Confirmation that the storage tank is not in a location where rainwater will pond.
- The venting arrangements for the pumping station are installed in accordance with the Technology Suppliers requirements and out of any floodplain.
- Visual inspection of the property delivery line to confirm:
  - The line has been laid as per the household drawings
  - The line is appropriately marked.
  - The line has been appropriately compacted
- All Work as Executed information has been provided.
- All property information as requested in section 7 is provided.

## **6.6 New Homes - Test for Debris in Lines**

In addition to the above tests there is a need to flush out the new home drainage lines prior to the connection to the pumping unit. This is to ensure that all building debris are flushed from the system before a connection to the storage vessel is made.

This test should be carried out only after all external construction has been completed and the internal household fit out works have also been completed and immediately before any new residents move into the house.

The bath will be filled and all internal taps turned on immediately after the bath plugs are released. The taps will be left to run for approximately 5 minutes to flush away building debris from the system, before connection is made to the storage vessel.

The 5 minute period is only a minimum guideline and will be governed by what is coming out of the pipelines. This test period can be lengthened if debris is still being flushed out of the pipelines.

## **7.0 INFORMATION TO BE PROVIDED TO COUNCIL BY THE INSTALLER AND PIPELAYER**

The installation of pressure sewerage systems requires that a significant amount of information be provided to Council for both the reticulation mains and the on-property works.

An individual file should be kept on each property as well as a file on the reticulation system. This information is required to build an effective profile on the performance of the pressure sewerage pumps over time and the factors that might impact on their performance.

The sections below set out what information is required for inclusion in these files and Council will have a standard proforma that it will provide to Installers and Pipelayers but they will be required to provide all additional notes in support of these basic forms.

Council will make available copies of the relevant parts of the files for the Installers/Pipelayers information at a later date if they need to update their records.

### **7.1 Reticulation Mains**

The following is seen as the minimal information that is required to be provided to Council in relation in the reticulation system information file:

- Work as Executed plans showing all of the usual information such as location of line, fittings, and points of connection from residential property etc. However no long section is required for the Work as Executed plans as in general the pipe is laid at minimum depth.
- Where the depth of the pipeline changes from the standard minimum cover these are to be noted and the actual depths recorded.
- The sections of the pipelines that have been directionally drilled.
- The sections where the pipe has had to be laid in sand bedding.
- The sections where pipe has had to be concrete encased.
- Nature of host soils where these differ from clay/soil materials
- Location where other services (water, power, gas, etc) were encountered and crossed. Plus any details of intrusion of these services into the set allocation for the Council mains.
- The dates on which the sections of mains were actually laid and what traffic measures were taken on those dates.
- Copies of any photographs/ videos that show the pipeline routes before construction and the pipelines after construction.
- Location details of the installation process. This includes the locations of any marker posts and tie measurements.



- Details of all subcontractors used and nature of their works.
- Verification of pipe size and type.
- Date construction completed for a reticulation zone. Date made operational.
- Dates boundary kits installed on the property
- Pipe Head tested/ verified.
- Verification lines cleared and secured.
- Pressure test results/ verified.
- Date property connection line laid.
- Persons with whom property Boundary kit location determined, if servicing a vacant property.
- Date of handover to Council.
- Any provisional details determined from handover.
- Any road audits in the area and details in respect to traffic management activities.
- Any incidents during construction that should be noted.

## **7.2 On Property Information**

The following is seen as the minimal information to be provided to Council in the on-property information file:

- Works as executed plans based upon the property design, highlighting any deviation from this design. It is assumed that the layout design will become the Work as Executed drawing unless there have been significant changes made.
- The date the property owner was originally contacted to organise onsite meeting.
- The date the property owner was provided with a copy of the household designs.
- The date the Installer contacted the resident for construction purposes.
- The date work commenced on the property.
- The date/s the work was completed and the Installer left the property.
- The date the property works were handed over to Council.
- A discrete number linking the property drawings and the reticulation drawings.
- The date the pump made operational.
- Results of the pressure test on the pump (if carried out).

- Date and number of the pump commissioning certificate.
- Serial number of pump.
- Serial number of pump station.
- Tradesman verification that the electrical connection into the household handover complies with regulatory requirements and the NSW Plumbing Code.
- Tradesman verification that the hydraulic connections into the household lines are in accordance with regulatory requirements and relevant Australian Standards.
- Copies of photographs/ videos of properties before the onsite activities commenced plus any photographic evidence including photos of the site after the work has been completed.
- Property owner's name.
- Name of Resident if different from property owner.
- Property owner's representative (if a representative was used) and copy of the letter of authority.
- Nature of any additional storage provided.
- Date and officer to whom all confidential information returned and their signature
- Details in respect to any carting away of septic sewage if applicable including the certificate for the waste from an authorised facility.
- Other information as the Installer sees appropriate

### **7.3 Information Files**

These files need be nothing more than a manila folder, but a separate folder for each property and reticulation zone. It should at minimum contain the following:

- Any Council Information Proforma provided but be completed supplying all information requested.
- Copy of the Household "work as executed" drawing
- File number relevant to the drawing number
- Clear identification of the property that the file is applicable to in a manner that avoids confusion
- Any final copies of photographs taken.
- Any further information as required in this Section.
- Any other information
- Copies of all pump commissioning tests carried out
- Signatures of the tradespeople verifying that the connection to the power board and the household connections is in accordance with appropriate standards.

- Any other information that the Developer no longer requires.

The file should be readily identifiable from the cover of the file and ideally should be presented as whole streets in backlog areas. Failure to produce such a file will be deemed to have not completed the work as executed information and may see Council's handover revoked. Specific conditions in respect to this may apply to any installation contract Council may put in place.

## **8.0 ATTACHMENTS**

- 8.1 EGL Boundary Kit
- 8.2 EGL Flushing Kit
- 8.3 Pressure Pump Site Diagram
- 8.4 Typical house Connection Details
- 8.5 Pressure Sewer System Main Details
- 8.6 Typical Road Crossing and Alignment
- 8.7 Pressure Sewer Main Connection to Manhole
- 8.8 Pipe Embedment and Trench Fill
- 8.9 Pump Performance Curve
- 8.10 Alarm Panel Details

## Pressure Sewer Division

# The EGL Boundary Kit

**Boundary Kit**

The boundary kit is a purpose-built unit, comprising of a non-return valve, unions and isolation ball valve & tee arrangement. To standardize the installation process, the boundary kit is positioned at a pre-determined distance within each of the property's boundary line, connecting the discharge line from the house to the pressure sewer main. The use of standardised kit facilitates quick removal or isolation of the system from the main sewer line if so required.

**Boundary Kit Access Box**

The Eone access box is a purposely-built, bottomless polypropylene box designed to house the lateral kit arrangement. The access box comprises of a molded unit with a removable reinforced recessed cover. The design characteristics, enables simple installation of the box after the pipe work and valving is in place.

**EGL**

The Environmental Group Limited

# Features include:

## The Boundary Kit

- EOne non return flap valve used in pressure sewer projects for over 15 years
- Brass or 316 stainless steel isolating valve
- Quick disconnect union couplings with "O"Ring seals
- Pre-assembled to allow ease of connection to polyethylene pipe work.
- Each unit is assembled to a specific length to facilitate quick replacement if necessary.
- Designed to fit snugly within the purposely built boundary kit access box

## The Boundary Kit Access Box

- Low profile, reinforced, non slip cover
- The cover is attached internally by means of a stainless steel cable to prevent theft
- The cover is clearly marked  
PRESSURE SEWER  
CONTROL VALVE
- Bottomless design to facilitate installation of the unit.



[www.environmental.com.au](http://www.environmental.com.au)

**Environmental Group (Operations) Pty Ltd**  
Unit 3, 9 Packard Avenue  
Castle Hill NSW 2154 Australia  
Telephone: (02) 8858 3499  
Facsimile: (02) 9899 3463



Pressure Sewer Division

# The EGL Flushing Pit



The Flushing Kit  
supplied by EGL  
is available with both  
re-enforced concrete  
and galvanised locking lid.



**EGL**

The Environmental Group Limited

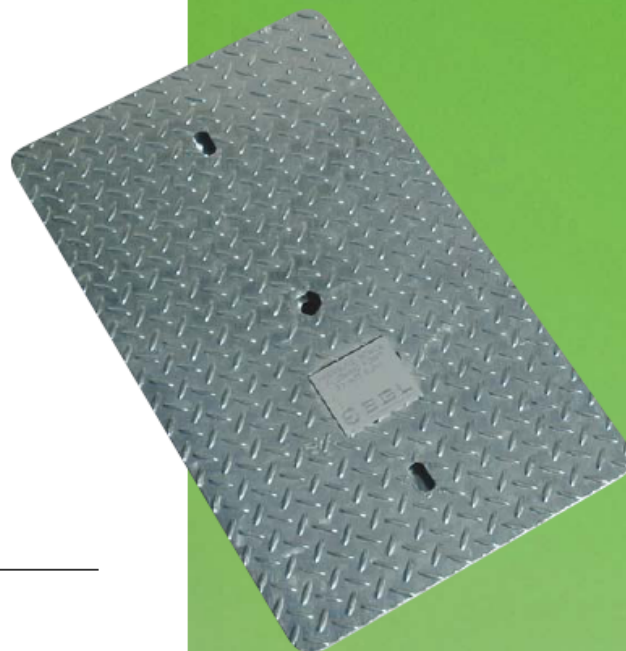
# Designed for optimum strength

Flushing connections are included in the sewer reticulation network for the safe and effective flushing of the lines when required. Generally, the need for flushing only occurs in systems such as new subdivisions where the build-out of homes is progressive and flow rates are below scouring velocities during early development.

Systems installed at developed properties are unlikely to require flushing due to the "self-cleaning" properties of low pressure sewer systems which use E/One's semi-positive displacement pump. Alternatively, the EGL Flushing Pit can be used as a temporary suction point in the event of the sewer mains pipe work being damaged further downstream.

The EGL Flushing Pit is a purpose-built unit comprising a polypropylene housing retro-fitted with an assembly made of 50mm, 316 stainless steel threaded pipe and 50mm, 316 stainless steel ball valve and polypropylene cam lock assembly for simple and quick connect/disconnect operation.

The flushing kit pit box used by EGL is available with both re-enforced concrete or galvanized steel locking lids.



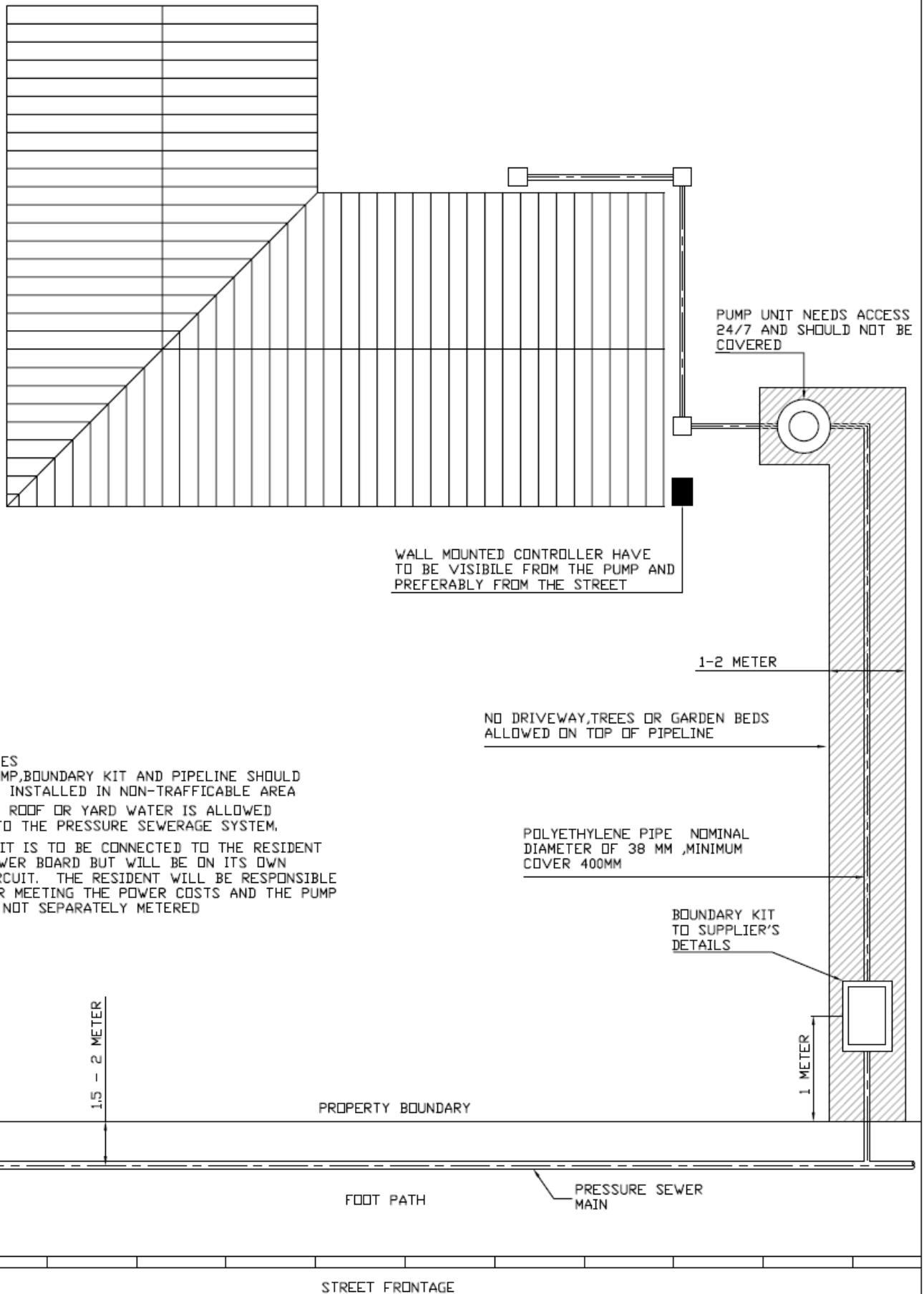
---

[www.environmental.com.au](http://www.environmental.com.au)

**Environmental Group (Operations) Pty Ltd**  
Unit 3, 9 Packard Avenue  
Castle Hill NSW 2154 Australia  
Telephone: (02) 8858 3499  
Facsimile: (02) 9899 3463

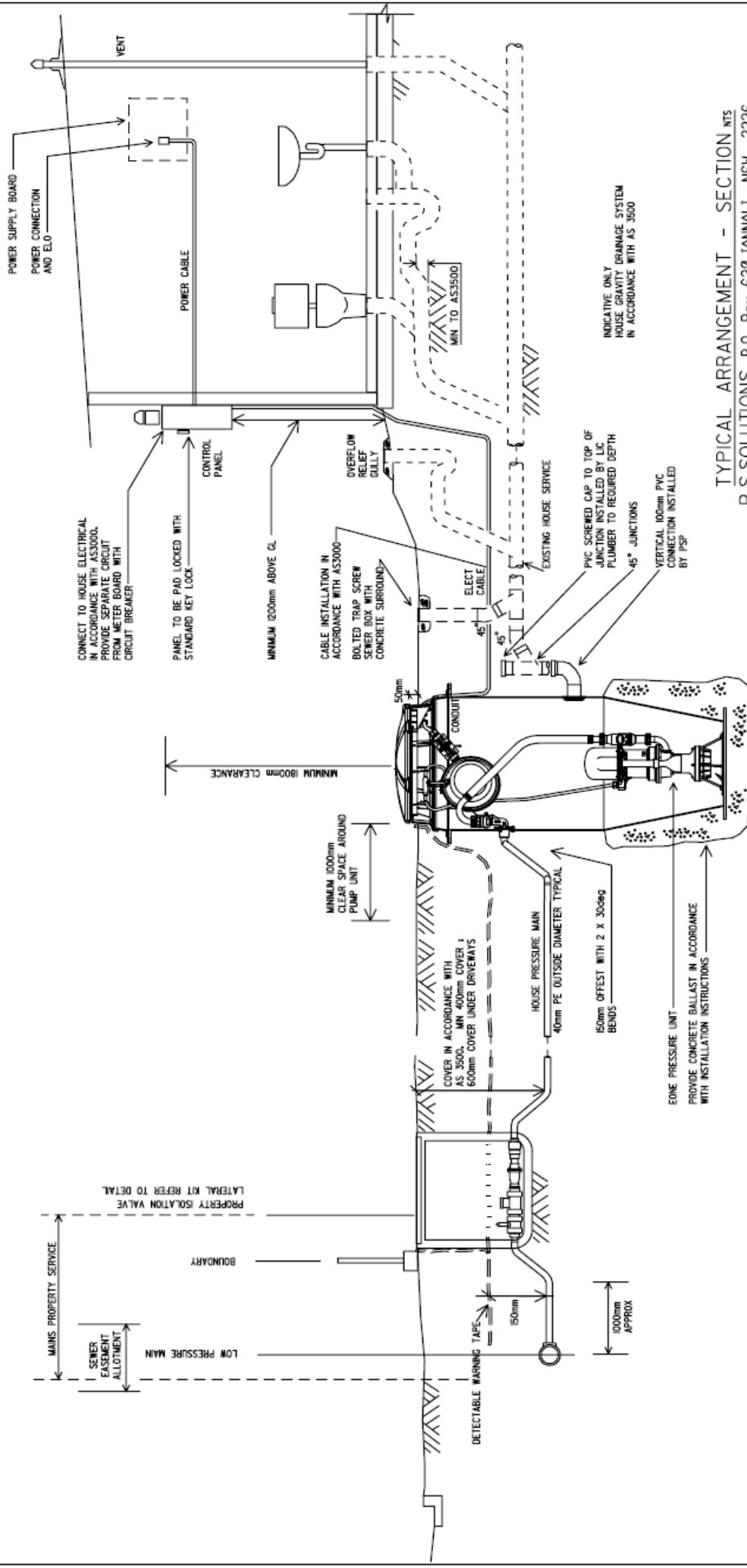
# TYPICAL PRESSURE PUMP SITE DIAGRAM

## ATTACHMENT 8.3





# ATTACHMENT 8.4



TYPICAL ARRANGEMENT - SECTION NTS  
P.S.SOLUTIONS P.O. Box 630 JANNALI NSW 2226  
Ph: +61 2 9589 3779 Email: pssol@solutions.net.au  
ABN: 57 097 164 899

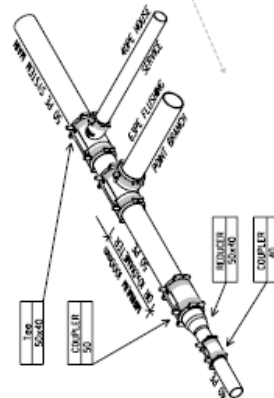
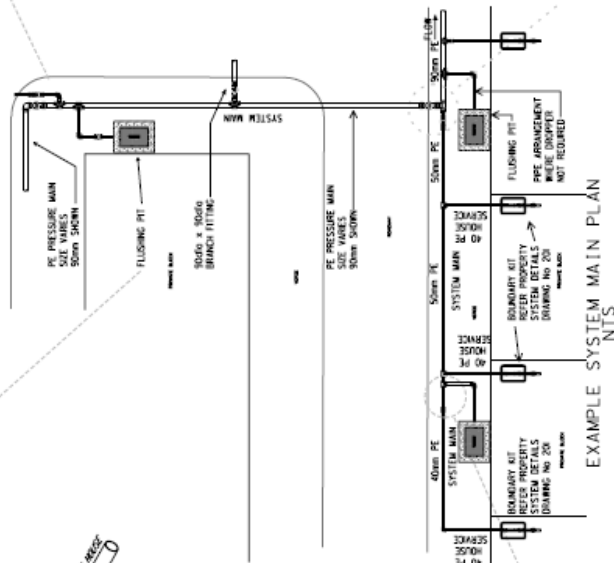
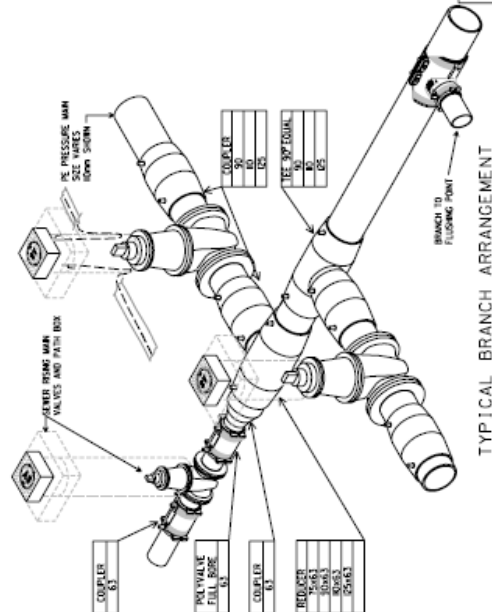
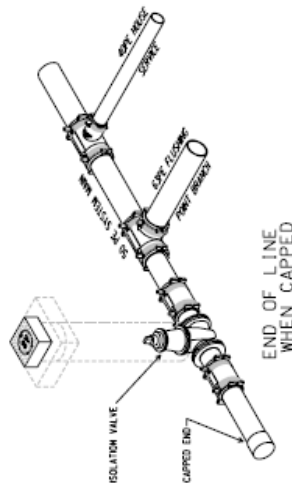
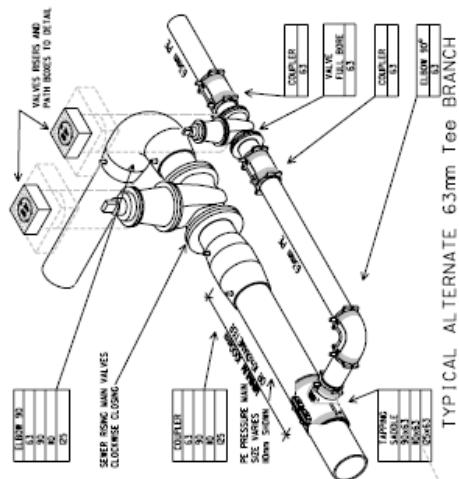
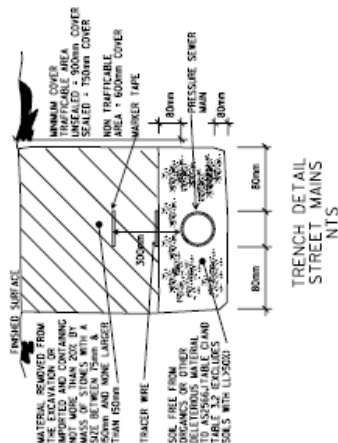
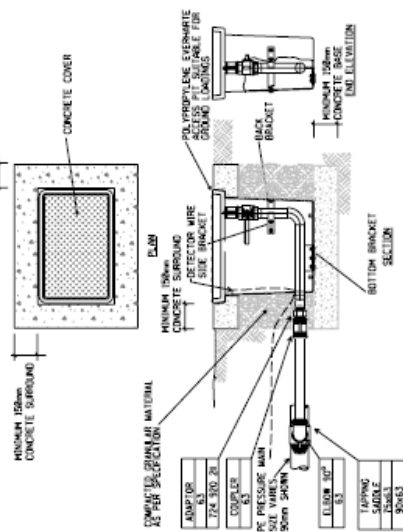


This drawing & the design it covers are the property of PRESSURE SEWER SOLUTIONS PTY LTD. They are furnished on a confidential basis. The receipt of this drawing shall constitute an agreement by the recipient thereof that neither the drawing nor the design will be reproduced, copied, or used in any manner whatsoever, except in the limited way and private use permitted by any written consent given by PRESSURE SEWER SOLUTIONS PTY LTD.

**PRESSURE SEWER SOLUTIONS PTY LTD**  
P.O. Box 630  
JANNALI NSW 2226  
Ph: +61 2 9589 3779  
ABN: 57 097 164 899

DETAIL SHEET			
TYPICAL HOUSE CONNECTION DETAIL			
DESIGNED	CHECKED	DATE	DETAIL No
SW	MR	23/12/04	A4

## ATTACHMENT 8.5

TYPICAL END OF  
LINE ARRANGEMENT

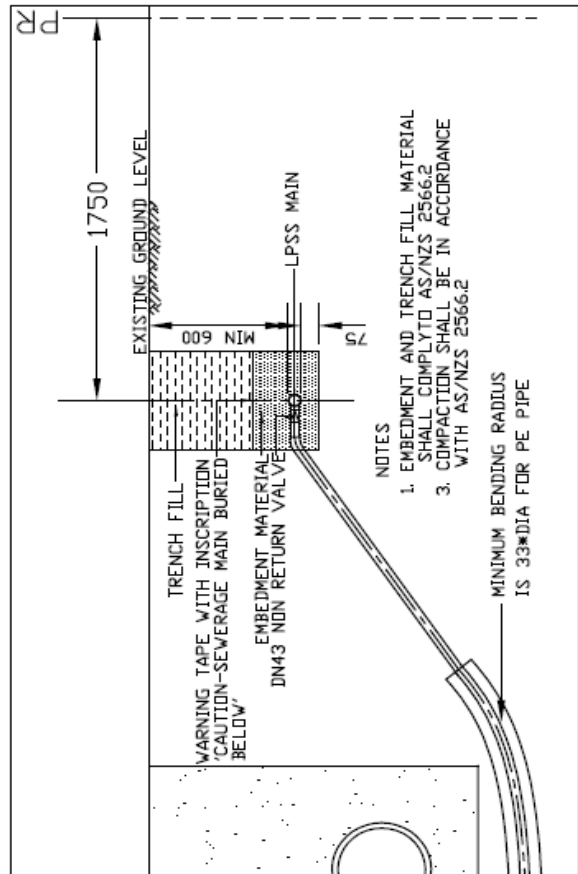
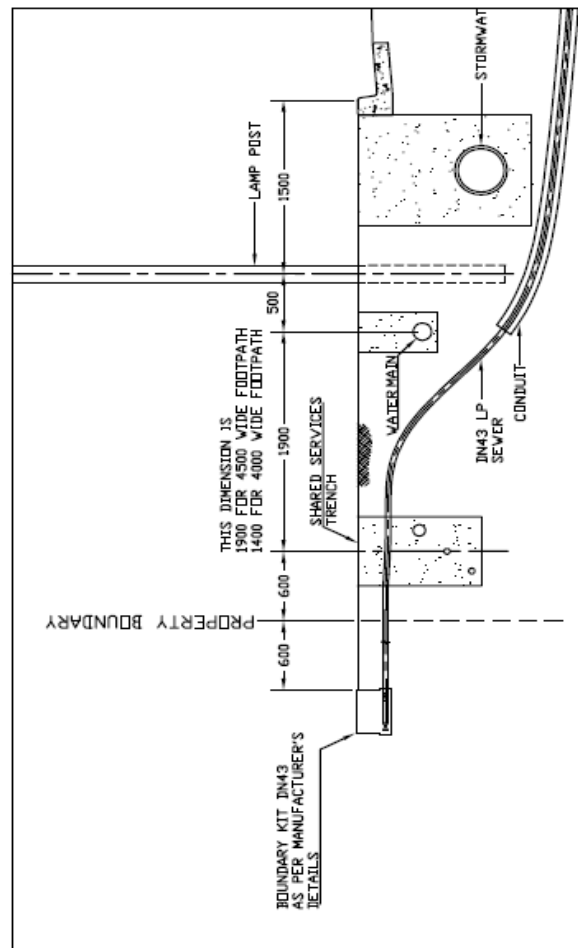
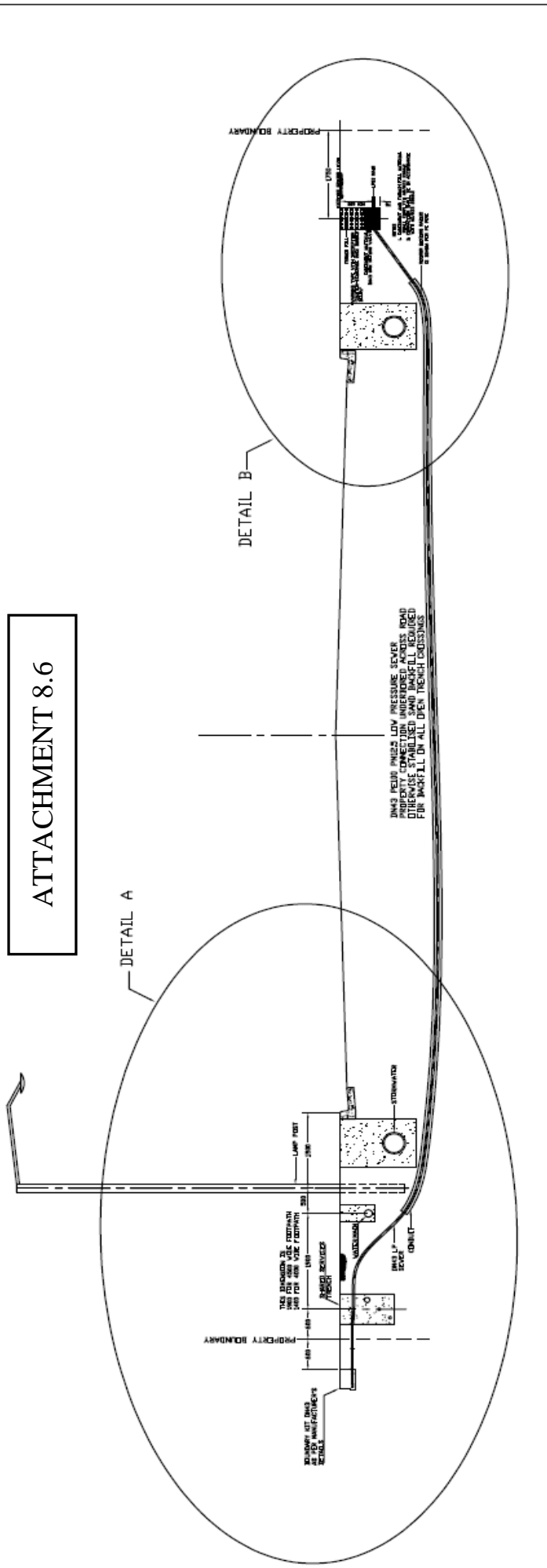
# EXAMPLE SYSTEM MAIN PLAN<sup>NTS</sup>

TYPICAL ALTERNATE 63mm Tee BRANCH

TYPICAL BRANCH ARRANGEMENT


[illegible]

## ATTACHMENT 8.6

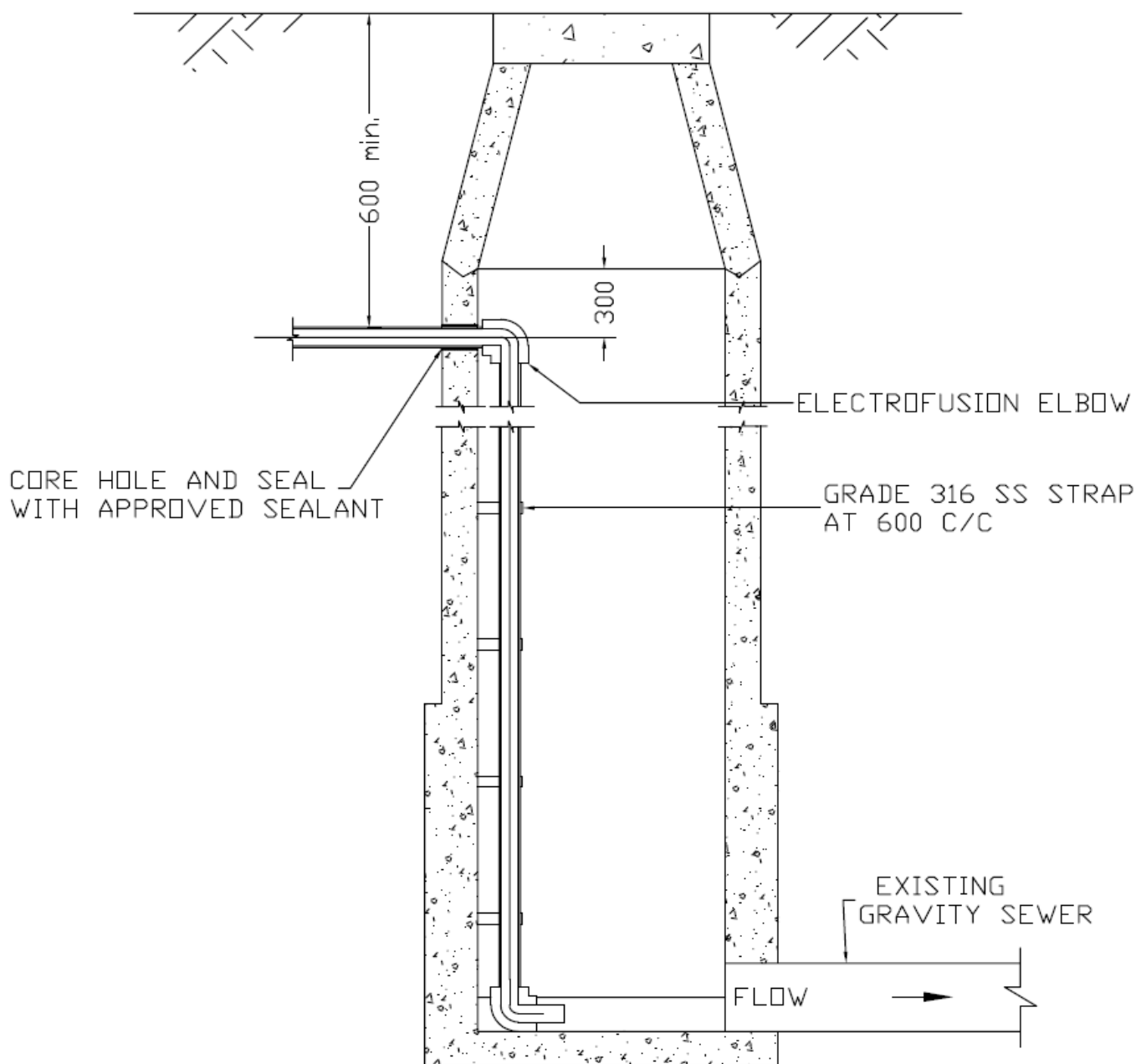


### DETAIL A

DETAIL B

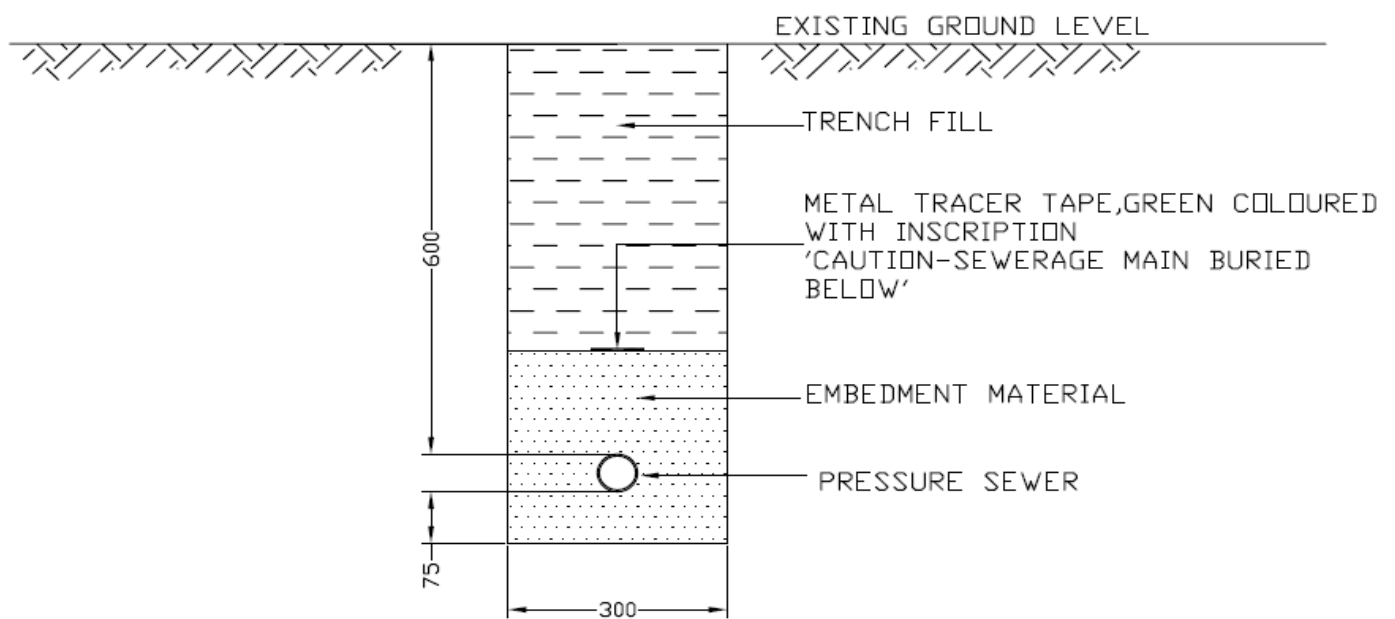
 Griffith Engineering & Construction	CITY OF GRIFFITH				LOCATION		DESCRIPTION		DETAILS OF AMENDMENTS		CREATED										
	SURVEYED	NA	DRAWN	BA	DESIGNED	BA	CHECKED	DT	WAS ENGINEER	BA	DATE:	DT	WAS DIRECTOR	AY	DATE:	JAN 06	SCALED:	NTS	JOB No.		SHEET No. 1 OF 1 SHEETS
LPSS ROAD CROSSING																					

## ATTACHMENT 8.7



PRESSURE SEWER CONNECTION TO MANHOLE

## ATTACHMENT 8.8

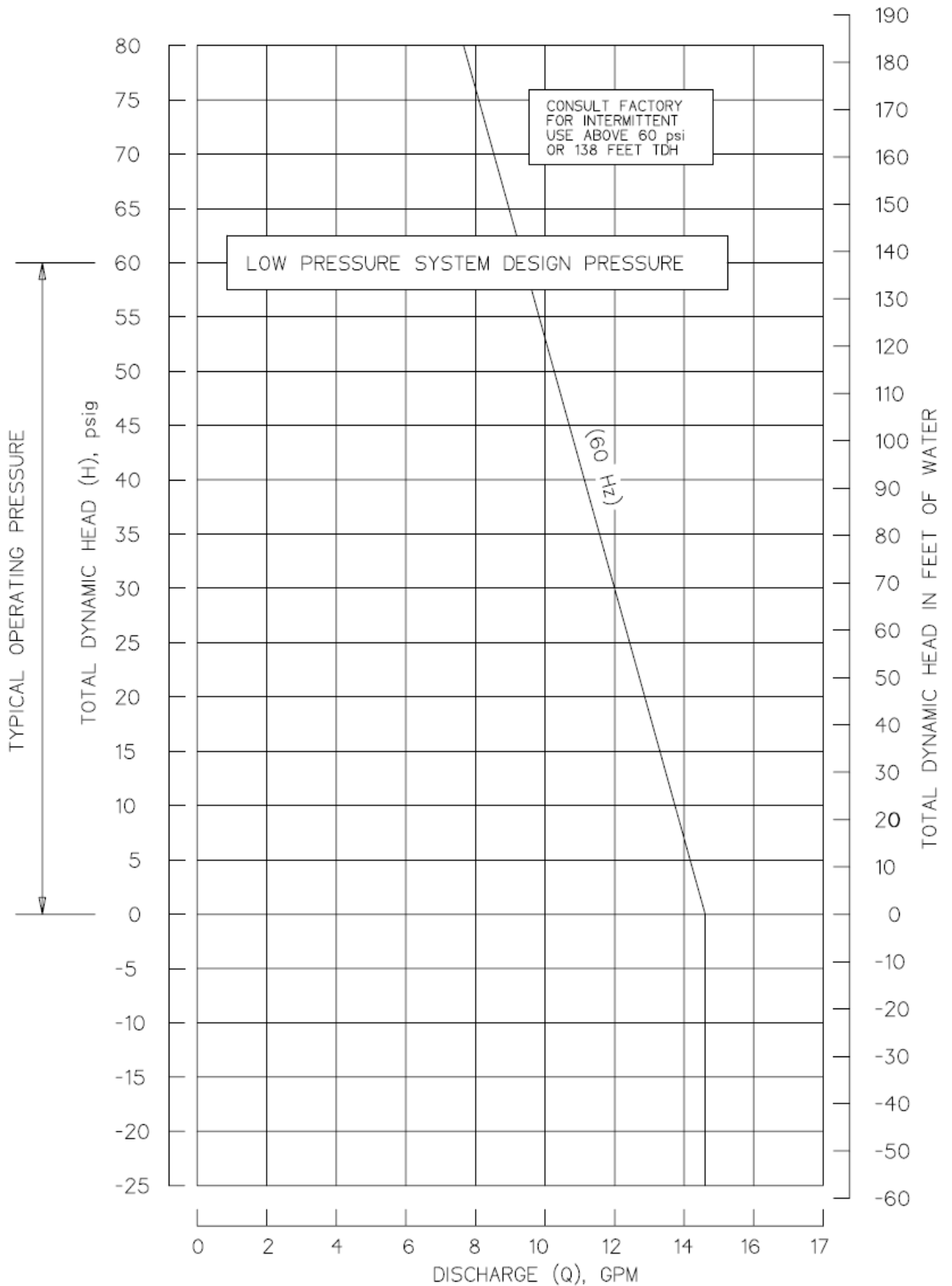


### NOTES

1. ALL DIMENSIONS IN MILLIMETRES OTHERWISE NOTED.
2. EMBEDMENT AND TRENCH FILL MATERIAL SHALL COMPLY TO AS/NZS 2566.2
3. COMPACTION SHALL BE IN ACCORDANCE WITH AS/NZS 2566.2

## PIPE EMBEDMENT AND TRENCH FILL DETAILS

## ATTACHMENT 8.9



# MOD 250

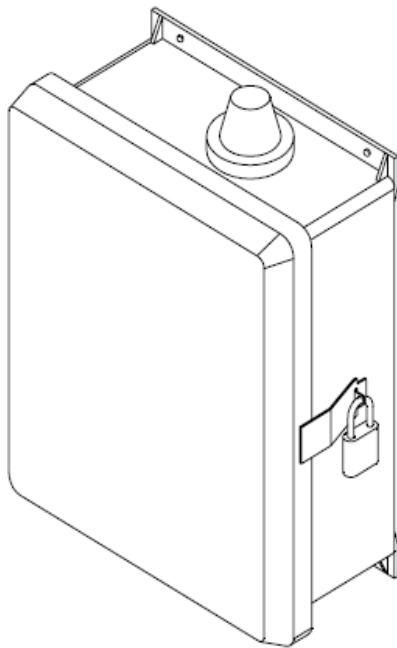
## *Simplex Alarm Panel*

### **Description**

The MOD 250 Electrical Panels are custom designed for use with Environment One Simplex Grinder Pumps. They are specified for installations that require an electrical disconnect separate from the residence distribution panel.

MOD Panels are supplied with audible and visual high water level alarms. They are easily installed in accordance with relevant national and local codes. Standard MOD Alarm Panels are listed by Underwriters Laboratories to ensure high quality and safety.

Please consult factory for special applications.



### **Standard Features**

- Corrosion-proof fiberglass enclosure
- NEMA 4X rated enclosure
- Hinged access panel
- Lockable latch with padlock
- Circuit breakers
- Terminal blocks and ground lugs

### **Optional Features**

- No audible alarm
- Dry contacts
- Remote contacts
- 120 VAC or 240 VAC service

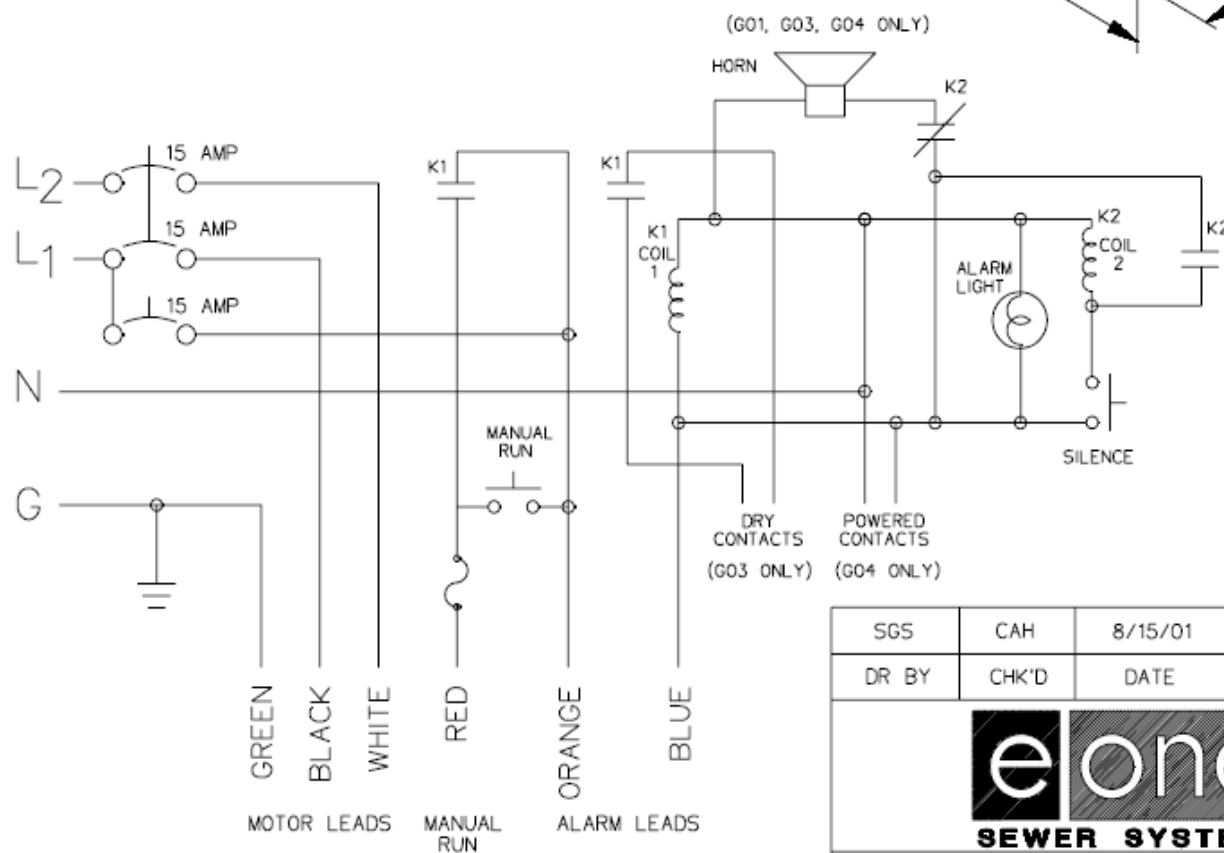
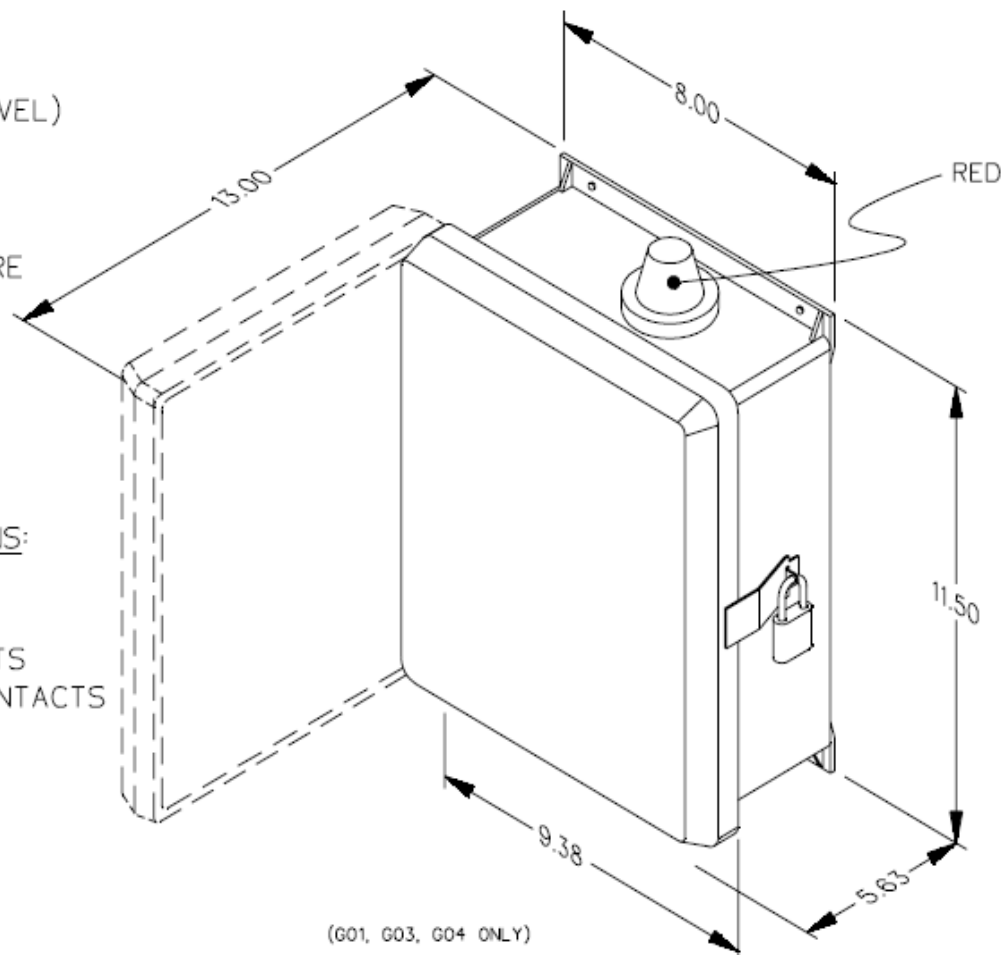
LM000154, Rev A, 1/02

# SIMPLEX MOD 250

REDUNDANT RUN (HIGH LEVEL)  
VISUAL & AUDIBLE ALARM  
MANUAL SILENCE  
MANUAL RUN  
240VAC  
4X FIBERGLASS ENCLOSURE

## AVAILABLE CONFIGURATIONS:

- GO1 - STANDARD
- GO2 - WITHOUT HORN
- GO3 - WITH DRY CONTACTS
- GO4 - WITH POWERED CONTACTS



## CONTROL CABLE:

TYPE TC; DIRECT BURIAL, 12AWG,  
SIX CONDUCTOR.

SGS	CAH	8/15/01	B	5/32
DR BY	CHK'D	DATE	ISSUE	SCALE



PANEL, 4X SIMPLEX, 240V

LM000152