



Project: Burndell Road, Yapton

Foul Water Pump Station

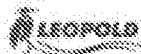
Client: Crayfern Homes Ltd

Issue	Reason For Revision	Date	Issued	Approved
A	Issued for SWS Comments/Approvals	03/04/2019	I Biggin	I Ireland

Ian Biggin
Senior Proposals Engineer
Xylem Water Solutions UK Ltd
106 Hawley Lane
Farnborough, Hampshire, GU14 8JE
[REDACTED]



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1: Specification

This proposal is based on equipment providing compliance with the Southern Water Services MED 4006 Issue 1 Supplementary Addendum to the Sewers for Adoption 7th (SFA7) Edition specification as obtained from the WRC Website at the time of this submission.

2: Hazardous Area Applications

Application - Pumping Station

The proposed pumping station is designed to serve the domestic foul inflow from 45 new residential dwellings.

Sewage enters the pump station wet well via a foul water gravity network as outlined on the BdR drainage layout supplied under separate cover.

Surface water run-off from impermeable areas is being handled by a separate storm water drainage system.

The pumping station transfers the sewage/foul water via a rising main to the Southern Water network.

Flammable atmospheres

Decomposition of raw sewage is not considered a source of explosive atmosphere. The worst-case flammable atmosphere that may exist in a sewage pumping station is hydrocarbon contamination from industrial discharges or tanker spillages. As the actual contaminant is not known the content of the flammable atmosphere cannot be specific, but will typically be the lighter more volatile hydrocarbons such as pentane from petrol.

The pumping station compound surface is designed to drain away from the wet well and will not be provided with a surface/run off drain in to the pump chamber.

Hazardous area classification

The pumping station is designated as a hazardous area, due to the risk of contaminated sewage entering. The inlet chamber, pump and valve chamber have been classified as zone 2 internally in accordance with the Southern Water MED4006 guidelines.

A Zoning Plan is shown on drawing A5601-06.

Equipment category and certification

All new equipment intended to be located in an area classified as zone 1, has to be certified as equipment **group II category 2 G** equipment (or better). For zone 2 the new equipment shall be certified as equipment **group II category 3 G** equipment (or better). Please refer to Appendix C for the manufacturer's certificates for the equipment within the Hazardous Area as defined.

3: Peak Inflow and Proposed Discharge

The proposed pumping station is designed to serve the domestic foul inflow from 45 new residential dwellings.

In accordance with SFA7 Clause B5.1.1 the residential peak inflow is based upon 4,000 Litres per dwelling per day and considering 45 units, this equates to a flow of 2.08L/sec. We have selected a design discharge rate of 7.32L/sec.

This drawing indicates the rising main specification as a 90mm OD PE100 SDR17 pressure pipe with 78.7 mm bore. The pump station discharge pipework has been sized as 80mm nominal bore in order to satisfy SWS minimum wet well/valve chamber velocities at 1.2m/s in accordance with their guidance D6.3.9.

4: Emergency Storage

The residential foul emergency storage is based upon SFA7 Clause D4.5.3 at a rate of 160 Litres per dwelling and considering 45 units this equates to 7,200 Litres.

The required 7,200 Litres will be accommodated within the wet well. For details of these please refer to appendix B

5: Rising Main/Surge Analysis

These proposals are based on the utilisation of a new 90mm outside diameter PE100 Pressure Pipe SDR17 with a 78.7mm internal diameter.

The rising main constantly ascends to the receiving manhole.

As the rising main at 78.8 m long is less than the 500m detailed in SFA7 then we do not propose to prepare a surge analysis report in this instance.

6: Pump Duty Requirements and Selection

We have determined the pump duty to be 7.32 L/sec at a head of 7.21 metres and have therefore selected submersible sewage pumps from the Xylem Flygt N series NP3085 MT with 462 impeller and 2kW motor, suitable for operating from a 400v/3ph/50hz electrical supply.

The pumps will be supplied in an explosion proof format complete with intrinsically safe level controls.

One pump will also be fitted with a hydraulic auto-flush device.

As the motor ratings are less than 7.5kW we do not propose a seal leakage detection system.

The pumps will be provided with Stainless Steel Guide Rails and SWS Nylon Rope Lift System.

We have attached our hydraulic calculations, system curves and pump performance details in Appendix B

7: Pump Station Layout

The pumps, pipework and valves would be installed within concrete chambers constructed by others to a layout as shown on Xylem Water Solutions drawings A6601 01 - 06. Please refer to Appendix D.

The non-return valves would be fitted with levers, weights and guards and the gate valves with extension spindles. Xylem Water Solutions contract would terminate a short distance outside the valve chamber in a 100mm nominal bore pipe from where provision of the rising main and connecting it to the pump station pipework would be the responsibility of others.

A 100mm valve chamber drain would be installed by others and a penstock valve fitted in the valve chamber.

8: Retention Time and Septicity

In line with SFA7 D4.6.3e, the sewage retention time within the pump well and rising main should not exceed 6 hours (to prevent septicity occurring).

Based on the operating volumes within the pump well (between start/stop levels) the retention time in hours equates to 1.4 hours at final development and 2.79 hours at half development.

Therefore we do not propose to provide any additional equipment to suppress the effects of septicity.

9: Pump and Level Control Cabling

The pumps and level controls will be supplied with 20m of power cable connected to the control panel via Junction Box systems mounted on steel work at waist height as per Southern Waters preferences under SFA7 MED4006 Issue 1.

We have allowed for sealing the two 150mm pump cable ducts and one 100mm level control cable duct with a RISE cable transit system.

10: Control Equipment

Automatic level control would be via a Siemens Hydromat Plus ultrasonic level controller augmented by 2 separate float switches for high level and back up control, all wired back to a multi compartment control panel complying with the SWS MED4006 Issue 1 Addendum to the Sewers for Adoption 7th Edition Specification.

The control panel would be installed within a floor fixing GRP kiosk of dimensions 2000mm wide x 1750mm high x 750mm deep. The GRP kiosk has a meter compartment with a separate lockable door

Please refer to Appendix E for wiring diagrams and kiosk layout

11: Telemetry Equipment

A Multiform M40 Telemetry Outstation will be provided for use in conjunction with a standard PSTN Line complete with a lightning protection barrier. Configuration of the telemetry system will be provided by a suitable contractor at the cost of the developer.

12: Access Covers

We are proposing Steelway Stamp Lock Pro Lift FACTA B access covers in compliance with SFA7 D6.7 for the inlet manhole, wet well and valve chamber.

The access covers have torsion spring assisted lift lids, internal safety grids for fall protection and demountable barriers and posts.

The wet well cover would be of a Twin Lid design as preferred by Southern Water.

13: Lifting Equipment

We propose that a REID Porta lifting davit be provided complete with a single cast in type davit socket all rated for 500kg SWL with the davit socket in the position as shown on our drawings.

14: Penstock Valve.

We have included for a wall mounting penstock valve for installation over the incoming 150mm foul sewer within the upstream demarcation manhole. The penstock will be complete with a non-rising spindle, spindle support brackets, tee key and top box.

15: Baffle Plate

We have included for a galvanised steel baffle plate to be fitted over the 150mm diameter incoming sewer.

16: Appendices

Appendix A Summary

**FOUL WATER PUMPING STATION
SPECIFICATION FOR
GUIDERAIL MOUNTED SEWAGE PUMPS & ACCESSORIES**

**SEWERS FOR ADOPTION 7TH EDITION SPECIFICATION
INCLUDING SWS SUPPLEMENTARY ADDENDUM MED4006 ISSUE 1**

PUMP:

Single stage fully submersible pump with cast iron case and impeller which is securely locked to the fully protected motor shaft extension. Impeller as data section.

SEAL CHAMBER:

Buffer chamber between pump and motor, charged with oil retained by opposing seals.

MOTOR:

Squirrel cage induction motor of watertight IP68 enclosure suitable for continuous service and having Klaxon lock out circuit for over-temperature protection on Explosion Proof motors.

CABLE:

Suitable length(s) of multi-core VRI PCP sheathed flexible cable connected through watertight gland(s) to the motor windings.

DUCKFOOT:

Cast iron floor fixing duckfoot bend incorporating guiderail socket(s) and self-locating boltless pump quick release coupling.

GUIDERAILS:

Stainless steel rail(s) for attachment to cover slab or ground level steelwork and extending to duck foot sockets. Complete with necessary location brackets.

LIFTING CHAINS:

Nylon Rope Lifting System

REFLUX VALVE:

Fullway pattern delivery non-return valve.

SLUICE VALVE:

Fullway pattern isolating sluice valve with non-rising spindle and hand wheel.

PIPES:

From duckfoot through to defined point for rising main connection, incorporating the valves and, in case of multi-pump system, an appropriately sized manifold. All fitting connections appropriate to materials employed.

LEVEL CONTROLS:

Hydroranger Plus ultrasonic level control unit as data sheet complete with submersible transducer, bracket and cable to control panel, with float switches for ultrasonic backup control and high-level alarm functions.

ACCESS COVERS:

Inlet Chamber – Steelway Stamp Lock Pro Lift Access Cover and Frame providing a clear opening of 1000mm x 750mm complete with torsion spring assisted lift galvanised single steel lids, self-locating safety stays, recessed pad lock facility, 1 no turn catch locking devices, hinged internal safety grids for fall protection, demountable barriers and posts.

Pump Chamber – Steelway Stamp Lock Pro Lift Access Cover and Frame providing a clear opening of 1500mm x 900mm complete with torsion spring assisted lift galvanised TWIN steel lids, self-locating safety stays, recessed pad lock facility, 2 no turn catch locking devices, hinged internal safety grids for fall protection, demountable barriers and posts.

Valve Chamber – Steelway Stamp Lock Pro Lift Access Cover and Frame providing a clear opening of 2400mm x 1800mm complete with torsion spring assisted lift galvanised steel lids, self-locating safety stays, recessed pad lock facility, 2 no turn catch locking devices, hinged internal safety grids for fall protection, demountable barriers and posts.

LIFTING EQUIPMENT:

- 1 - Reid type ADV500 lifting davit
- 1 - Reid davit socket to suit the above lifting davit

KIOSK:

GRP, floor fixing three door weatherproof lockable enclosure in deep green textured finish, provisional dimensions 1750H x 2000W x 750D containing a full sized backboard on which would be mounted / provided:-

- a) Control panel as specified.
- b) Anti-condensation heater and thermostat.
- c) Interior light and switch.
- d) Set of suitably rated double insulated cable tails for connection to Electricity Board meters.
- e) Minimum 600 x 450 clear space for the mounting of Electricity Board meters.
- f) Multi Form M40 Telemetry.

The whole of the above being suitably interconnected and earth bonded extended to all non-conductive steelwork within the pump station in 16mm² cable to provide a complete P.M.E system.

GENERATOR EARTH:

Comprising a copper electrode to be driven into the ground adjacent to the control kiosk, a concrete inspection pit and interconnecting cable to the panel.

ANCILLARY EQUIPMENT:

- 1. Lever arm and weights on non-return valves
- 2. Guards on non-return valves
- 3. Pressure tappings on valve chamber pipe work
- 4. 100mm Bauer coupling on over pumping tee
- 5. Rubber matting in control panel kiosk
- 6. Three copies of Operating and Maintenance Manuals plus drawings to Xylem standard format.
- 7. 225mm NB Inlet Penstock Valve C/w Extension Spindle, brackets, tee key and surface box.
- 8. 225mm Baffle Plate
- 9. Flushing Valve fitted to one pump unit
- 10. 100mm Valve Chamber drain with penstock valve and coplastic flap valve

CLIENT : Crayfern Homes Ltd **DATE** : 14/11/18
SITE : Burndell Road, Yapton, nr. Arundel, West Sussex
PROJECT REF : Q1171898

TECHNICAL DATA SOUTHERN WATER SFA7

PUMP STATION

Liquid handled : FOUL
 Design flow (l/sec) : 7.3
 Cover level at pump chamber (m) : 7.200
 Invert level of lowest inlet (m) : 3.123
 Pump Chamber base (m) : 1.700
 Invert level of valve chamber outlet (m) : 6.000
 Discharge invert in receiving manhole (m) : 5.350

RISING MAIN PIPE

Length (m) : 79
 Inside diameter (mm) : 78.7
 Undulating rising main : No

90mmOD SDR17 PE100
0
tbc

PUMP DATA

Number of pumps : 2
 Type of pump : NP3085.190 MT 461
 Pump impeller type : N
 Solids handling (mm) : N/A
 Capacity per pump (l/sec) : 7.32 Mid Water
 Head generated (m) : 0.00
 Motor speed (RPM) : 1375
 Motor rating (KW) : 2
 Full load current (Amps) : 4.5
 Power supply (Volts) : 400V Three phase 50Hz
 Method of starting : DOL
 Zone classification : EXPLOSION PROOF
 Length of pump cable (m) : 20
 Pump Weight (kg) : 69

INLET CHAMBER

Inlet chamber construction : Concrete constructed by others
 Inlet chamber Diameter (mm) : 1500
 Inlet chamber Depth (mm) : 4.177
 Slab thickness (mm) : to be specified by others
 Inlet Chamber outlet pipe diameter (mm) : 150
 Access cover size (mm) : 1000 x 750
 Access cover wheel loading (tonnes) : FACTA Class B

WET WELL

Wet well construction : Concrete constructed by others
 Wet well diameter (mm) : 1800
 Emergency Storage capacity (m³) : Offline storage tanks
 Wet well overall depth (mm) : 5500
 Slab thickness (mm) : to be specified by others
 Wet well discharge pipe size (mm) : 80
 Access cover size (mm) : 1500 x 900
 Access cover wheel loading (tonnes) : FACTA Class B
 Number of inlet connections : Isolation of incoming sewers by others

VALVE CHAMBER

Valve chamber construction : Concrete constructed by others
 Valve chamber Length (mm) : 2400
 Valve chamber Width (mm) : 1800
 Valve chamber overall depth (mm) : 1500
 Slab thickness (mm) : to be specified by others
 Pipes & Valves nominal diameter (mm) : 80
 Valve Chamber outlet pipe diameter (mm) : 80
 Valve chamber drain diameter (mm) : 80
 Overpumping diameter (mm) : 100 Female Bauer
 Access cover size (mm) : 2400 x 1800
 Access cover wheel loading (tonnes) : FACTA Class B

CONTROLS

Enclosure : GRP Roadside Floor fixing Kiosk
 Enclosure dimensions (mm) : 1750 H x 2000 W x 750 D
 Control panel : 2-Pump Generic SFA7
 Level controls : Ultrasonic c/w high level and backup float switches
 Location of electricity meter : within kiosk
 Duct length from chamber to control panel (m) : 10

General arrangement drawing : Provided in the event of an order

Appendix B

Hydraulic Calculations, System Curves and Performance Curves and Dimensional Data

Client's Name	Crayfern Homes Ltd		Project Ref	Q1171898	
Site Address	Burndell Road, Yapton, nr. Arundel, West Sussex		Date	14/11/18	
				Ver 1	

Adopting Authority	SOUTHERN WATER SFA7				
Station Type Foul / Storm	FOUL				
Number of Dwellings	45				
Impermeable Area					
Number of Duty Pumps	1				
Number of Pumps	2				
Population Per Dwelling	4				
Rainfall Intensity Per Hour					

Cover Level	7.280	High Point		MH F13A Discharge	5.350
VC Outlet	6.000	Depth to Outlet	1.200	Air Relif At VC Required	-0.65
Flood Level	5.806				
Inlet	3.123				
HLA	2.723				
P2 Start	2.623	Inlet To Stop	1.123		
P1 Start	2.473				
Mid Water	2.237	Depth Below Inlet	1.423		
Stop Level	2.000				
Dead Area	300	Take Duty From	2.237		
Base Level	1.700	Mid Water			

Wet Well Diameter	1800	mm	Volume Per M	2544.69	litres
Calc Chamber Depth	4.850	m	Depth Between Starts	100	mm
Actual Chamber Depth	5.500	m			
Max Theoretical Starts	15.00				
Actual Starts	5.47	s/s	Theoretical Op Volume	439.20	litres
			Actual Op Volume	1203.64	litres
			Rising Main Volume	383.32	litres
			Combined Main and Op Vol	1586.96	litres
Dwf Inflow Per Day	27272.73				
No. of Main Clears per Day	17.19				
Retention Hrs Full Usage	1.40				
Retention Hrs Half Usage	2.79				

Flow Rate (l/sec)	7.32	Static Head (M)	3.11
Pipe Diameter (mm)	78.70		
Velocity (M/sec)	1.50		
Roughness Factor	0.15		
Pipe length (M)	78.8		
Duckfoot Bend			
Short Radius Bends			
Long Radius Bends	2		
Tee Straight through			
Tee through branch			
Radial Tee thro Branch			
Sluice Valve			
Non Return Valve			
Bellmouth inlet			
Sharp Taper			
Standard Taper			
Equivalent Pipe Length (M)	81.6332		
Reynolds Number	1.0E+05		
Darcy-Weisbach Friction Factor	0.0248		
Velocity Head	0.115		
Hydraulic (Piezometric) gradient	0.0364		
Friction Head Loss	2.970		

Calc Duty Point	7.32	L/S	Total Head	7.17	M	Static Head	3.11	M
Pump Selection	NP3085.190 MT		Impeller	461		Kw Rating	2	
Actual Duty	7.32	L/S	Head	7.21	M			

Rising Main	Common 2	Common 1	Individual 3	Individual 2	Individual 1
Flow Rate (l/sec)	7.32	7.32	7.32	7.32	7.32
Static Head (M)	3.11				
Pipe Diameter (mm)	78.70	80	80	80	100
Velocity (M/sec)	1.50	1.46	1.46	1.46	0.93
Roughness Factor	0.15	0.15	0.15	0.15	0.30
Pipe length (M)	78.8		3.0	4.3	
Duckfoot Bend					1
Short Radius Bends				1	
Long Radius Bends	2		1		
Tee Straight through			1		
Tee through branch			2		
Radial Tee thro Branch			1		
Sluice Valve			1		
Non Return Valve			1		
Bellmouth inlet					
Sharp Taper					
Standard Taper					1
Equivalent Pipe Length (M)	81.6332	0	0	19.88	7.02
Reynolds Number	1.0E+05	1.0E+05	1.0E+05	1.0E+05	8.2E+04
Darcy-Weisbach Friction Factor	0.0248	0.0248	0.0248	0.0248	0.0278
Velocity Head	0.115	0.108	0.108	0.108	0.044
Hydraulic (Piezometric) gradient	0.0364	0.0334	0.0334	0.0334	0.0123
Friction Head Loss	2.970	0.000	0.000	0.665	0.235

Xylem Water Solutions UK Ltd
Unit 1, 106 Hawley Lane
Farnborough
Hampshire GU14 8JE

Quote Reference Q1171898

Date 14/11/18

Client: Crayfern Homes Ltd
Scheme: Burndell Road, Yapton, nr. Arundel, West Sussex

Location Of First Flood:
Level of First Flood (M):

Number of Dwellings: 45
Storage in Cubic M: 7.200 At 160L / Unit

Storage In Manholes

Manhole Reference	Manhole Diameter (mm)	First Flood Level (M)	Cover Level (M)	Invert Level (M)	Effective Volume (Cu M)
F13	1200	5.806	7.150	3.138	3.017
F12	1200	5.806	6.670	3.715	2.365
F11	1200	5.806	7.130	3.552	2.549
F10	1200	5.806	7.000	3.715	2.365
		5.806			0.000
		5.806			0.000
		5.806			0.000
F27	450	5.806	6.700	4.193	0.257
		5.806			0.000
		5.806	0.000	0.000	0.000
		5.806	0.000	0.000	0.000
		5.806	0.000	0.000	0.000
Total Storage Available In Manholes Below Flood Level Detailed Above					10.553

Storage In Gravity Sewers

Gravity Run	Gravity Drain Diameter(mm)	First Flood Level (M)	Length (M)	Upper Invert (M)	Effective Volume (Cu M)
F13 - PS	150	5.806	1.600	3.138	0.028
F12 - F13	150	5.806	22.100	3.715	0.391
F11 - F12	150	5.806	37.300	3.552	0.659
F10 - F11	150	5.806	23.400	3.715	0.414
		5.806			0.000
		5.806			0.000
		5.806			0.000
		5.806			0.000
		5.806			0.000
Total Storage Available In Gravity Pipes Below Flood Level Detailed Above					1.491

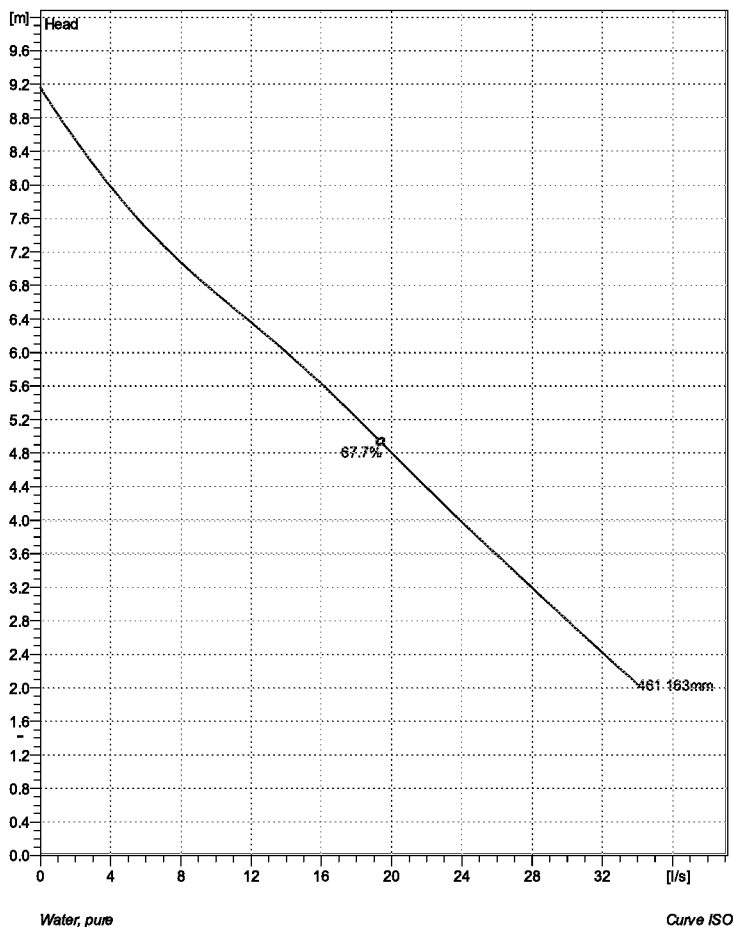
Storage In Wet Well

	Wet Well Diameter(mm)	First Flood Level (M)		High Level Alarm (M)	Effective Volume (Cu M)
Pump Station	1800	5.806		2.723	7.845
Total Storage Available In Wet Well Below Flood Level Detailed Above					7.845

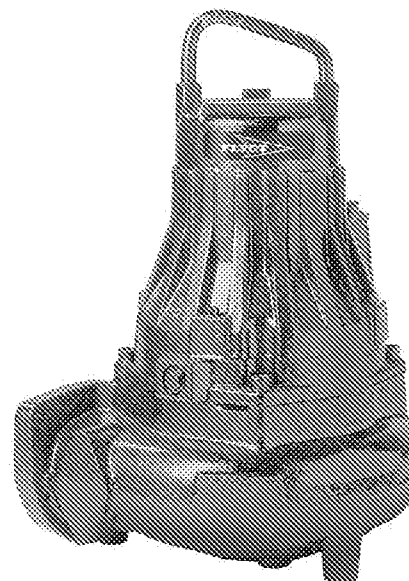
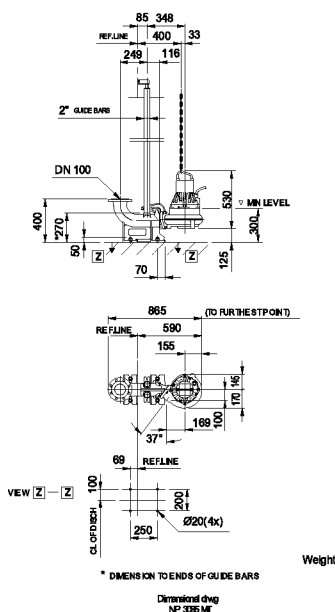
Total Volume Required in Cu M	7.200	Total Volume Available in Cu M	19.890
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NP 3085 MT 3~ Adaptive 461

Technical specification



Installation: P - Semi permanent, Wet



Note: Picture might not correspond to the current configuration.

General

Patented self cleaning semi-open channel impeller, ideal for pumping in most waste water applications. Possible to be upgraded with Guide-pin® for even better clogging resistance. Modular based design with high adaptation grade.

Impeller

Impeller material	Grey cast iron
Discharge Flange Diameter	80 mm
Suction Flange Diameter	80 mm
Impeller diameter	163 mm
Number of blades	2

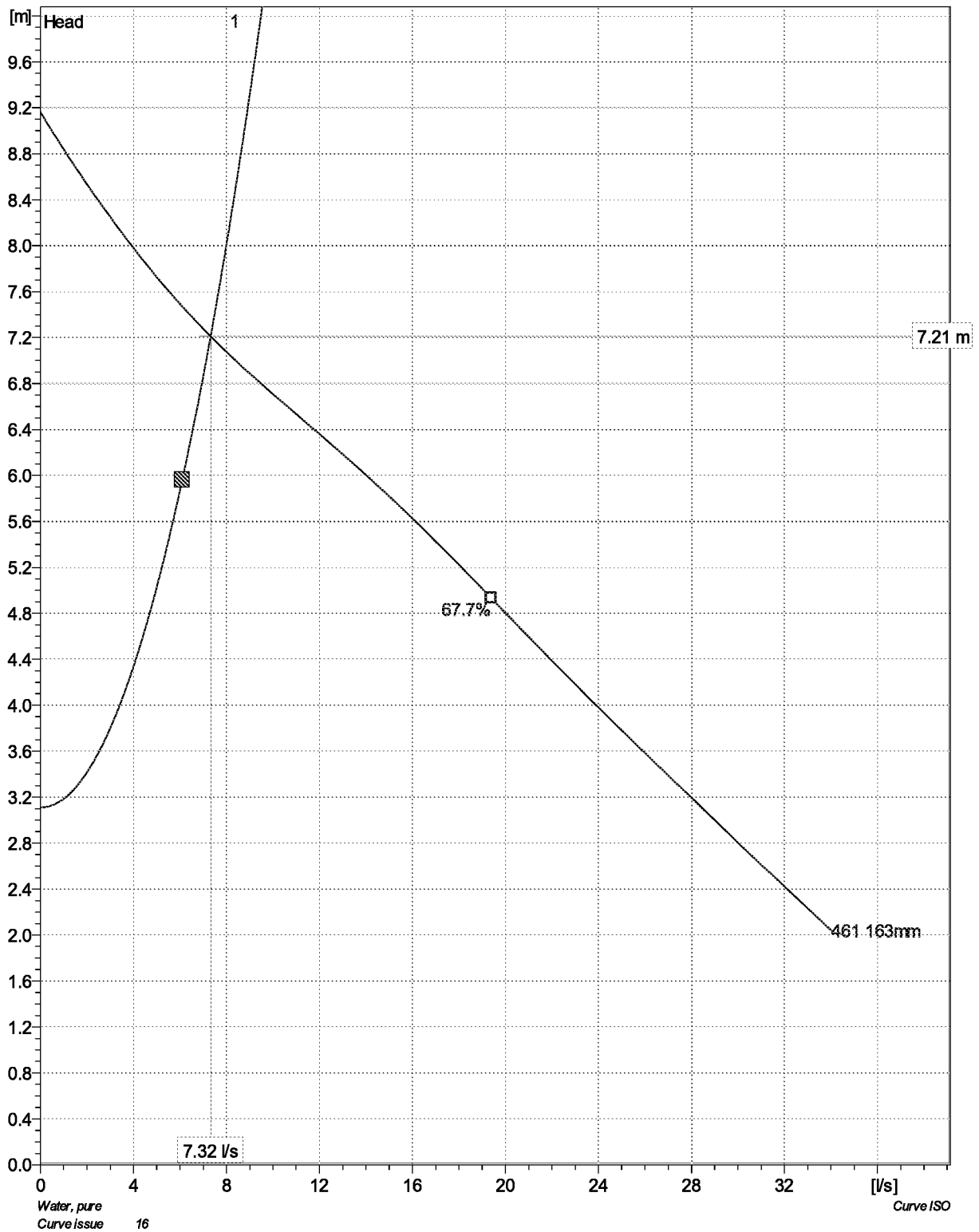
Motor

Motor #	N3085.190 15-10-4AL-W 2KW
Stator variant	CSA
Frequency	67
Rated voltage	50 Hz
Number of poles	400 V
Phases	4
Rated power	3~
Rated current	2 kW
Starting current	4.5 A
Rated speed	19 A
Power factor	1375 rpm
1/1 Load	0.86
3/4 Load	0.81
1/2 Load	0.70
Motor efficiency	
1/1 Load	74.2 %
3/4 Load	77.8 %
1/2 Load	78.4 %

Configuration

Project	Project ID	Created by	Created on	Last update
			11/14/2018	

NP 3085 MT 3~ Adaptive 461 Duty Analysis



Pumps running /System	Individual pump			Total			Pump eff.	Specific energy	NPSHre
	Flow	Head	Shaft power	Flow	Head	Shaft power			
1	7.32 l/s	7.21 m	1.17 kW	7.32 l/s	7.21 m	1.17 kW	44.1 %	0.0566 kWh/m³	3.09 m

Project	Project ID	Created by	Created on 11/14/2018	Last update
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Appendix C

Pump Specification & Hazardous Area Certification



Flygt N-pump series

SELF-CLEANING PUMPS WITH SUSTAINED HIGH EFFICIENCY



Sustained high efficiency is priceless



The N-pump advantage

- Patented technology
- Innovative design
- Sustained high efficiency
- Self cleaning ability
- Modular design
- Reliable
- Fewer unplanned service calls

Flygt N-pumps take on the toughest applications and get the job done. Every component is designed and manufactured to deliver sustained high efficiency. Thanks to patented N-technology with its innovative self-cleaning impeller, Flygt N-pumps deliver the highest total efficiency. It lowers your energy bill and reduces unplanned maintenance costs. That adds up to total peace of mind - and big savings over the long term.

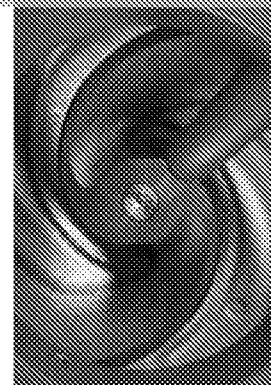
Our vast fluid handling knowledge and dedication to research and development leads to technological advances and continuous improvement.

That's why our Flygt N-pumps are at work in more than a hundred thousand installations worldwide. They have proven, by far, to be the best and most reliable choice for both dry and submersible installations.

Robust and reliable

Every Flygt N-pump is tested in the factory to ensure high performance and premium quality. Flygt products deliver outstanding, cost-effective performance that has been proven in applications such as:

- Wastewater
- Raw water
- Cooling water
- Sludge
- Storm water
- Industrial effluent



Broad range capacity

- Ratings from 1.3 kW to 310 kW
- Flow up to 1,000 l/s
- Heads up to 100 m
- Submersible and dry installations
- Every Flygt pump is performance tested in the factory

Self-cleaning N-pump saves money

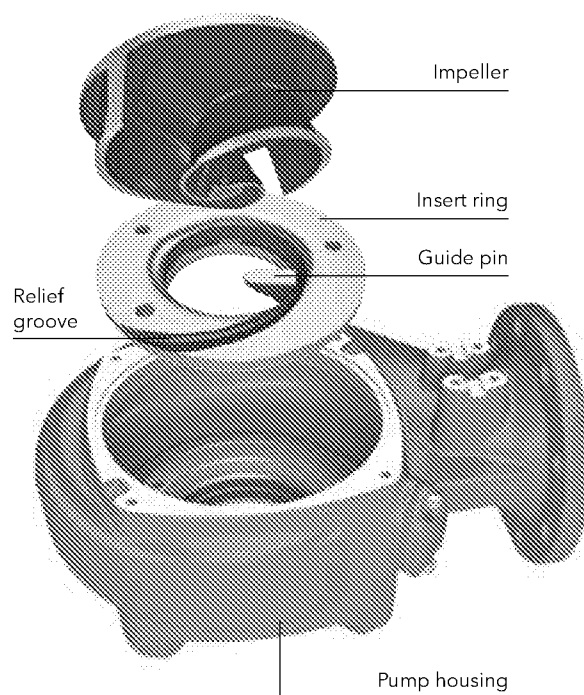
Sustained high efficiency

When solid object such as stringy fibrous material and modern trash, enter the inlet of a conventional pump, they tend to get caught on the leading edges of the impeller vanes. This build-up reduced the impeller's efficiency, resulting in increased power consumption (Fig. A). This increased rate of power consumption generates an increase in energy charges.

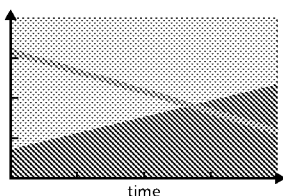
As solids continue to build-up inside the impeller, motor thermal protection can trip causing the pump to stop. This leads to costly unplanned service calls.

If a conventional wastewater pump runs intermittently, the solids build-up will be removed by backflushing when the pump is shut off at the end of the operating cycle. When next cycle begins, efficiency returns to its initial value since the impeller is free from solid objects (Fig B).

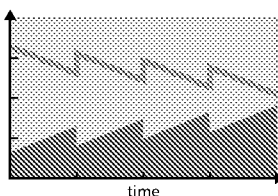
The high efficiency of the Flygt N-pump is sustained over time due to its self-cleaning ability, keeping energy costs to a minimum (Fig. C).



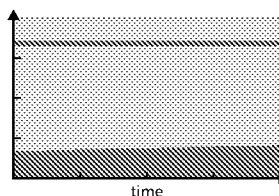
A. Conventional wastewater pump



B. Conventional pump running intermittently



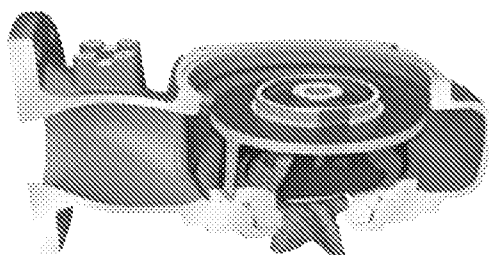
C. Flygt N-pump



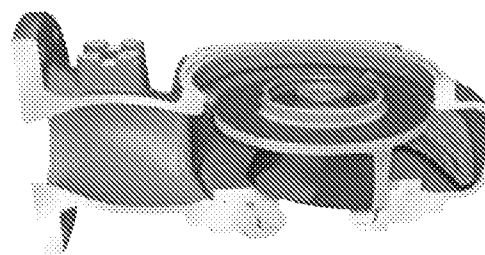
..... Hydraulic efficiency
 Sustained high efficiency
 ▨ Energy consumption

The self-cleaning concept

All Flygt N-pumps have the same self-cleaning performance regardless of duty point.



Stage 1. Most solid objects entering the pump will pass through the impeller between the impeller vanes. If an object gets caught on the leading edge of one of the vanes, it will slide along the backswept shape towards the perimeter of the inlet.



Stage 2. The solid object will slide along the tip of the impeller vane inside the relief groove. The guide pin in the insert ring will push all types of solids away from the center of the impeller, along the leading edge and out through the relief groove.

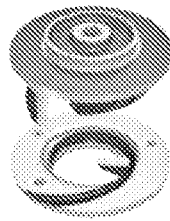
Broad capacity range to suit your application

Flexible and modular design

Flygt N-technology enables you to tailor the hydraulics to meet the requirements of virtually any application. Choose the hardened cast iron version for typical wastewater applications and the chopper ring version for cutting long fibres or solids. The Hard-Iron™ version should be used in abrasive applications and waters that could cause erosion corrosion due to high oxygen content.

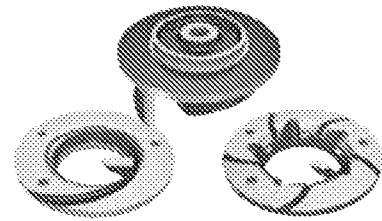
Whatever you choose, you never sacrifice pump efficiency – and you can easily switch the module if the operating conditions change.

Cast iron



Cast iron impeller with hardened edges and insert ring for typical pumping applications.

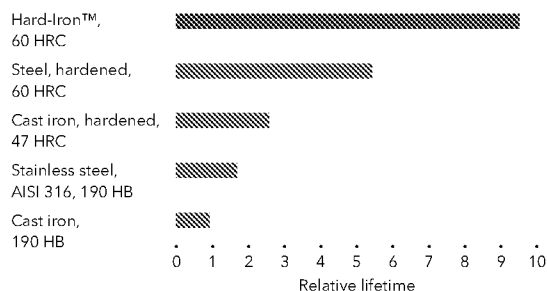
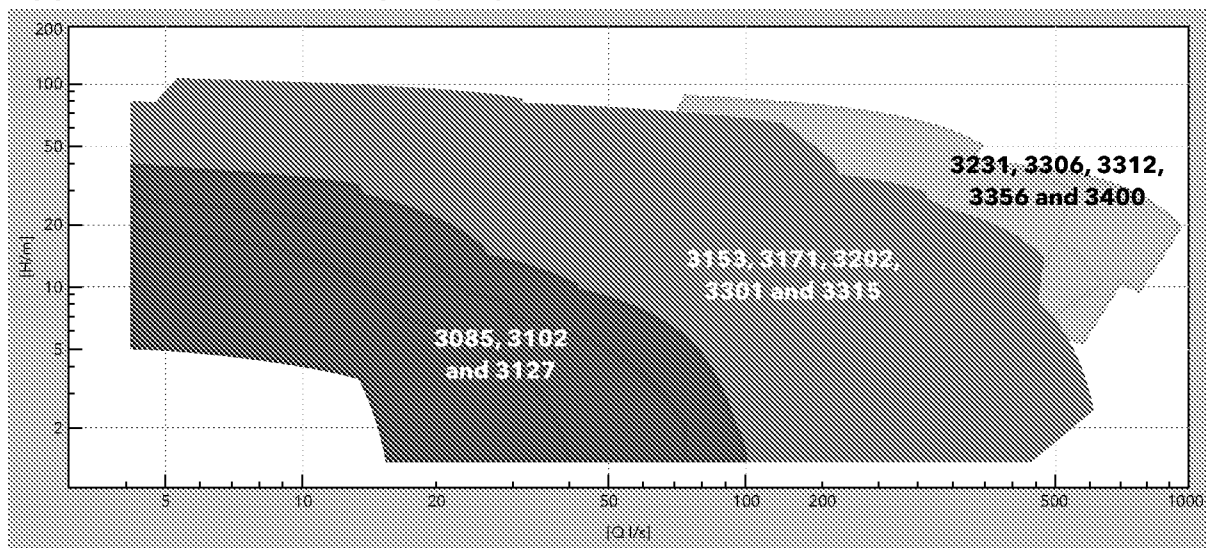
Hard-Iron™ (60 HRC)



Extra durable option for abrasive and erosion corrosion applications.

Chopper ring for cutting long fibers or solids.

Top performance with a broad capacity range



Hard-Iron™ (60 HRC) for the toughest wastewater challenges

Accelerated wear tests prove that Hard-Iron™ hydraulic components keep on working efficiently with minimal wear after pumping water with a very high concentration of coarse sand (2,400 tons).

Flygt N pumps with Hard-Iron™ components continue to deliver sustained high efficiency without clogging or erosion corrosion, prolonging lifetime by 200 percent compared to standard hardened cast iron hydraulics.

Designed and engineered for longer life

Xylem specially designs and manufactures Flygt N-pump components, such as the motor, seals and shaft, to optimize operation and prolong pump service life.

Motor

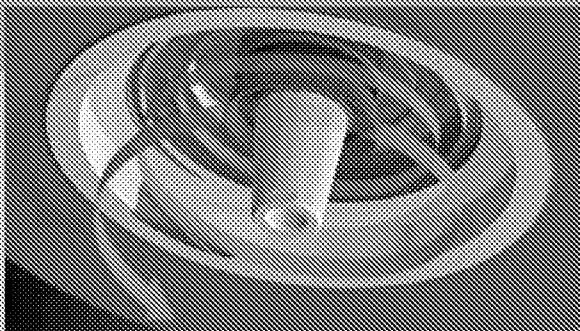
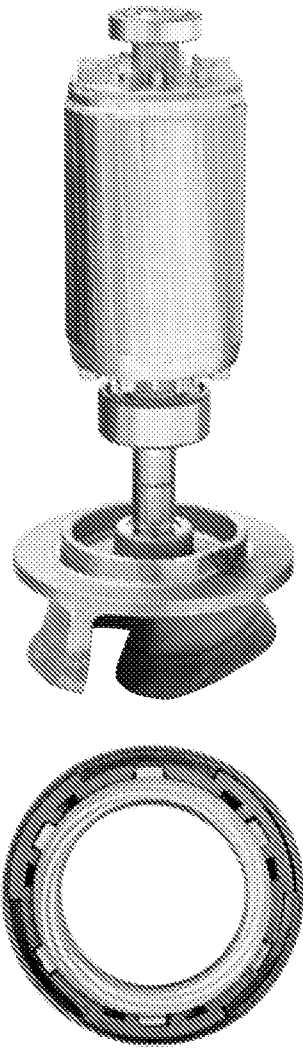
The Class H squirrel-cage induction motor delivers outstanding performance and superior heat transfer in submersible and dry installations. Heat losses are concentrated around the shrink-fitted stator, which is cooled by means of the surrounding water. The motor has a NEMA Class B maximum operating temperature rise of 80°C (176°F) to ensure long service life. Prepared for variable speed operation, all motors are capable of fully utilizing the available power.

Long-life seals

Durable tungsten carbide seals offer exceptional mechanical strength as well as superior sliding properties even when running dry. These low-friction seals withstand thousands of hours of high-pressure operation under extreme conditions without cracking, seizing up or showing signs of unacceptable wear.

Low shaft deflection

To minimize vibration, promote quiet operation and prolong seal and bearing life, all Flygt N-pumps feature a short shaft overhang to reduce shaft deflection.

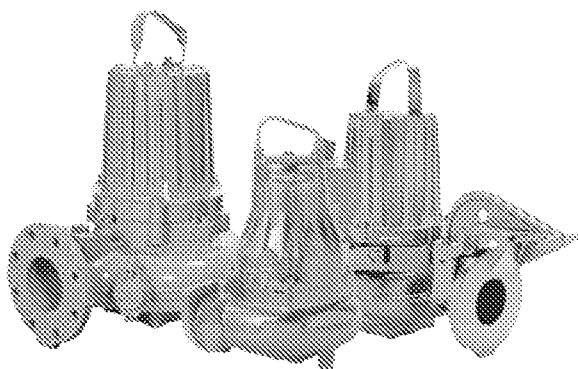


Spin-out™ seal protection for pumps with cavities in the seal chamber

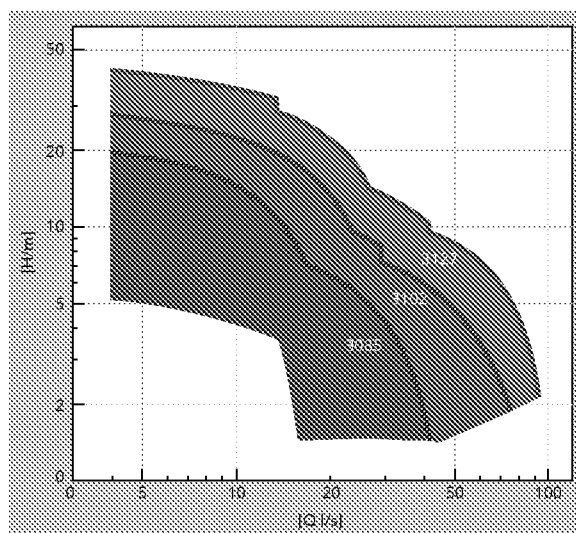
The patented Spin-out™ design expels abrasive particles from the seal chamber, providing protection against wear of the outer seal. As an integral part of the seal chamber, Spin-out™ is as simple as it is effective.

Low capacity pumps

This series of Flygt N-pumps includes three models that handle capacities up to 100 l/s. Like all Flygt N-pumps, these contribute to reducing the total life cycle costs of your installation.



Performance, 50 Hz

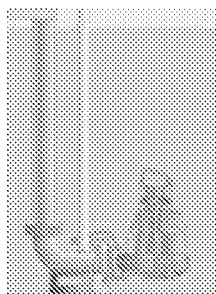


Power ratings and sizes

Model	3085	3102	3127
Rating, kW	1.3–2.4	3.1–4.2	4.7–7.4
Discharge, mm (in)	80 (3")	80 (3") 100 (4") 150 (6")	80 (3") 100 (4") 150 (6")

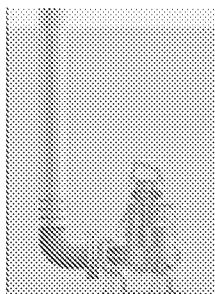
Methods of installation

NP



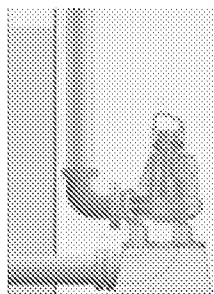
For semi-permanent wet well installations. The pump is installed with twin guide bars on a discharge connection.

NS



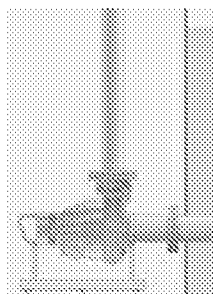
A semi-permanent free standing installation. Transportable version with pipe or hose connection.

NT



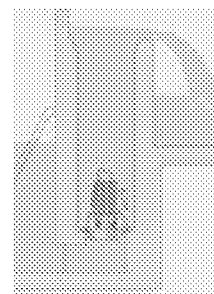
A vertically-mounted, permanent dry well or in-line installation with flange connections for suction and discharge pipework.

NZ



A horizontally-mounted, permanent dry well or in-line installation with flange connections for suction and discharge pipework.

NL



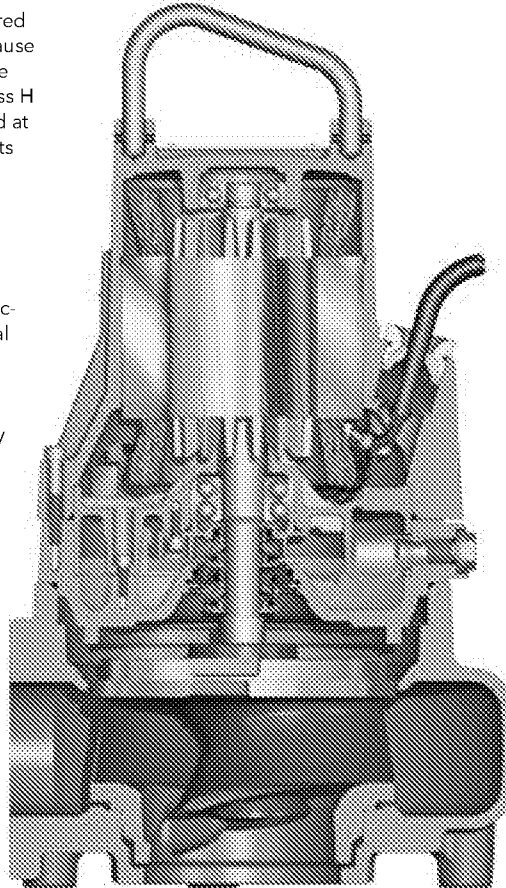
A semi-permanent installation of a pump within a vertical steel or concrete column.

BETTER HEAT TRANSFER

Our specially designed and manufactured motor provides enhanced cooling because heat losses are concentrated around the stator. Trickle impregnated in resin (Class H insulation), the stator windings are rated at 180°C (355°F) and enable up to 30 starts per hour.

COMPLIANCE

Each pump is tested and approved in accordance with national and international standards, including IEC 34-1 and CSA. Pumps are available in explosion-proof versions for use in hazardous environments, and are approved by the Factory Mutual, European Standard and IEC.



CABLE ENTRY

Water-resistant cable entry provides both sealing and strain relief functions to ensure a safe installation.

SENSORS

Thermal sensors embedded in the stator windings prevent overheating. Optional leakage sensors in the stator and oil housings are also available.

LONG-LIFE BEARINGS

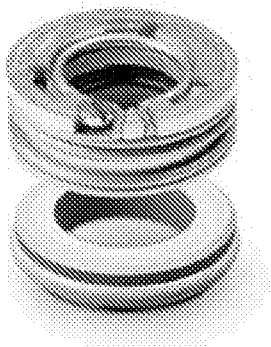
Durable bearings provide a minimum service life of 50,000 hours.

ENDURING SEALS

The Griploc™ system consists of two sets of mechanical shaft seals that operate independently to provide double security against leakage.

Griploc™ seal

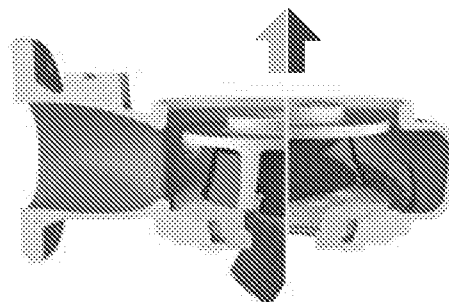
With a robust design, Griploc™ seals offer consistent performance and trouble-free operation in challenging environments. Solid seal rings minimize leakage and the patented griplock spring,



which is tightened around the shaft, provides axial fixation and torque transmission. In addition, the Griploc™ design facilitates quick and correct assembly and disassembly.

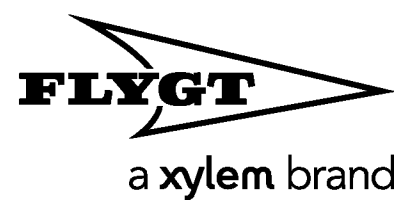
Adaptive N-impeller

The Flygt N3085 features an adaptive self-cleaning N-impeller that can move axially to enable easy passage of large solids through the pump.



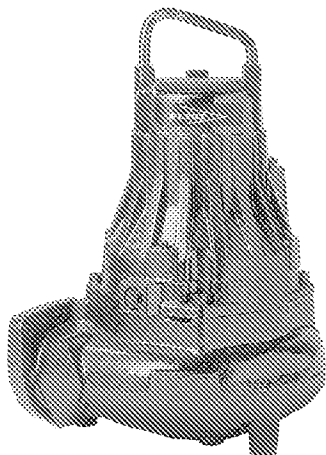


Flygt 3085, 50Hz



7 N-pump, Standard Motor

7.1 Product description



Usage

A submersible pump for efficient pumping of clean water, surface water, and wastewater containing solids or long-fibred material. The pump is designed for sustained high efficiency. For abrasive media, Hard-Iron™ is required. Stainless steel N-impeller is available as an option.

Denomination

Table 25: Adaptive N-hydraulic

Impeller material	Non-explosion proof version	Explosion proof version	Pressure class	Installation types
Hard-Iron™	3085.060	3085.070	MT – Medium head SH – Super head	F, P, S, T, Z
Cast iron, gray	3085.160	3085.190	MT – Medium head SH – Super head	F, P, S, T, Z
Stainless steel	3085.760	3085.770	MT – Medium head SH – Super head	F, P, S, T, Z

Table 26: N-hydraulic

Impeller material	Non-explosion proof version	Explosion proof version	Pressure class	Installation types
Hard-Iron™	3085.183	3085.092	MT – Medium head	F, P, S, T, Z

The pump can be used in the following installations:

- F Free standing semipermanent, wet well arrangement where the pump is placed on a firm surface.
- P Semipermanent, wet well arrangement with the pump installed on two guide bars. The connection to the discharge is automatic.
- S Portable semipermanent, wet well arrangement with hose coupling or flange for connection to the discharge pipeline.
- T Vertical permanent, dry well arrangement with flange connection to the suction and discharge piping.

Z Horizontal permanent, dry well arrangement with flange connection to the suction and discharge piping.

Application limits

Feature	Description
Liquid temperature	Maximum 40°C (104°F)
Liquid temperature, warm water version	Maximum 70°C (158°F)
Depth of immersion	Maximum 20 m (65 ft)
pH of the pumped liquid	5.5 - 14
Liquid density	Maximum 1100 kg/m ³

Motor data

Feature	Description
Motor type	Squirrel-cage induction motor
Frequency	50 Hz
Power supply	1-phase or 3-phase
Starting method	• Direct on-line • Star-delta • Soft starter • Variable Frequency Drive (VFD)
Number of starts per hour	Maximum 30
Code compliance	IEC 60034-1
Voltage variation	• Continuously running: Maximum $\pm 5\%$ • Intermittent running: Maximum $\pm 10\%$
Voltage imbalance between phases	Maximum 2%
Stator insulation class	H (180°C, 356°F)

Motor encapsulation

Motor encapsulation is in accordance with IP68.

Cables

Application	Type
Direct-on-line start or Y/D start with two cables	Flygt SUBCAB® - a heavy duty 4 cores motor power cable with two twisted pair screened control cores. Conductor insulation rating of 90°C, which allows for increased current. Superior mechanical strength and high abrasion and tear resistant. Chemical resistant within pH 3-10 and ozone, oil, and flame resistant. Used up to 70°C water temperature. Cables < 10 mm ² with unscreened control cores.
Y/D start	Flygt SUBCAB® - a heavy duty 7 cores motor power cable with two twisted pair screened control cores. Conductor insulation rating of 90°C, which allows for increased current. Superior mechanical strength and high abrasion and tear resistant. Chemical resistant within pH 3-10 and ozone, oil, and flame resistant. Used up to 70°C water temperature. Cables < 7G6 mm ² with unscreened control cores.

Application	Type
Variable Frequency drive	Screened Flygt SUBCAB® - a heavy duty 4 screened cores motor power cable with four twisted pair screened control cores. Conductor insulation rating of 90°C, which allows for increased current. Superior mechanical strength and high abrasion and tear resistant. Chemical resistant within pH 3-10 and ozone, oil, and flame resistant. Used up to 70°C water temperature.

Monitoring equipment

Thermal contacts opening temperature 125°C (257°F)

Materials

Table 27: Major parts except mechanical seals

Denomination	Material	ASTM	EN
Major castings	Cast iron, gray	35B	GJL-250
Pump housing	Cast iron, gray	35B	GJL-250
Impeller, alternative 1	Cast iron, gray	35B	GJL-250
Impeller, alternative 2	Cast iron, Hard-Iron™	A 532 IIIA	GJN-HB555(XCR23)
Impeller, alternative 3	Stainless steel, Duplex	CD-4MCuN	10283:2010 -1.4474
Insert ring, alternative 1	Cast iron, gray	35B	GJL-250
Insert ring, alternative 2	Cast iron, Hard-Iron™	A 532 IIIA	GJN-HB555(XCR23)
Lifting handle	Stainless steel	AISI 316L	1.4404, 1.4432, ...
Shaft	Stainless steel	AISI 431	1.4057+QT800
Screws and nuts	Stainless steel, A4	AISI 316L, 316, 316Ti	1.4401, 1.4404, ...
O-rings, alternative 1	Nitrile rubber (NBR) 70° IRH	-	-
O-rings, alternative 2	Fluorinated rubber (FPM) 70° IRH	-	-
Oil, part no 901752	Medical white oil of paraffin type. Fulfills FDA 172.878 (a)	-	-

Table 28: Mechanical seals

Alternative	Inner seal	Outer seal
1	Carbon/ Aluminum oxide	Corrosion resistant cemented carbide/ Corrosion resistant cemented carbide
2	Carbon/ Aluminum oxide	Silicon carbide/ Silicon carbide
3	Corrosion resistant cemented carbide/ Corrosion resistant cemented carbide	Corrosion resistant cemented carbide/ Corrosion resistant cemented carbide

Surface treatment

Priming	Finish
Painted with a primer, see internal standard M0700.00.0002	Navy gray color NCS 5804-B07G. Two-component high-solid top coating, see internal standard M0700.00.0004 for standard painting and M0700.00.0008 for special painting.

Options

- Warm liquid version (non-explosion proof versions)
- Leakage sensor in the stator housing (FLS)

- Leakage sensor in the oil housing (CLS)
- Surface treatment (Epoxy)
- Zinc anodes
- Other cables

Accessories

Discharge connections, adapters, hose connections, and other mechanical accessories

Electrical accessories such as pump controller, control panels, starters, monitoring relays, cables

7.2 Motor rating and performance curves 3085.183/.092

These are examples of motor rating and curves. For more information, please contact your local sales and service representative.

Star-delta starting current is 1/3 of Direct on-line starting current.

MT

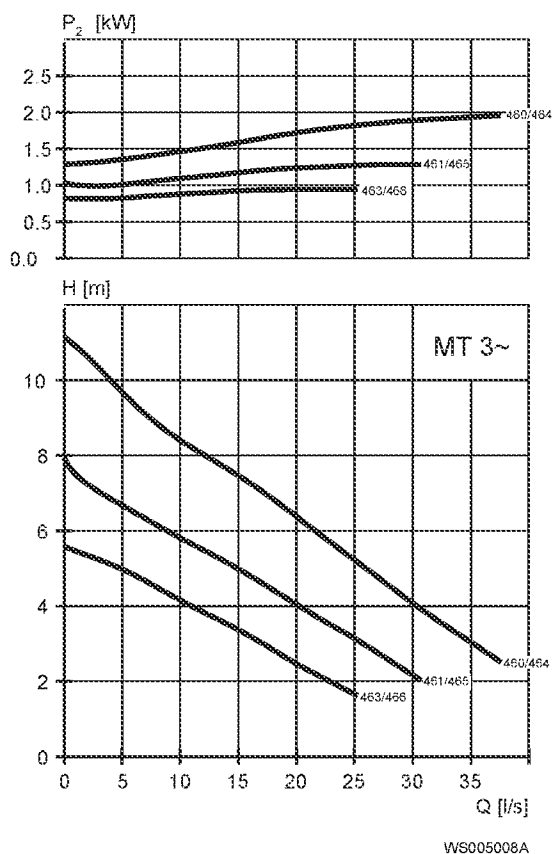
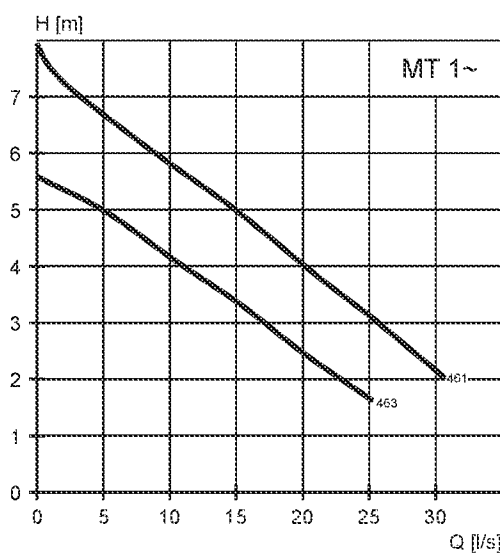
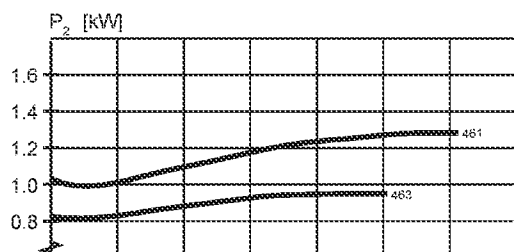


Table 29: 400 V, 50 Hz, 3-phase

Rated power, kW	Rated power, hp	Curve/ Impeller No	Revolutions per minute, rpm	Rated current, A	Starting current, A	Power factor, cos ϕ	Installation
1	1,3	463	1455	3,2	23	0,6	T,Z
1	1,3	466	1455	3,2	23	0,6	T,Z
1,3	1,7	461	1440	3,6	23	0,68	F,P,S
1,3	1,7	463	1440	3,6	23	0,68	F,P,S
1,3	1,7	465	1440	3,6	23	0,68	F,P,S
1,3	1,7	466	1440	3,6	23	0,68	F,P,S
1,4	1,9	461	1435	3,7	23	0,7	T,Z

Rated power, kW	Rated power, hp	Curve/ Impeller No	Revolutions per minute, rpm	Rated current, A	Starting current, A	Power factor, $\cos \phi$	Installation
1,4	1,9	463	1435	3,7	23	0,7	T,Z
1,4	1,9	465	1435	3,7	23	0,7	T,Z
1,4	1,9	466	1435	3,7	23	0,7	T,Z
2	2,7	460	1415	5,2	27	0,73	F,P,S
2	2,7	461	1415	5,2	27	0,73	F,P,S
2	2,7	463	1415	5,2	27	0,73	F,P,S
2	2,7	464	1415	5,2	27	0,73	F,P,S
2	2,7	465	1415	5,2	27	0,73	F,P,S
2	2,7	466	1415	5,2	27	0,73	F,P,S



W5005009A

Table 30: 230 V, 50 Hz, 1-phase

Rated power, kW	Rated power, hp	Curve/ Impeller No	Revolutions per minute, rpm	Rated current, A	Starting current, A	Power factor, $\cos \phi$	Installation
1,5	2	461	1425	9,4	43	0,9	P,S
1,5	2	463	1425	9,4	43	0,9	P,S

SH

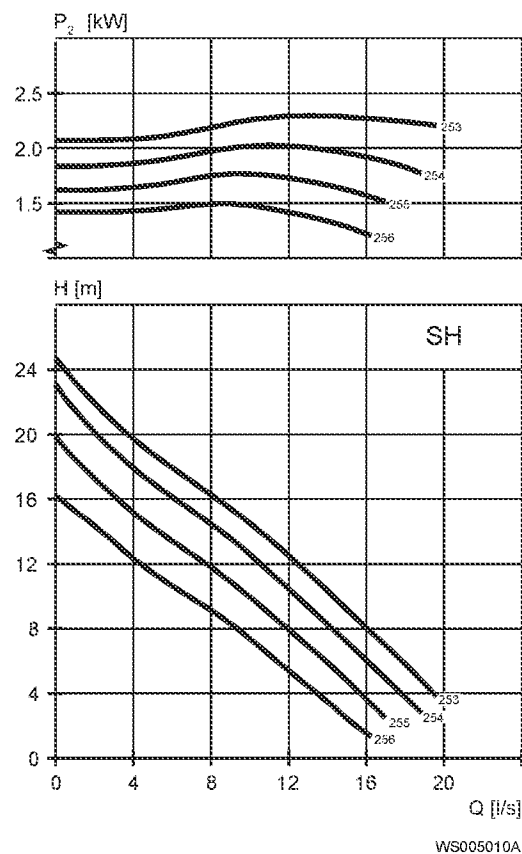


Table 31: 400 V, 50 Hz, 3-phase

Rated power, kW	Rated power, hp	Curve/ Impeller No	Revolutions per minute, rpm	Rated current, A	Starting current, A	Power factor, cos φ	Installation
2,4	3,2	253	2845	4,8	29	0,9	P,S
2,4	3,2	254	2845	4,8	29	0,9	P,S
2,4	3,2	255	2845	4,8	29	0,9	P,S
2,4	3,2	256	2845	4,8	29	0,9	P,S

7.3 Motor rating and performance curves

3085.060/.070/.160/.190/.760/.770

These are examples of motor rating and curves. For more information, please contact your local sales and service representative.

Star-delta starting current is 1/3 of Direct on-line starting current.

MT

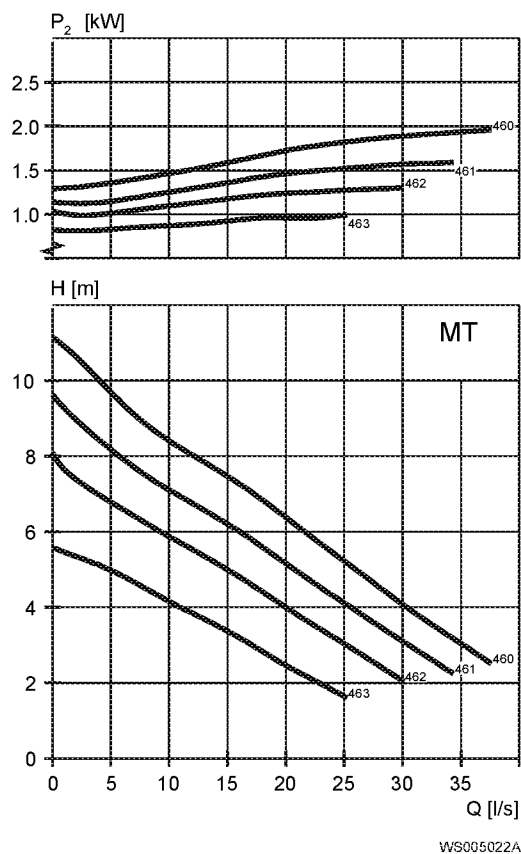


Table 32: 400 V, 50 Hz, 3-phase

Rated power, kW	Rated power, hp	Curve/Impeller No	Revolutions per minute, rpm	Rated current, A	Starting current, A	Power factor, cos ϕ	Installation
1	1,3	463	1455	3,2	23	0,6	T,Z
1,3	1,7	462	1440	3,6	23	0,68	F,P,S
1,3	1,7	463	1440	3,6	23	0,68	F,P,S
1,4	1,9	462	1435	3,7	23	0,7	T,Z
1,4	1,9	463	1435	3,7	23	0,7	T,Z
2	2,7	460	1400	4,8	23	0,8	F,P,S
2	2,7	461	1400	4,8	23	0,8	F,P,S
2	2,7	462	1400	4,8	23	0,8	F,P,S
2	2,7	463	1400	4,8	23	0,8	F,P,S

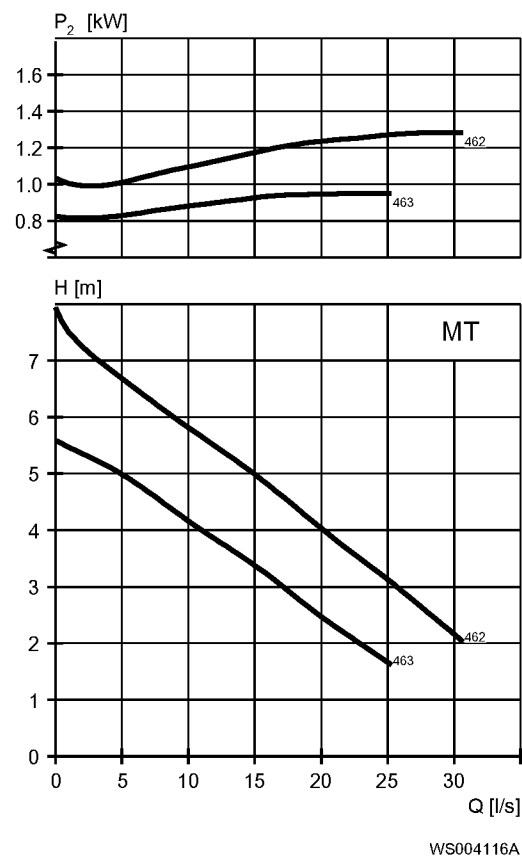


Table 33: 230 V, 50 Hz, 1-phase

Rated power, kW	Rated power, hp	Curve/ Impeller No	Revolutions per minute, rpm	Rated current, A	Starting current, A	Power factor, cos ϕ	Installation
1.5	2.0	462	1425	9.4	43	0.9	F,P,S
1.5	2.0	463	1425	9.4	43	0.9	F,P,S

SH

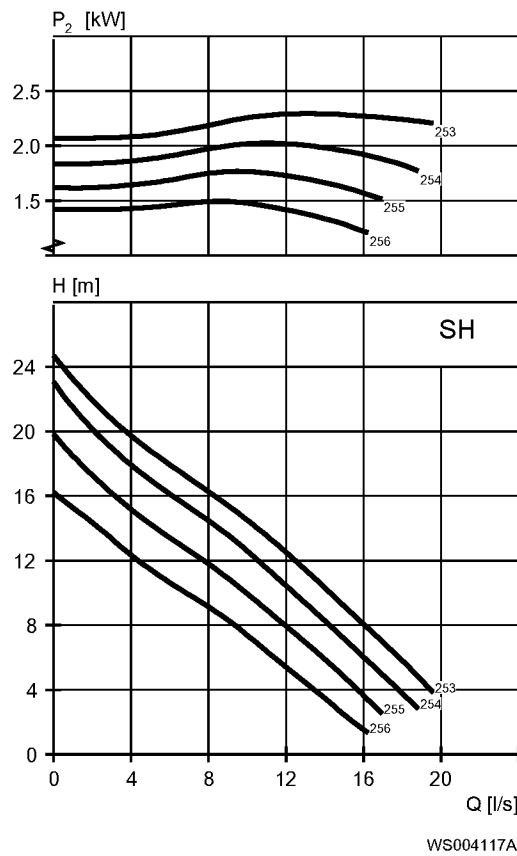
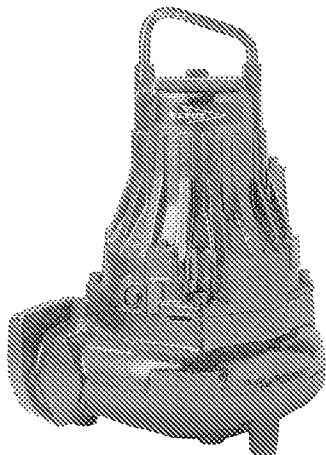


Table 34: 400 V, 50 Hz, 3-phase

Rated power, kW	Rated power, hp	Curve/ Impeller No	Revolutions per minute, rpm	Rated current, A	Starting current, A	Power factor, $\cos \varphi$	Installation
2,4	3,2	253	2845	4,8	29	0,91	P,S
2,4	3,2	254	2845	4,8	29	0,91	P,S
2,4	3,2	255	2845	4,8	29	0,91	P,S
2,4	3,2	256	2845	4,8	29	0,91	P,S
2,4	3,2	253	2870	4,9	34	0,87	P,S
2,4	3,2	254	2870	4,9	34	0,87	P,S
2,4	3,2	255	2870	4,9	34	0,87	P,S
2,4	3,2	256	2870	4,9	34	0,87	P,S

8 N-pump, Premium Efficiency Motor (IE3)

8.1 Product description



Usage

A submersible pump for efficient pumping of clean water, surface water, and wastewater containing solids or long-fibered material. The pump is designed for sustained high efficiency. For abrasive media, Hard-Iron™ is required. Stainless steel N-impeller is available as an option.

Denomination

Table 35: Adaptive N-hydraulic

Impeller material	Non-explosion proof version	Explosion proof version	Pressure class	Installation types
Cast iron, gray	3085.900	3085.910	MT – Medium head SH – Super head	F, P, S, T, Z
Hard-Iron™	3085.920	3085.930	MT – Medium head SH – Super head	F, P, S, T, Z
Stainless steel	3085.960	3085.970	MT – Medium head SH – Super head	F, P, S, T, Z

Table 36: N-hydraulic

Impeller material	Non-explosion proof version	Explosion proof version	Pressure class	Installation types
Hard-Iron™	3085.820	3085.830	MT – Medium head	F, P, S, T, Z

The pump can be used in the following installations:

- F Free standing semipermanent, wet well arrangement where the pump is placed on a firm surface.
- P Semipermanent, wet well arrangement with the pump installed on two guide bars. The connection to the discharge is automatic.
- S Portable semipermanent, wet well arrangement with hose coupling or flange for connection to the discharge pipeline.

- T Vertical permanent, dry well arrangement with flange connection to the suction and discharge piping.
- Z Horizontal permanent, dry well arrangement with flange connection to the suction and discharge piping.

Application limits

Feature	Description
Liquid temperature	Maximum 40°C (104°F)
Depth of immersion	Maximum 20 m (65 ft)
pH of the pumped liquid	5.5 - 14
Liquid density	Maximum 1100 kg/m ³

Motor data

Feature	Description
Motor type	Line started permanent magnet motor (LSPM)
Frequency	50 Hz
Power supply	1-phase or 3-phase
Starting method	• Direct on-line • Star-delta • Soft starter • Variable Frequency Drive (VFD)
Number of starts per hour	Maximum 30
Code compliance	IEC 60034-1
Voltage variation	• Continuously running: Maximum $\pm 5\%$ • Intermittent running: Maximum $\pm 10\%$
Voltage imbalance between phases	Maximum 2%
Stator insulation class	H (180°C, 356°F)

Motor encapsulation

Motor encapsulation is in accordance with IP68.

Cables

Application	Type
Direct-on-line start or Y/D start with two cables	Flygt SUBCAB® - a heavy duty 4 cores motor power cable with two twisted pair screened control cores. Conductor insulation rating of 90°C, which allows for increased current. Superior mechanical strength and high abrasion and tear resistant. Chemical resistant within pH 3-10 and ozone, oil, and flame resistant. Used up to 70°C water temperature. Cables < 10 mm ² with unscreened control cores.
Y/D start	Flygt SUBCAB® - a heavy duty 7 cores motor power cable with two twisted pair screened control cores. Conductor insulation rating of 90°C, which allows for increased current. Superior mechanical strength and high abrasion and tear resistant. Chemical resistant within pH 3-10 and ozone, oil, and flame resistant. Used up to 70°C water temperature. Cables < 7G6 mm ² with unscreened control cores.

Application	Type
Variable Frequency drive	Screened Flygt SUBCAB® - a heavy duty 4 screened cores motor power cable with four twisted pair screened control cores. Conductor insulation rating of 90°C, which allows for increased current. Superior mechanical strength and high abrasion and tear resistant. Chemical resistant within pH 3-10 and ozone, oil, and flame resistant. Used up to 70°C water temperature.

Monitoring equipment

Thermal contacts opening temperature 125°C (257°F)

Materials

Table 37: Major parts except mechanical seals

Denomination	Material	ASTM	EN
Major castings	Cast iron, gray	35B	GJL-250
Pump housing	Cast iron, gray	35B	GJL-250
Impeller, alternative 1	Cast iron, gray	35B	GJL-250
Impeller, alternative 2	Cast iron, Hard-Iron™	A 532 IIIA	GJN-HB555(XCR23)
Impeller, alternative 3	Stainless steel, Duplex	CD-4MCuN	10283:2010 -1.4474
Insert ring, alternative 1	Cast iron, gray	35B	GJL-250
Insert ring, alternative 2	Cast iron, Hard-Iron™	A 532 IIIA	GJN-HB555(XCR23)
Lifting handle	Stainless steel	AISI 316L	1.4404, 1.4432, ...
Shaft	Stainless steel	AISI 431	1.4057+QT800
Screws and nuts	Stainless steel, A4	AISI 316L, 316, 316Ti	1.4401, 1.4404, ...
O-rings, alternative 1	Nitrile rubber (NBR) 70° IRH	-	-
O-rings, alternative 2	Fluorinated rubber (FPM) 70° IRH	-	-
Oil, part no 901752	Medical white oil of paraffin type. Fulfills FDA 172.878 (a)	-	-

Table 38: Mechanical seals

Alternative	Inner seal	Outer seal
1	Carbon/ Aluminum oxide	Corrosion resistant cemented carbide/ Corrosion resistant cemented carbide
2	Carbon/ Aluminum oxide	Silicon carbide/ Silicon carbide
3	Corrosion resistant cemented carbide/ Corrosion resistant cemented carbide	Corrosion resistant cemented carbide/ Corrosion resistant cemented carbide

Surface treatment

Priming	Finish
Painted with a primer, see internal standard M0700.00.0002	Navy gray color NCS 5804-B07G. Two-component high-solid top coating, see internal standard M0700.00.0004 for standard painting and M0700.00.0008 for special painting.

Options

- Leakage sensor in the stator housing (FLS)
- Leakage sensor in the oil housing (CLS)

- Surface treatment (Epoxy)
- Zinc anodes
- Other cables

Accessories

Discharge connections, adapters, hose connections, and other mechanical accessories

Electrical accessories such as pump controller, control panels, starters, monitoring relays, cables

8.2 Motor rating and performance curves 3085.820/.830

These are examples of motor rating and curves. For more information, please contact your local sales and service representative.

Star-delta starting current is 1/3 of Direct on-line starting current.

MT

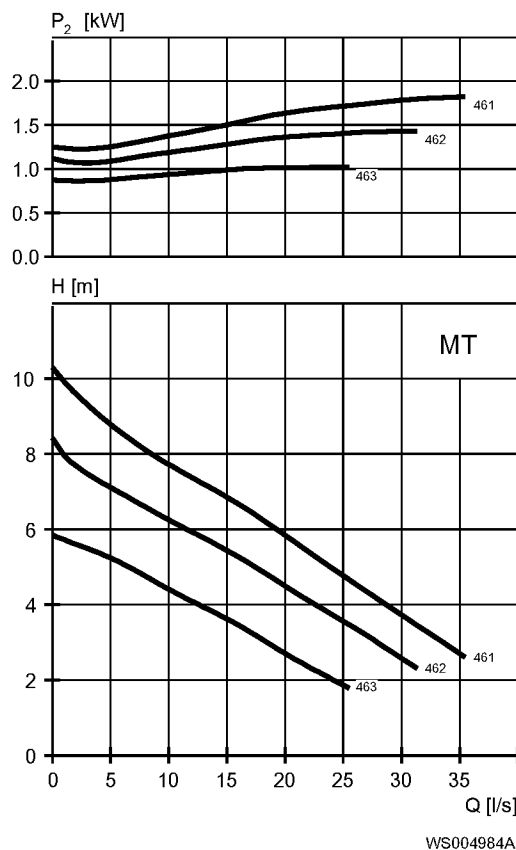


Table 39: 400 V, 50 Hz, 3-phase

Rated power, kW	Rated power, hp	Curve/ Impeller No	Revolutions per minute, rpm	Rated Current, A	Start current, A	Power factor, $\cos \varphi$	Installation
1.6	2.1	462	1500	3.3	23	0.82	P,S,T,Z
1.6	2.1	463	1500	3.3	23	0.82	F,P,S,T,Z
2	2.7	461	1500	3.8	23	0.87	P,S,T,Z
2	2.7	462	1500	3.8	23	0.87	P,S,T,Z
2	2.7	463	1500	3.8	23	0.87	F,P,S,T,Z

8.3 Motor rating and performance curves 3085.900/.910/.920/.930/.960/.970

These are examples of motor rating and curves. For more information, please contact your local sales and service representative.

Star-delta starting current is 1/3 of Direct on-line starting current.

MT

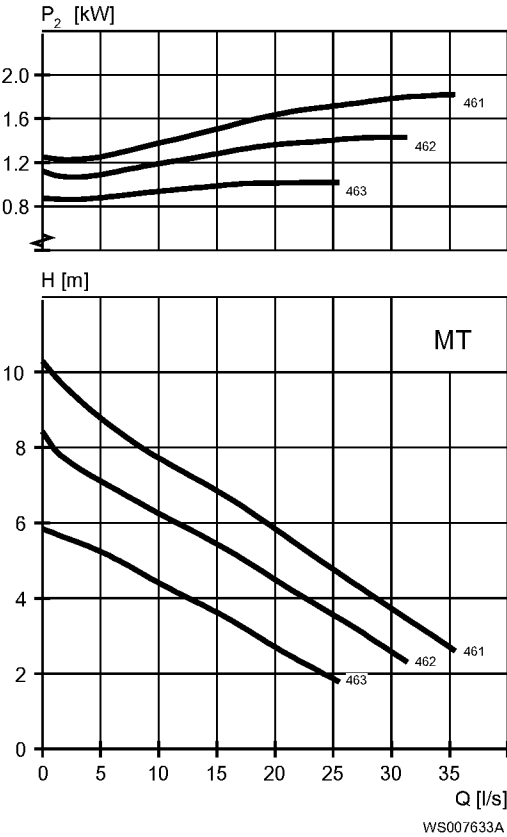
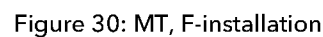


Table 40: 400 V, 50 Hz, 3-phase

Rated power, kW	Rated power, hp	Curve/ Impeller No	Revolutions per minute, rpm	Rated Current, A	Start current, A	Power Factor, cos φ	Installation
1.6	2.1	462	1500	3.3	23	0.82	F,P,S
1.6	2.1	463	1500	3.3	23	0.82	F,P,S
2	2.7	461	1500	3.8	23	0.87	F,P,S
2	2.7	462	1500	3.8	23	0.87	F,P,S
2	2.7	463	1500	3.8	23	0.87	F,P,S

All dimensions are in mm.



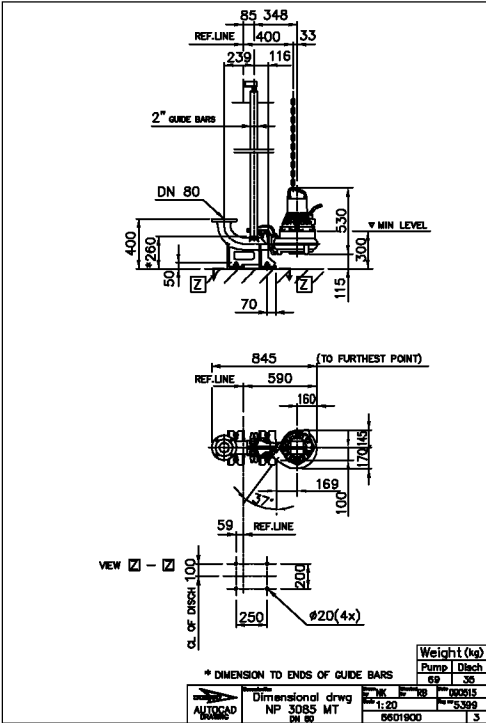


Figure 32: MT, P-installation

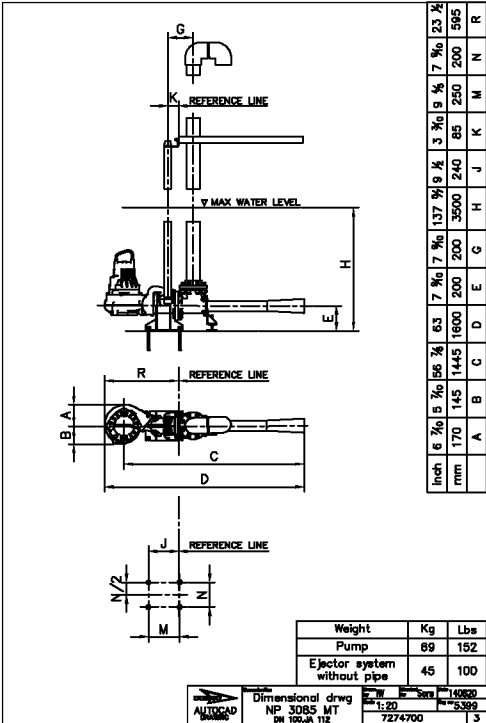


Figure 33: MT, P-installation

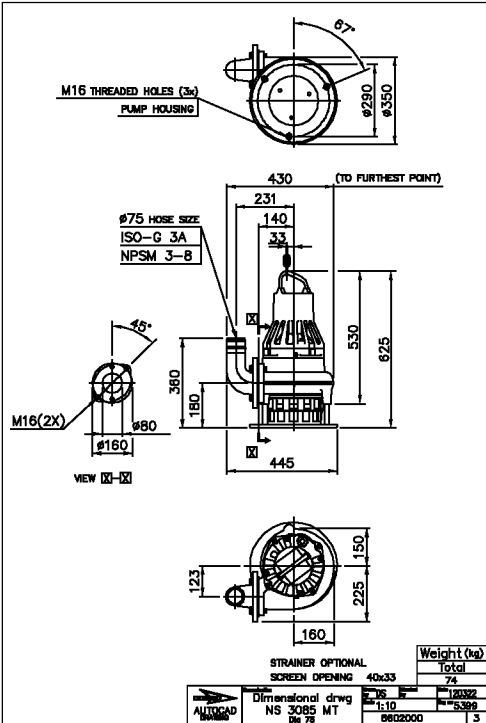


Figure 34: MT, S-installation

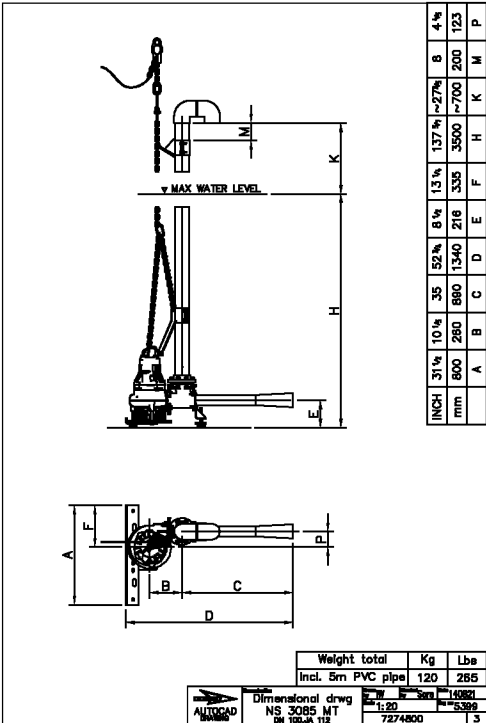


Figure 35: MT, S-installation

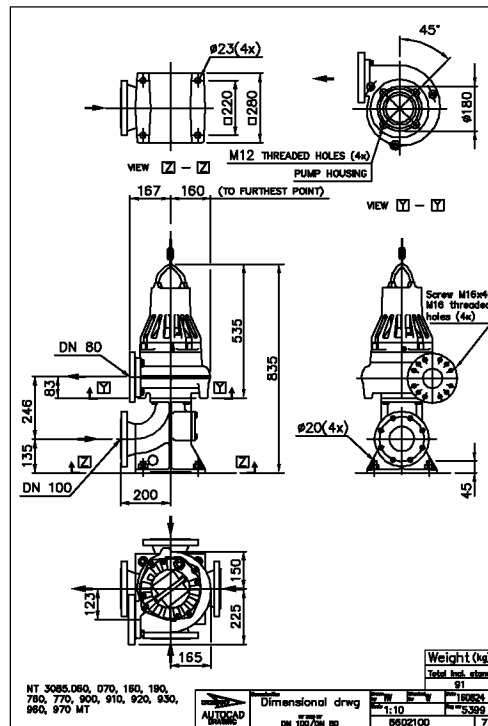


Figure 36: MT, T-installation

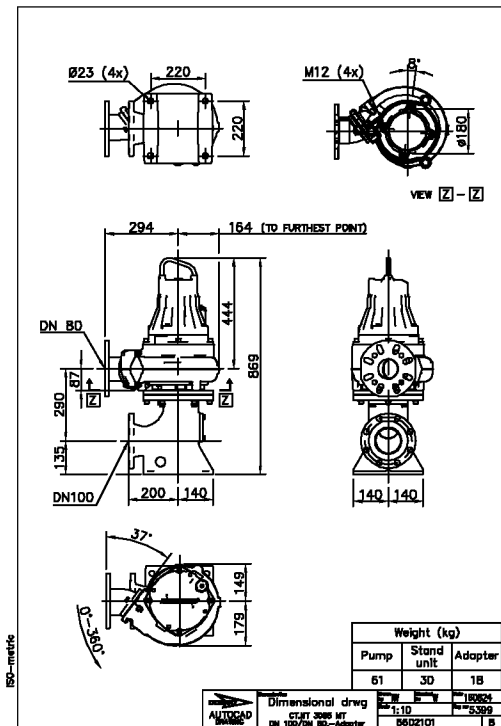


Figure 37: MT, T-installation

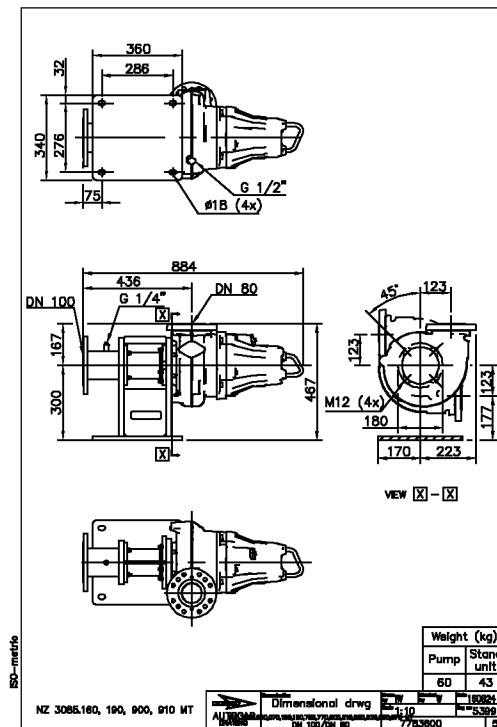


Figure 38: MT, Z-installation

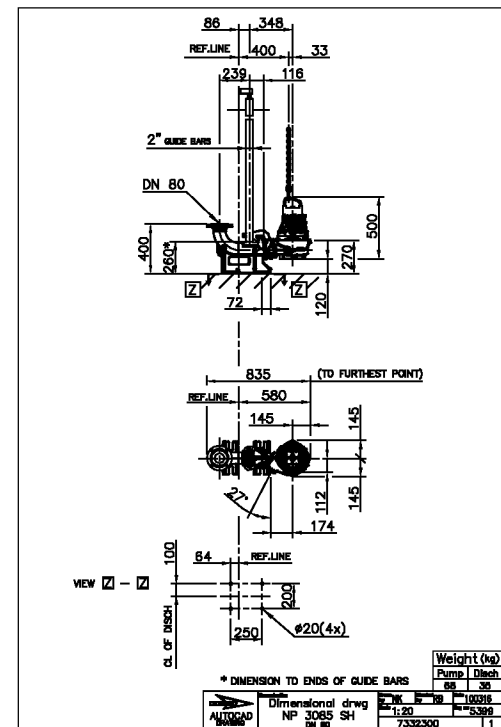


Figure 39: SH, P-installation

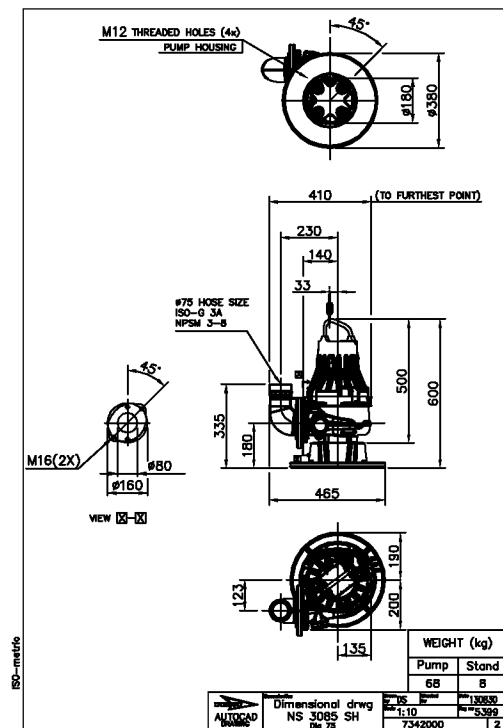


Figure 40: SH, S-installation

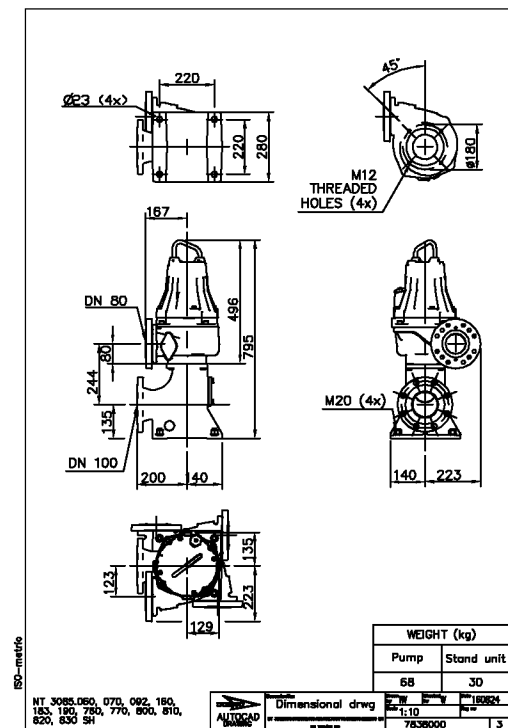


Figure 41: SH, T-installation

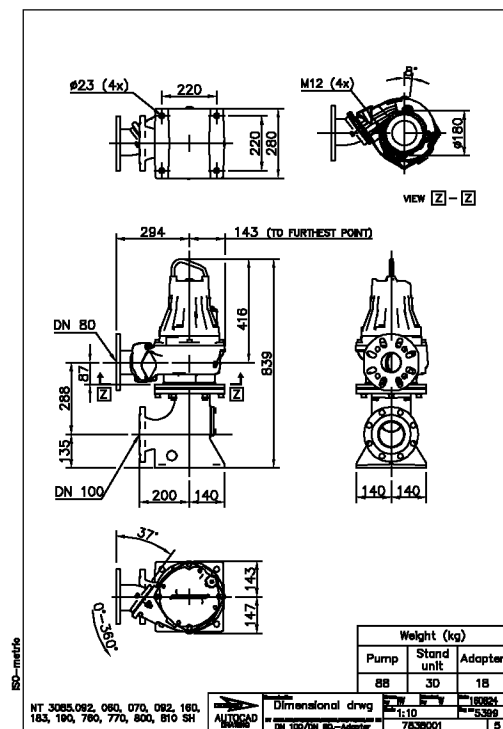


Figure 42: SH, T-installation

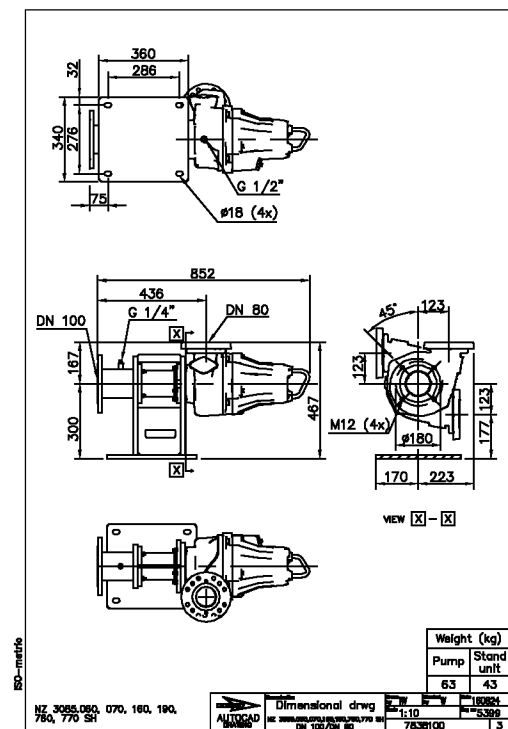
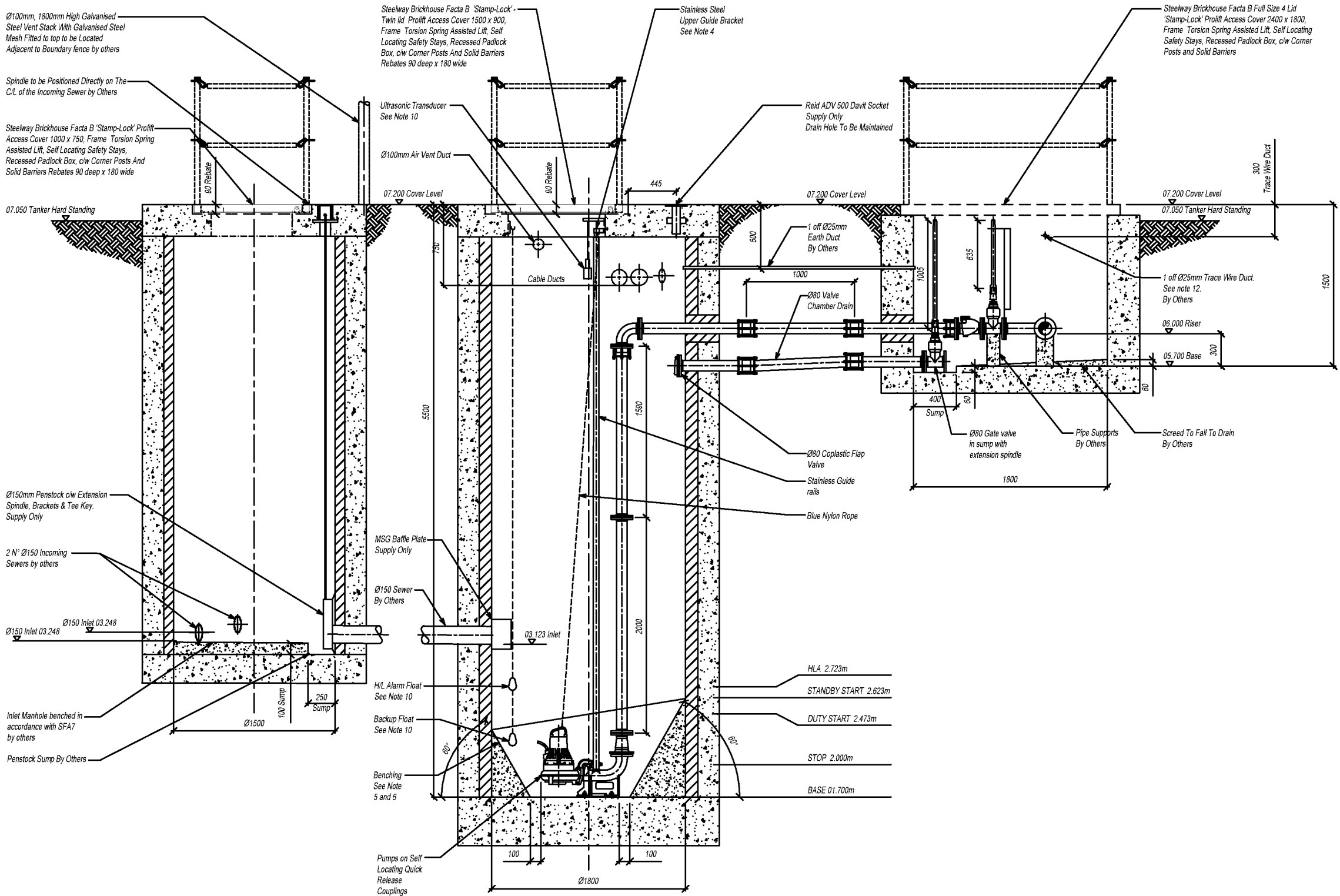


Figure 43: SH, Z-installation

Appendix D Pump Station Drawings



- | | | | | | | | |
|-----------------|-------------|---------------|-------|------|-----|------|------------|
| SCALE
ATA1 | 1:20 | SCALE
ATA3 | 1:40 | APR1 | PB | DATE | 30/01/2019 |
| PROJECT
REF. | PR20134 | | CHK'd | | JTI | DATE | 30/01/2019 |
| DRAWING
No. | A 6601 - 01 | | DR'n | | KPS | DATE | 30/01/2019 |



VIEW ON SECTION A-A

NOTES

- DO NOT SCALE.
- ALL DIMENSIONS IN MILLIMETRES, ALL INVERTS IN METRES AOD, UNLESS OTHERWISE STATED.
- ALL CIVIL WORK BY OTHERS INCLUDING MAKING GOOD AROUND PIPES AFTER INSTALLATION, BENCHING, FIXING ACCESS COVERS AND LAYING CABLE DUCTS.
- REINFORCING BARS TO BE 75mm MIN. BELOW SURFACE. STRUCTURAL DETAIL ILLUSTRATIVE ONLY, MAY BE WORKED TO FOR DIMENSIONS BUT XYLEM HAVE NO DETAIL INVOLVEMENT.
- BENCHING TO BE FORMED AS LAID DOWN IN 'SEWERS FOR ADOPTION' 6th EDITION AND TO LOCAL/ADOPTING AUTHORITY SPECIFICATIONS.
- BENCHING TO BE FORMED AFTER PUMP INSTALLATION.
- ALL DUCTS 100 I.D. MIN. COMPLETE WITH DRAW ROPES AND AVOIDING ACUTE CHANGES OF DIRECTION. SERVICE DUCTS TO SUPPLIERS SPECIFICATIONS.
- DIRECTION OF DUCTS SHOWN DIAGRAMMATICALLY - ALL DUCTS TO BE LAID ON MOST DIRECT LINE TO SUIT SERVICE BEING CARRIED.
- SITE PLAN ILLUSTRATIVE IF NO SPECIFIC DETAILS PREVIOUSLY PROVIDED.
- LEVEL CONTROLS SHOWN NOTIONALLY, TO BE POSITIONED AWAY FROM OBSTRUCTIONS, LEVELS READILY ADJUSTABLE AFTER INSTALLATION.
- DRAWINGS ARE ILLUSTRATIVE WITH REGARD TO CIVIL WORKS AND SHOULD NOT BE USED FOR CONSTRUCTION.
- TRACE WIRE MARKER TAPE SHOULD BE TERMINATED WITH 1000mm OF WIRE COILED INSIDE THE VALVE CHAMBER THROUGH A SEALED DUCT.

B	03/04/2019	Revised in Line With Comments Received 04/03/2019	KPS	M.D.	I.B.
A	30/01/2019	First Issue	KPS	JTI	P.B.
REV	DATE	DESCRIPTION	DR'n	CHK'd	APR'l

APPROVED

xylem

WATER SOLUTIONS Ltd.
UNIT 1, 106 HAWLEY LANE
FARNBOROUGH
HAMPSHIRE GU14 8JE
TEL No. (01252) 513366
FAX No. (01252) 532695

xylem
Let's Solve Water

PROJECT
BURNDILL ROAD
YAPTON
ARUNDEL

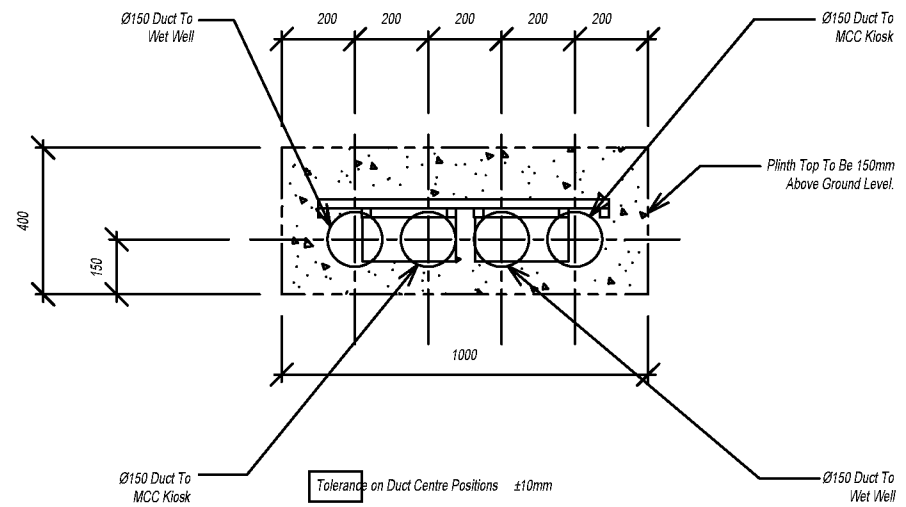
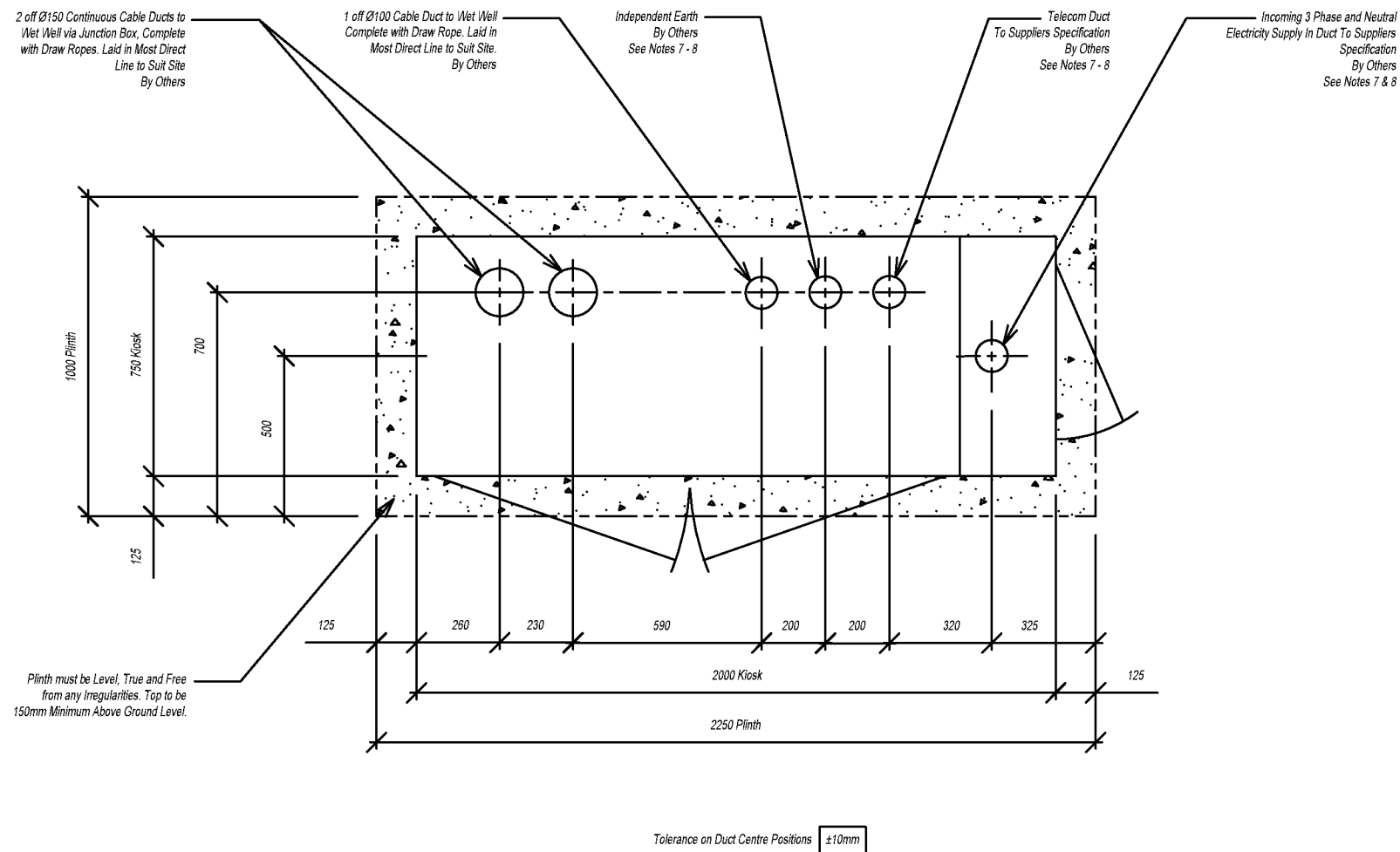
TITLE
FOUL WATER PUMPING STATION
ELEVATION VIEW

CLIENT
CRAYFERN HOMES LTD

SCALE
AT A1 1:20 AT A3 1:40 APR1 PB DATE 28/01/2019

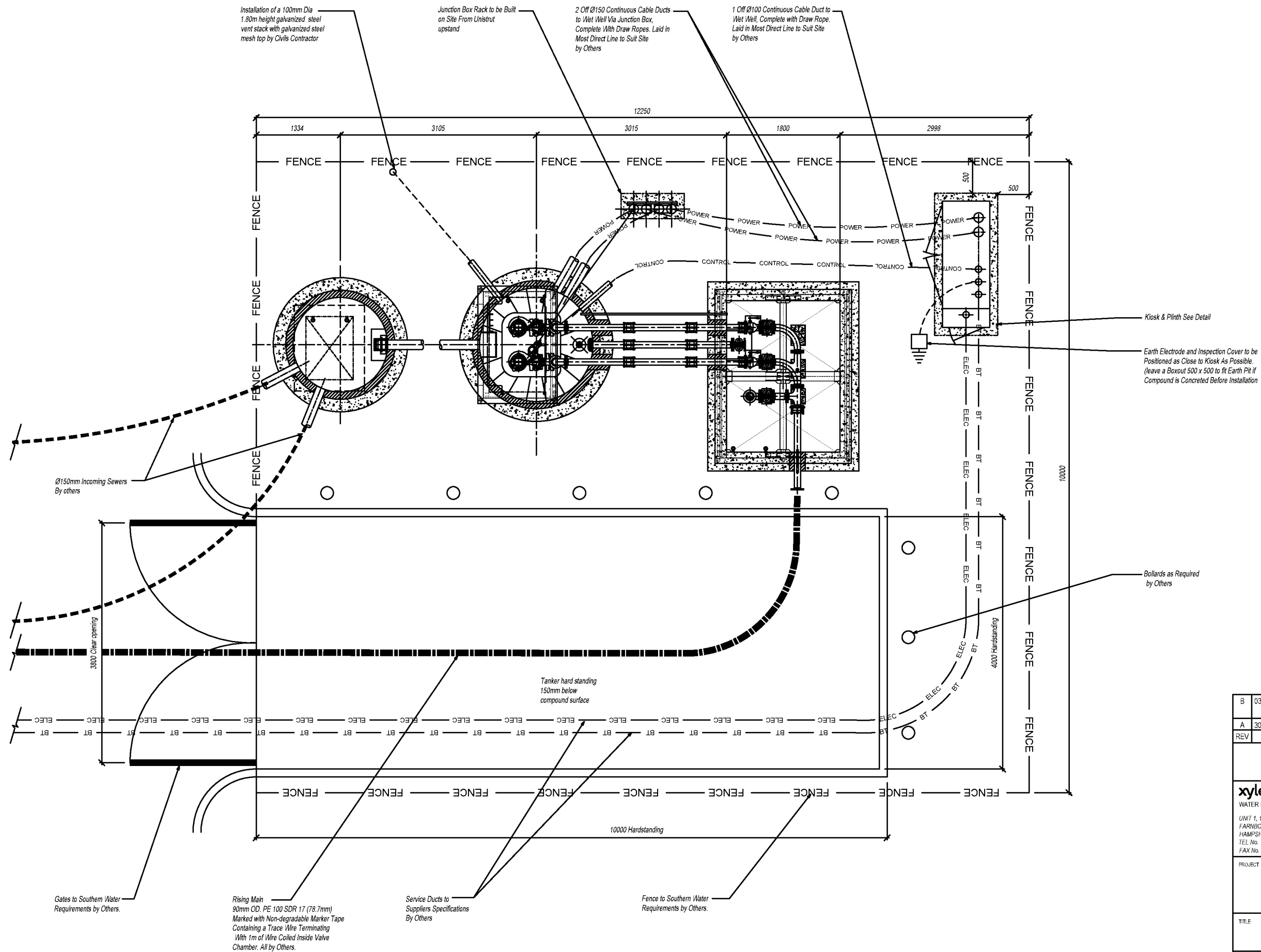
PROJECT
REF. PR20134 CHK'd JTI DATE 28/01/2019

DRAWING
No. A 6601- 02 DR'n KPS DATE 28/01/2019

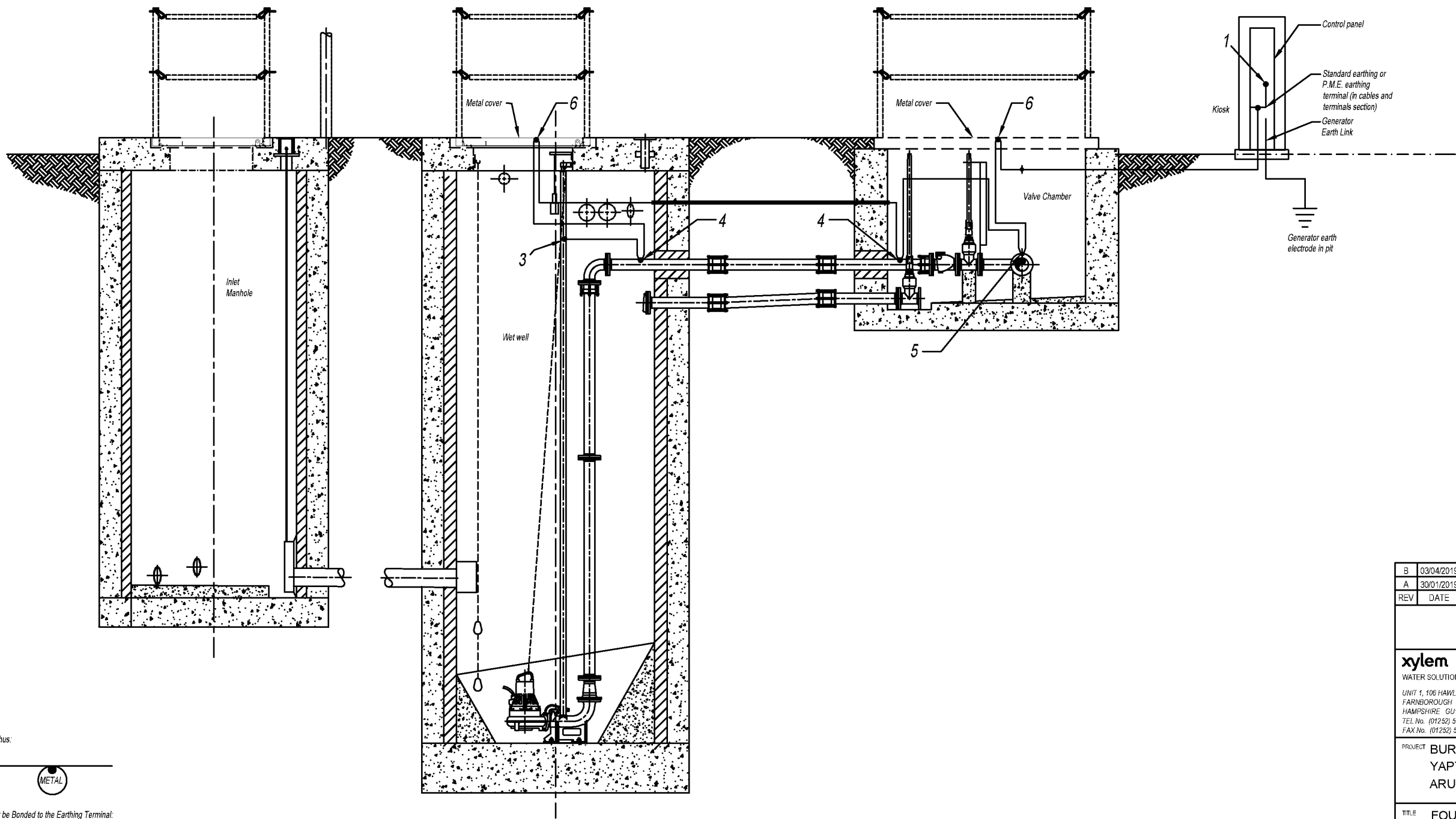


B	03/04/2019	No Changes	KPS	M.D.	I.B.
A	30/01/2019	First Issue	KPS	JTI	P.B.
REV	DATE	DESCRIPTION	DR'n	CHK'd	APPR
APPROVED					
xylem WATER SOLUTIONS Ltd. UNIT 1, 106 HAWLEY LANE FARNBOROUGH HAMPSHIRE GU14 8JE TEL No. (01252) 513366 FAX No. (01252) 532699			 Let's Solve Water		
PROJECT BURNDILL ROAD YAPTON ARUNDEL					
TITLE FOUL WATER PUMPING STATION KIOSK AND PLINTH DETAIL					
CLIENT CRAYFERN HOMES LTD					
SCALE AT A1	1:10	SCALE AT A3	1:20	APR1 PB	DATE 28/01/2019
PROJECT REF.	PR20134		CHK'd JTI	DATE 28/01/2019	
DRAWING No.	A 6601 - 03		DR'n KPS	DATE 28/01/2019	

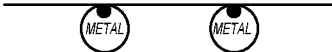
Note: all dimensions indicated
are to be confirmed on site



B	03/04/2019	Revised in Line With Comments Received 04/03/2019	KPS	M.D.	I.B.
A	30/01/2019	First Issue	KPS	JTI	P.B.
REV	DATE	DESCRIPTION	DR'n	CHK'd	APR'l
APPROVED					
xylem WATER SOLUTIONS Ltd. UNIT 1, 106 HAWLEY LANE FARNBOROUGH HAMPSHIRE GU14 8JE TEL No. (01252) 513366 FAX No. (01252) 532699			xylem Let's Solve Water		
PROJECT BURNDILL ROAD YAPTON ARUNDEL					
TITLE FOUL WATER PUMPING STATION SITE PLAN					
CLIENT CRAYFERN HOMES LTD					
SCALE AT A1	1:30	SCALE AT A3	1:60	APR'l	PB
PROJECT REF.	PR20134	CHK'd	JTI	DATE	28/01/2019
DRAWING No.	A 6601 - 04	DR'n	KPS	DATE	28/01/2019



Note:
Earth bonding connections indicated thus:

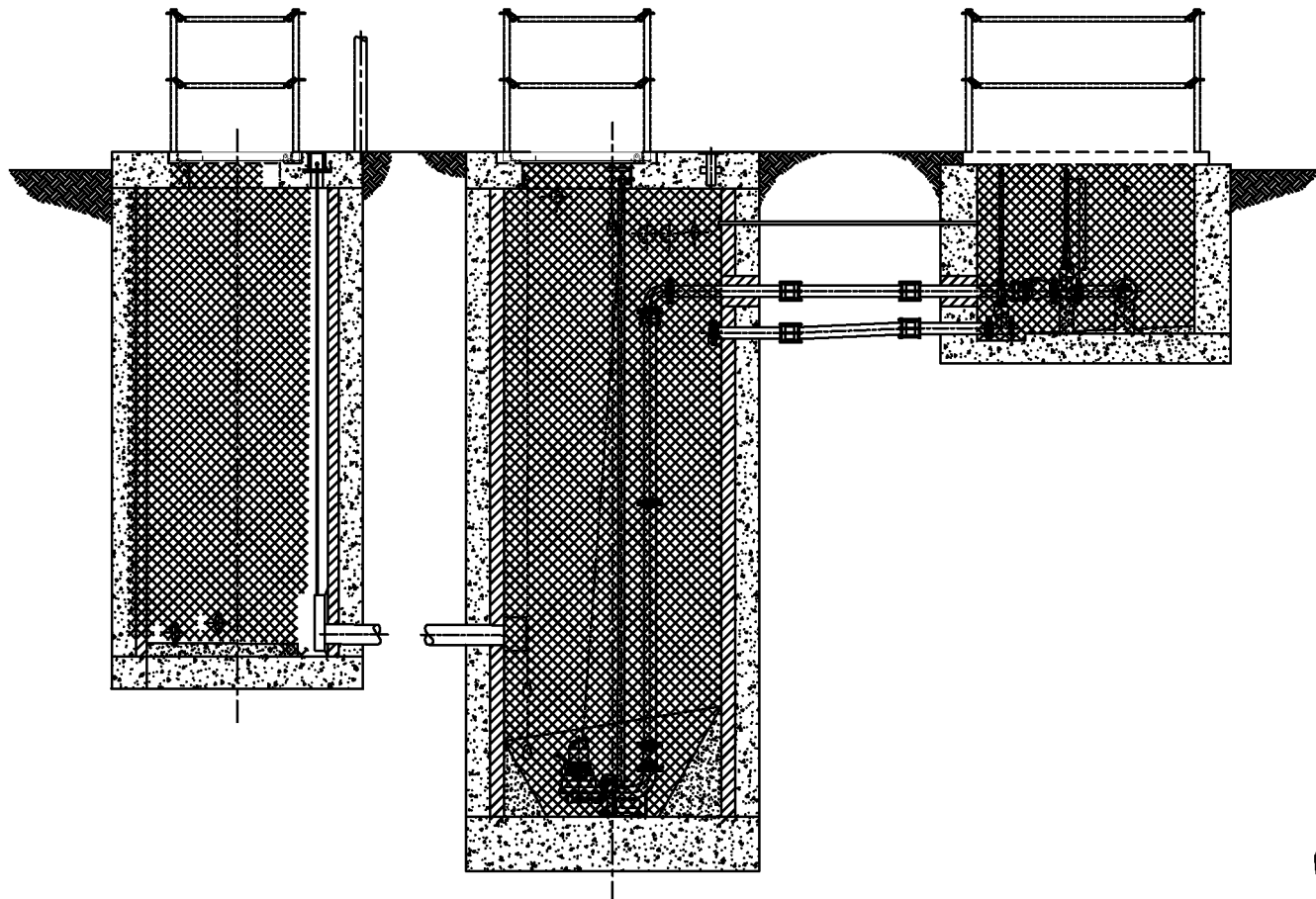


The Following Actual Equipment Must be Bonded to the Earthing Terminal:

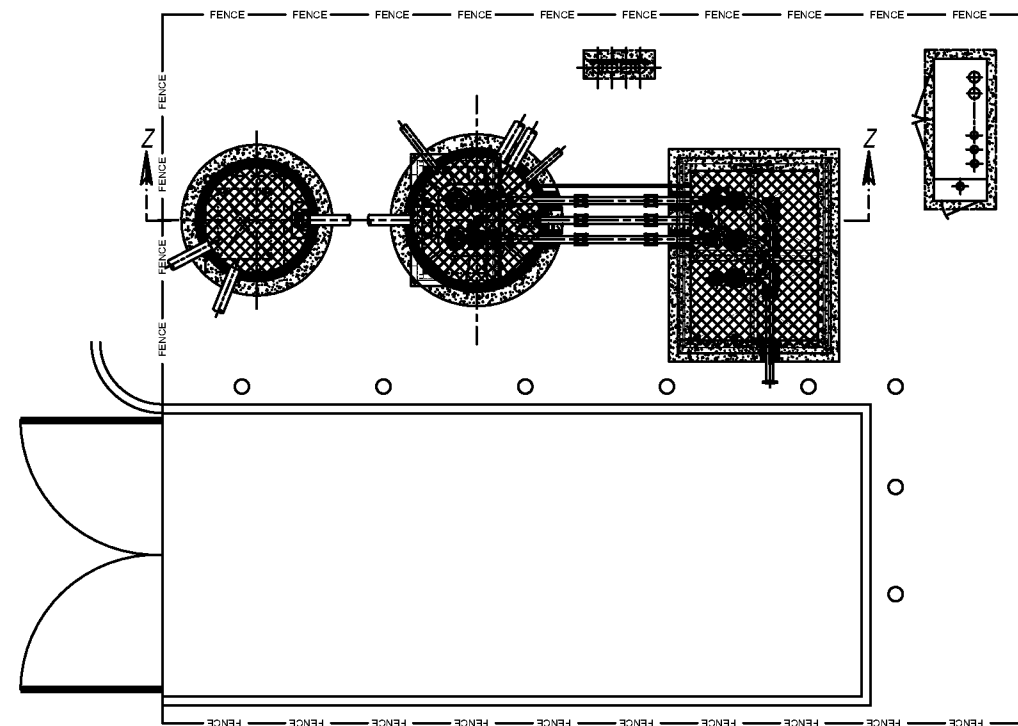
1. All Case Earth Connections, etc, in the Kiosk/Building;
2. Metal Ladder (Not applicable)
3. Pump Guide Rails;
4. Pump Delivery Pipes and Auxiliary Suction Pipe;
5. Metal Rising Main
6. Metal cover support frames.

The pump casing is connected to the protective multiple earth (P.M.E.) earthing terminal via the flexible cable between the pump and the kiosk/building.

B	03/04/2019	No Changes	KPS	M.D.	I.B.
A	30/01/2019	First Issue	KPS	JTI	P.B.
REV	DATE	DESCRIPTION	DR'n	CHK'd	APR'l
APPROVED					
xylem WATER SOLUTIONS Ltd. UNIT 1, 106 HAWLEY LANE FARNBOROUGH HAMPSHIRE GU14 8JE TEL No. (01252) 513366 FAX No. (01252) 532699			 Let's Solve Water		
PROJECT BURNDILL ROAD YAPTON ARUNDEL					
TITLE FOUL WATER PUMPING STATION EARTHING ARRANGEMENT					
CLIENT CRAYFERN HOMES LTD					
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DRAWING No.	A 6601 - 05		DR'n KPS	DATE 28/01/2019	

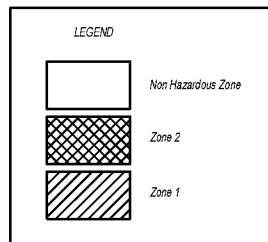


VIEW ON SECTION Z-Z



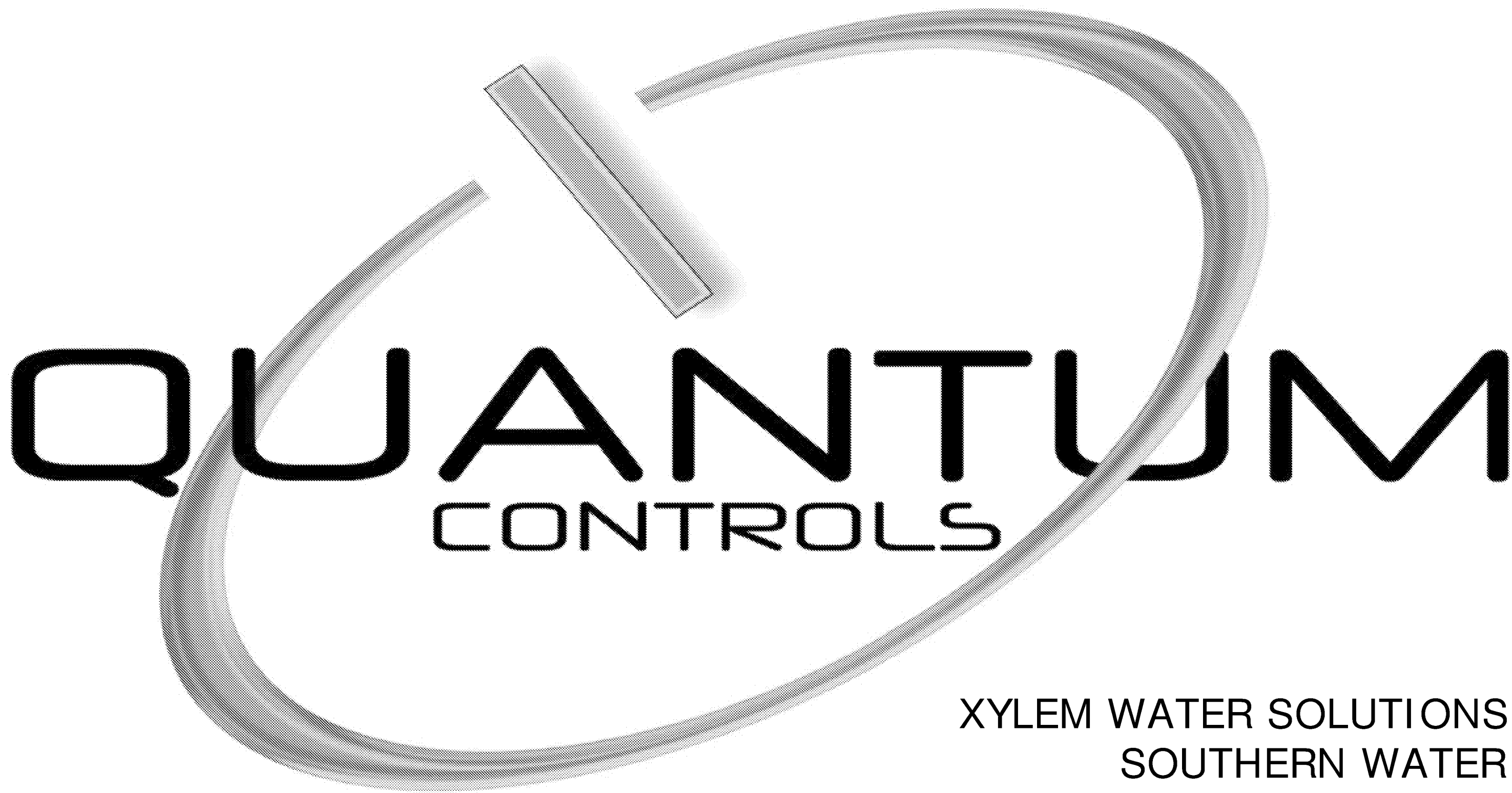
PLAN VIEW COMPOUND LAYOUT
not to Scale

Cable Ducts in accordance with SFA7 F.3.4.4 and BS EN 14014-01 & BS 4860 sealed with rise sealant system Gas + waterproof sealant system



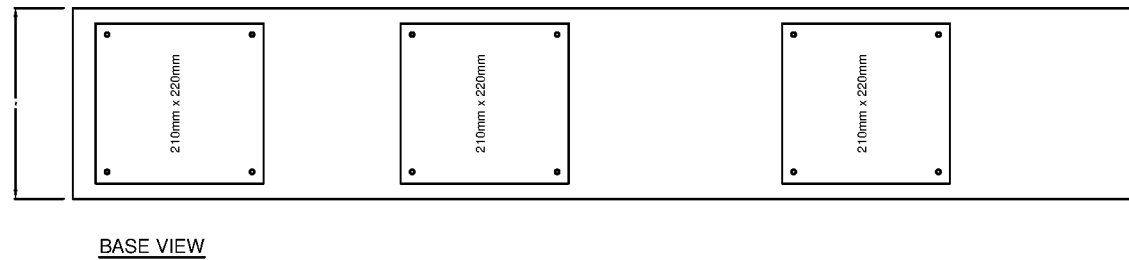
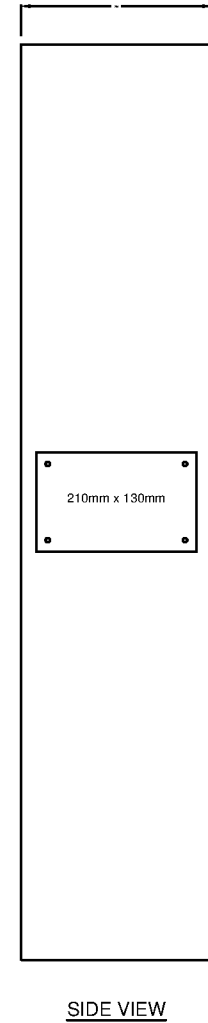
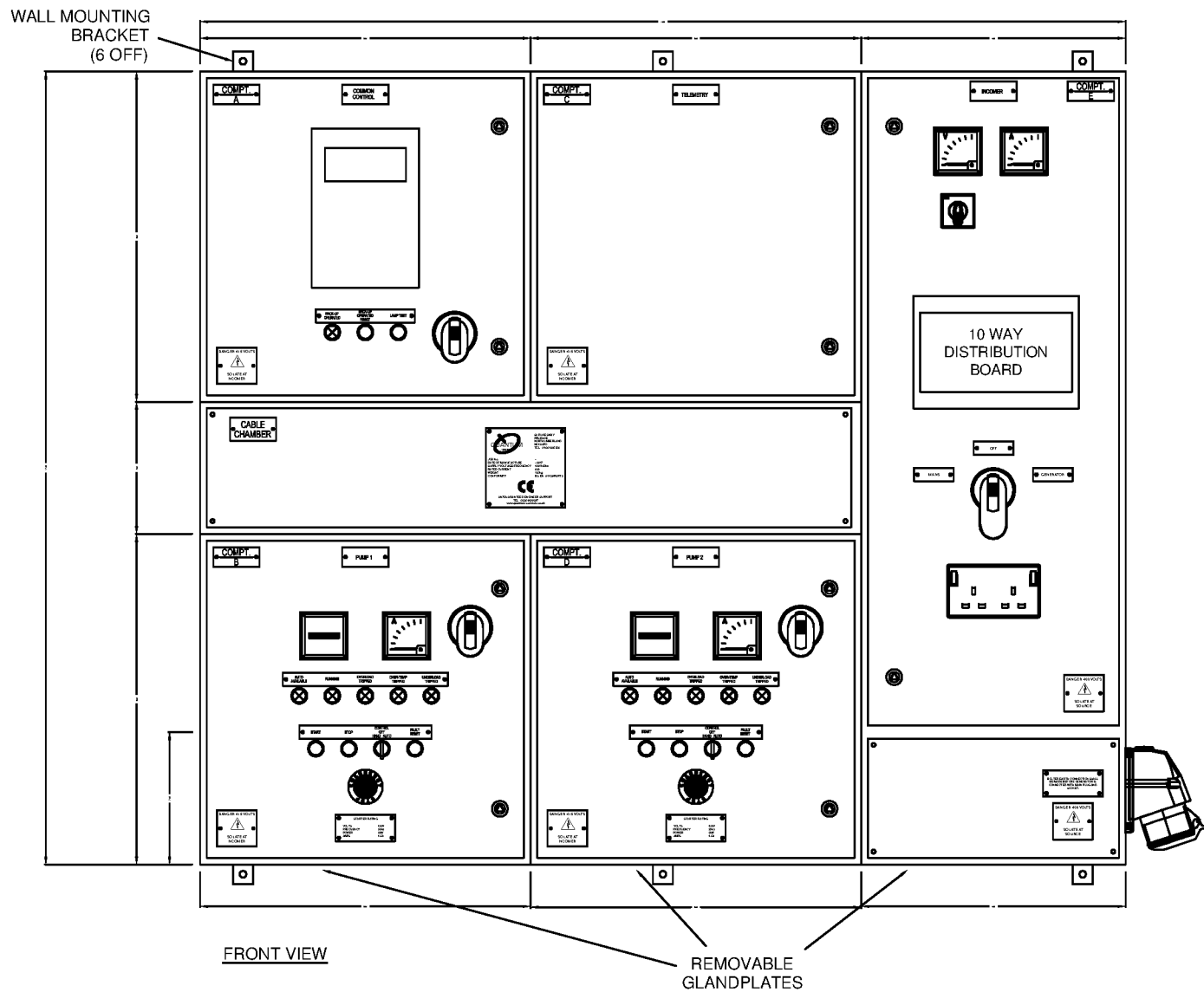
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A	30/01/2019	First Issue	KPS	JTI	P.B.
REV	DATE	DESCRIPTION	DR'n	CHK'd	APR'l
APPROVED					
xylem WATER SOLUTIONS Ltd. UNIT 1, 106 HAWLEY LANE FARNBOROUGH HAMPSHIRE GU14 8JE TEL No. (01252) 513366 FAX No. (01252) 532699			 Let's Solve Water		
PROJECT BURNDELL ROAD YAPTON ARUNDEL					
TITLE FOUL WATER PUMPING STATION HAZARDOUS ZONING DETAIL					
CLIENT CRAYFERN HOMES LTD					
SCALE AT A1	1:30	SCALE AT A3	1:60	APR'l	PB
PROJECT REF.	PR20134		CHK'd	JTI	DATE 28/01/2019
DRAWING No.	A 6601 - 06		DR'n	KPS	DATE 28/01/2019

Appendix E Wiring Diagrams



XYLEM WATER SOLUTIONS
SOUTHERN WATER
BURNDELL ROAD

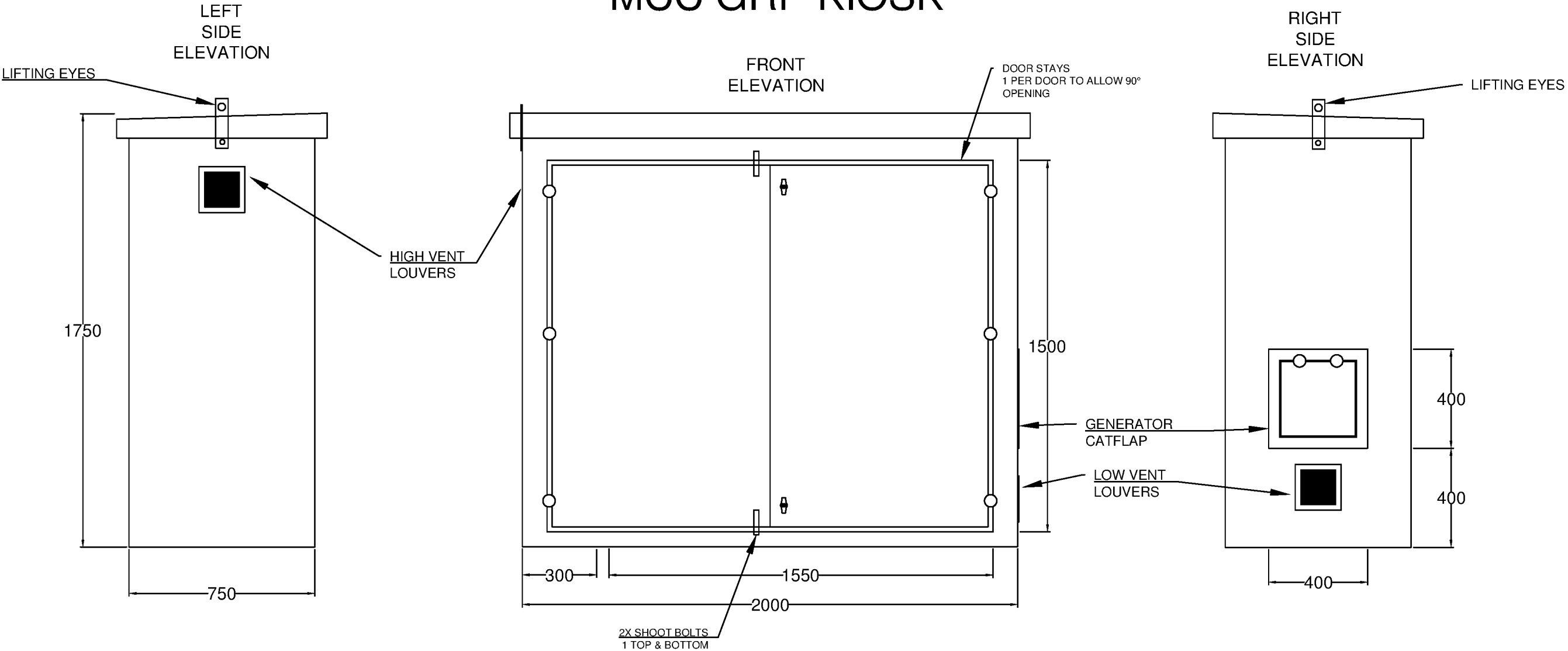
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							Project SW								
							Title 2 x DOL STARTER CONTROL PANEL			Checked JH	Sheet 1				
00	QUOTATION		PM	03/04/2019	JH		DWG Title FRONT SHEET		ALL DESIGN & PROPERTY RIGHTS RESERVED. THIS DRAWING MUST NOT BE USED FOR MANUFACTURE OR COPYING WITHOUT THE PRIOR PERMISSION OF QUANTUM CONTROLS LTD.	Approved	Total 12				
Revision	Description		Rev. By	Date	Checked		Approved								
1		2		3		4		5		6		7		8	



NOTES:
CONTROL PANEL CONSTRUCTION TO IP54 FORM 4a TYPE 2
INCOMING CABLES BOTTOM ENTRY
CONTROL PANEL HAS FRONT ACCESS ONLY
CONTROL PANEL TRI LOCKS
PANEL COLOUR: TBC
BACK PLATE COLOUR: WHITE

						 6A Dukesway, Low Prudhoe Industrial Estate, Prudhoe, Northumberland, NE42 6PQ United Kingdom Tel: +44 (0)1661 835566 Fax: +44(0)1661 833888 Web: www.quantum-controls.co.uk	Client XYLEM WATER SOLUTIONS		Project No. Q12586	Drawn PM	Date 03/04/2019				
							Project SW								
							Title 2 x DOL STARTER CONTROL PANEL								
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Revision	Description		Rev. By	Date	Checked		Approved			Approved	Total 12				
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MCC GRP KIOSK



00	QUOTATION	PM	03/04/2019	JH	
Revision	Description	Rev. By	Date	Checked	Approved



QUANTUM
CONTROLS

6A Dukesway, Low Prudhoe Industrial Estate,
Prudhoe, Northumberland, NE42 6PQ
United Kingdom
Tel: +44 (0)1661 835566
Fax: +44(0)1661 833868
Web: www.quantum-controls.co.uk

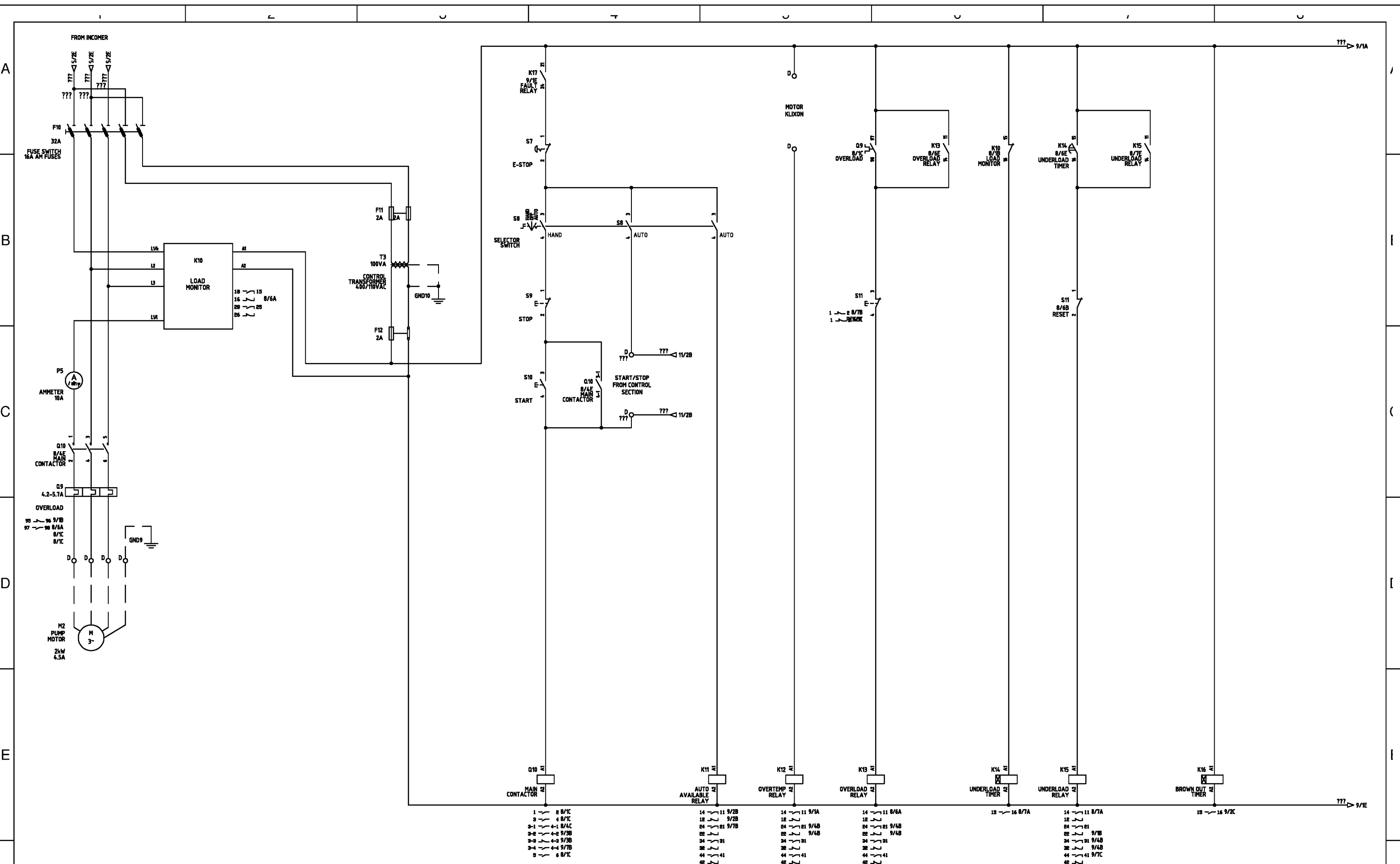
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Project	SW
Title	2 x DOL STARTER CONTROL PANEL
DWG Title	KIOSK ARRANGEMENT

Project No.

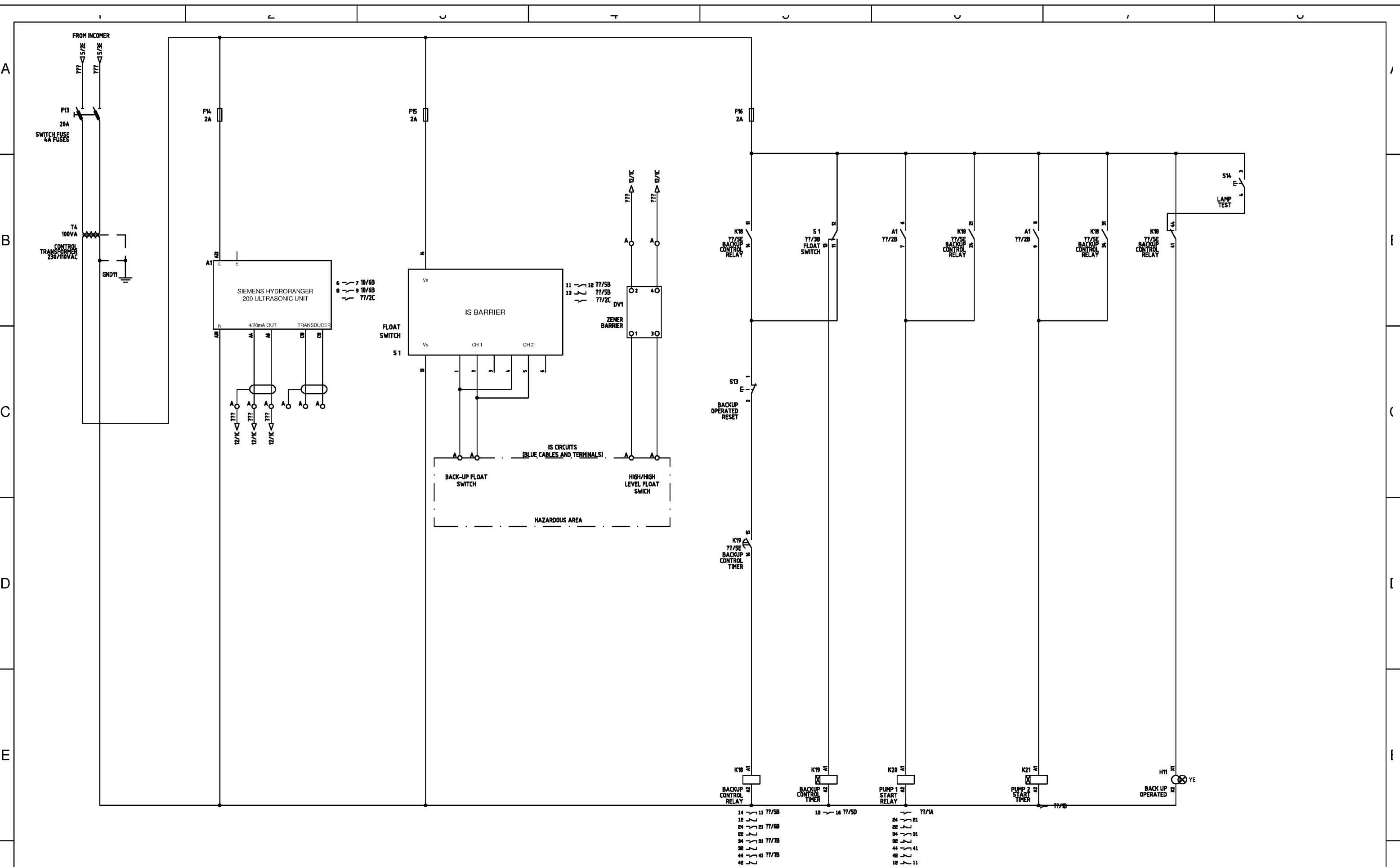
Q12586

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THE PRIOR PERMISSION OF QUANTUM CONTROLS LTD.

Drawn PM	Date 03/04/2019
Checked JH	Sheet 4
Approved	Total 12



F							QUANTUM CONTROLS 6A Dukesway, Low Prudhoe Industrial Estate, Prudhoe, Northumberland, NE42 6PQ United Kingdom Tel: +44 (0)1661 835566 Fax: +44(0)1661 833868 Web: www.quantum-controls.co.uk	Client	XYLEM WATER SOLUTIONS		Project No. Q12586	Drawn	Date
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											JH	8	
	00	QUOTATION			PM	03/04/2019		JH					
Revision	Description		Rev. By	Date	Checked	Approved	DWG Title	PUMP 2 WIRING		ALL DESIGN & PROPERTY RIGHTS RESERVED. THIS DRAWING MUST NOT BE USED FOR MANUFACTURE OR COPYING WITHOUT THE PRIOR PERMISSION OF QUANTUM CONTROLS LTD.		Approved	Total
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F							 6A Dukesway, Low Prudhoe Industrial Estate, Prudhoe, Northumberland, NE42 6PQ United Kingdom Tel: +44 (0)1661 835566 Fax: +44(0)1661 833868 Web: www.quantum-controls.co.uk	Client XYLEM WATER SOLUTIONS		Project No. Q12586	Drawn PM	Date 03/04/2019			
								Project SW							
								Title 2 x DOL STARTER CONTROL PANEL							
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F							 6A Dukeway, Low Prudhoe Industrial Estate, Prudhoe, Northumberland, NE42 6PQ United Kingdom Tel: +44 (0)1661 835566 Fax: +44(0)1661 833868 Web: www.quantum-controls.co.uk	Client	XYLEM WATER SOLUTIONS		Project No.	Q12586	Drawn	Date	
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	Revision	Description		Rev. By	Date	Checked		Approved			ALL DESIGN & PROPERTY RIGHTS RESERVED. THIS DRAWING MUST NOT BE USED FOR MANUFACTURE OR COPYING WITHOUT THE PRIOR PERMISSION OF QUANTUM CONTROLS LTD.			12	
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A

B

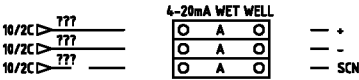
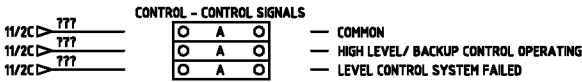
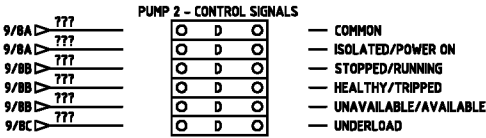
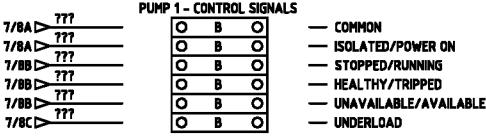
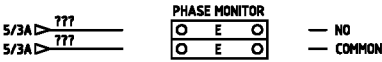
C

D

E

F

KNIFE ISOLATING
TERMINALS



NOTE:
ALL EXTERNAL CABLING TO THESE TERMINALS WILL BE
UNDERTAKEN BY A THRID PARTY

00	QUOTATION	PM	03/04/2019	JH	
Revision	Description	Rev. By	Date	Checked	Approved



QUANTUM
CONTROLS

6A Dukesway, Low Prudhoe Industrial Estate,
Prudhoe, Northumberland, NE42 6PQ
United Kingdom
Tel: +44 (0)1661 835566
Fax: +44(0)1661 833868
Web: www.quantum-controls.co.uk

Client	XYLEM WATER SOLUTIONS
Project	SW
Title	2 x DOL STARTER CONTROL PANEL
DWG Title	TELEMETRY WIRING

Project No.

Q12586

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