

TECHNICAL SUBMISSION

PROJECT

Whitechapel Road, Cleckheaton

CLIENT

Barratt David Wilson Homes Yorkshire  
West

PROJECT REFERENCE

1926-14633

ISSUE

D

## Change History

Issue	Revision Description	Date	Engineer	Approved
A	Initial submission to Yorkshire Water for approval / comment	29.11.2021	C. Butler	I. Handem
B	Update to new site plan and amendments to Yorkshire Water comments	11.03.2022	C. Butler	I. Handem
C	Removed the air duct in the valve chamber, as per YWS comments	18.05.2022	C. Butler	I. Handem
D	Structural detail added	28.06.2022	C. Butler	I. Handem

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### **1: Specification**

Our Technical Submission is based on equipment providing compliance with the SSG Appendix C – Design and Construction Guidance v2 document and version number v1.0 as amended by the Yorkshire Water Addendum to this document as obtained from the YWS Developer Services website at the time of this proposal, although the control equipment will be supplied in accordance with YWS addendum of the Code for Adoption specification since there is no YWS addendum for DCG Version 2.1 for this element.

### **2: Design Inflow**

The pump station is dealing with the domestic inflow from 87 dwellings.

Based on the 4000 litres per day per dwelling criteria detailed in the DCG Version 2.1 this equates to a peak inflow of 4.03L/sec.

The SSG document details that the pump discharge rate is to be at least half the design flow (2.01L/sec) or that to provide a self-cleansing velocity in the rising main. We are proposing the rising main is a 110mm OD PE100 SDR11 pressure pipe with a 89.1mm nominal bore through which a minimum flow rate of 4.75L/sec would be required.

Since the highest is the self-cleansing flow rate of 4.75 L/sec, our calculations are based on this figure.

### **3: Emergency Storage**

The emergency storage has been based on the DCG v2.0 premise of 160 litres per unit for 87 dwellings, which equates to 13.920m<sup>3</sup>.

Clause D5.5.2b in DCG v2.1 details that storage can be provided within any upstream public sewers and public lateral drains and associated manholes and inspection chambers above high level alarm and up to the upstream end of the lowest private lateral drain. The invert level of the lowest private demarcation chamber is 109.625m off the main manhole F15. However, the valve chamber base level is 108.800m which is lower than the lowest private lateral drain level. To avoid flooding of the valve chamber we have used the valve chamber base level as the Maximum Storage Level.

We calculate there to be 4.472m<sup>3</sup> of storage within the upstream manholes. The inlet manhole would be 1500mm internal diameter by 2.880m deep, and it would contribute to the storage on the above figure for the upstream manholes.

For the wet well, we propose a 2700mm internal diameter by 4.8m deep chamber which will contribute a further volume of 10.442m<sup>3</sup> above the normal pump operating area and below the maximum storage level.

The total volume available on this scheme is 14.914m<sup>3</sup> which is approximately 7% over what is required for this scheme. We have attached our storage calculations in Appendix C.

### **4: Rising Main and Surge Analysis**

We propose the use of a 110mm OD PE100 SDR11 pressure pipe with a 89.1mm nominal bore installed with an undulating profile. Consequently, an air valve would be installed in the valve chamber and a washout chamber will be installed at the low point of chainage 40.4m.

The rising main long section drawings are to be provided by the Engineer under a separate cover.

As the rising main is shorter than the 500m length stipulated within the DCG Version 2.1 standards, we do not propose to prepare a surge report for the rising main.

## **5: Retention Time and Septicity**

Based on a half developed site the retention time within the system is 2.24 hours and for the fully developed site is 1.12 hours. Both figures are below the 6 hour figure after which septicity is considered to be a problem and as such, we do not propose to install a permanent septicity control equipment.

Should problems be encountered with low flows leading to septicity during the early stages of the development they would be dealt with using temporary measures.

## **6: Pump Duty Requirements and Selection**

From the information provided and at a pump discharge flow rate of 4.75 L/sec, we calculate a total head of 14.45m at Pump Stop Level for which we have selected submersible pumps from the Grundfos SEV.80.80.40.A.EX.4.51D range as illustrated on the attached literature which are fitted with Super Vortex impeller and 4.0 kW explosion-proof motors designed to operate from a 400V, three phase and neutral power supply.

Yorkshire Water have requested the actual pump discharge rate to not exceed 6 L/sec. Therefore, a pump has been selected with actual discharge rate of 5.62L/sec at Pump Stop Level with pump efficiency of 29.2%.

A fully automatic flushing system will be fitted to one of the pumps.

As the motor ratings are less than the 7.5 kW detailed in DCG Version 2.1, we do not propose to fit the pumps with a seal leak detection system. Although Grundfos pumps will be supplied with overtemperature and moisture sensors that will be monitored at the control panel.

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 the scheme civils Contractor to a layout as shown on drawings 1926-14633-001 to 008. Please refer to Appendix C for drawings.

The non-return valves would be fitted with levers, weights and guards, and the gate valves would be fitted with extension spindles.

The pump station pipework would terminate a short distance outside the valve chambers with a 100mm nominal bore PN16 flanged from where the provision of the rising main and connecting it to the pump stations pipework would be the responsibility of the Developer or Contractor.

In accordance with the DCG Version 2.1, there will be a separate 100mm nominal bore wet well auxiliary pipework terminating just below the valve chamber's access cover with a Male Bauer coupling.

An overpumping point will be located within the valve chamber which will terminate just below the valve chamber's access cover with a Female Bauer coupling.

A 100mm valve chamber drain would be installed with P Trap and sludge valve complete with extension spindle at the valve chambers.

## **8: Pump and Level Control Cabling**

The pump cables would be wired directly back to the control panel without intermediate junction boxes or Icore connectors as detailed and generally preferred by Yorkshire Water. All cable ducts emanating from the wet well should only be sealed within the kiosk with gas tight sealing putty to 10ATEX 137 Directive as required by YWS.

### 9: Control Equipment

Automatic level control would be provided via Siemens Hydromat 200 ultrasonic level control systems augmented by two separate Ex rated float switches for high level and ultrasonic failure all wired back to a composite multi-compartment control panel in accordance with the Yorkshire Water SFA6 Addendum.

The control panel would be installed within a kiosk of dimensions 1350mm High x 2200mm Wide x 500mm Deep, which will also contain the electricity board meters.

Please refer to Appendix E for Wiring Diagrams and Kiosk Layout.

### 10: Telemetry Equipment

The Developer will supply, install and commission the telemetry at their expense. Yorkshire Water's telemetry system is the Metasphere MMIM Outstation.

### 11: Access Covers

We are proposing Steelway Stamp Lock Prolift FACTA Class B access covers in compliance with DCG Version 2.1 for the wet well and valve chamber.

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

For the inlet manhole we propose a cast iron D400 square (750 x 750mm) manhole cover.

The sizes for each access cover are as follows.

<i>Chamber</i>	<i>Clear Opening Dimension</i>
Wet Well	1500 x 900mm
Valve Chamber	2400 x 1800mm
Inlet Manhole	750 x 750mm

### 12: Lifting Equipment

A 500kg WLL Reid lifting Porta-Davit will be provided for the site. Reid cast-in type Davit socket (with cover plate) would be installed adjacent to the Wet Well's access openings.

The Davit socket drain-down holes should penetrate through the cover slabs as required by YWS.

Since the pump traverse distance is below 6m, we do not propose a hoist for this scheme.

Refer to Appendix F for the lifting equipment literature.

### 13: Storage Kiosk

A dedicated GRP Storage Kiosk will be provided to house the lifting Davit arm and access cover posts and barriers systems when not in use. Please refer to the PDAS layout drawings for further details and location.

### 14: Inlet Penstock

A Penstock valve would be mounted in the inlet manhole over the outgoing sewer to the wet well. The penstock valves would be manufactured from cast iron, wall mounting complete with non-rising spindles, support brackets, a single tee key and a top box for the inlet manhole unit.

For Penstock drawing see Appendix F.

**15: Valve Chamber Access Ladder**

A galvanised mild steel access ladder complete with a retractable handhold would be installed within the valve chamber.

**16: Services**

It would be the responsibility of our client to provide a suitably rated 400 Volt, three phase and neutral power supply to the control panel.

The telemetry unit uses GPRS / GSM communications and subject to there being suitable network coverage in the area this would be used. As a contingency the provision of a telecom line for the telemetry outstation should be investigated by the developer. A spare duct for this is shown on the drawings.

**17: Appendices**

**Appendix A**  
**Summary**

## Technical Summary

Liquid Handled	Foul Water
Number of Pumps	2
Control Philosophy	Duty / Standby
Capacity per Pump (L/sec)	4.75
Head Generated (m)	14.45
Pump Manufacturer	Grundfos
Pump Type	SEV.80.80.40.A.EX.4.51D
Impeller Type / Reference	Super Vortex
Solids Handling (mm)	80
Hazardous Area Rating of Pump	EXP
Motor Rating (kW)	4.0
Speed (rpm)	1460
Electric Supply	230/400V 50Hz, 3 Phase
Full Load Current (Amps)	10.0 – 10.2
Method of Starting	Direct On Line
Length of Cables (m)	20
Level Controls	Siemens Hydromanager 200 Ultrasonic + high level and float switch back up
Wet Well Diameter (mm)	2700
Wet Well Depth (m)	4.8
Station Pipes and Valves (mm)	80
Station Final Discharge Pipe (mm)	100 PN16 Flanged
Pump Station Pipe Material	Ductile Iron
Rising Main (By Civil contractor or Developer)	110mm OD PE100 SDR11 (89.1mm Bore)
Access Covers	Wet Well 1500 x 900mm Prolift FACTA B (5 tonne wheel load) Valve Chamber 2400 x 1800mm Prolift FACTA B (5 tonne wheel load) Inlet Manhole 750 x 750mm D400 cast iron
Inlet Diameter (mm)	150
Penstock	150mm NB Cast Iron, wall fixing Isolation of incoming sewers by Developer / Contractor
General Arrangement Drawings	1926-14633-001 to 008

## Materials Specification

<b>Pump Station Type</b>	<b>Submersible – Guiderail Mounted Pumps</b>
<b>Base Specification</b>	<b>DCG Version 2.1</b>
<b>Addendum</b>	<b>DCG Version 2.1 – Mechanical YWS SF6 addendum - Electrical</b>

### **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 (or pedestal with elbow) 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 duckfoot sockets. Complete with necessary location brackets.

### **LIFTING CHAINS:**

Stainless Steel Chain as specified with DCG Version 2.1 and Yorkshire Water addendum.

### **REFLUX VALVE:**

Fullway pattern delivery non-return valve.

### **SLUICE VALVE:**

Fullway pattern isolating sluice valve with non-rising spindle and Cap Top.

### **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:**

Siemens Hydromanager 200 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.

### **STORAGE KIOSK:**

GRP, floor fixing, weatherproof lockable enclosure in deep green textured finish, provisional dimensions 1350 H x 2200W x 500D.

**MAIN KIOSK:**

GRP, floor fixing, weatherproof lockable enclosure in deep green textured finish, provisional dimensions 1350mm (H) x 2200mm (W) x 500mm (D) containing a full-sized backboard on which would be mounted / provided:

- a) Yorkshire Water DCG V2.1 control panel as specified for the surface water pumps
- 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) Space for the mounting of Electricity Board meters
- f) Space for telemetry

**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.

**The whole of the above being suitably interconnected and earth bonded extended to all non-conductive steelwork within the pump station in 16mm<sup>2</sup> cable to provide a complete PME system.**

**ACCESS COVERS:**

Steelway Prolift FACTA B (5 tonne wheel load) Access Covers and Frames complete with safety grids and demountable barrier system.

Wet Well                      1500 x 900mm clear opening  
Valve Chamber              2400 x 1800mm clear opening

The Inlet Manhole        750 x 750mm clear opening D400 cover.

**LIFTING EQUIPMENT:**

- 1 – Cast in Type Davit Socket and cover plate to suit Reid Porta Davit for in situ casting by Contractor
- 1 – 500kg WLL Reid lifting Porta-Davit

**NOTE:** *If lifting equipment is supplied site load testing of items cast into cover slab by ground-workers is excluded from our offer.*

**ANCILLARY EQUIPMENT:**

1. Lever arm and weights on non-return valves complete with guards
2. Extension spindle for gate valves
3. Pressure tappings on pump discharge leg non-return valves and on common manifold
4. 100mm female Bauer coupling on over pumping tee
5. 100mm auxiliary suction pipework
6. Cast iron Penstock c/w extension spindle for installation within the inlet manhole
7. Stainless Steel Inlet Baffle plate
8. Rubber matting in control panel kiosk
9. Galvanised Steel Access Ladder c/w Retractable hand hold in valve chamber
10. 100mm nominal bore P Trap and valve chamber drain
11. Three copies of operating and maintenance manuals plus drawings or one electronic copy prepared in PDAS standard format
12. Air valve for installation in the valve chamber
13. Washout pipework for installation at the rising main low point by the civil contractor

**Appendix B**  
**Hydraulic Calculations, System Curves and Performance Curves and Dimensional Data**

Pump Design and Services Ltd  
 Building 4.6 HiTECH  
 Frimley 4 Business Park  
 Frimley, Camberley  
 Surrey GU16 7SG



Tel: 01483 930 520  
 Email: [info@pdasgroup.co.uk](mailto:info@pdasgroup.co.uk)

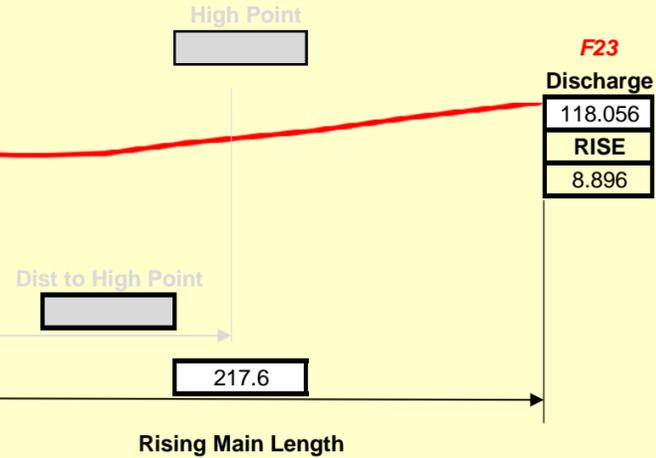
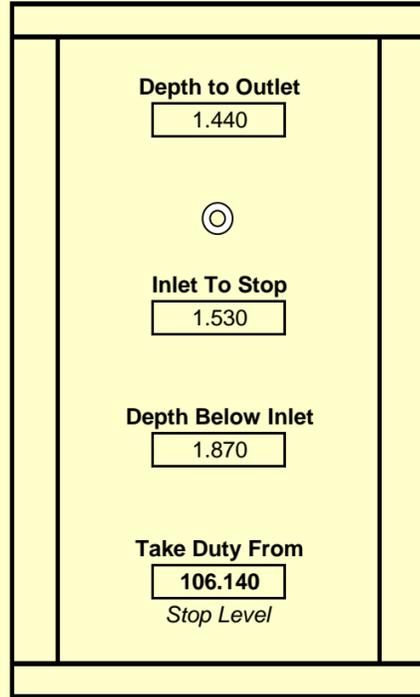
Site ID #	1926
Project Reference	14633
Date	09/03/2022

Clients Name	Barratt David Wilson Homes Yorkshire West
Site Address	Whitechapel Road Cleckheaton

Adopting Authority	Yorkshire Water
Pump Station Type	Foul Water
Number of Dwellings	87
Non Domestic Area (m <sup>2</sup> )	
Non Domestic Rate (L/sec Ha)	
Number of Pumps	2
Number of Duty Pumps	1

Design Flow / Rising Main	
Peak Flow (DCG v2.0 Discharge)	4.03 L/sec
Pump Discharge Rate DCG v2.0	2.01 L/sec
Pump Discharge Rate	4.75 L/sec
Rising Main I.D.	89.1 mm
Velocity in Main	0.76 m/sec
Surge Analysis	NOT REQUIRED

Cover Level	110.600
VC Outlet	109.160
Max Storage	108.800
Inlet	107.670
HLA	106.870
P2 Start	106.770
P1 Start	106.670
Mid Water	106.405
Stop Level	106.140
Dead Area	340
Base Level	105.800



**Notes:**  
 Inlet level lowered by client  
 Washout chamber chainage updated  
 Rising main updated

Wet Well	
Wet Well Diameter	2700 mm
Calc Chamber Depth	4.323 m
Volume Per M	5,725.55 litres
Depth Between Starts	100 mm
Actual Chamber Depth	4.800 m
Theoretical Op Volume	534.38 litres
Actual Op Volume	1,100.75 litres
Max Theoretical Starts	8.00
Actual Starts	4.60

Retention Calculations	
DWF Inflow Per Day	52,727.27 litres
Rising Main Volume	1,356.83 litres
Combined Main and Op Vol	2,457.58 litres
No. of Main Clears per Day	21.45
Retention Full Usage	1.12 Hours
Retention Half Usage	2.24 Hours

*Retention calcs assume ascending rising main*

Storage	
Domestic @ 160L / Dwelling	13.920 m <sup>3</sup>
Industrial 1 Hr @ Design Flow	0.000 m <sup>3</sup>
Total Required Storage	13.920 m <sup>3</sup>
Capacity in Gravity System	4.472 m <sup>3</sup>
Capacity between HLA & inlet	4,580.44 litres

	Rising Main	Common 3	Common 2	Common 1	Individual 3	Individual 2	Individual 1
Flow Rate (L/sec)	4.75	4.75	4.75	4.75	4.75	4.75	4.75
Static Head (m)	11.92						
Pipe Diameter (mm)	89.10	100	80	80	80	80	80
Velocity (m/sec)	0.76	0.60	0.94	0.94	0.94	0.94	0.94
Roughness Factor	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Pipe length (m)	217.61					8.360	
Duckfoot Bend							1
Short Radius Bends						1	
Long Radius Bends						1	
Tee Straight through		1				3	
Tee through branch							
Radial Tee thro Branch							
Sluice Valve						1	
Non Return Valve						1	
Bellmouth inlet							
Sharp Taper							
Standard Taper						1	
Equivalent Pipe Length (m)	217.61	1.1	0	0	0	21.08	2.72
Reynolds Number	5.9E+04	5.3E+04	6.6E+04	6.6E+04	6.6E+04	6.6E+04	6.6E+04
Darcy-Weisbach Friction Factor	0.0290	0.0285	0.0296	0.0296	0.0296	0.0296	0.0296
Velocity Head	0.030	0.019	0.045	0.045	0.045	0.045	0.045
Hydraulic (Piezometric) gradient	0.0096	0.0053	0.0168	0.0168	0.0168	0.0168	0.0168
Friction Head Loss	2.097	0.006	0.000	0.000	0.000	0.355	0.046

Calc Duty Point	
Flow	4.75 L/sec
Static Head	11.92 m
Total Head	14.45 m

Pump Selection	
Pump Type	SEV.80.80.40.A.EX4.51D
Impeller	Super Vortex
kW Rating	4

Actual Duty	
Flow	5.62 L/sec
Head	15.48 m

Qty.	Description
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1	SEV.80.80.40.A.EX.4.51D
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Note! Product picture may differ from actual product

Product No.: [96177707](#)

Non-self-priming, single-stage, centrifugal pump designed for handling wastewater, process water and unscreened raw sewage.

The pump is designed for intermittent and continuous operation. The liquidless and maintenance free cooling system ensures that the pump can be used for submerged or dry installation. The efficient SuperVortex impeller provides passage of long fibres and solids up to 80 mm and is suitable for wastewater with a dry matter content of up to 5 %. A unique stainless-steel clamp assembling system enables quick and easy disassembly of the pump from the motor unit for service and inspection. No special tools are required. Pipework connection is via a DIN flange.

The pump is explosion-proof.

### Further product details

The pump is suitable for both temporary and permanent installation either as free-standing on ring stand, on base stand, on brackets or on an auto-coupling system.

### Pump

The pump is fitted with an easy-to-clean stainless-steel motor sleeve (EN 1.4301) that is extremely robust and impact-resistant. Pump housing and impeller is made of cast iron (EN-GJL-250).

All surfaces of the cast iron parts are protected with cathodolysis coating.

The surface of the cast iron pump parts is afterwards painted with environmental friendly powder coating (type NCS 9000N (black), gloss code 30, thickness 100 µm) which ensures high impact and corrosion protection.

The final pump is assembled from already painted parts which ensures that no rust or scale can be formed in grooves between parts, etc.

The SuperVortex impeller is a symmetrical multivane winglet impeller.

The design ensures a flow entirely outside the impeller providing limited contact between the impeller and the pumped liquid.

This ensures that long fibres, rags and more passes freely through the pump without getting caught and without causing clogging or jamming.



The shaft seal consists of two mechanical seals that ensure a reliable sealing between the pumped liquid and motor. The shaft seals are incorporated in a single-unit cartridge shaft seal system that is easy to replace in the field without use of special tools.

The combination of the primary and secondary seals in a cartridge shaft seal system results in a shorter assembly length compared to conventional shaft seals.

- Primary seal: Silicon carbide/silicon carbide (SiC/SiC)
- Secondary seal: Carbon/Ceramics

The shaft seal is bidirectional, meaning it operates correctly in case of backflow through the pump.



The pump is approved according to EN12050-1. Furthermore, the pump is approved for installation in explosive atmospheres and holds the following examination certificate:

- ATEX (EU): KEMA04ATEX2201

The certificate has been issued according to the ATEX directive (94/9/EC).

For applications involving a risk of explosion, or where otherwise required, the pump is approved with the following explosion protection classifications.

Mains-driven pump, without sensor:

II2 GD Ex cd IIB T4, T3 and Ex c tD A21 IP68 T135°C, T200°C

Mains-driven pump, with sensor:

II2 GD Ex cd mb IIB T4, T3 and Ex c tD A21 IP68 T135°C, T200°C

Frequency converter pump, without sensor:

II2 GD Ex cd IIB T4, T3 and Ex c tD A21 IP68 T135°C, T200°C

Frequency converter pump, with sensor:

II2 GD Ex cd mb IIB T4, T3 and Ex c tD A21 IP68 T135°C, T200°C

## Motor

The motor is a watertight, totally encapsulated motor supplied with a 10 m power cable. The stainless steel plug is fastened with a union nut. This nut and the O-rings provide sealing against ingress of the liquid.

The plug is polyurethane-embedded, ensuring a watertight and durable seal around the leads of the cable. This prevents the ingress of water into the motor through the cable in case of cable breakage or adverse handling in connection with installation or service.

A compact motor construction with a short shaft reduces vibrations, resulting in an increased efficiency and lifetime of the shaft seal and ball bearings.

The motor features built-in thermal protection to protect the motor against overheating and ensure the reliability.

A solid-block stator housing with built-in cooling conduits, efficiently transfers excess heat to the pumped liquid via a solid cast intermediate cooling flange, that is in direct contact with the pumped liquid.

This allows for continuous operation even in a dry installation.

An extremely robust impact-resistant stainless-steel jacket with an easy-to-clean smooth surface is fitted on the top of the solid-block stator housing.

The pump is equipped with the following sensor(s):

- A digital moisture switch that is fitted in the motor chamber monitors whether water enters the motor chamber. If moisture is detected in the motor chamber, the switch will trip and send a warning to the sensor module.
- A Pt1000 sensor in motor windings for stator temperature measurements.
- An analog sensor that is fitted in the oil chamber monitors whether water enters the pump from the liquid side. It sends a signal if the water content is outside the normal range (warning), or if there is air in the oil chamber (alarm).

The pump is designed for speed-controlled operation to keep the energy consumption at a minimum.

To avoid the risk of sedimentation in the pipes, we recommend that you operate the speed-controlled pump within a speed range of 30 % to 100 % and at a flow rate above 1 m/s.

Controls:

Moisture sensor: with moisture sensors

Water-in-oil sensor: with water-in-oil sensor

Temp. sensor: Y

Liquid:

Liquid temperature range: 0 .. 40 °C

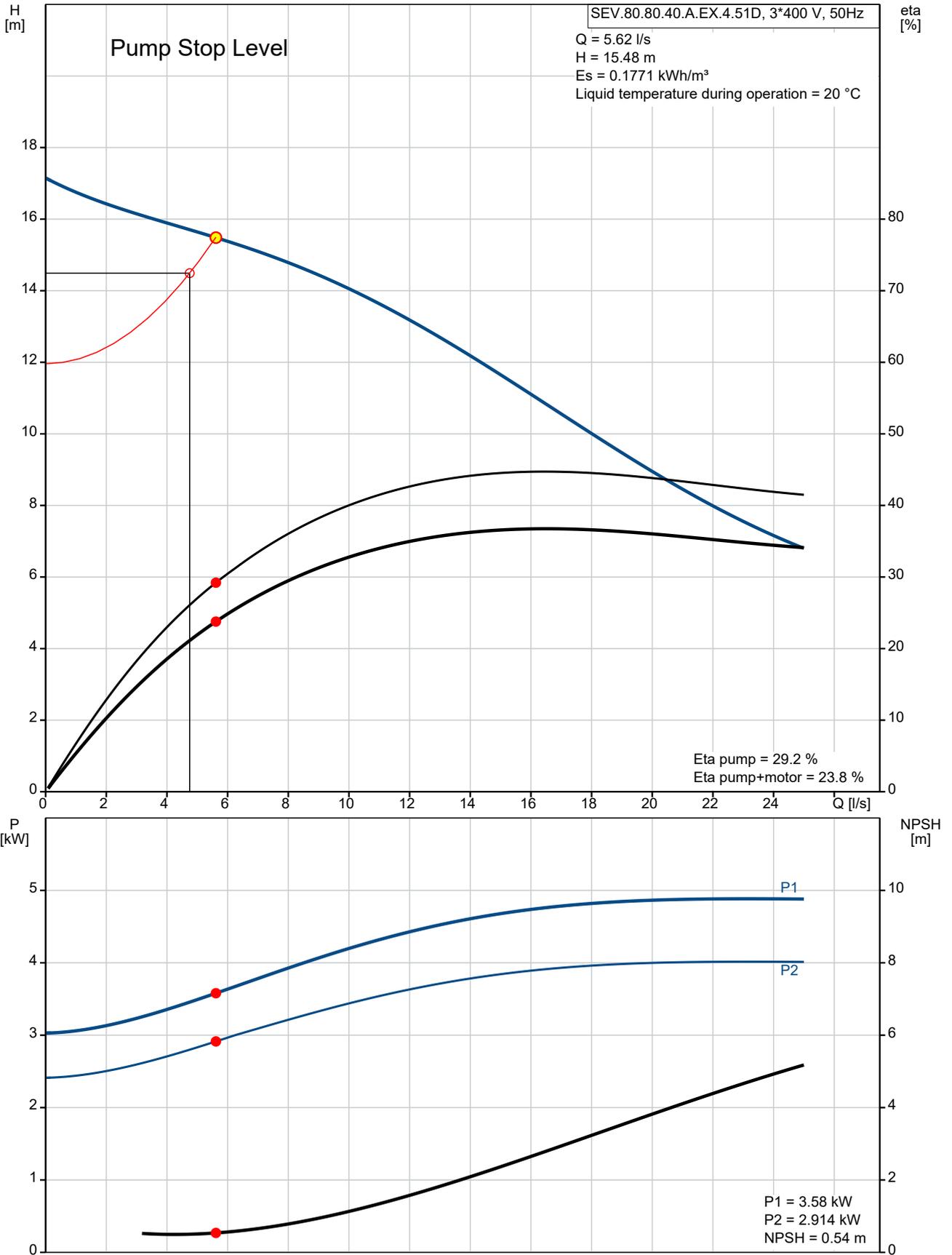
Selected liquid temperature: 20 °C

Density: 998.2 kg/m<sup>3</sup>

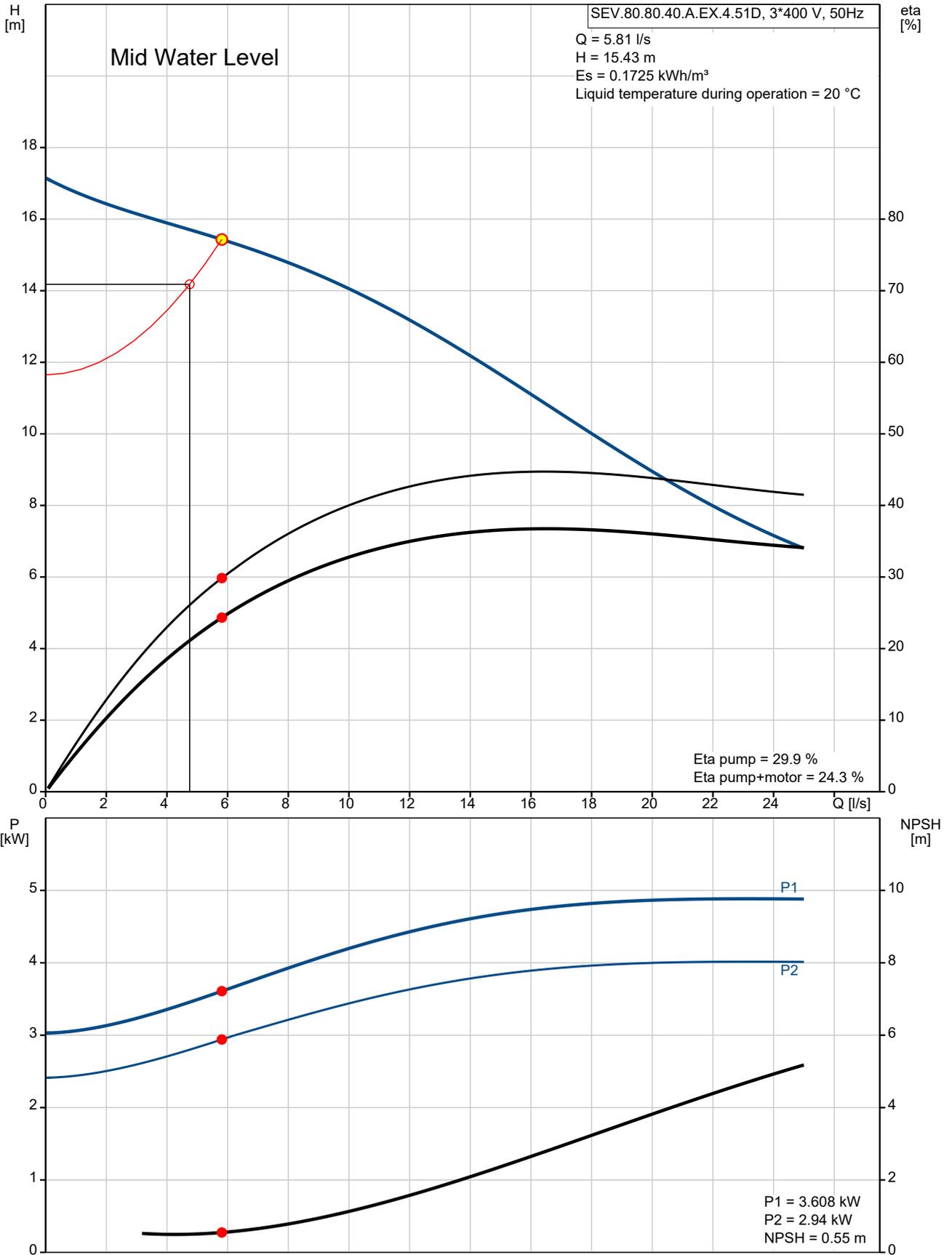
Technical:

Qty.	Description
	<p>Actual calculated flow: 5.62 l/s            Resulting head of the pump: 15.48 m            Type of impeller: SUPER VORTEX            Maximum particle size: 80 mm            Primary shaft seal: SIC/SIC            Max. hydraulic efficiency: 45 %            Approvals on nameplate: EN12050-1            Curve tolerance: ISO9906:2012 3B2</p> <p>Materials:            Pump housing: EN 1561 EN-GJL-250            Impeller: Cast iron            EN 5.1301 EN-GJL-200</p> <p>Installation:            t max amb: 40 °C            Maximum operating pressure: 6 bar            Flange standard: DIN            Pump outlet: DN 80            Pressure rating: PN 10            Maximum installation depth: 20 m            Auto-coupling: 96090993</p> <p>Electrical data:            Power input - P1: 4.9 kW            Rated power - P2: 4 kW            Mains frequency: 50 Hz            Rated voltage: 3 x 380-415 V            Voltage tolerance: +6/-10 %            Max starts per. hour: 20            Rated current: 10.0-10.2 A            Rated current at 3/4 load: 8.2 A            Rated current at 1/2 load: 7.1 A            Starting current: 67 A            Rated current at no load: 6.1 A            Cos phi - power factor: 0.73            Cos phi - p.f. at no load: 0.11            Cos phi - p.f. at 3/4 load: 0.65            Cos phi - p.f. at 1/2 load: 0.52            Rated speed: 1460 rpm            Locked-rotor torque: 72 Nm            Breakdown torque: 100 Nm            Moment of inertia: 0.0479 kg m<sup>2</sup>            Motor efficiency at full load: 82.2 %            Motor efficiency at 3/4 load: 81.7 %            Motor efficiency at 1/2 load: 78.2 %            Number of poles: 4            Start. method: star/delta            Enclosure class (IEC 34-5): IP68            Insulation class (IEC 85): F            Explosion proof: yes            Ex-protection standard: Ex db eb h mb IIB T4, T3 Gb            Length of cable: 10 m            Cable type: LYNIFLEX            Type of cable plug: NO PLUG</p> <p>Others:            Net weight: 157 kg            Gross weight: 178 kg</p>

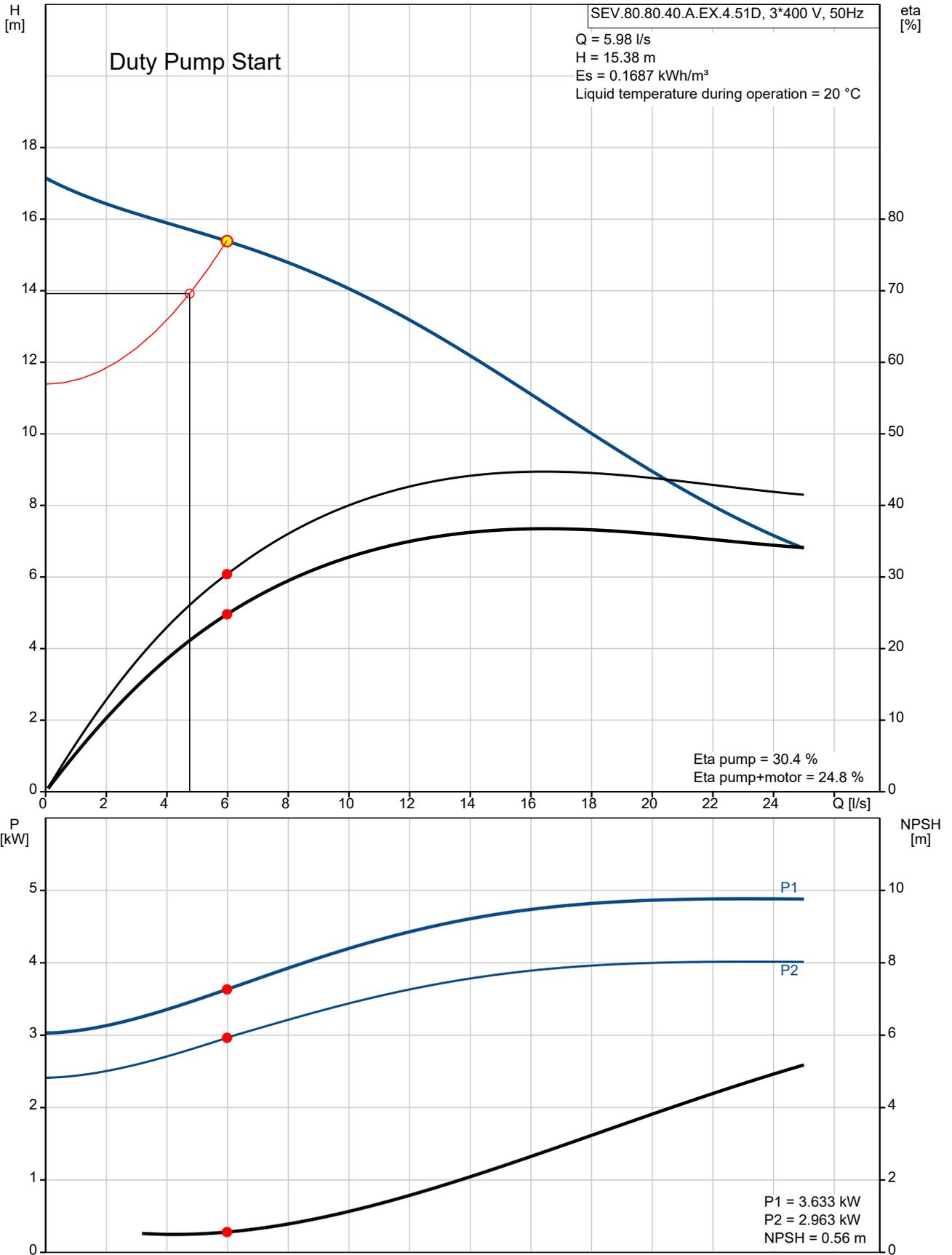
## 96177707 SEV.80.80.40.A.EX.4.51D 50 Hz



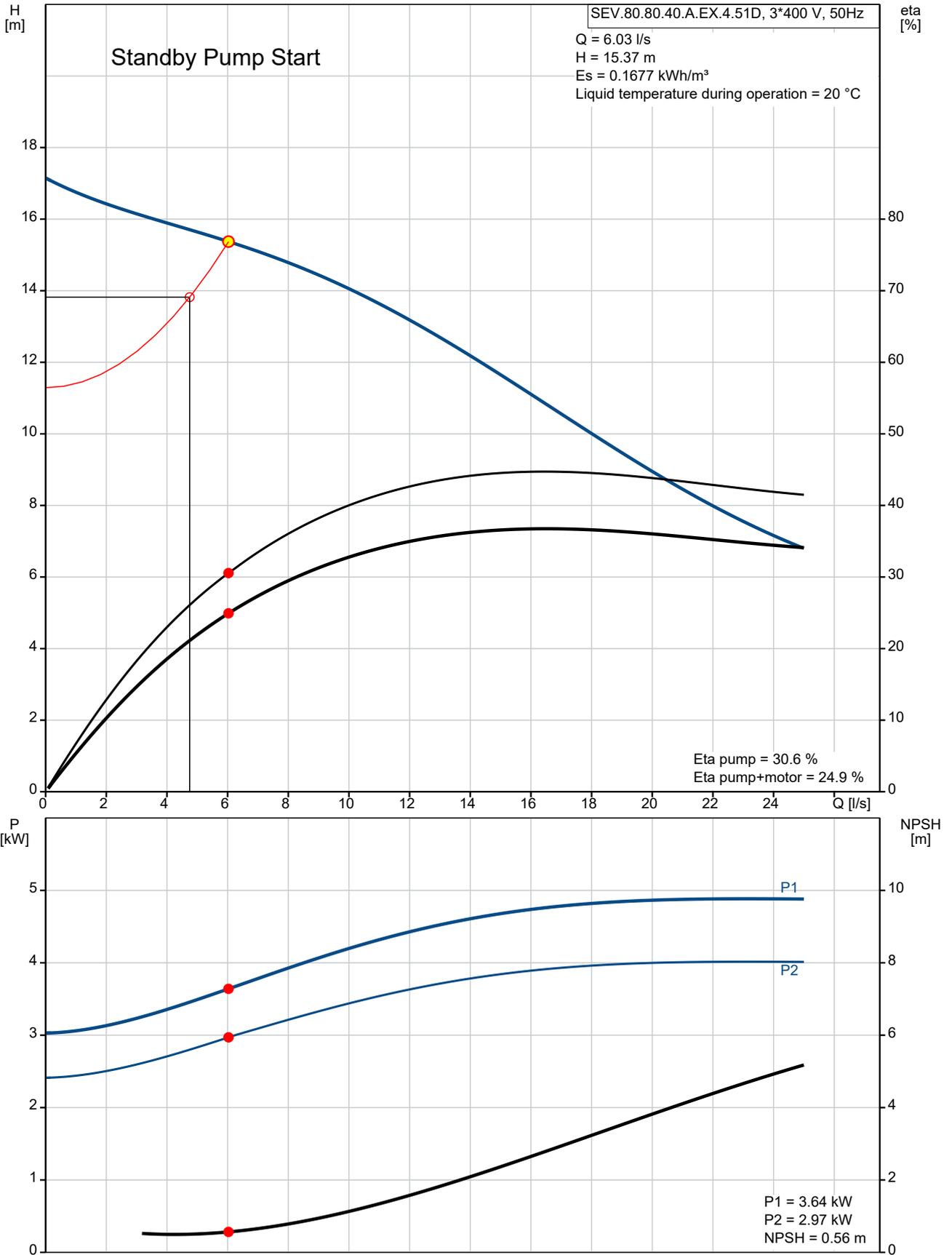
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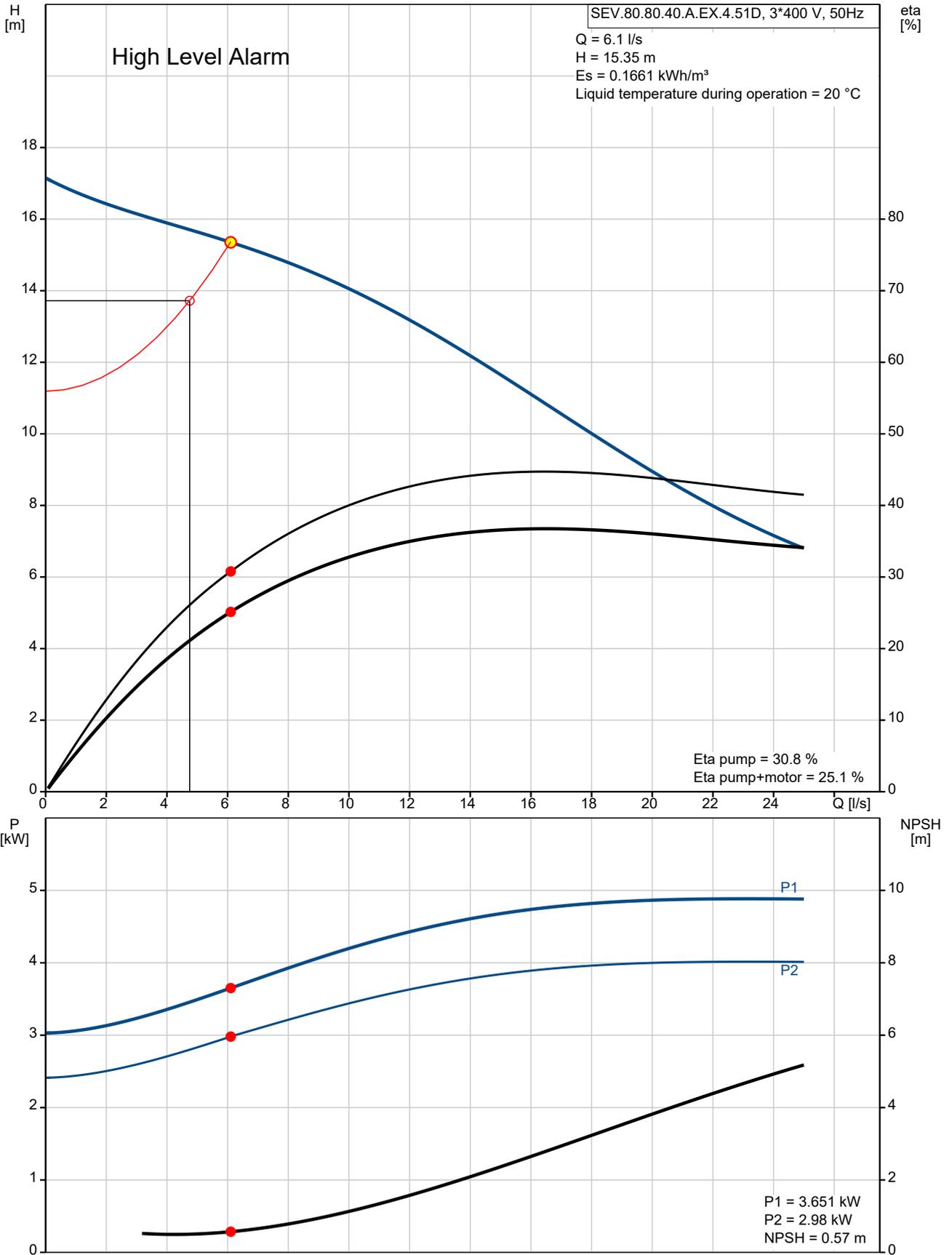
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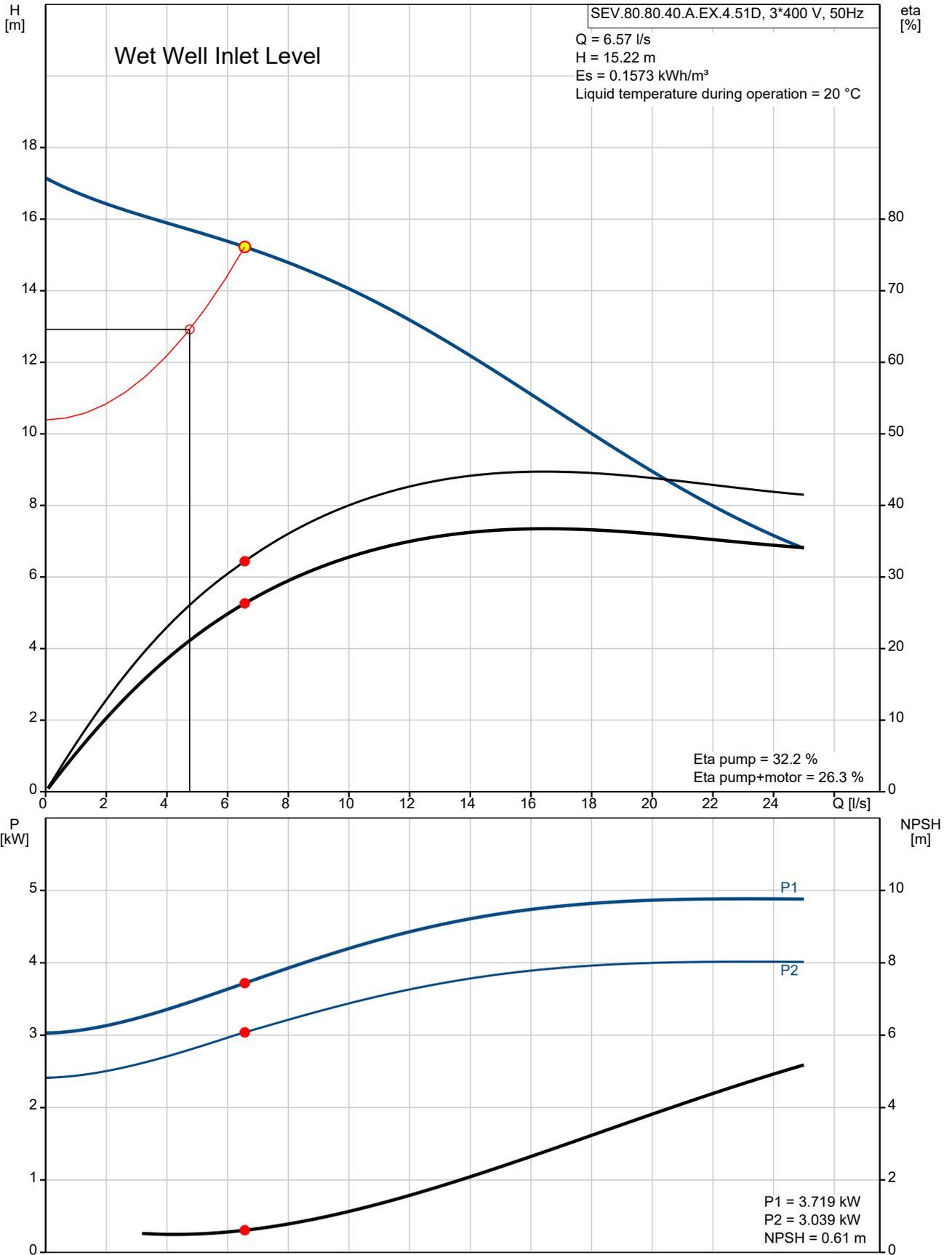
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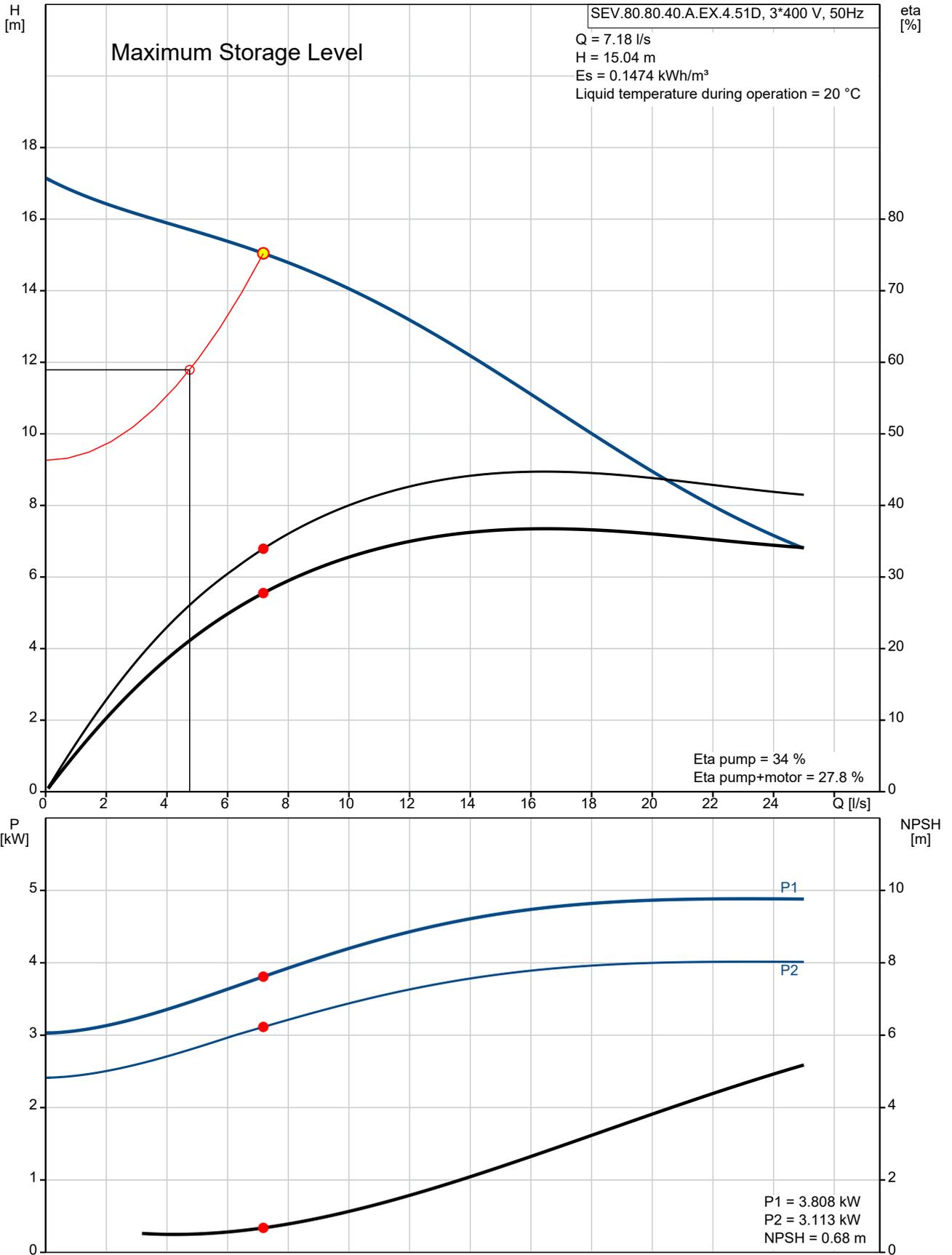
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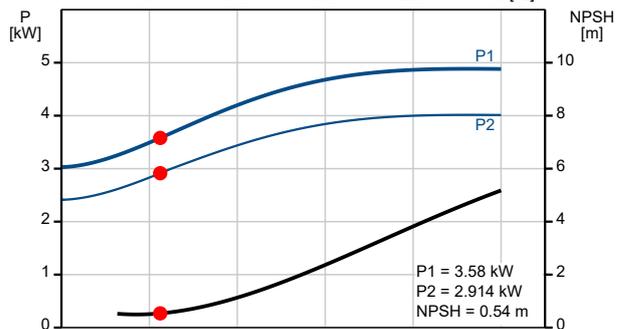
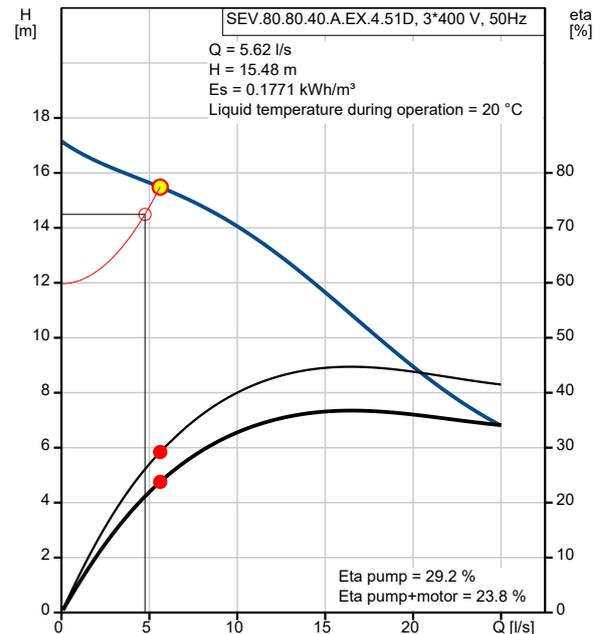
## 96177707 SEV.80.80.40.A.EX.4.51D 50 Hz



## 96177707 SEV.80.80.40.A.EX.4.51D 50 Hz



Description	Value
<b>General information:</b>	
Product name:	SEV.80.80.40.A.EX.4.51D
Product No:	96177707
EAN number:	5700830443538
Price:	
<b>Technical:</b>	
Actual calculated flow:	5.62 l/s
Max flow:	25 l/s
Max flow:	25 l/s
Resulting head of the pump:	15.48 m
Head max:	17.1 m
Type of impeller:	SUPER VORTEX
Maximum particle size:	80 mm
Primary shaft seal:	SIC/SIC
Max. hydraulic efficiency:	45 %
Approvals on nameplate:	EN12050-1
Curve tolerance:	ISO9906:2012 3B2
Cooling jacket:	with cooling jacket
<b>Materials:</b>	
Pump housing:	EN 1561 EN-GJL-250
Impeller:	Cast iron
Impeller:	EN 5.1301 EN-GJL-200
<b>Installation:</b>	
t max amb:	40 °C
Maximum operating pressure:	6 bar
Flange standard:	DIN
Pump outlet:	DN 80
Pressure rating:	PN 10
Maximum installation depth:	20 m
Inst dry/wet:	DRY/SUBMERGED
Installation:	horizontal or vertical
Auto-coupling:	96090993
<b>Liquid:</b>	
Liquid temperature range:	0 .. 40 °C
Selected liquid temperature:	20 °C
Density:	998.2 kg/m <sup>3</sup>
<b>Electrical data:</b>	
Power input - P1:	4.9 kW
Rated power - P2:	4 kW
Mains frequency:	50 Hz
Rated voltage:	3 x 380-415 V
Voltage tolerance:	+6/-10 %
Max starts per. hour:	20
Rated current:	10.0-10.2 A
Rated current at 3/4 load:	8.2 A
Rated current at 1/2 load:	7.1 A
Starting current:	67 A
Rated current at no load:	6.1 A
Cos phi - power factor:	0.73
Cos phi - p.f. at no load:	0.11
Cos phi - p.f. at 3/4 load:	0.65
Cos phi - p.f. at 1/2 load:	0.52
Rated speed:	1460 rpm
Locked-rotor torque:	72 Nm
Breakdown torque:	100 Nm
Moment of inertia:	0.0479 kg m <sup>2</sup>
Motor efficiency at full load:	82.2 %
Motor efficiency at 3/4 load:	81.7 %





Company name:

Created by:

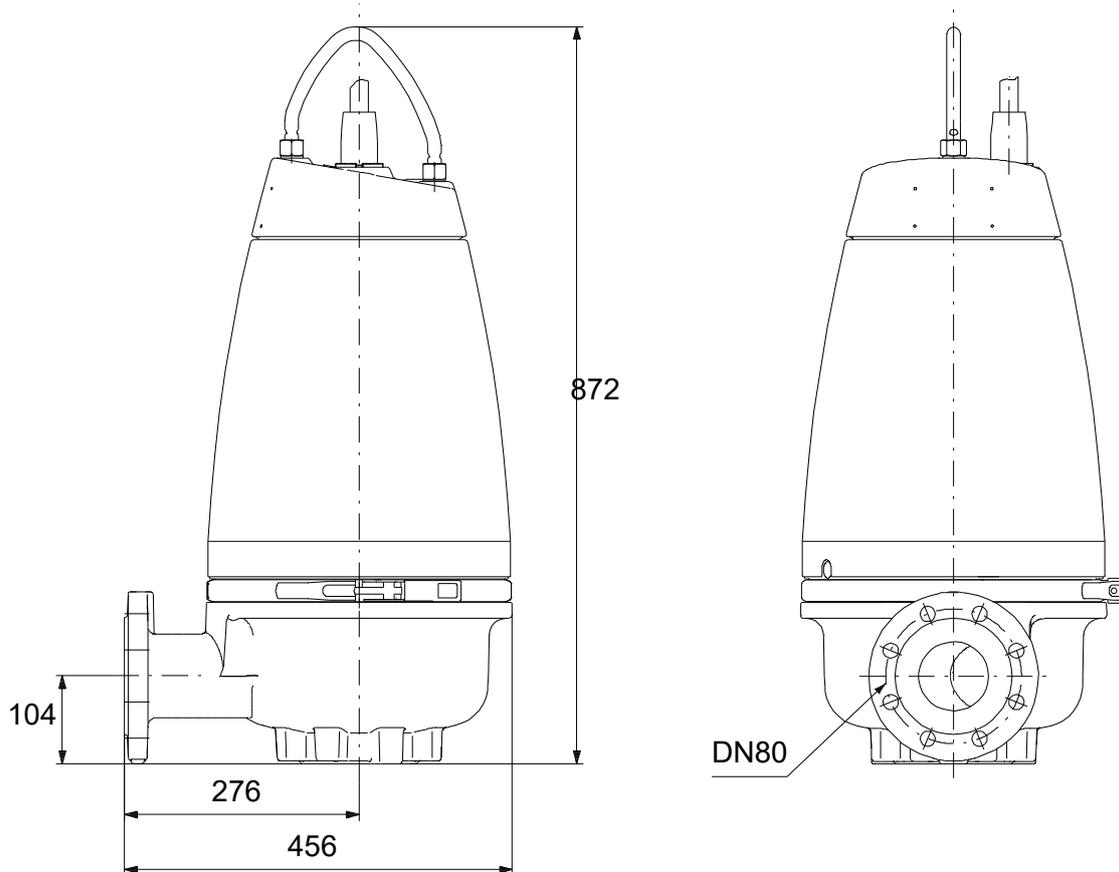
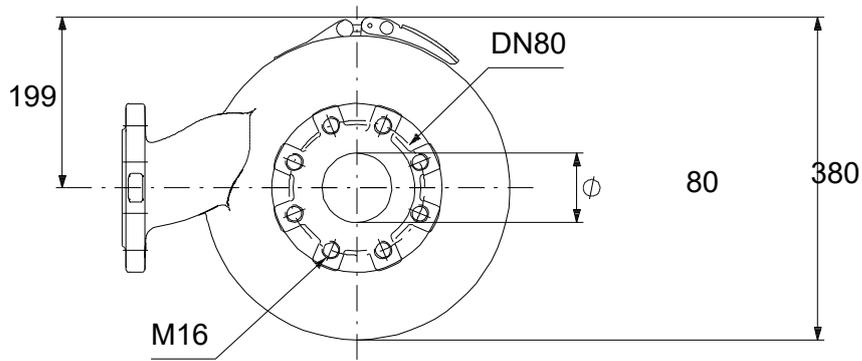
Phone:

Date:

09/03/2022

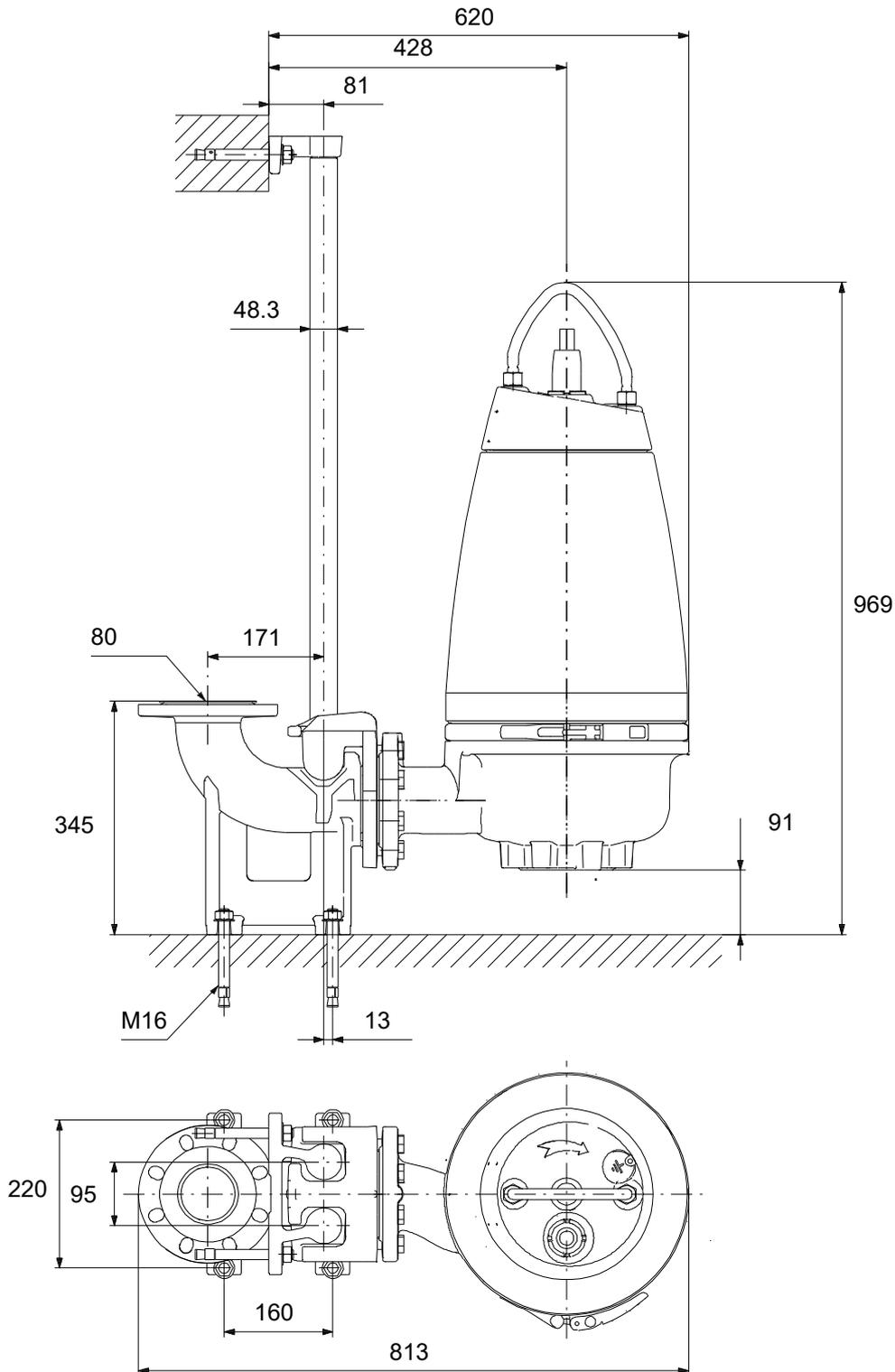
Description	Value
Motor efficiency at 1/2 load:	78.2 %
Number of poles:	4
Start. method:	star/delta
Enclosure class (IEC 34-5):	IP68
Insulation class (IEC 85):	F
Explosion proof:	yes
Ex-protection standard:	Ex db eb h mb IIB T4, T3 Gb
Built-in motor protection:	THERMAL SWITCH
Thermal protec:	internal
Length of cable:	10 m
Cable type:	LYNIFLEX
Type of cable plug:	NO PLUG
<b>Controls:</b>	
Control box:	not included
Moisture sensor:	with moisture sensors
Water-in-oil sensor:	with water-in-oil sensor
Temp. sensor:	Y
<b>Others:</b>	
Net weight:	157 kg
Gross weight:	178 kg
Danish VVS No.:	391289534

## 96177707 SEV.80.80.40.A.EX.4.51D 50 Hz



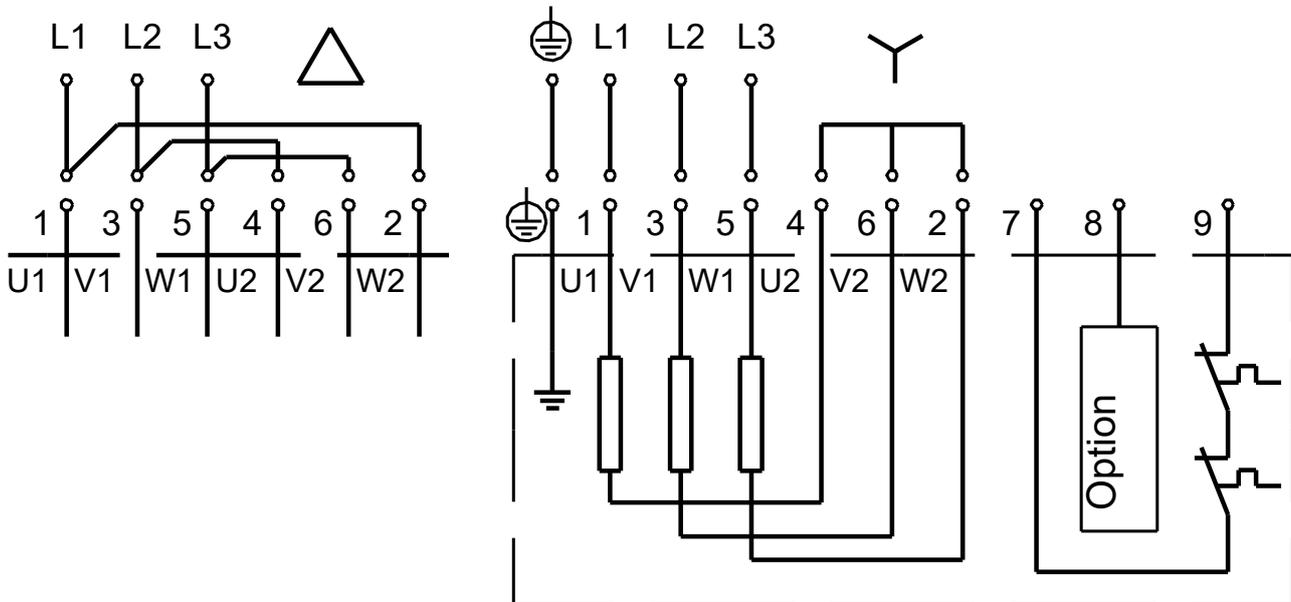
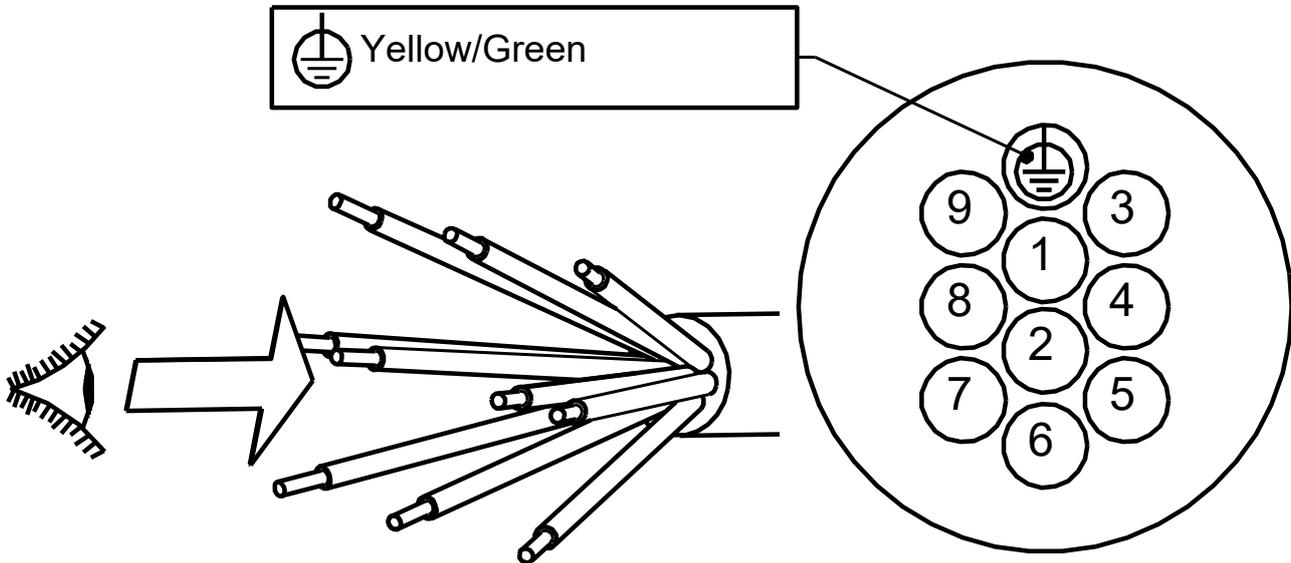
Note! All units are in [mm] unless others are stated.  
Disclaimer: This simplified dimensional drawing does not show all details.

## 96177707 SEV.80.80.40.A.EX.4.51D 50 Hz



Note! All units are in [mm] unless others are stated.  
Disclaimer: This simplified dimensional drawing does not show all details.

## 96177707 SEV.80.80.40.A.EX.4.51D 50 Hz



Note! All units are in [mm] unless others are stated.

**Appendix C**  
**Storage Calculations**

Pump Design and Services Ltd  
 Building 4.6 HiTECH  
 Frimley 4 Business Park  
 Frimley, Camberley  
 Surrey GU16 7SG



Tel: 01483 930 520  
 Email: [info@pdasgroup.co.uk](mailto:info@pdasgroup.co.uk)

Site ID #	1926
Project Reference	14633
Date	09/03/2022

Clients Name	Barratt David Wilson Homes Yorkshire West
Site Address	Whitechapel Road Cleckheaton

Storage Requirement	
Number of Dwellings	87
Non Domestic Design Flow	L/sec
Domestic @ 160L / Dwelling	13.920 m <sup>3</sup>
Industrial 1 Hr @ Design Flow	m <sup>3</sup>
Total Required Storage	13.920 m <sup>3</sup>
Location of Lowest Private Manhole	VC Base
Invert Level of Lowest Private Manhole	108.800 m

**Notes:**  
 Contributing manholes and pipes only  
 Maximum Storage set at the VC base level 108.800m

Storage in Gravity Manholes					
Manhole Reference	Manhole Diameter (mm)	Max Storage Level (m)	Cover Level (m)	Invert Level (m)	Storage Volume (m <sup>3</sup> )
Inlet F30	1500	108.800	110.600	107.720	1.909
					0.000
F22	1200	108.800	110.600	107.950	0.961
F21	1200	108.800	110.600	108.165	0.718
F20	1500	108.800	110.800	108.300	0.884
F19	1200	108.800	111.660	109.200	0.000
F18	1200	108.800	113.568	110.292	0.000
F17	1200	108.800	112.944	110.605	0.000
F16	1200	108.800	116.012	113.650	0.000
		108.800			0.000
F15	1200	108.800	111.493	109.275	0.000
F14	1200	108.800	113.054	110.992	0.000
F13	1200	108.800	113.513	111.842	0.000
DF13a	1200	108.800	113.700	111.950	0.000
F12	1200	108.800	116.029	114.175	0.000
F11	1200	108.800	117.216	114.391	0.000
F10	1200	108.800	117.295	114.573	0.000
F9	1200	108.800	116.900	114.800	0.000
		108.800			0.000
<b>Total storage in manholes below detailed maximum storage level</b>					<b>4.472</b>

Private Manhole Invert (m)	
108.800	VC Base
110.100	DF20b
111.350	
111.130	DF18b
110.900	DF17a
114.300	DF16a
109.625	DF15b
111.435	DF14a
112.700	
115.000	
115.050	DF9b

Pump Design and Services Ltd  
 Building 4.6 HiTECH  
 Frimley 4 Business Park  
 Frimley, Camberley  
 Surrey GU16 7SG



Tel: 01483 930 520  
 Email: [info@pdasgroup.co.uk](mailto:info@pdasgroup.co.uk)

Site ID #	1926
Project Reference	14633
Date	09/03/2022

#### Storage in Gravity Sewer Pipes

Sewer Pipe Run	Sewer Diameter (mm)	Max Storage Level (m)	Length (m)	Upper Invert (m)	Storage Volume (m <sup>3</sup> )
F2.007	150	108.800	16.600	110.600	0.000
		108.800			0.000
<b>Total storage in sewers below detailed maximum storage level</b>					<b>0.000</b>

#### Storage in Wet Well

	Wet Well Diameter (mm)	Max Storage Level (m)		High Level Alarm (m)	Storage Volume (m <sup>3</sup> )
Pump Station	2700	108.800		106.870	11.050
			<i>lost to benching</i>		<i>-0.608</i>
<b>Total storage in wet well below detailed maximum storage level</b>					<b>10.442</b>

#### Summary

Manholes	4.472	m <sup>3</sup>
Sewers	0.000	m <sup>3</sup>
Pump Station	10.442	m <sup>3</sup>
Total Provided	14.914	m <sup>3</sup>
Total Required	13.920	m <sup>3</sup>

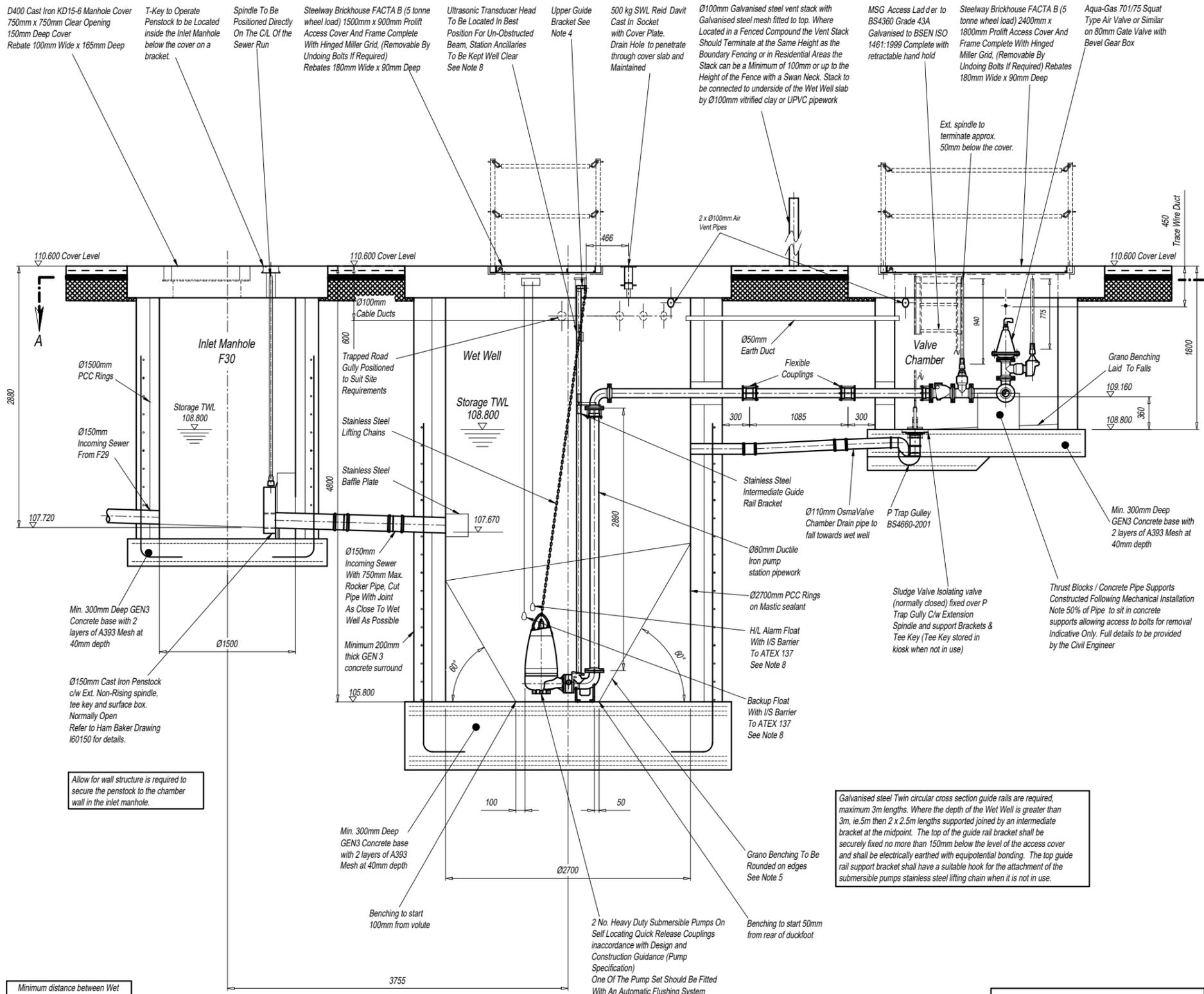
**Appendix D**  
**Pump Station Drawings**

**STANDARD NOTES** H-3-264-734

1. DO NOT SCALE.
2. UNLESS OTHERWISE STATED ALL DIMENSIONS ARE IN MILLIMETRES AND ALL INVERTS IN METRES AOD.
3. ALL CIVIL WORKS ARE THE RESPONSIBILITY OF THE DEVELOPER / CONTRACTOR INCLUDING FIXING OF STEELWORK SUCH AS ACCESS COVERS AND PENSTOCKS ETC. INSTALLATION OF CABLE DUCTS, BENCHING AND MAKING GOOD AROUND PIPES AFTER INSTALLATION.
4. REINFORCING BARS ARE TO BE A MINIMUM OF 75MM BELOW THE SURFACE. ANY STRUCTURAL DETAILING / CIVIL WORKS SHOWN ON THIS DRAWING ARE ILLUSTRATIVE ONLY UNLESS OTHERWISE STATED AND SHOULD NOT BE USED FOR CONSTRUCTION.
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7. DUCT ROUTES ARE SHOWN DIAGRAMMATICALLY ONLY. ALL DUCTS TO BE LAID IN THE MOST DIRECT ROUTE TO SUIT THE SERVICE BEING CARRIED AVOIDING ANY ACUTE CHANGES OF DIRECTION.
8. LEVEL CONTROL POSITIONS ARE DIAGRAMMATIC ONLY. THEY WILL BE POSITIONED AWAY FROM OBSTRUCTIONS AND BE READILY ADJUSTABLE AFTER INSTALLATION.

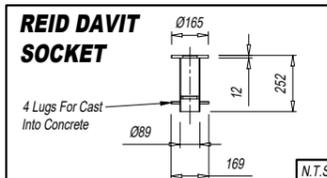
**YORKSHIRE WATER NOTES**

- A. COVER TO RE INFORCEMENT TO BE 40MM TO BOTH FACES.
- B. SPACERS TO BE 1200MM CENTRE TO CENTRE.
- C. CONCRETE TO BE 30 NMM AT 28 DAYS.
- D. GROUND BEARING PRESSURE TAKEN AS 50 KN/M.
- E. NO DAY WORK JOINTS PERMITTED IN SLABS.
- F. ALL SOFT SPOTS TO BE REMOVED AND REPLACED BY SUITABLE MATERIAL.
- G. PROVIDE 50MM BLINDING CONCRETE.
- H. ALL ADOPTABLE SEWER WORKS & MATERIALS TO BE IN ACCORDANCE WITH THE CODE FOR ADOPTION, THE RELEVANT BRITISH, EUROPEAN & YORKSHIRE WATER STANDARDS, REQUIREMENTS & ADDENDUM TO THE MECHANICAL & ELECTRICAL SPECIFICATION AND KIT MARKED.
- I. MINIMUM BAR LAP LENGTH 800MM.
- J. WET WELL AND VALVE CHAMBER COVERS TO BE AS SUPPLIED BY PUMP SUPPLIER AND BE RATED FACTA B (5 TONNE WHEEL LOAD). COVERS TO BE CAPABLE OF BEING LIFTED WITH AN EFFORT NOT EXCEEDING 25KG.
- K. TO BE READ IN CONJUNCTION WITH THE CIVILS DETAILS.
- L. ANY OVER BREAK BETWEEN INLET MANHOLE, WET WELL AND VALVE CHAMBER TO BE FILLED WITH LEAN MIX CONCRETE.
- M. WET WELL TO BE CLEAN AND DRY BEFORE INSTALLATION OF PUMPS COMMENCES.
- N. DEWATERING TO BE PROVIDED IF NECESSARY AS WORKS PROCEED.
- O. RISING MAIN TO BE 110MM OD PE100 SDR11 (89.1MM ID).
- P. CUT OUT AND CUT IN LEVELS TO BE ESTABLISHED ON SITE BY PUMP SUPPLIER.
- Q. THE BRACKET FOR HOLDING THE DAVIT EQUIPMENT SHOULD BE KEPT IN THE KIOSK.
- R. THRUST BLOCKS TO BE PROVIDED AT CHANGES IN DIRECTIONS.
- S. STATUTORY SERVICES TO PROVIDE ADEQUATE SERVICES TO PUMP STATION AND KIOSK AND TO ALLOW FOR ALL NECESSARY REQUIREMENTS.
- T. STAINLESS STEEL PUMP LIFTING CHAINS REQUIRED.
- U. THE DEVELOPER WILL SUPPLY, INSTALL AND COMMISSION THE TELEMETRY AT THEIR EXPENSE. YORKSHIRE WATER'S TELEMETRY SYSTEM IS THE METASPHERE MMIM OUTSTATION.
- V. KIOSK TO BE PROVIDED TO THE LATEST YWS, SFA6 AND M&E ADDENDUM.
- W. DUCTS WITHIN THE WET WELL SHOULD NOT BE SEALED WITH FOAM THEY SHOULD BE SEALED WITHIN THE KIOSK.
- X. EXTERNAL LEVEL AROUND THE BOUNDARY COMPOUND TO BE AGREED IN A PRE-START MEETING WITH AN INSPECTOR, SO THAT LEVELS FLOW TOWARDS THE GULLY.
- Y. ALL METAL FIXINGS TO BE STAINLESS STEEL.
- Z. ALL REGULAR LEVEL SWITCHES USED WITHIN THE HAZARDOUS AREA MUST BE EX-RATED.



**VIEW ON SECTION B - B**

To be read in conjunction with MJA Consulting Structural Design



Minimum distance between Wet Well and Valve Chamber to be 1200mm

All Cut Pipe Joints As Close To Structures As Possible Consistent With Making The Joint. The Rocker Pipes To Be 1m Or Equal To One Nominal Pipe Diameter Whichever Is The Larger

IF BOXOUT HOLES TO BE CORE DRILLED. Civils To Ensure All Core Drillings Are Parallel To Centre Line / Perpendicular To Valve Chamber

The Over-break between the Wet Well and Valve Chamber Should be Filled with Concrete

Minimum distance between Inlet Chamber and Wet Well to be 1000mm

Galvanised steel Twin circular cross section guide rails are required, maximum 3m lengths. Where the depth of the Wet Well is greater than 3m, ie 5m then 2 x 2.5m lengths supported joined by an intermediate bracket at the midpoint. The top of the guide rail bracket shall be securely fixed no more than 150mm below the level of the access cover and shall be electrically earthed with equipotential bonding. The top guide rail support bracket shall have a suitable hook for the attachment of the submersible pumps stainless steel lifting chain when it is not in use.

STATION INFORMATION		
PUMP TYPE	GRUNDFOS	SEV.80.80.40.A.EX.4.51D
IMPELLER		Super Vortex
MOTOR RATING		4.0 kW
FULL LOAD CURRENT		10.0 - 10.2 A FLC
ZONE RATING		EXP
DESIGN FLOW		4.75 L/Sec
HEAD GENERATED		14.45m
LEVEL CONTROLS		HYDRORANGER 200 ULTRASONIC C/W HIGH LEVEL ALARM AND BACK UP FLOAT SWITCHES
PIPE / VALVE SIZE		Ø80 mm
FINAL DISCHARGE		
INTERNAL DIAMETER		Ø100 mm
MATERIAL		DUCTILE IRON
TERMINATION		FLANGED
PIPE OD		N/A
FLANGE DATA		Ø100 mm PN16 Flanged
RISING MAIN		110mm OD PE100 SDR11 (89.1mm BORE)
RISING MAIN COUPLER		110mm OD PE CONVERTER
OPERATING LEVELS		
STORAGE LEVEL		N/A
INVERT OF INLET		107.670
INVERT OF H.L.A.		106.870
INVERT OF PUMP 2		106.770
INVERT OF PUMP 1		106.670
INVERT OF B.W.L. / STOP		106.140
INVERT OF WET WELL BASE		105.800
DEAD AREA		340 mm
OPERATING DEPTH		530 mm
OPERATING VOLUME		1101 Litres
PUMP FLOW		5.62 Litres / Second
FROM THE ABOVE : (1101 X 2) + (5.62 x 2) = 784 SECONDS		
784 SECONDS DIVIDED INTO 3600 = 4.60 STARTS PER HOUR		

REV	DATE	DESCRIPTION	DR'n	CHK'd	APR'l
B	28/06/22	Updated in line with latest MJA structural design.	K.A.	C.B.	C.B.
A	09/03/22	Inlet details, levels, wet well diameter and pumps updated	C.B.	I.H.	I.H.

**FOR APPROVAL**

**TOTAL WATER EXPERTISE**

BUILDING 4.6, ITECH, FRIMLEY 4 BUSINESS PARK, FRIMLEY, CAMBERLEY, SURREY, GU16 7SG OFFICE TEL No: (01483) 930520 WEBSITE: WWW.PDASLTD.CO.UK

PROJECT: **WHITECHAPEL ROAD CLECKHEATON**

TITLE: **FOUL WATER PUMP STATION ELEVATION VIEW**

CLIENT: **BARRATT DAVID WILSON HOMES YORKSHIRE WEST**

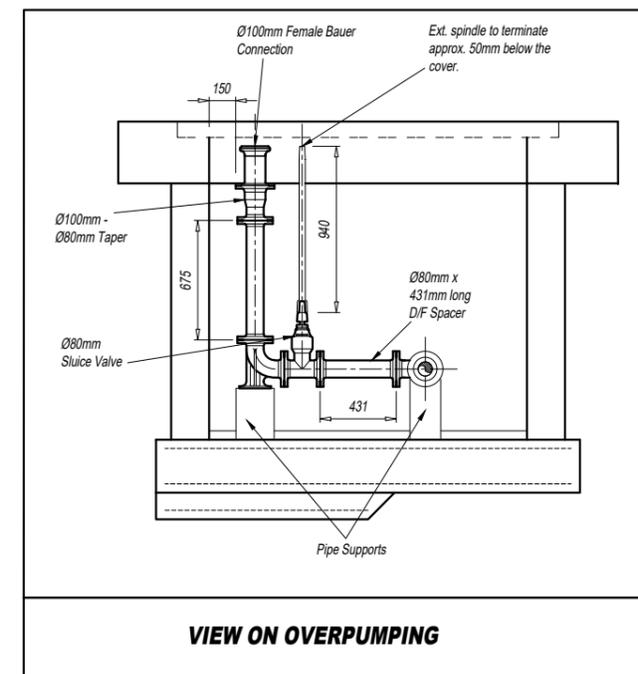
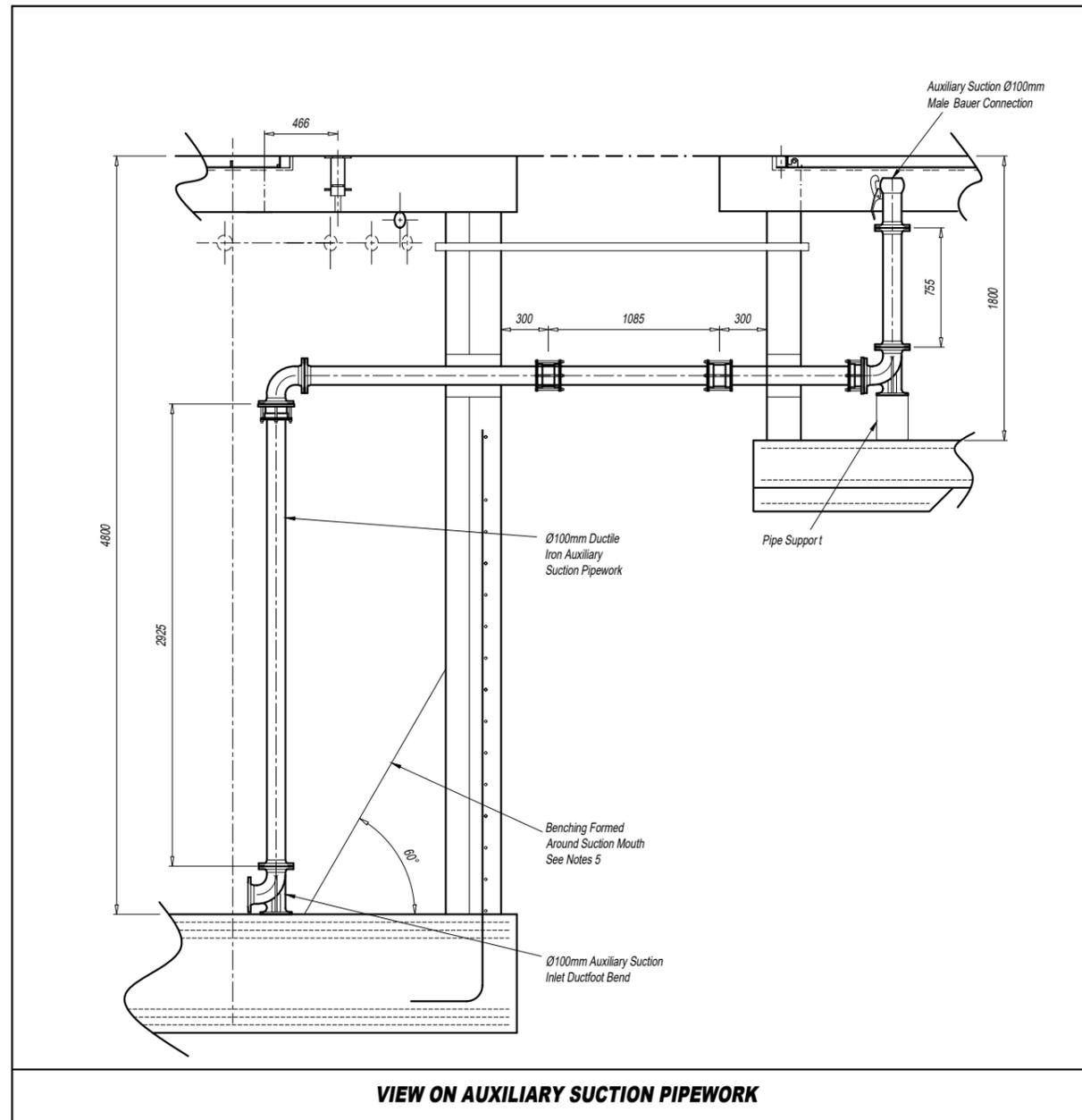
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JOB NO.: 14633	CHK'd: I.H. DATE: 19-11-2021
DRAWING NUMBER: 1926-14633-001	DR'n: K.M. DATE: 19-11-2021

**STANDARD NOTES** **H-3-264-734**

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- D. GROUND BEARING PRESSURE TAKEN AS 50 KN/M.
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- F. ALL SOFT SPOTS TO BE REMOVED AND REPLACED BY SUITABLE MATERIAL.
- G. PROVIDE 50MM BLINDING CONCRETE.
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To be read in conjunction  
with MJA Consulting  
Structural Design

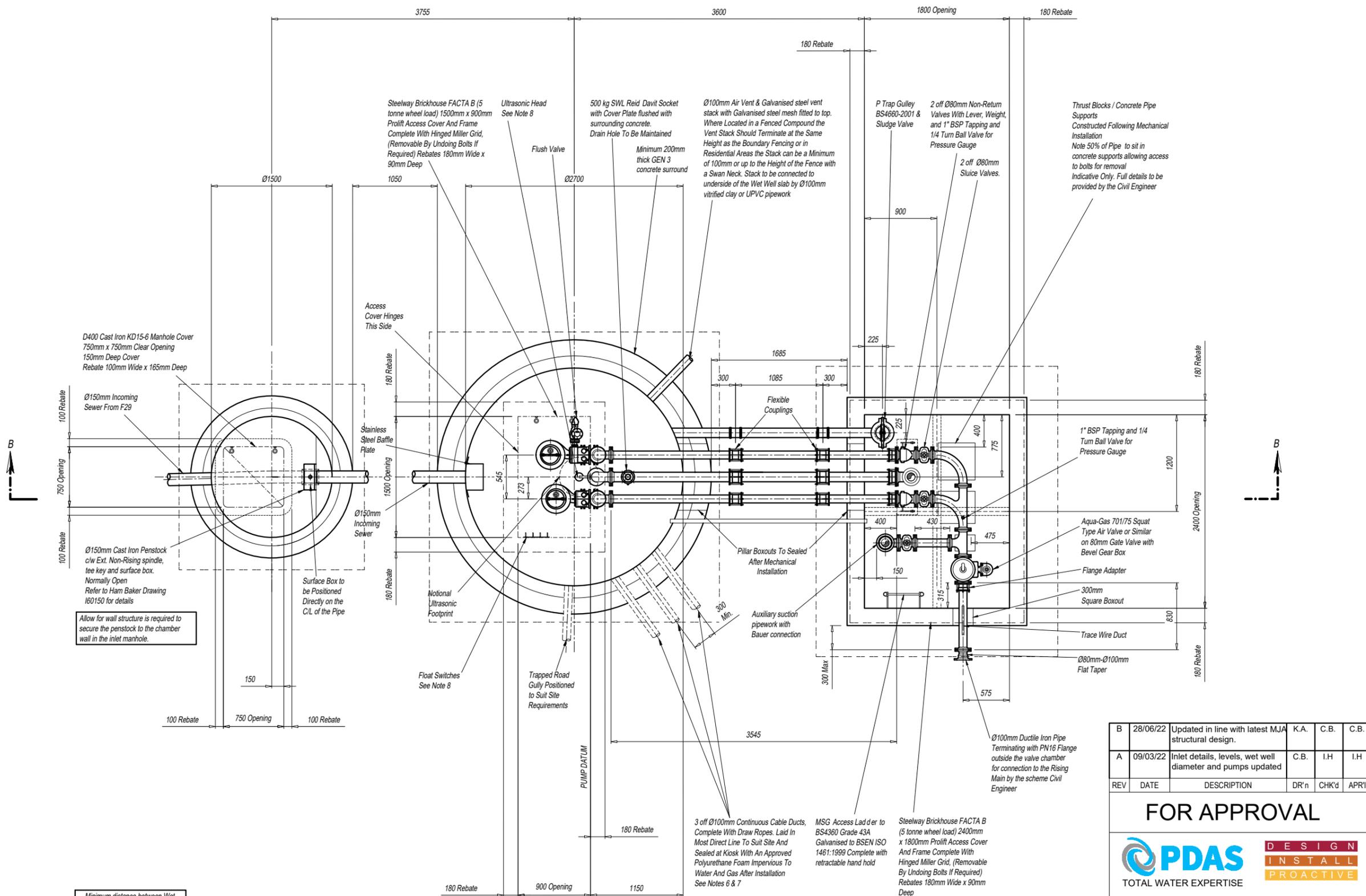
A	28/06/22	Updated in line with latest MJA structural design.	K.A.	C.B.	C.B.
REV	DATE	DESCRIPTION	DR'n	CHK'd	APR'l
<b>FOR APPROVAL</b>					
<b>DESIGN INSTALL PROACTIVE</b>					
<small>TOTAL WATER EXPERTISE</small>					
<small>BUILDING 4 &amp; 6, HTECH, FRIMLEY 4 BUSINESS PARK, FRIMLEY, CAMBERLEY, SURREY, GU16 7SG OFFICE TEL No. (01483) 930520 WEBSITE WWW.PDASLTD.CO.UK</small>					
PROJECT <b>WHITECHAPEL ROAD CLECKHEATON</b>					
TITLE <b>FOUL WATER PUMP STATION VIEW ON OVERPUMPING / AUXILIARY SUCTION</b>					
CLIENT <b>BARRATT DAVID WILSON HOMES YORKSHIRE WEST</b>					
SCALE AT A1	1:20	SCALE AT A3	1:40		
QUOTE NUMBER	1926	APR'l	C.B.	DATE	19-11-2021
JOB NO.	14633	CHK'd	I.H.	DATE	19-11-2021
DRAWING NUMBER	1926-14633-002	DR'n	K.M.	DATE	19-11-2021

**STANDARD NOTES** H-3-264-734

1. DO NOT SCALE.
2. UNLESS OTHERWISE STATED ALL DIMENSIONS ARE IN MILLIMETRES AND ALL INVERTS IN METRES AOD.
3. ALL CIVIL WORKS ARE THE RESPONSIBILITY OF THE DEVELOPER / CONTRACTOR INCLUDING FIXING OF STEELWORK SUCH AS ACCESS COVERS AND PENSTOCKS ETC. INSTALLATION OF CABLE DUCTS, BENCHING AND MAKING GOOD AROUND PIPES AFTER INSTALLATION.
4. REINFORCING BARS ARE TO BE A MINIMUM OF 75MM BELOW THE SURFACE. ANY STRUCTURAL DETAILING / CIVIL WORKS SHOWN ON THIS DRAWING ARE ILLUSTRATIVE ONLY UNLESS OTHERWISE STATED AND SHOULD NOT BE USED FOR CONSTRUCTION.
5. BENCHING IS TO BE FORMED AFTER PUMP INSTALLATION AND TO BE IN ACCORDANCE WITH THE APPLICABLE DESIGN AND CONSTRUCTION GUIDANCE AND ADOPTING AUTHORITY SPECIFICATION.
6. UNLESS OTHERWISE STATED, ALL DUCTS ARE TO BE 100MM DIAMETER AND BE COMPLETE WITH DRAW ROPES. SERVICE DUCTS TO BE TO THE UTILITY SUPPLIER'S SPECIFICATION.
7. DUCT ROUTES ARE SHOWN DIAGRAMMATICALLY ONLY. ALL DUCTS TO BE LAID IN THE MOST DIRECT ROUTE TO SUIT THE SERVICE BEING CARRIED AVOIDING ANY ACUTE CHANGES OF DIRECTION.
8. LEVEL CONTROL POSITIONS ARE DIAGRAMMATIC ONLY. THEY WILL BE POSITIONED AWAY FROM OBSTRUCTIONS AND BE READILY ADJUSTABLE AFTER INSTALLATION.

**YORKSHIRE WATER NOTES**

- A. COVER TO RE INFORCEMENT TO BE 40MM TO BOTH FACES.
- B. SPACERS TO BE 1200MM CENTRE TO CENTRE.
- C. CONCRETE TO BE 30 N/MM AT 28 DAYS.
- D. GROUND BEARING PRESSURE TAKEN AS 50 KN/M.
- E. NO DAY WORK JOINTS PERMITTED IN SLABS.
- F. ALL SOFT SPOTS TO BE REMOVED AND REPLACED BY SUITABLE MATERIAL.
- G. PROVIDE 50MM BLINDING CONCRETE.
- H. ALL ADOPTABLE SEWER WORKS & MATERIALS TO BE IN ACCORDANCE WITH THE CODE FOR ADOPTION, THE RELEVANT BRITISH, EUROPEAN & YORKSHIRE WATER STANDARDS, REQUIREMENTS & ADDENDUM TO THE MECHANICAL & ELECTRICAL SPECIFICATION AND KIT MARKED.
- I. MINIMUM BAR LAP LENGTH 800MM.
- J. WET WELL AND VALVE CHAMBER COVERS TO BE AS SUPPLIED BY PUMP SUPPLIER AND BE RATED FACTA B (5 TONNE WHEEL LOAD). COVERS TO BE CAPABLE OF BEING LIFTED WITH AN EFFORT NOT EXCEEDING 25KG.
- K. TO BE READ IN CONJUNCTION WITH THE CIVILS DETAILS.
- L. ANY OVER BREAK BETWEEN INLET MANHOLE, WET WELL AND VALVE CHAMBER TO BE FILLED WITH LEAN MIX CONCRETE.
- M. WET WELL TO BE CLEAN AND DRY BEFORE INSTALLATION OF PUMPS COMMENCES.
- N. DEWATERING TO BE PROVIDED IF NECESSARY AS WORKS PROCEED.
- O. RISING MAIN TO BE 110MM OD PE100 SDR11 (89.1MM ID).
- P. CUT OUT AND CUT IN LEVELS TO BE ESTABLISHED ON SITE BY PUMP SUPPLIER.
- Q. THE BRACKET FOR HOLDING THE DAVIT EQUIPMENT SHOULD BE KEPT IN THE KIOSK.
- R. THRUST BLOCKS TO BE PROVIDED AT CHANGES IN DIRECTIONS.
- S. STATUTORY SERVICES TO PROVIDE ADEQUATE SERVICES TO PUMP STATION AND KIOSK AND TO ALLOW FOR ALL NECESSARY REQUIREMENTS.
- T. STAINLESS STEEL PUMP LIFTING CHAINS REQUIRED.
- U. THE DEVELOPER WILL SUPPLY, INSTALL AND COMMISSION THE TELEMETRY AT THEIR EXPENSE. YORKSHIRE WATER'S TELEMETRY SYSTEM IS THE METASPHERE MMIM OUTSTATION.
- V. KIOSK TO BE PROVIDED TO THE LATEST YWS, SFA6 AND M&E ADDENDUM.
- W. DUCTS WITHIN THE WET WELL SHOULD NOT BE SEALED WITH FOAM THEY SHOULD BE SEALED WITHIN THE KIOSK.
- X. EXTERNAL LEVEL AROUND THE BOUNDARY COMPOUND TO BE AGREED IN A PRE-START MEETING WITH AN INSPECTOR, SO THAT LEVELS FLOW TOWARDS THE GULLY.
- Y. ALL METAL FIXINGS TO BE STAINLESS STEEL.
- Z. ALL REGULAR LEVEL SWITCHES USED WITHIN THE HAZARDOUS AREA MUST BE EX-RATED.



**VIEW ON SECTION A - A**

- Minimum distance between Wet Well and Valve Chamber to be 1200mm
- All Cut Pipe Joints As Close To Structures As Possible Consistent With Making The Joint. The Rocker Pipes To Be 1m Or Equal To One Nominal Pipe Diameter Whichever Is The Larger
- IF BOXOUT HOLES TO BE CORE DRILLED. Civil's To Ensure All Core Drillings Are Parallel To Centre Line / Perpendicular To Valve Chamber
- The Over-break between the Wet Well and Valve Chamber Should be Filled with Concrete
- Minimum distance between Inlet Chamber and Wet Well to be 1000mm
- To be read in conjunction with MJA Consulting Structural Design

B	28/06/22	Updated in line with latest MJA structural design.	K.A.	C.B.	C.B.
A	09/03/22	Inlet details, levels, wet well diameter and pumps updated	C.B.	I.H.	I.H.
REV	DATE	DESCRIPTION	DR'n	CHK'd	APR'l

**FOR APPROVAL**

**PDAS** DESIGN INSTALL PROACTIVE  
TOTAL WATER EXPERTISE

BUILDING 4 & 5, HTECH, FRIMLEY 4 BUSINESS PARK, FRIMLEY, CAMBERLEY, SURREY, GU16 7SG OFFICE TEL No. (01483) 930520 WEBSITE WWW.PDASLTD.CO.UK

PROJECT **WHITECHAPEL ROAD CLECKHEATON**

TITLE **FOUL WATER PUMP STATION PLAN VIEW**

CLIENT **BARRATT DAVID WILSON HOMES YORKSHIRE WEST**

SCALE AT A1	1:25	SCALE AT A3	1:50
QUOTE NUMBER	1926	APR'l	C.B. DATE 19-11-2021
JOB NO.	14633	CHK'd	I.H. DATE 19-11-2021
DRAWING NUMBER	1926-14633-003	DR'n	K.M. DATE 19-11-2021

**STANDARD NOTES** **H-3-264-734**

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8. LEVEL CONTROL POSITIONS ARE DIAGRAMMATIC ONLY. THEY WILL BE POSITIONED AWAY FROM OBSTRUCTIONS AND BE READILY ADJUSTABLE AFTER INSTALLATION.

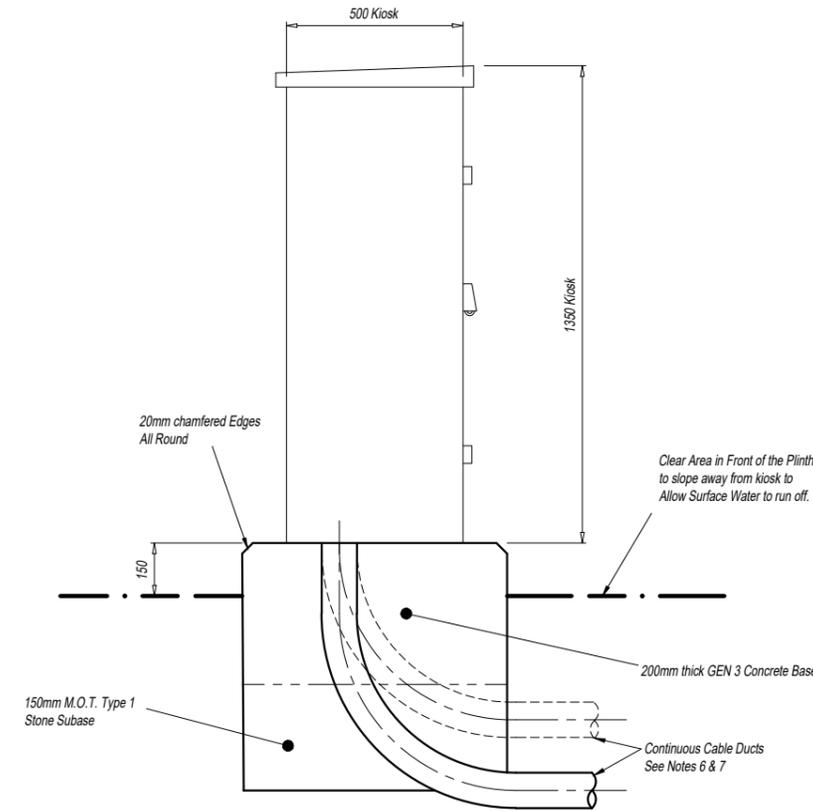
**YORKSHIRE WATER NOTES**

- A. COVER TO RE INFORCEMENT TO BE 40MM TO BOTH FACES.
- B. SPACERS TO BE 1200MM CENTRE TO CENTRE.
- C. CONCRETE TO BE 30 NMM AT 28 DAYS.
- D. GROUND BEARING PRESSURE TAKEN AS 50 KN/M.
- E. NO DAY WORK JOINTS PERMITTED IN SLABS.
- F. ALL SOFT SPOTS TO BE REMOVED AND REPLACED BY SUITABLE MATERIAL.
- G. PROVIDE 50MM BLINDING CONCRETE.
- H. ALL ADOPTABLE SEWER WORKS & MATERIALS TO BE IN ACCORDANCE WITH THE CODE FOR ADOPTION, THE RELEVANT BRITISH, EUROPEAN & YORKSHIRE WATER STANDARDS, REQUIREMENTS & ADDENDUM TO THE MECHANICAL & ELECTRICAL SPECIFICATION AND KIT MARKED.
- I. MINIMUM BAR LAP LENGTH 800MM.
- J. WET WELL AND VALVE CHAMBER COVERS TO BE AS SUPPLIED BY PUMP SUPPLIER AND BE RATED FACTA B (5 TONNE WHEEL LOAD). COVERS TO BE CAPABLE OF BEING LIFTED WITH AN EFFORT NOT EXCEEDING 25KG.
- K. TO BE READ IN CONJUNCTION WITH THE CIVILS DETAILS.
- L. ANY OVER BREAK BETWEEN INLET MANHOLE, WET WELL AND VALVE CHAMBER TO BE FILLED WITH LEAN MIX CONCRETE.
- M. WET WELL TO BE CLEAN AND DRY BEFORE INSTALLATION OF PUMPS COMMENCES.
- N. DEWATERING TO BE PROVIDED IF NECESSARY AS WORKS PROCEED.
- O. RISING MAIN TO BE 110MM OD PE100 SDR11 (89.1MM ID).
- P. CUT OUT AND CUT IN LEVELS TO BE ESTABLISHED ON SITE BY PUMP SUPPLIER.
- Q. THE BRACKET FOR HOLDING THE DAVIT EQUIPMENT SHOULD BE KEPT IN THE KIOSK.
- R. THRUST BLOCKS TO BE PROVIDED AT CHANGES IN DIRECTIONS.
- S. STATUTORY SERVICES TO PROVIDE ADEQUATE SERVICES TO PUMP STATION AND KIOSK AND TO ALLOW FOR ALL NECESSARY REQUIREMENTS.
- T. STAINLESS STEEL PUMP LIFTING CHAINS REQUIRED.
- U. THE DEVELOPER WILL SUPPLY, INSTALL AND COMMISSION THE TELEMETRY AT THEIR EXPENSE. YORKSHIRE WATER'S TELEMETRY SYSTEM IS THE METASPHERE MMIM OUTSTATION.
- V. KIOSK TO BE PROVIDED TO THE LATEST YWS, SFA6 AND M&E ADDENDUM.
- W. DUCTS WITHIN THE WET WELL SHOULD NOT BE SEALED WITH FOAM THEY SHOULD BE SEALED WITHIN THE KIOSK.
- X. EXTERNAL LEVEL AROUND THE BOUNDARY COMPOUND TO BE AGREED IN A PRE-START MEETING WITH AN INSPECTOR, SO THAT LEVELS FLOW TOWARDS THE GULLY.
- Y. ALL METAL FIXINGS TO BE STAINLESS STEEL.
- Z. ALL REGULAR LEVEL SWITCHES USED WITHIN THE HAZARDOUS AREA MUST BE EX-RATED.

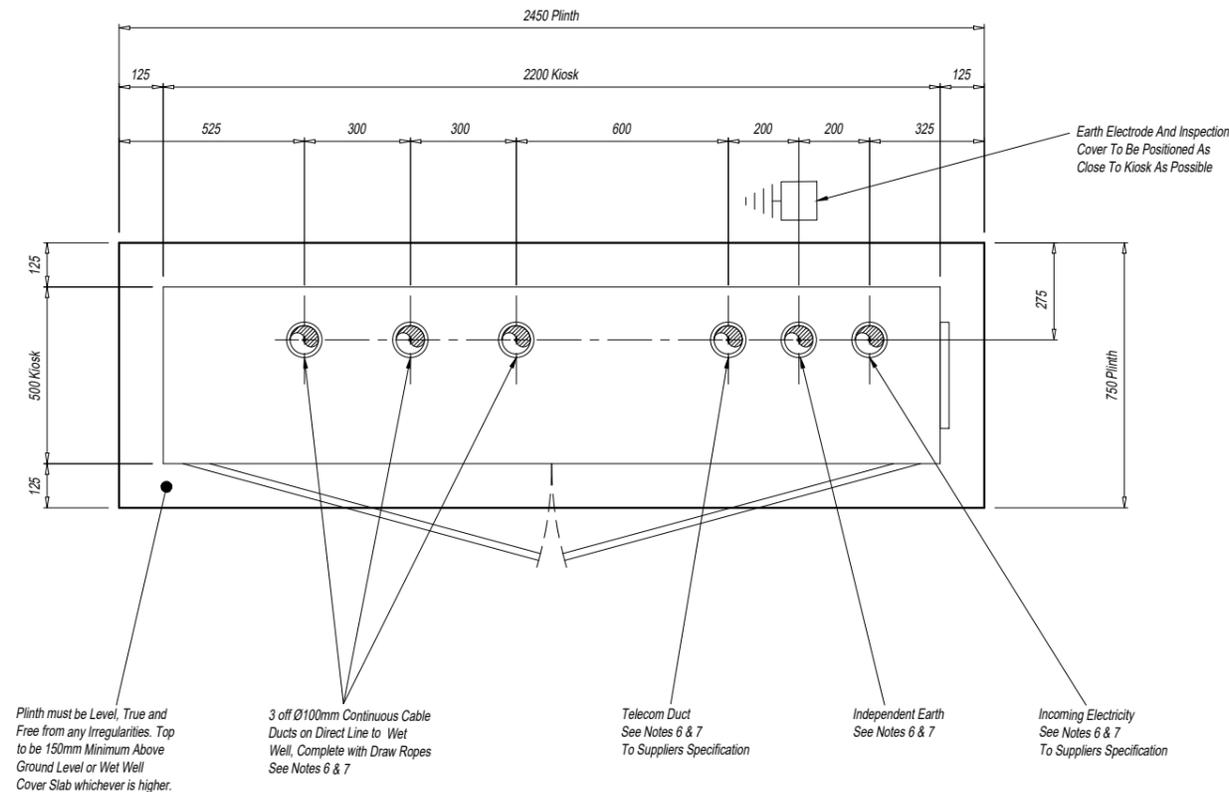
**KIOSK NOTES**

- KIOSK DOORS FITTED WITH TRIANGULAR KEYED CAMLOCKS AT THE TOP AND BOTTOM OF EACH DOOR AND SECURED BY AN HARDENED HASP AND STAPLE IN THE CENTRE, SIZED TO TAKE A YORKSHIRE WATER PADLOCK.
- DUCTS WITHIN THE WET WELL SHOULD NOT BE SEALED WITH FOAM - THEY SHOULD BE SEALED WITHIN THE KIOSK USING GAS TIGHT SEALING PUTTY TO 10 ATEX 137 DIRECTIVE.

To be read in conjunction with MJA Consulting Structural Design



**VIEW ON ARROW Z**



Plinth must be Level, True and Free from any Irregularities. Top to be 150mm Minimum Above Ground Level or Wet Well Cover Slab whichever is higher.

3 off 100mm Continuous Cable Ducts on Direct Line to Wet Well, Complete with Draw Ropes See Notes 6 & 7

Telecom Duct See Notes 6 & 7 To Suppliers Specification

Independent Earth See Notes 6 & 7

Incoming Electricity See Notes 6 & 7 To Suppliers Specification

Earth Electrode And Inspection Cover To Be Positioned As Close To Kiosk As Possible

Tolerance on Duct Centre Positions ±10mm  
All Ducts To Be Cut Level With Top Of Plinth

A	28/06/22	Updated in line with latest MJA structural design.	K.A.	C.B.	C.B.
REV	DATE	DESCRIPTION	DR'n	CHK'd	APR'l
<b>FOR APPROVAL</b>					
		<b>DESIGN INSTALL PROACTIVE</b>			
TOTAL WATER EXPERTISE					
BUILDING 4 & 6, HTECH, FRIMLEY 4 BUSINESS PARK, FRIMLEY, CAMBERLEY, SURREY, GU16 7SG		OFFICE TEL No. (01483) 930520		WEBSITE WWW.PDASLTD.CO.UK	
PROJECT <b>WHITECHAPEL ROAD CLECKHEATON</b>					
TITLE <b>FOUL WATER PUMP STATION KIOSK AND PLINTH DETAIL</b>					
CLIENT <b>BARRATT DAVID WILSON HOMES YORKSHIRE WEST</b>					
SCALE AT A1	1:10	SCALE AT A3	1:20		
QUOTE NUMBER	1926	APR'l	C.B.	DATE	19-11-2021
JOB NO.	14633	CHK'd	I.H.	DATE	19-11-2021
DRAWING NUMBER	1926-14633-004	DR'n	K.M.	DATE	19-11-2021

**STANDARD NOTES** **H-3-264-734**

1. DO NOT SCALE.
2. UNLESS OTHERWISE STATED ALL DIMENSIONS ARE IN MILLIMETRES AND ALL INVERTS IN METRES AOD.
3. ALL CIVIL WORKS ARE THE RESPONSIBILITY OF THE DEVELOPER / CONTRACTOR INCLUDING FIXING OF STEELWORK SUCH AS ACCESS COVERS AND PENSTOCKS ETC. INSTALLATION OF CABLE DUCTS, BENCHING AND MAKING GOOD AROUND PIPES AFTER INSTALLATION.
4. REINFORCING BARS ARE TO BE A MINIMUM OF 75MM BELOW THE SURFACE. ANY STRUCTURAL DETAILING / CIVIL WORKS SHOWN ON THIS DRAWING ARE ILLUSTRATIVE ONLY UNLESS OTHERWISE STATED AND SHOULD NOT BE USED FOR CONSTRUCTION.
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8. LEVEL CONTROL POSITIONS ARE DIAGRAMMATIC ONLY. THEY WILL BE POSITIONED AWAY FROM OBSTRUCTIONS AND BE READILY ADJUSTABLE AFTER INSTALLATION.

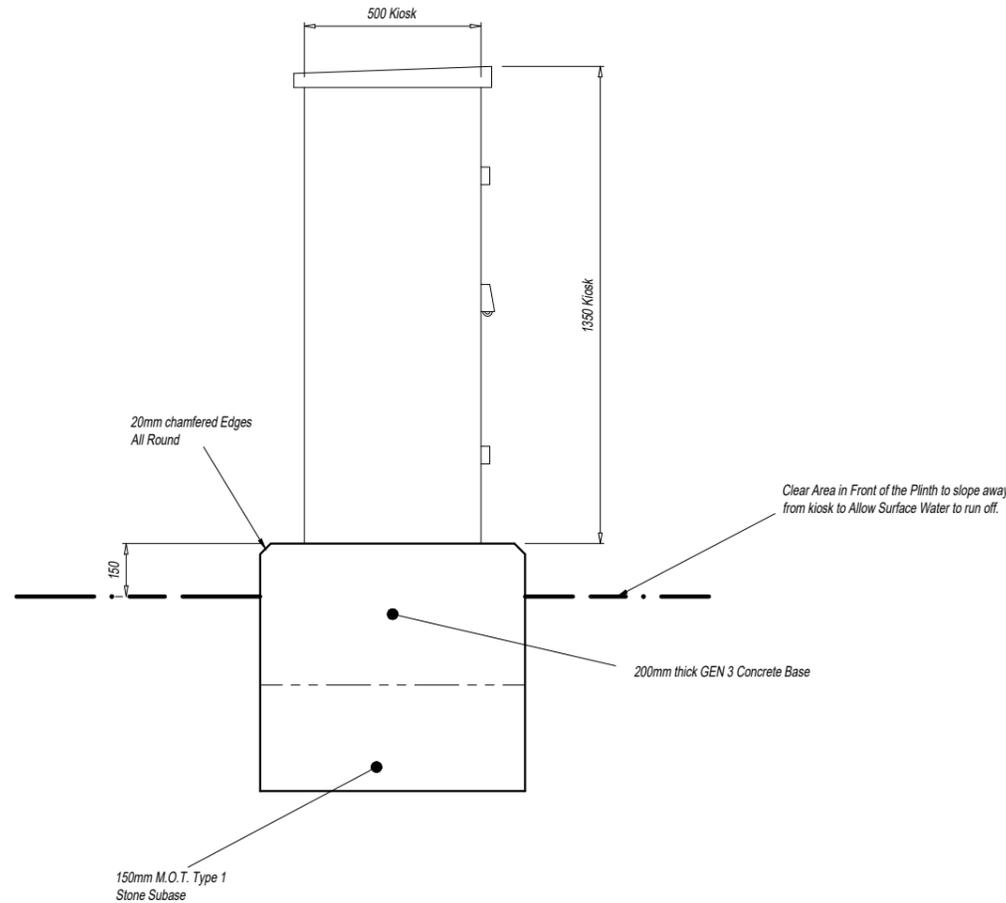
**YORKSHIRE WATER NOTES**

- A. COVER TO RE INFORCEMENT TO BE 40MM TO BOTH FACES.
- B. SPACERS TO BE 1200MM CENTRE TO CENTRE.
- C. CONCRETE TO BE 30 N/MM AT 28 DAYS.
- D. GROUND BEARING PRESSURE TAKEN AS 50 KN/M.
- E. NO DAY WORK JOINTS PERMITTED IN SLABS.
- F. ALL SOFT SPOTS TO BE REMOVED AND REPLACED BY SUITABLE MATERIAL.
- G. PROVIDE 50MM BLINDING CONCRETE.
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- K. TO BE READ IN CONJUNCTION WITH THE CIVILS DETAILS.
- L. ANY OVER BREAK BETWEEN INLET MANHOLE, WET WELL AND VALVE CHAMBER TO BE FILLED WITH LEAN MIX CONCRETE.
- M. WET WELL TO BE CLEAN AND DRY BEFORE INSTALLATION OF PUMPS COMMENCES.
- N. DEWATERING TO BE PROVIDED IF NECESSARY AS WORKS PROCEED.
- O. RISING MAIN TO BE 110MM OD PE100 SDR11 (89.1MM ID).
- P. CUT OUT AND CUT IN LEVELS TO BE ESTABLISHED ON SITE BY PUMP SUPPLIER.
- Q. THE BRACKET FOR HOLDING THE DAVIT EQUIPMENT SHOULD BE KEPT IN THE KIOSK.
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- Y. ALL METAL FIXINGS TO BE STAINLESS STEEL.
- Z. ALL REGULAR LEVEL SWITCHES USED WITHIN THE HAZARDOUS AREA MUST BE EX-RATED.

**KIOSK NOTES**

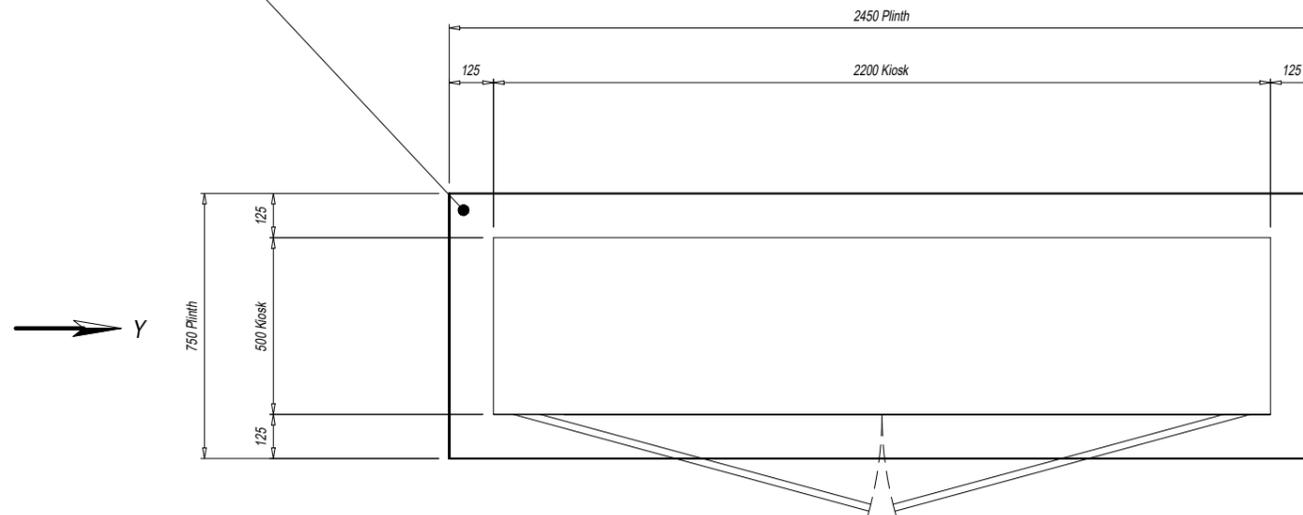
- KIOSK DOORS FITTED WITH TRIANGULAR KEYED CAMLOCKS AT THE TOP AND BOTTOM OF EACH DOOR AND A SECURE HARDENED HASP AND STAPLE TO TAKE A YORKSHIRE WATER SIZED SERVICES PADLOCK

To be read in conjunction with MJA Consulting Structural Design



**VIEW ON ARROW Y**

Plinth must be Level, True and Free from any Irregularities. Top to be 150mm Minimum Above Ground Level or Wet Well Cover Slab Level (Whichever is higher).



A	28/06/22	Updated in line with latest MJA structural design.	K.A.	C.B.	C.B.
REV	DATE	DESCRIPTION	DR'n	CHK'd	APR'l
<b>FOR APPROVAL</b>					
		<b>DESIGN INSTALL PROACTIVE</b>			
TOTAL WATER EXPERTISE					
<small>BUILDING 4 &amp; 6, HTECH, FRIMLEY 4 BUSINESS PARK, FRIMLEY, CAMBERLEY, SURREY, GU16 7SG OFFICE TEL No. (01483) 930520 WEBSITE WWW.PDASLTD.CO.UK</small>					
PROJECT <b>WHITECHAPEL ROAD CLECKHEATON</b>					
TITLE <b>FOUL WATER PUMP STATION STORAGE KIOSK AND PLINTH</b>					
CLIENT <b>BARRATT DAVID WILSON HOMES YORKSHIRE WEST</b>					
SCALE AT A1	1:10		SCALE AT A3	1:20	
QUOTE NUMBER	1926	APR'l	C.B.	DATE	19-11-2021
JOB NO.	14633	CHK'g	I.H.	DATE	19-11-2021
DRAWING NUMBER	1926-14633-005	DR'n	K.M.	DATE	19-11-2021

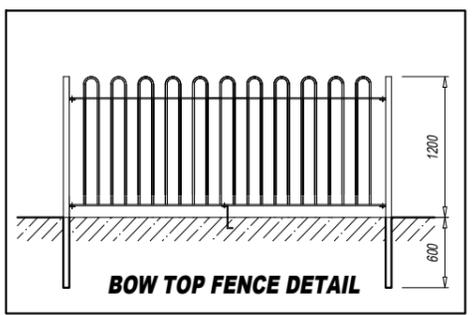
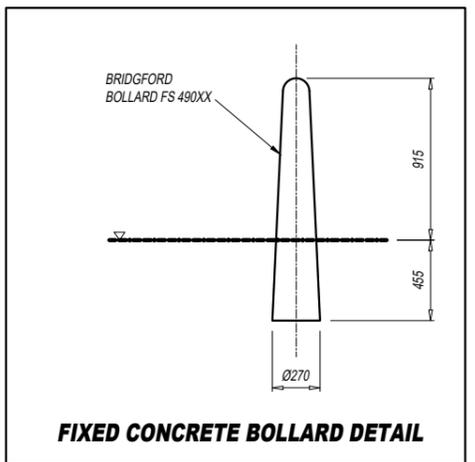
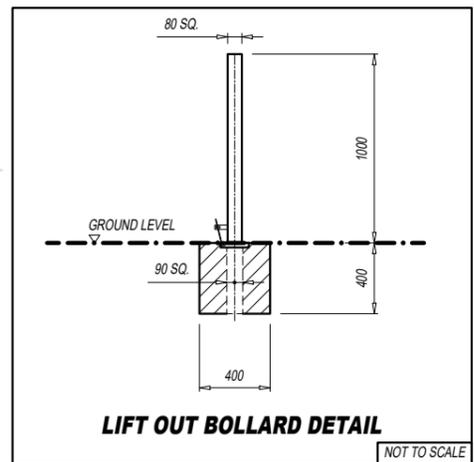
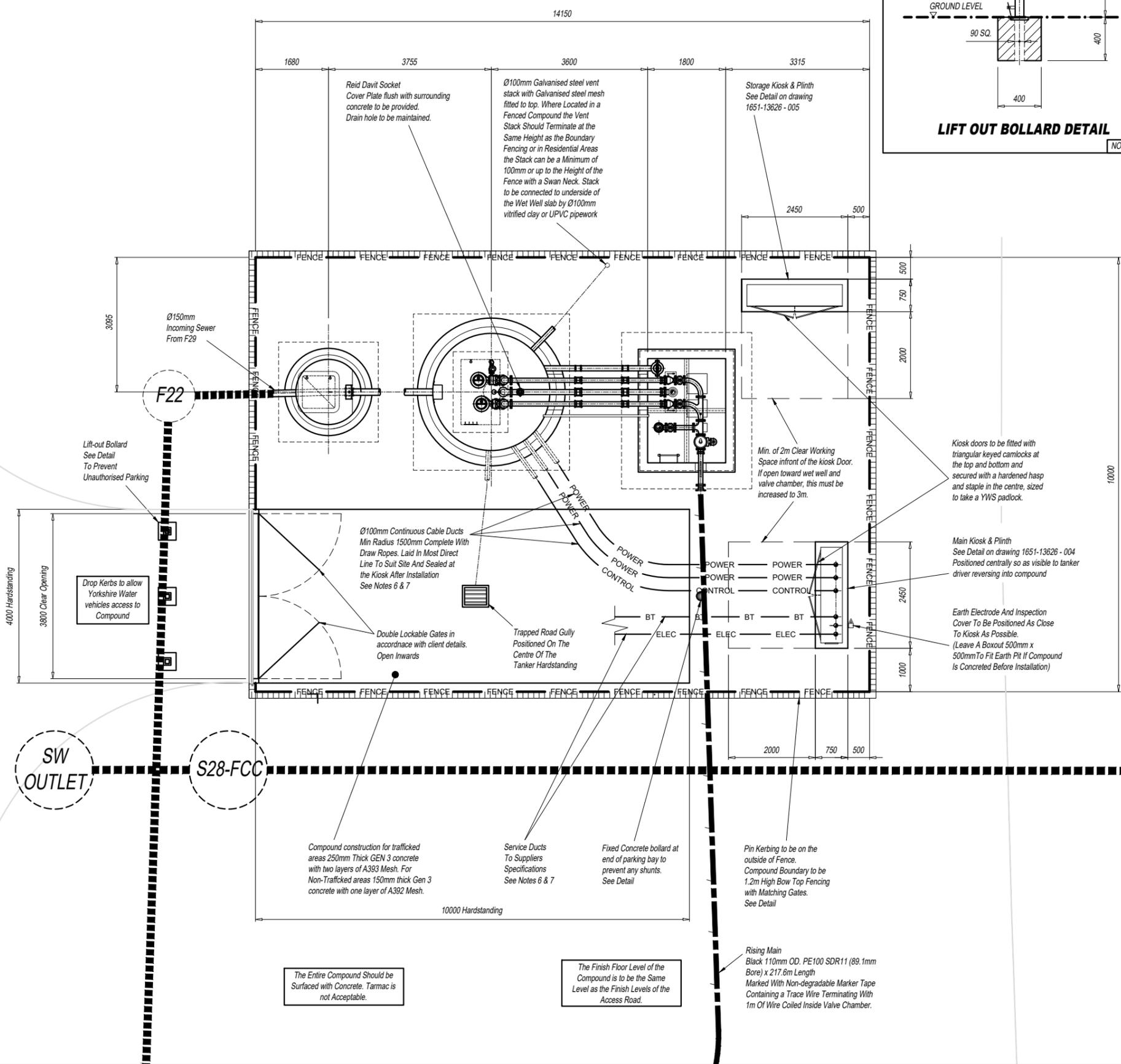
**STANDARD NOTES** H-3-264-734

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**YORKSHIRE WATER NOTES**

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- Z. ALL REGULAR LEVEL SWITCHES USED WITHIN THE HAZARDOUS AREA MUST BE EX-RATED.

Ownership of the compounds will have to be transferred to Yorkshire Water before adoption.



To be read in conjunction with MJA Consulting Structural Design

REV	DATE	DESCRIPTION	DR'n	CHK'd	APR'l
B	28/06/22	Updated in line with latest MJA structural design.	K.A.	C.B.	C.B.
A	25/01/22	Inlet details amended. Inlet manhole moved away from boundary. Compound extended.	C.B.	I.H.	I.H.

**FOR APPROVAL**

**PDAS** DESIGN INSTALL PROACTIVE  
TOTAL WATER EXPERTISE

BUILDING 4 & 6, HITECH, FRIMLEY 4 BUSINESS PARK, FRIMLEY, CAMBERLEY, SURREY, GU16 7SG OFFICE TEL No. (01483) 930520 WEBSITE WWW.PDASLTD.CO.UK

PROJECT: **WHITECHAPEL ROAD CLECKHEATON**

TITLE: **FOUL WATER PUMP STATION SITE PLAN**

CLIENT: **BARRATT DAVID WILSON HOMES YORKSHIRE WEST**

SCALE AT A1: 1:50 SCALE AT A3: 1:100

QUOTE NUMBER: 1926 APR'l: C.B. DATE: 19-11-2021

JOB NO.: 14633 CHK'g: I.H. DATE: 19-11-2021

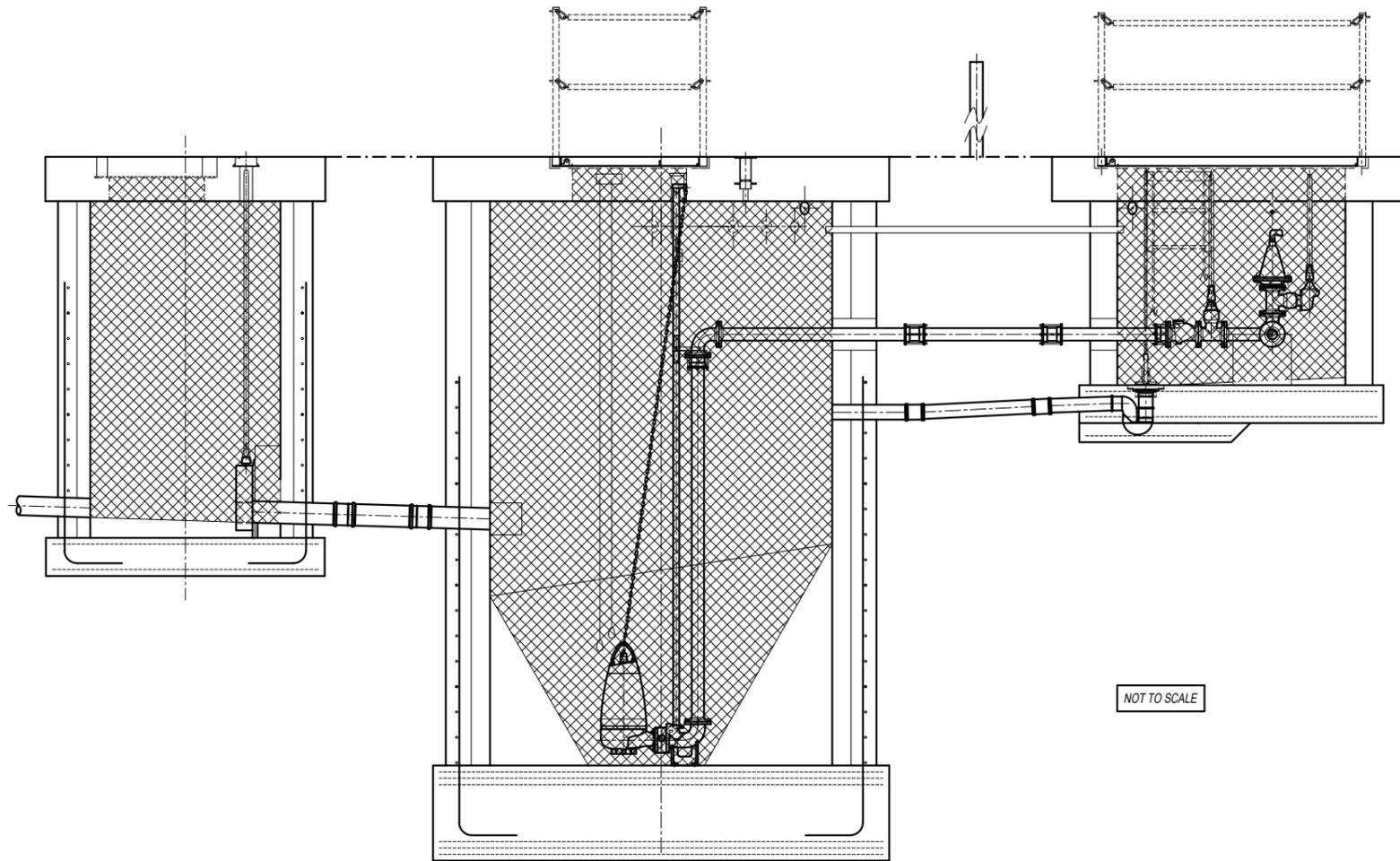
DRAWING NUMBER: 1926-14633-006 DR'n: K.M. DATE: 19-11-2021

**STANDARD NOTES** **H-3-264-734**

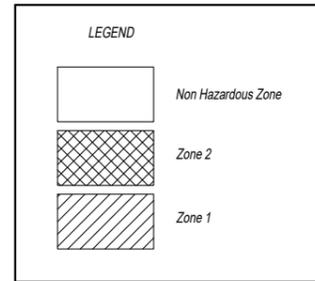
1. DO NOT SCALE.
2. UNLESS OTHERWISE STATED ALL DIMENSIONS ARE IN MILLIMETRES AND ALL INVERTS IN METRES AOD.
3. ALL CIVIL WORKS ARE THE RESPONSIBILITY OF THE DEVELOPER / CONTRACTOR INCLUDING FIXING OF STEELWORK SUCH AS ACCESS COVERS AND PENSTOCKS ETC. INSTALLATION OF CABLE DUCTS, BENCHING AND MAKING GOOD AROUND PIPES AFTER INSTALLATION.
4. REINFORCING BARS ARE TO BE A MINIMUM OF 75MM BELOW THE SURFACE. ANY STRUCTURAL DETAILING / CIVIL WORKS SHOWN ON THIS DRAWING ARE ILLUSTRATIVE ONLY UNLESS OTHERWISE STATED AND SHOULD NOT BE USED FOR CONSTRUCTION.
5. BENCHING IS TO BE FORMED AFTER PUMP INSTALLATION AND TO BE IN ACCORDANCE WITH THE APPLICABLE DESIGN AND CONSTRUCTION GUIDANCE AND ADOPTING AUTHORITY SPECIFICATION.
6. UNLESS OTHERWISE STATED, ALL DUCTS ARE TO BE 100MM DIAMETER AND BE COMPLETE WITH DRAW ROPES. SERVICE DUCTS TO BE TO THE UTILITY SUPPLIER'S SPECIFICATION.
7. DUCT ROUTES ARE SHOWN DIAGRAMMATICALLY ONLY. ALL DUCTS TO BE LAID IN THE MOST DIRECT ROUTE TO SUIT THE SERVICE BEING CARRIED AVOIDING ANY ACUTE CHANGES OF DIRECTION.
8. LEVEL CONTROL POSITIONS ARE DIAGRAMMATIC ONLY. THEY WILL BE POSITIONED AWAY FROM OBSTRUCTIONS AND BE READILY ADJUSTABLE AFTER INSTALLATION.

**YORKSHIRE WATER NOTES**

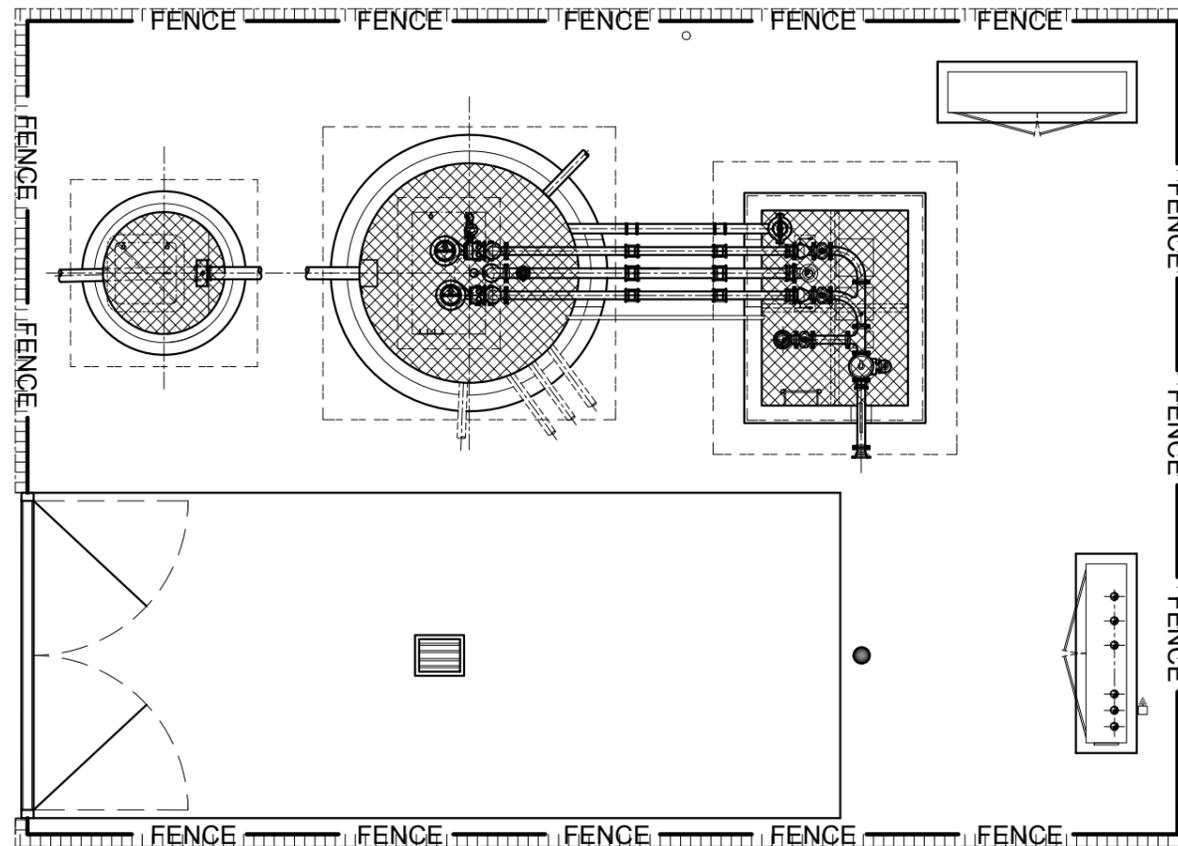
- A. COVER TO RE INFORCEMENT TO BE 40MM TO BOTH FACES.
- B. SPACERS TO BE 1200MM CENTRE TO CENTRE.
- C. CONCRETE TO BE 30 N/MM AT 28 DAYS.
- D. GROUND BEARING PRESSURE TAKEN AS 50 KN/M.
- E. NO DAY WORK JOINTS PERMITTED IN SLABS.
- F. ALL SOFT SPOTS TO BE REMOVED AND REPLACED BY SUITABLE MATERIAL.
- G. PROVIDE 50MM BLINDING CONCRETE.
- H. ALL ADOPTABLE SEWER WORKS & MATERIALS TO BE IN ACCORDANCE WITH THE CODE FOR ADOPTION, THE RELEVANT BRITISH, EUROPEAN & YORKSHIRE WATER STANDARDS, REQUIREMENTS & ADDENDUM TO THE MECHANICAL & ELECTRICAL SPECIFICATION AND KIT MARKED.
- I. MINIMUM BAR LAP LENGTH 800MM.
- J. WET WELL AND VALVE CHAMBER COVERS TO BE AS SUPPLIED BY PUMP SUPPLIER AND BE RATED FACTA B (5 TONNE WHEEL LOAD). COVERS TO BE CAPABLE OF BEING LIFTED WITH AN EFFORT NOT EXCEEDING 25KG.
- K. TO BE READ IN CONJUNCTION WITH THE CIVILS DETAILS.
- L. ANY OVER BREAK BETWEEN INLET MANHOLE, WET WELL AND VALVE CHAMBER TO BE FILLED WITH LEAN MIX CONCRETE.
- M. WET WELL TO BE CLEAN AND DRY BEFORE INSTALLATION OF PUMPS COMMENCES.
- N. DEWATERING TO BE PROVIDED IF NECESSARY AS WORKS PROCEED.
- O. RISING MAIN TO BE 110MM OD PE100 SDR11 (89.1MM ID).
- P. CUT OUT AND CUT IN LEVELS TO BE ESTABLISHED ON SITE BY PUMP SUPPLIER.
- Q. THE BRACKET FOR HOLDING THE DAVIT EQUIPMENT SHOULD BE KEPT IN THE KIOSK.
- R. THRUST BLOCKS TO BE PROVIDED AT CHANGES IN DIRECTIONS.
- S. STATUTORY SERVICES TO PROVIDE ADEQUATE SERVICES TO PUMP STATION AND KIOSK AND TO ALLOW FOR ALL NECESSARY REQUIREMENTS.
- T. STAINLESS STEEL PUMP LIFTING CHAINS REQUIRED.
- U. THE DEVELOPER WILL SUPPLY, INSTALL AND COMMISSION THE TELEMETRY AT THEIR EXPENSE. YORKSHIRE WATER'S TELEMETRY SYSTEM IS THE METASPHERE MMIM OUTSTATION.
- V. KIOSK TO BE PROVIDED TO THE LATEST YWS, SFA6 AND M&E ADDENDUM.
- W. DUCTS WITHIN THE WET WELL SHOULD NOT BE SEALED WITH FOAM THEY SHOULD BE SEALED WITHIN THE KIOSK.
- X. EXTERNAL LEVEL AROUND THE BOUNDARY COMPOUND TO BE AGREED IN A PRE-START MEETING WITH AN INSPECTOR, SO THAT LEVELS FLOW TOWARDS THE GULLY.
- Y. ALL METAL FIXINGS TO BE STAINLESS STEEL.
- Z. ALL REGULAR LEVEL SWITCHES USED WITHIN THE HAZARDOUS AREA MUST BE EX-RATED.



Cable Ducts in accordance with DCG v2.0 F.3.4.4 and BS EN 1401-01 & BS 4660 sealed with rise sealant system Gas + waterproof sealant system



*To be read in conjunction with MJA Consulting Structural Design*



REV	DATE	DESCRIPTION	DR'n	CHK'd	APR'l
B	28/06/22	Updated in line with latest MJA structural design.	K.A.	C.B.	C.B.
A	25/01/22	Minor ammendments	C.B.	I.H.	I.H.

**FOR APPROVAL**



BUILDING 4 & 6, HTECH, FRIMLEY 4 BUSINESS PARK, FRIMLEY, CAMBERLEY, SURREY, GU16 7SG OFFICE TEL No. (01483) 930520 WEBSITE WWW.PDASLTD.CO.UK

PROJECT **WHITECHAPEL ROAD CLECKHEATON**

TITLE **FOUL WATER PUMP STATION HAZARDOUS ZONING**

CLIENT **BARRATT DAVID WILSON HOMES YORKSHIRE WEST**

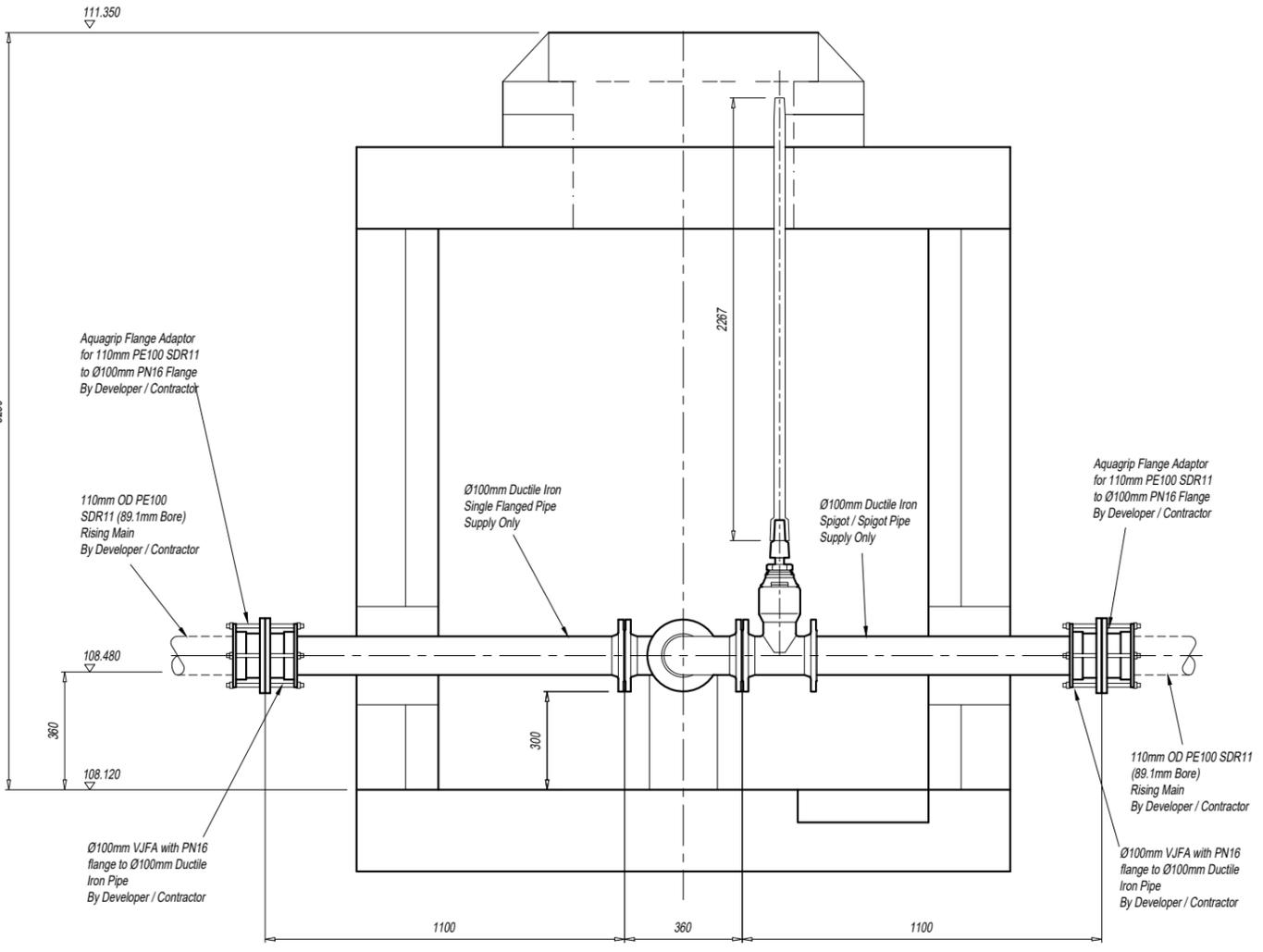
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QUOTE NUMBER	1926	APR'l	C.B. DATE 19-11-2021
JOB NO.	14633	CHK'g	I.H. DATE 19-11-2021
DRAWING NUMBER	1926-14633-007	DR'n	K.M. DATE 19-11-2021

**STANDARD NOTES** **H-3-264-734**

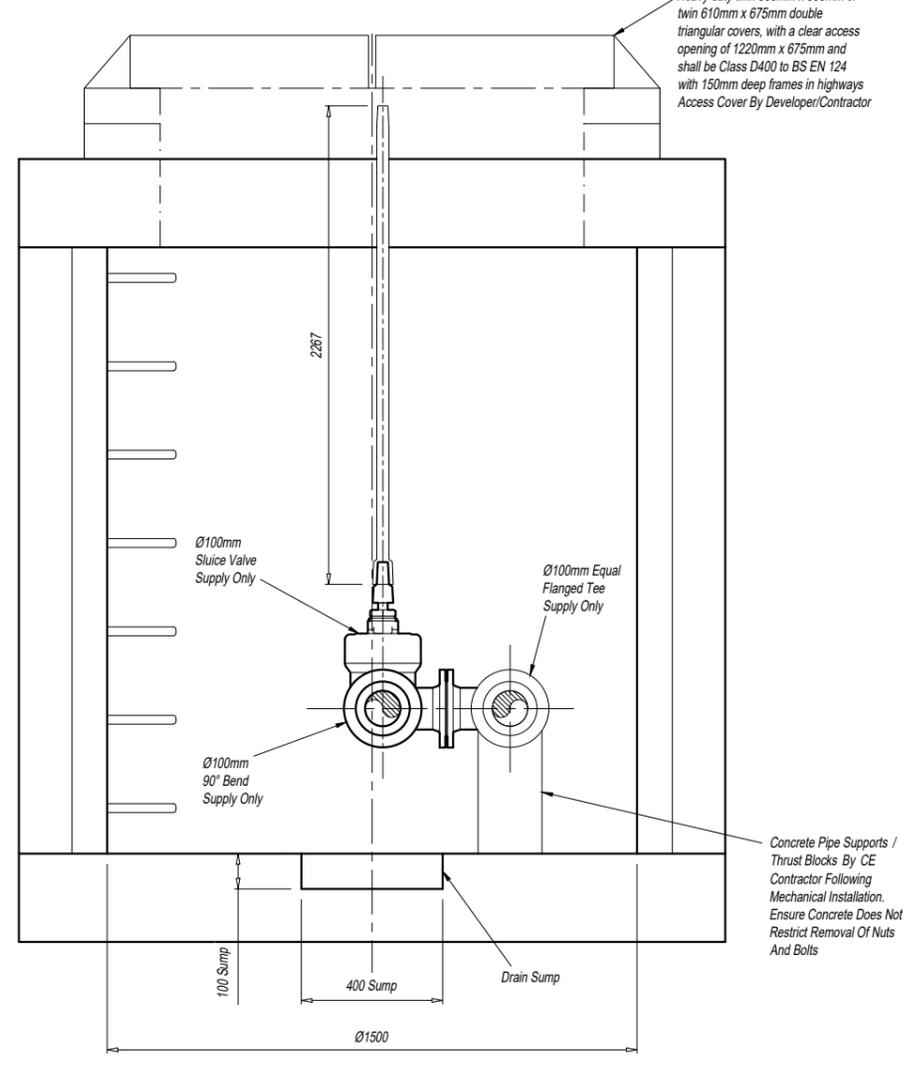
1. DO NOT SCALE.
2. UNLESS OTHERWISE STATED ALL DIMENSIONS ARE IN MILLIMETRES AND ALL INVERTS IN METRES AOD.
3. ALL CIVIL WORKS ARE THE RESPONSIBILITY OF THE DEVELOPER / CONTRACTOR INCLUDING FIXING OF STEELWORK SUCH AS ACCESS COVERS AND PENSTOCKS ETC. INSTALLATION OF CABLE DUCTS, BENCHING AND MAKING GOOD AROUND PIPES AFTER INSTALLATION.
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8. LEVEL CONTROL POSITIONS ARE DIAGRAMMATIC ONLY. THEY WILL BE POSITIONED AWAY FROM OBSTRUCTIONS AND BE READILY ADJUSTABLE AFTER INSTALLATION.

**YORKSHIRE WATER NOTES**

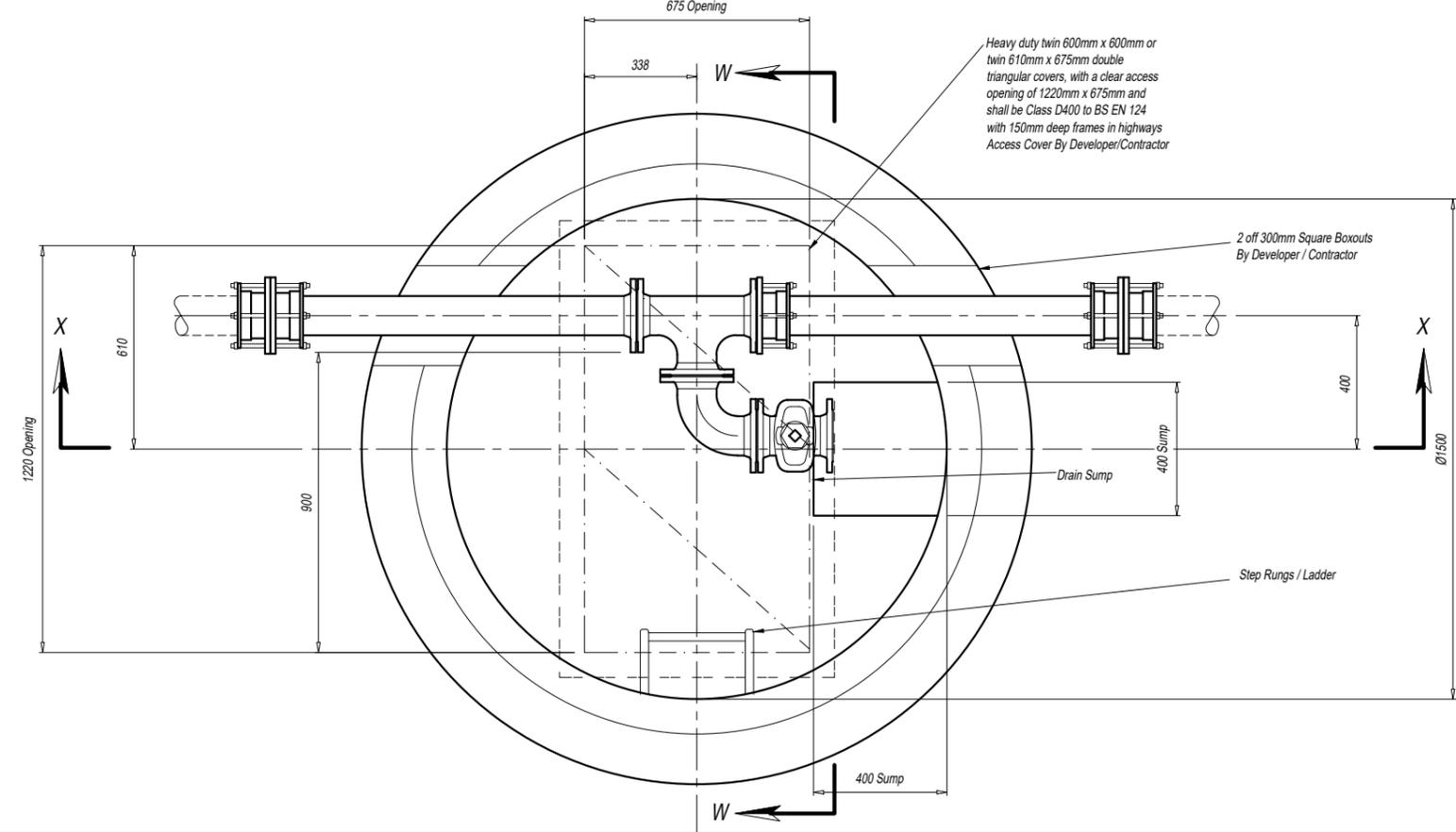
- A. COVER TO RE INFORCEMENT TO BE 40MM TO BOTH FACES.
- B. SPACERS TO BE 1200MM CENTRE TO CENTRE.
- C. CONCRETE TO BE 30 NMM AT 28 DAYS.
- D. GROUND BEARING PRESSURE TAKEN AS 50 KN/M.
- E. NO DAY WORK JOINTS PERMITTED IN SLABS.
- F. ALL SOFT SPOTS TO BE REMOVED AND REPLACED BY SUITABLE MATERIAL.
- G. PROVIDE 50MM BLINDING CONCRETE.
- H. ALL ADOPTABLE SEWER WORKS & MATERIALS TO BE IN ACCORDANCE WITH THE CODE FOR ADOPTION, THE RELEVANT BRITISH, EUROPEAN & YORKSHIRE WATER STANDARDS, REQUIREMENTS & ADDENDUM TO THE MECHANICAL & ELECTRICAL SPECIFICATION AND KIT MARKED.
- I. MINIMUM BAR LAP LENGTH 800MM.
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- U. THE DEVELOPER WILL SUPPLY, INSTALL AND COMMISSION THE TELEMETRY AT THEIR EXPENSE. YORKSHIRE WATER'S TELEMETRY SYSTEM IS THE METASPHERE MMIM OUTSTATION.
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- Y. ALL METAL FIXINGS TO BE STAINLESS STEEL.
- Z. ALL REGULAR LEVEL SWITCHES USED WITHIN THE HAZARDOUS AREA MUST BE EX-RATED.



**VIEW ON SECTION X - X**



**VIEW ON ARROW W - W**



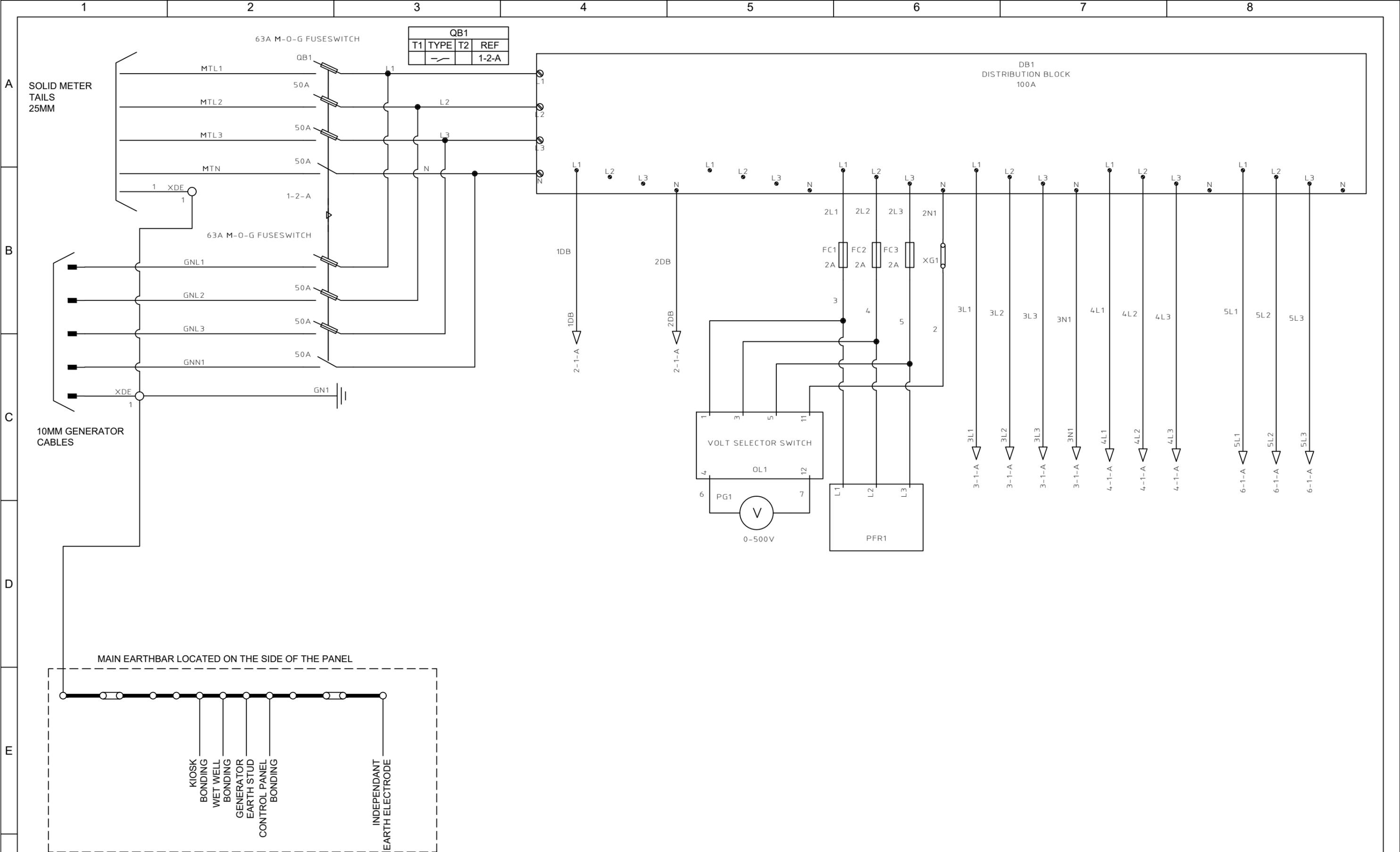
*To be read in conjunction with MJA Consulting Structural Design*

*All Cut Pipe Joints As Close To Structure As Possible Consistent With Making The Joint.*

B	28/06/22	Updated in line with latest MJA structural design.	K.A.	C.B.	C.B.
A	25/01/22	Updated chainage and levels	C.B.	I.H.	I.H.
REV	DATE	DESCRIPTION	DR'n	CHK'd	APR'l

<b>FOR APPROVAL</b>					
<b>PDAS</b>		<b>DESIGN INSTALL PROACTIVE</b>			
TOTAL WATER EXPERTISE					
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PROJECT <b>WHITECHAPEL ROAD CLECKHEATON</b>					
TITLE <b>FOUL WATER PUMP STATION WASHOUT CHAMBER AT CHAINAGE 40.4m</b>					
CLIENT <b>BARRATT DAVID WILSON HOMES YORKSHIRE WEST</b>					
SCALE AT A1	1:10	SCALE AT A3	1:20		
QUOTE NUMBER	1926	APR'l	C.B.	DATE	19-11-2021
JOB NO.	14633	CHK'd	I.H.	DATE	19-11-2021
DRAWING NUMBER	1926-14633-008	DR'n	K.M.	DATE	19-11-2021

**Appendix E**  
**Wiring Diagrams**



QB1			
T1	TYPE	T2	REF
—			1-2-A

Rev	Description	Date	Drn	Apprv
B	DOL TO ASD	10/03/22	JH	JH
A	FIRST ISSUE	21/10/21	JH	JH

Client Name Barratt David Wilson Homes Yorkshire West
Title YORKSHIRE WATER SFA6 DUAL PUMP ASD CONTROL PANEL INCOMER SECTION
Drawn By JH
Project Code 1926-14633
Drawing No 1926-14633

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**Interface**  
ISO 9001 CERTIFICATION

**UKAS**  
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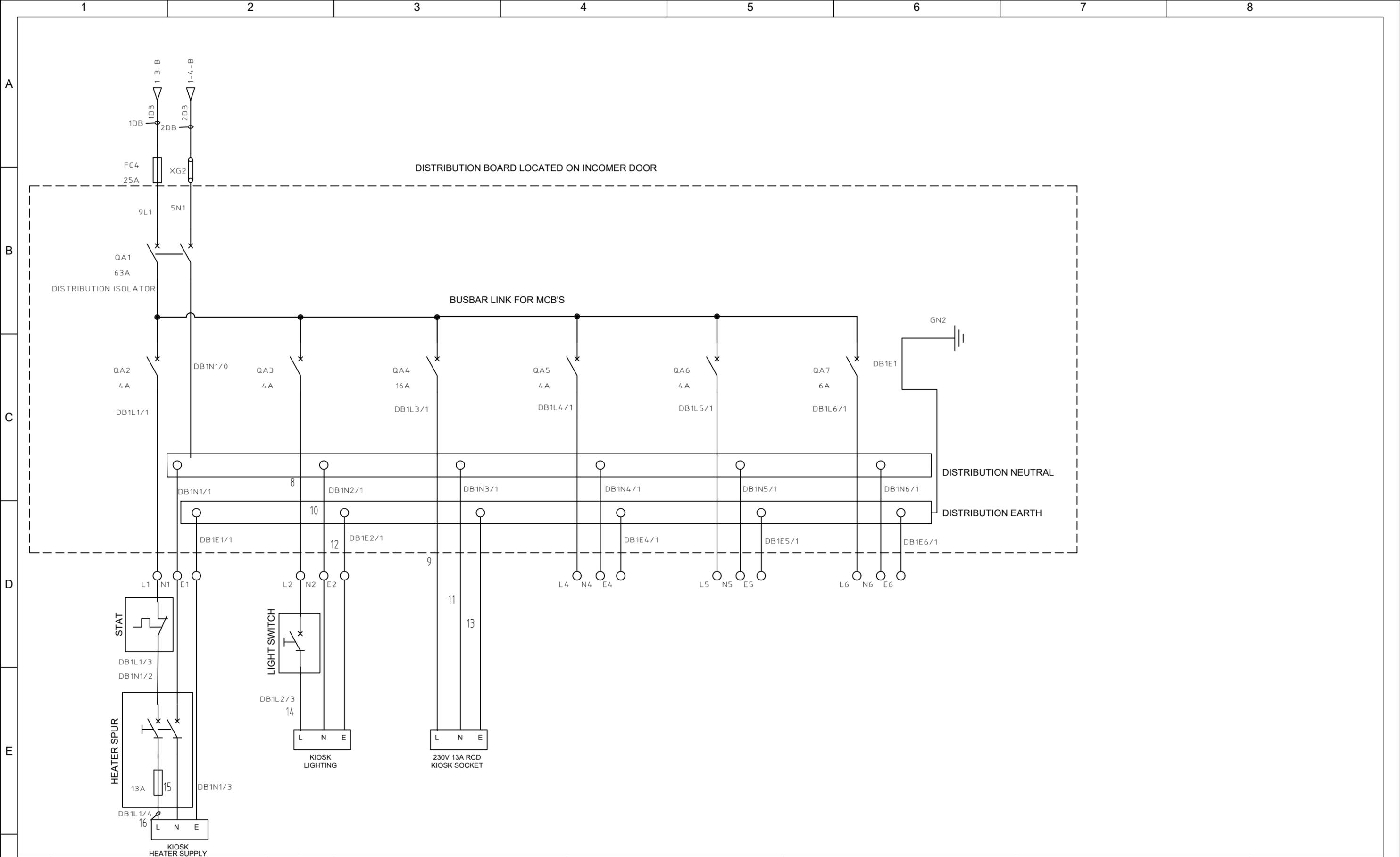
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B	DOL TO ASD	10/03/22	JH	JH
A	FIRST ISSUE	21/10/21	JH	JH

Client Name Barratt David Wilson Homes Yorkshire West	
Title YORKSHIRE WATER SFA6 DUAL PUMP ASD CONTROL PANEL DISTRIBUTION	
Drawn By JH	Project Code 1926-14633
Drawing No 1926-14633	

  
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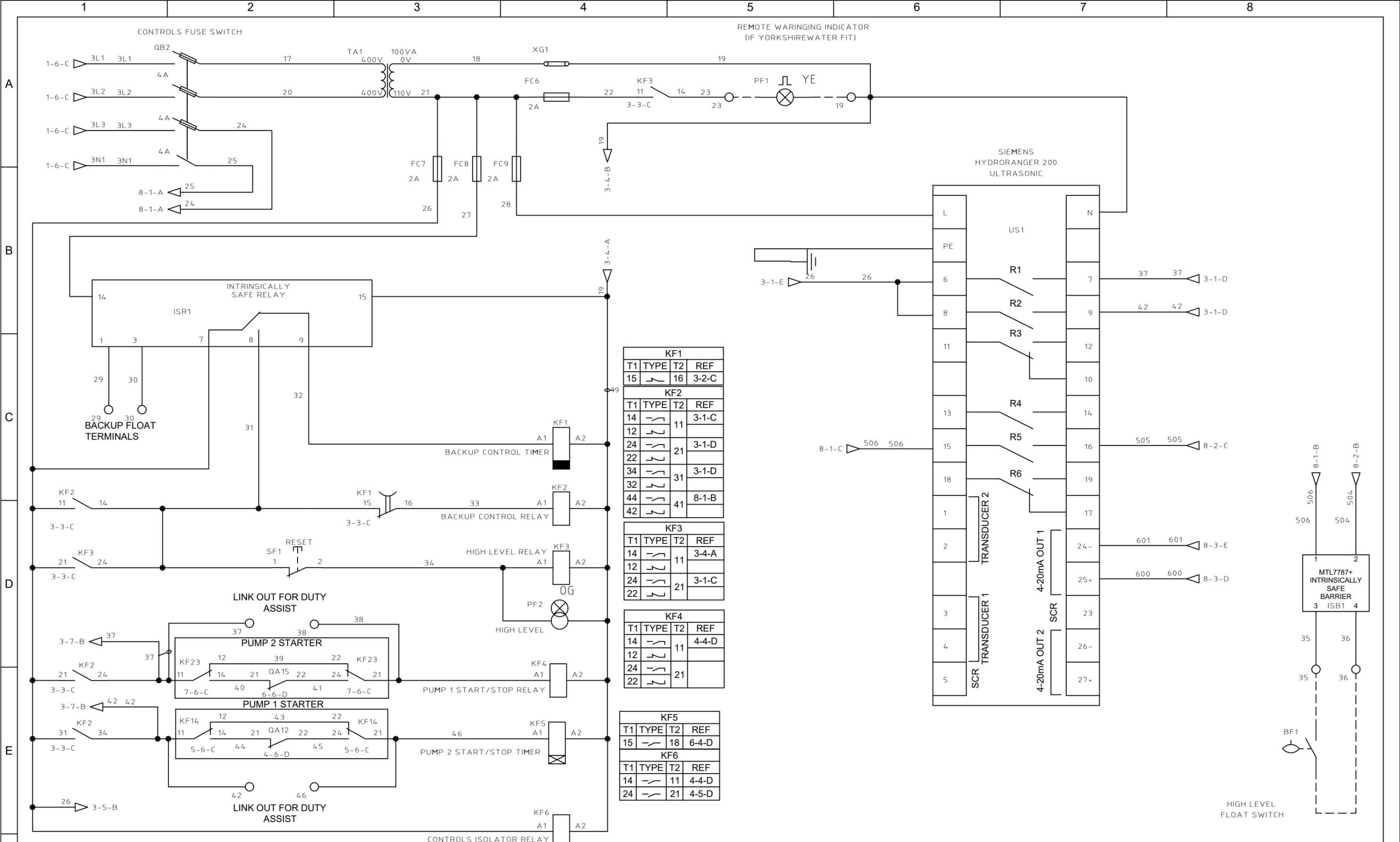
  
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KF1			
T1	TYPE	T2	REF
15	—	16	3-2-C

KF2			
T1	TYPE	T2	REF
14	—	11	3-1-C
12	—	11	
24	—	21	3-1-D
22	—	21	
34	—	31	3-1-D
32	—	31	
44	—	41	8-1-B
42	—	41	

KF3			
T1	TYPE	T2	REF
14	—	11	3-4-A
12	—	11	
24	—	21	3-1-C
22	—	21	

KF4			
T1	TYPE	T2	REF
14	—	11	4-4-D
12	—	11	
24	—	21	
22	—	21	

KF5			
T1	TYPE	T2	REF
15	—	18	6-4-D

KF6			
T1	TYPE	T2	REF
14	—	11	4-4-D
24	—	21	4-5-D

Rev	Description	Date	Drn	Apprv
B	DOL TO ASD	10/03/22	JH	JH
A	FIRST ISSUE	21/10/21	JH	JH

Client Name Barratt David Wilson Homes Yorkshire West	
Title YORKSHIRE WATER SFA6 DUAL PUMP ASD CONTROL PANEL COMMON CONTROLS SECTION	
Drawn By JH	Project Code 1926-14633
Drawing No 1926-14633	

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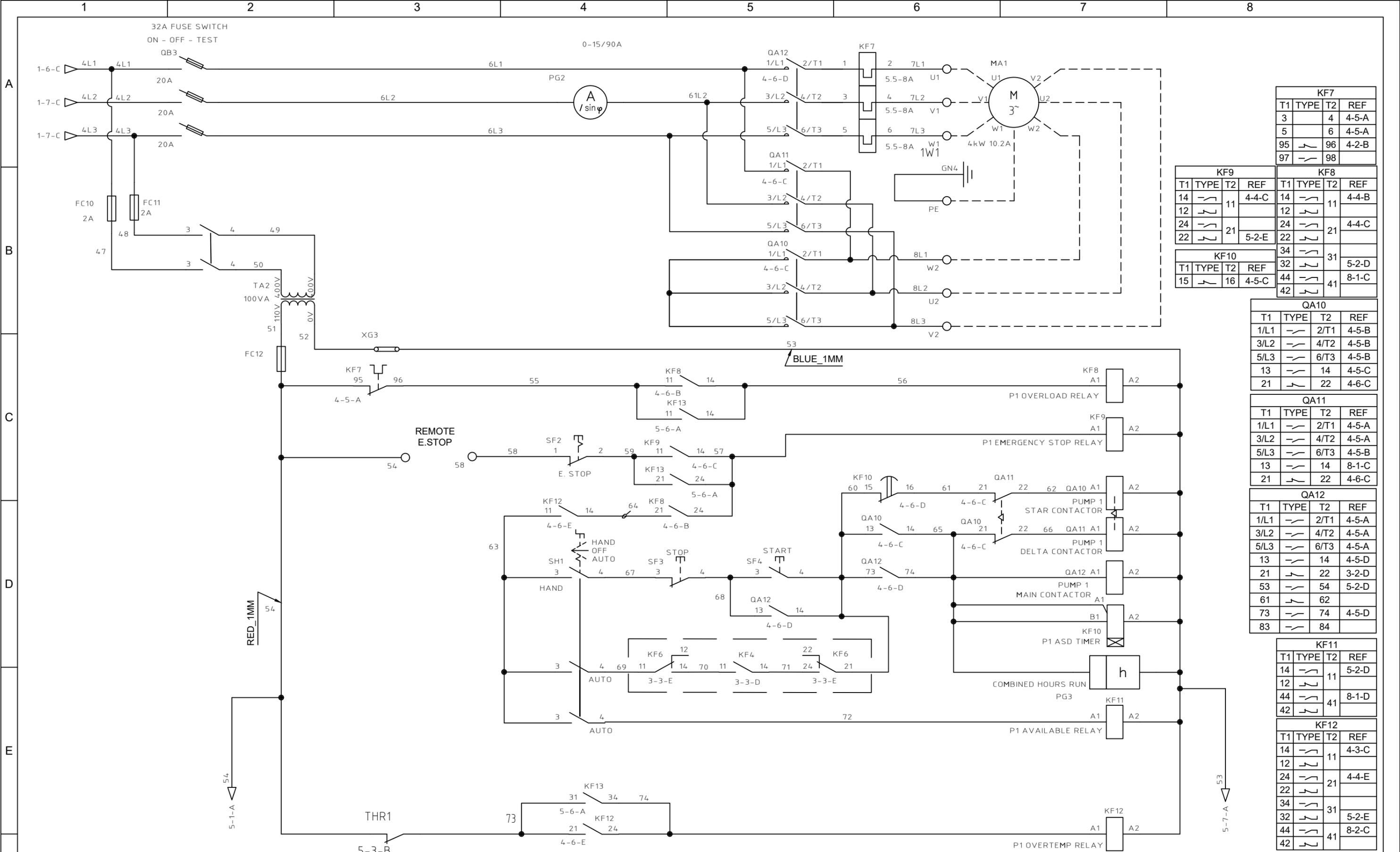
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KF7			
T1	TYPE	T2	REF
3		4	4-5-A
5		6	4-5-A
95		96	4-2-B
97		98	

KF9				KF8			
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14		11	4-4-C	14		11	4-4-B
12				12			
24		21		24		21	4-4-C
22			5-2-E	22			

KF10			
T1	TYPE	T2	REF
15		16	4-5-C

QA10			
T1	TYPE	T2	REF
1/L1		2/T1	4-5-B
3/L2		4/T2	4-5-B
5/L3		6/T3	4-5-B
13		14	4-5-C
21		22	4-6-C

QA11			
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1/L1		2/T1	4-5-A
3/L2		4/T2	4-5-A
5/L3		6/T3	4-5-B
13		14	8-1-C
21		22	4-6-C

QA12			
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3/L2		4/T2	4-5-A
5/L3		6/T3	4-5-A
13		14	4-5-D
21		22	3-2-D
53		54	5-2-D
61		62	
73		74	4-5-D
83		84	

KF11			
T1	TYPE	T2	REF
14		11	5-2-D
12			
44		41	8-1-D
42			

KF12			
T1	TYPE	T2	REF
14		11	4-3-C
12			
24		21	4-4-E
22			
34		31	
32			5-2-E
44		41	8-2-C
42			

Rev	Description	Date	Drn	Apprv
B	DOL TO ASD	10/03/22	JH	JH
A	FIRST ISSUE	21/10/21	JH	JH

Client Name Barratt David Wilson Homes Yorkshire West	
Title YORKSHIRE WATER SFA6 DUAL PUMP ASD CONTROL PANEL PUMP 1 STARTER	
Drawn By JH	Project Code 1926-14633
Drawing No 1926-14633	

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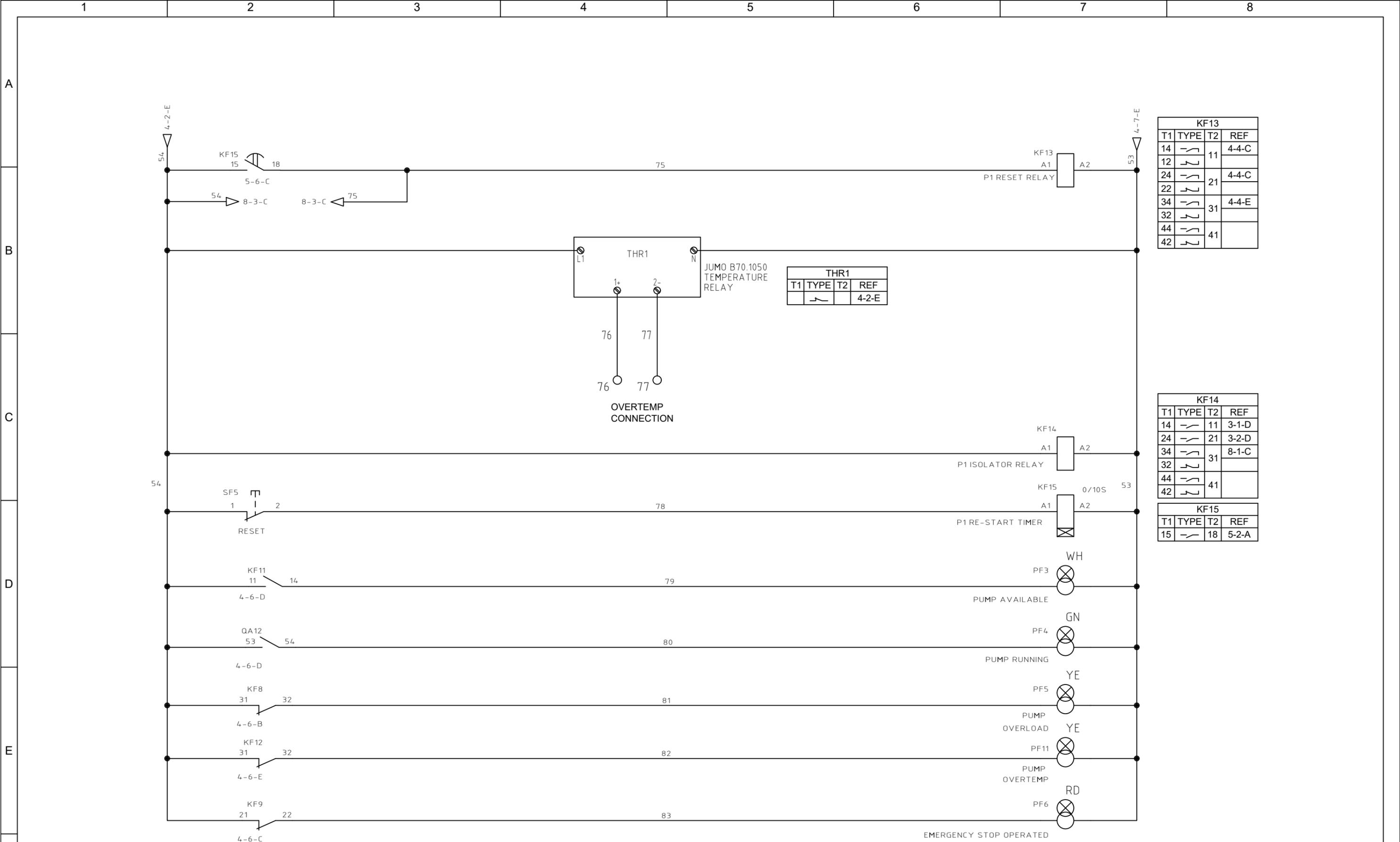
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14	—	11	4-4-C
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24	—	21	4-4-C
22	—	21	
34	—	31	4-4-E
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44	—	41	
42	—	41	

THR1			
T1	TYPE	T2	REF
	—		4-2-E

KF14			
T1	TYPE	T2	REF
14	—	11	3-1-D
24	—	21	3-2-D
34	—	31	8-1-C
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KF15			
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Rev	Description	Date	Drn	Apprv
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A	FIRST ISSUE	21/10/21	JH	JH

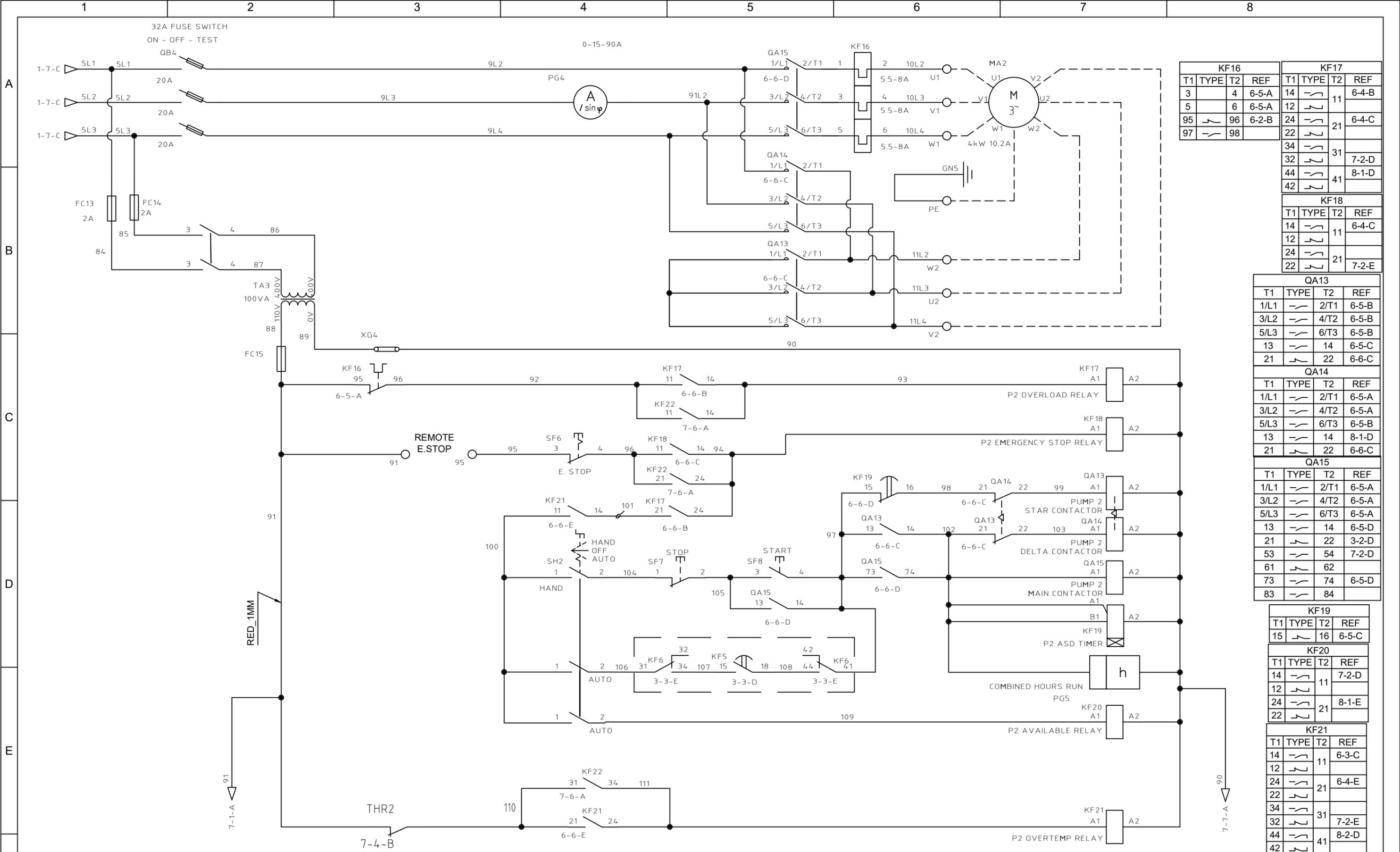
Client Name Barratt David Wilson Homes Yorkshire West	
Title YORKSHIRE WATER SFA6 DUAL PUMP ASD CONTROL PANEL PUMP 1 STARTER	
Drawn By JH	Project Code 1926-14633
Drawing No 1926-14633	

  
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KF16				KF17			
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5		6	6-5-A	12			
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97		98		22			

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12			
24		21	6-4-C
22			

QA13			
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5/L3		6/T3	6-5-B
13		14	6-5-C
21		22	6-6-C

QA14			
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3/L2		4/T2	6-5-A
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21		22	6-6-C

QA15			
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21		22	3-2-D
53		54	7-2-D
61		62	
73		74	6-5-D
83		84	

KF19			
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KF20			
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24		21	8-1-E
22			

KF21			
T1	TYPE	T2	REF
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12			
24		21	6-4-E
22			
34		31	
32		31	7-2-E
44		41	8-2-D
42			

Rev	Description	Date	Drn	Apprv
B	DOL TO ASD	10/03/22	JH	JH
A	FIRST ISSUE	21/10/21	JH	JH

Client Name Barratt David Wilson Homes Yorkshire West	
Title YORKSHIRE WATER SFA6 DUAL PUMP ASD CONTROL PANEL PUMP 2 STARTER	
Drawn By JH	Project Code 1926-14633
Drawing No 1926-14633	

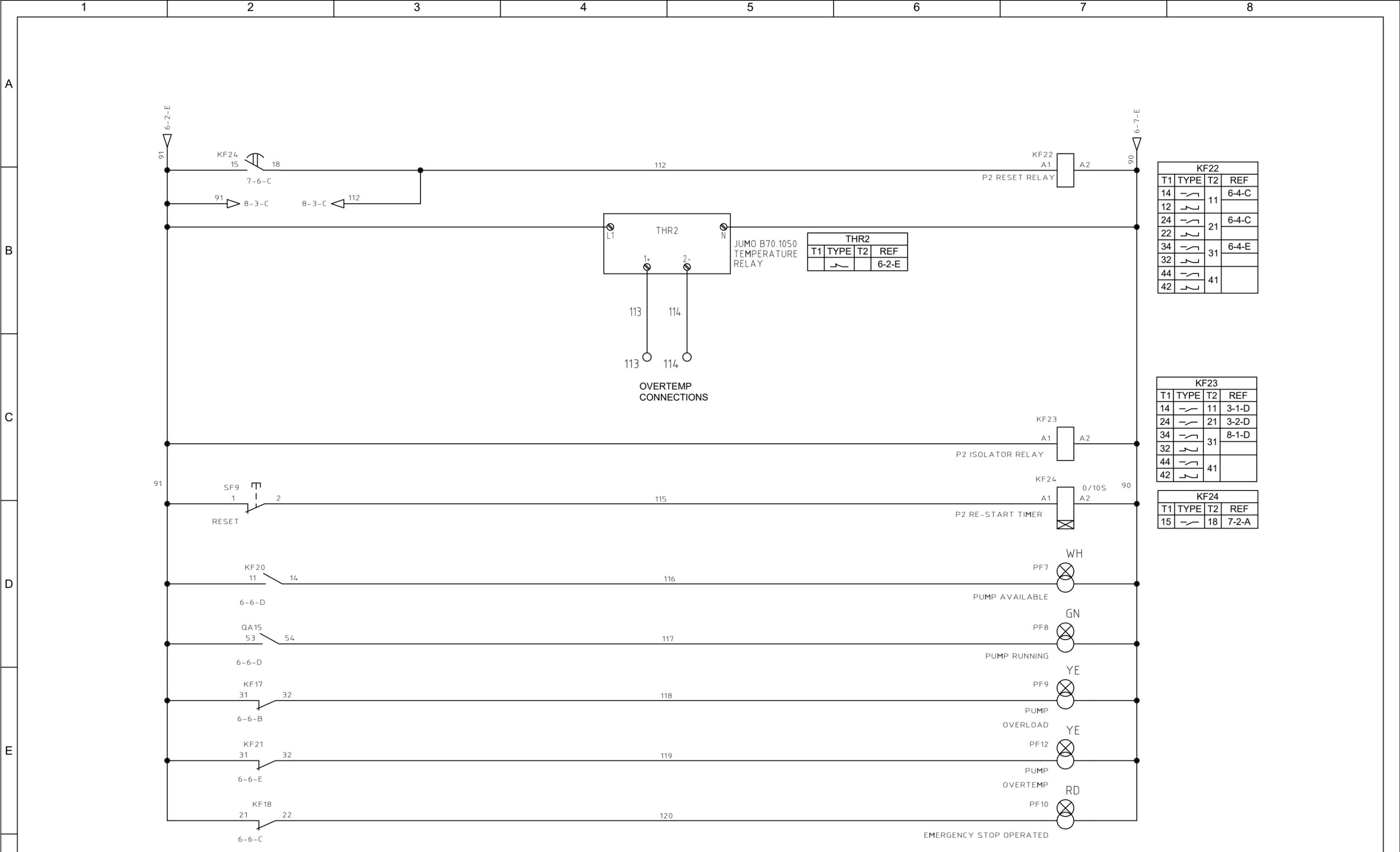
  
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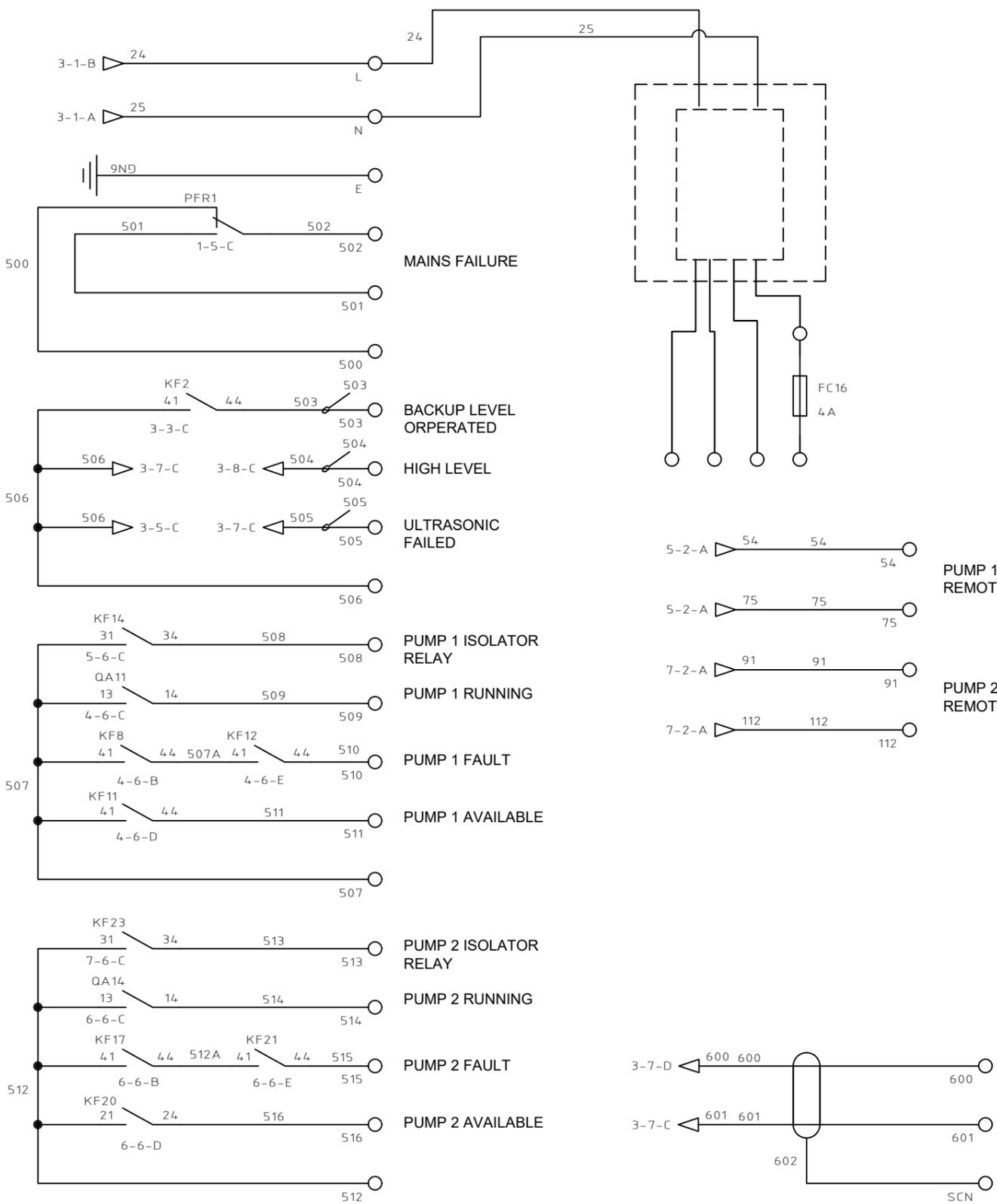
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12	—	21	6-4-C
24	—	31	6-4-E
32	—	41	
44	—		
42	—		

THR2			
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	—		6-2-E

KF23			
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24	—	21	3-2-D
34	—	31	8-1-D
44	—	41	
42	—		

KF24			
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15	—	18	7-2-A

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					Title YORKSHIRE WATER SFA6 DUAL PUMP ASD CONTROL PANEL PUMP 2 STARTER					
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A	FIRST ISSUE	21/10/21	JH	JH	Drawing No 1926-14633		Site Whitechapel Road Cleckheaton	This document may not, without our permission, be copied, shown or handed out to competitors or any other unauthorised persons Copyright Protected	Sheet No  7 of 12	
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Barratt David Wilson Homes Yorkshire West

Title  
YORKSHIRE WATER SFA6  
DUAL PUMP ASD CONTROL PANEL  
TELEMETRY SECTION

Drawn By  
JH

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designers and manufacturers

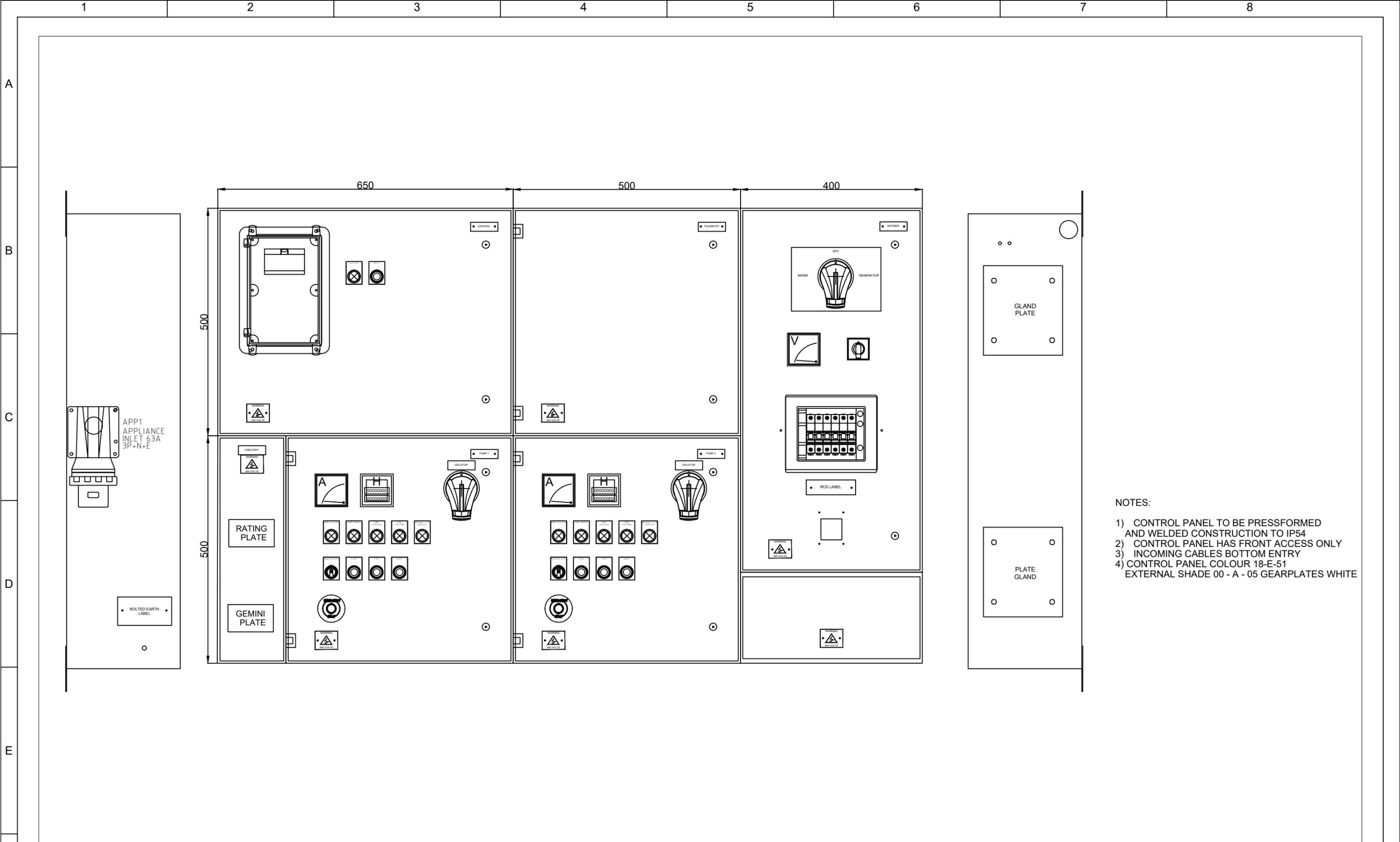
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- NOTES:
- 1) CONTROL PANEL TO BE PRESSFORMED AND WELDED CONSTRUCTION TO IP54
  - 2) CONTROL PANEL HAS FRONT ACCESS ONLY
  - 3) INCOMING CABLES BOTTOM ENTRY
  - 4) CONTROL PANEL COLOUR 18-E-51  
EXTERNAL SHADE 00 - A - 05 GEARPLATES WHITE

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					Title YORKSHIRE WATER SFA6 DUAL PUMP ASD CONTROL PANEL PANEL GA
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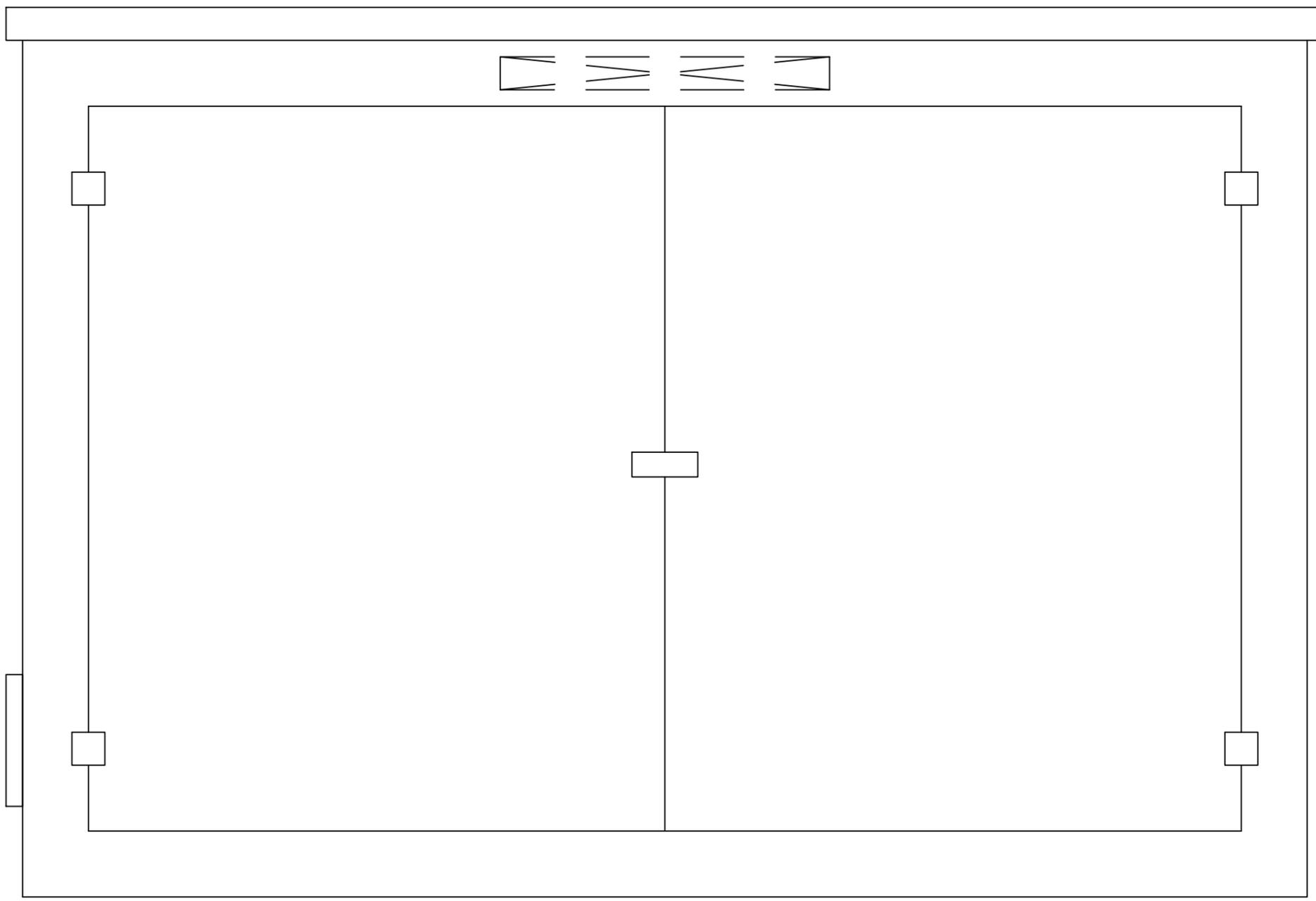
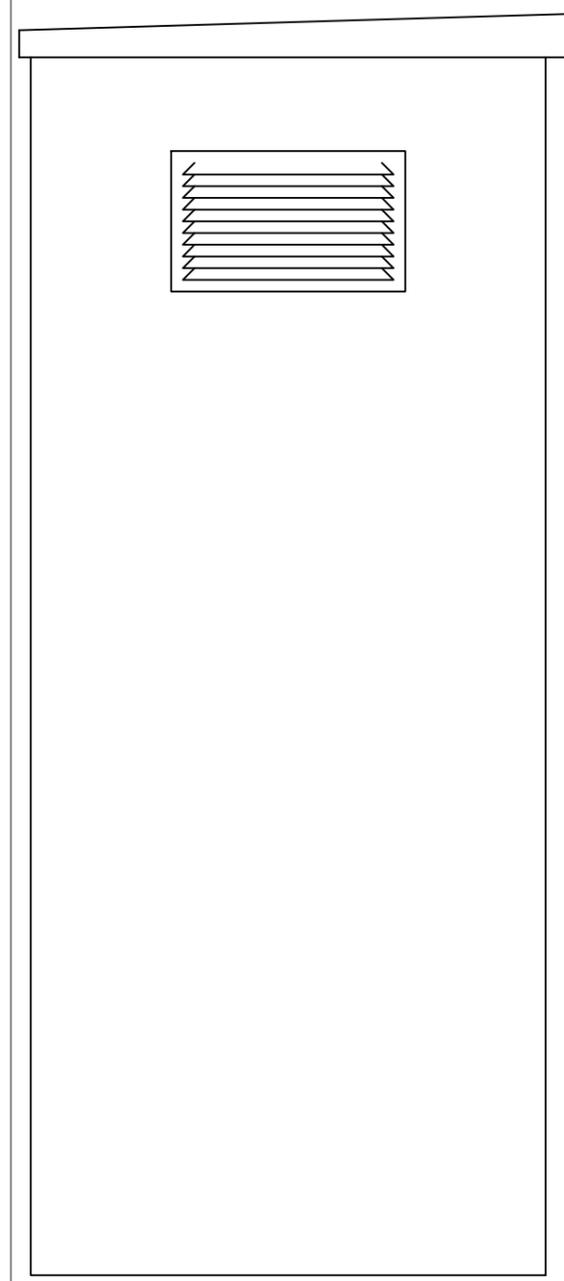
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1350

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2200

F

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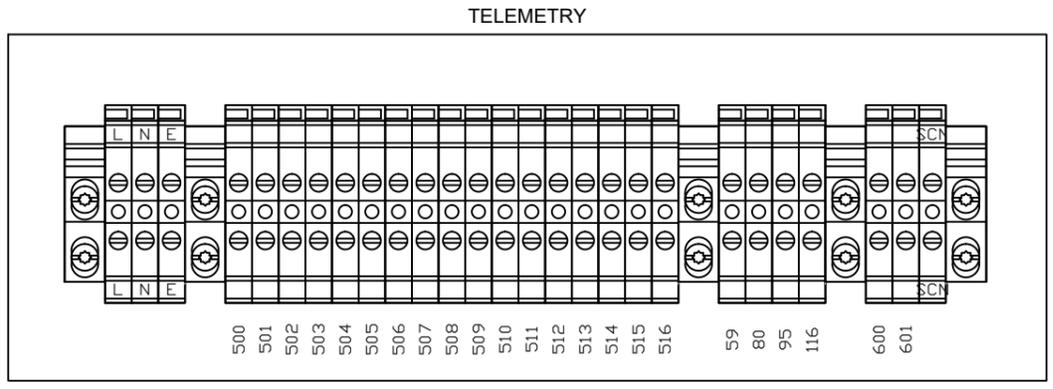
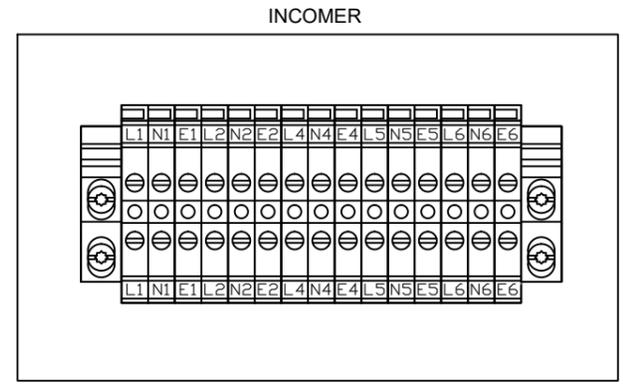
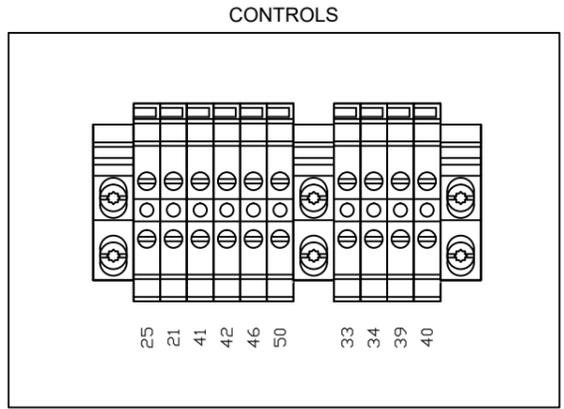
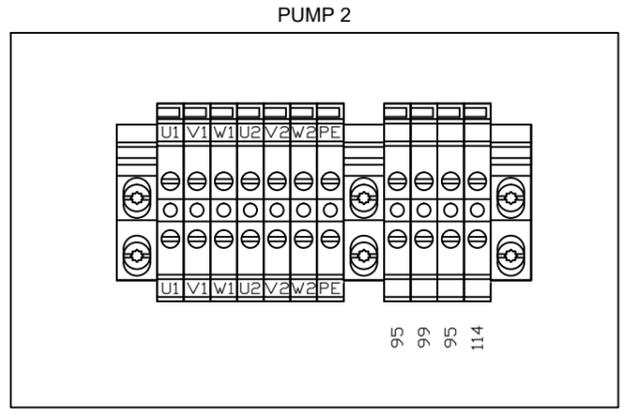
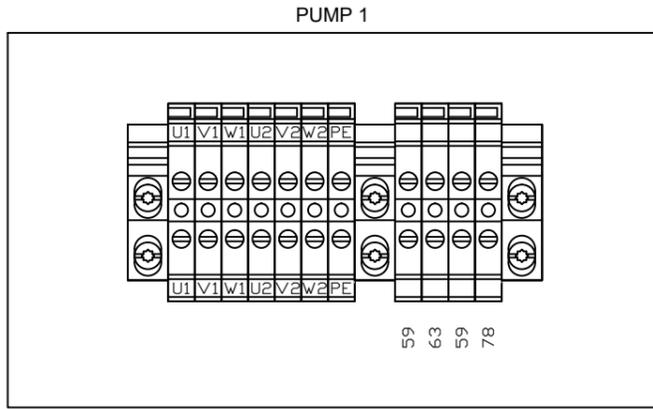
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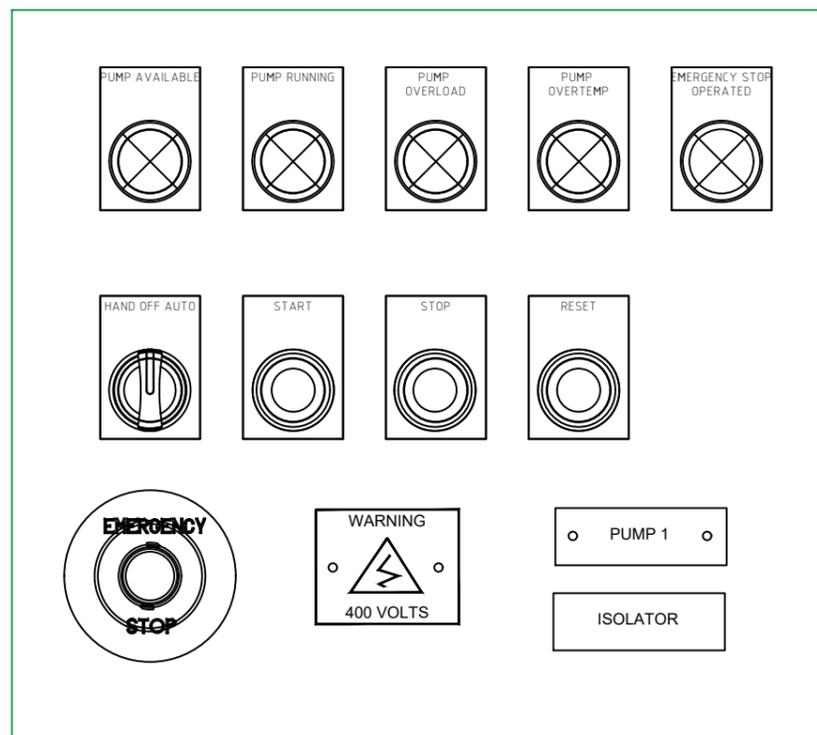
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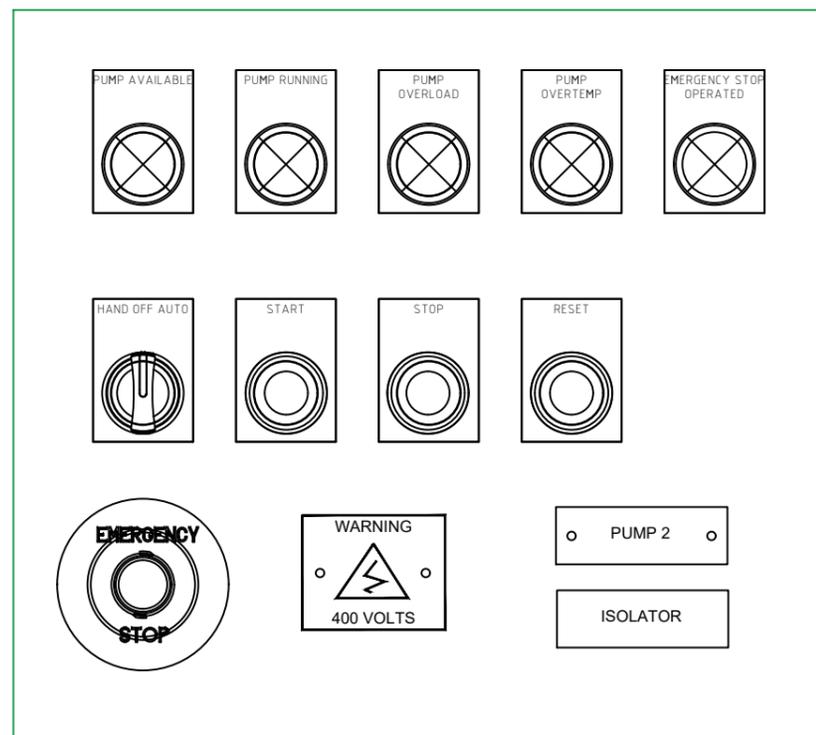
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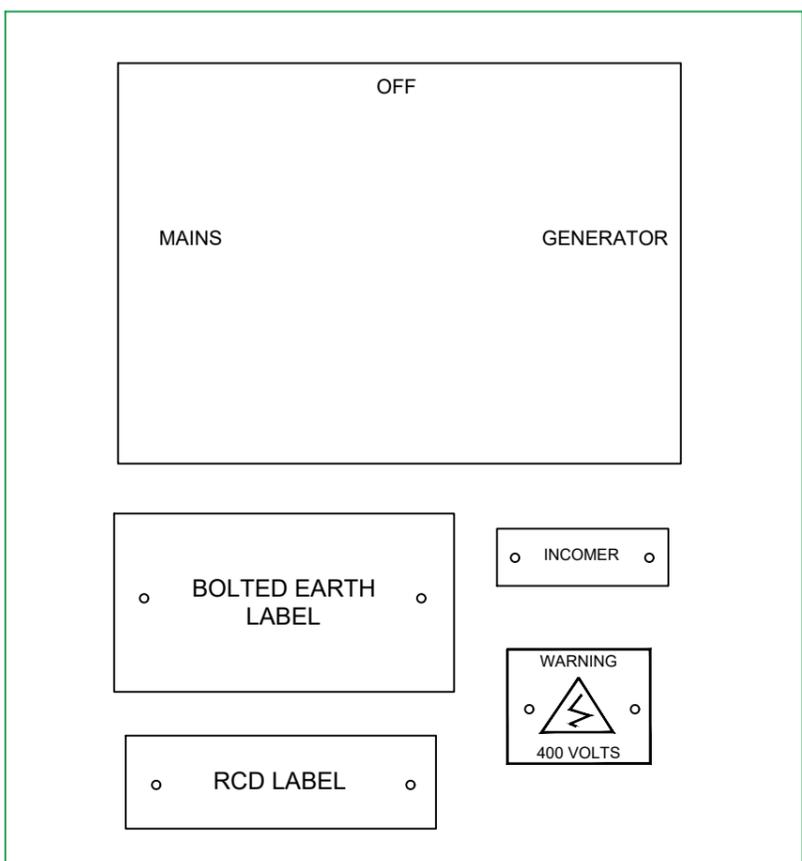
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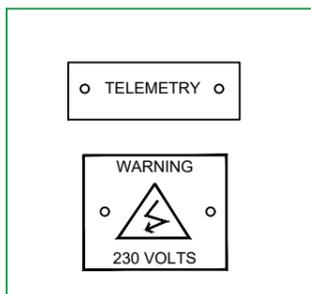
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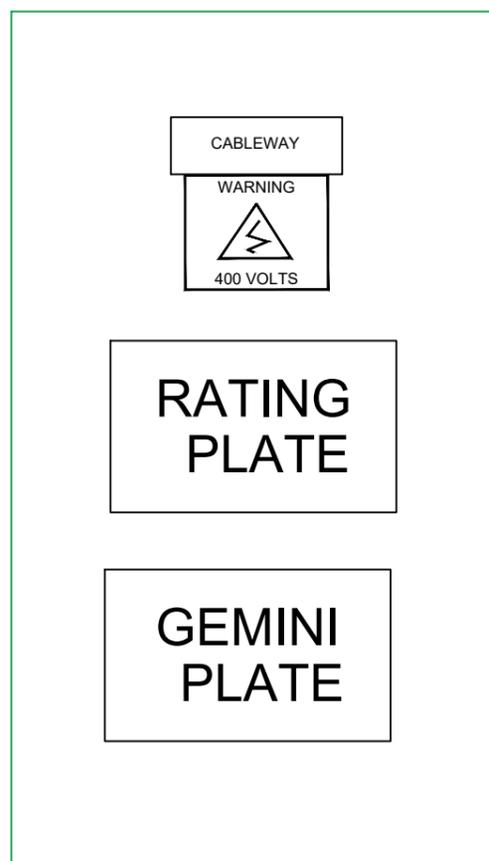
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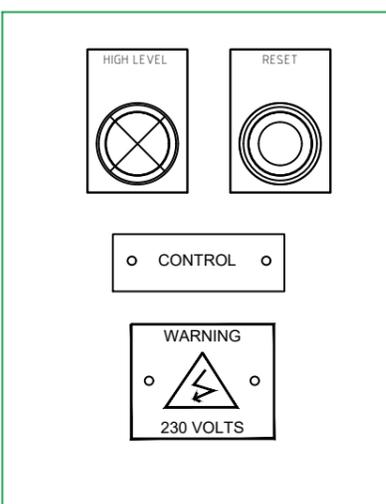
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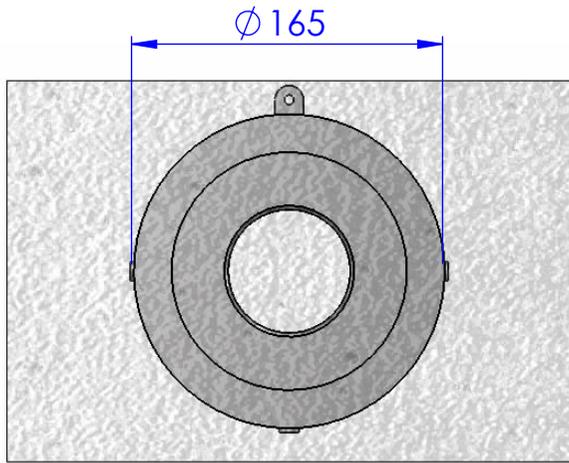
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DUAL PUMP ASD CONTROL PANEL  
LABEL LAYOUT

Site  
Whitechapel Road Cleckheaton

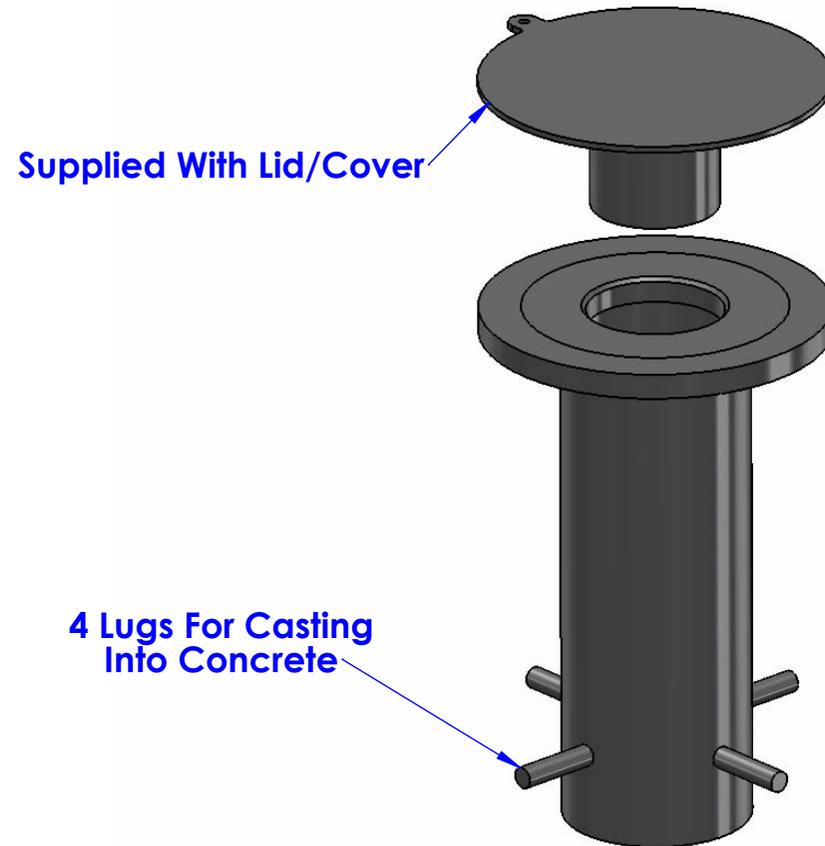
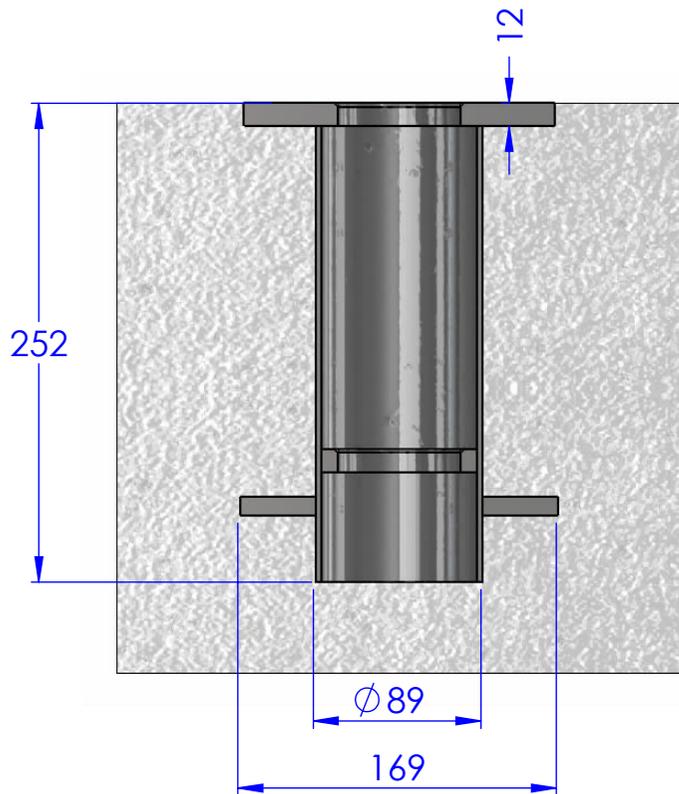
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**Appendix F**  
**Lifting Equipment**

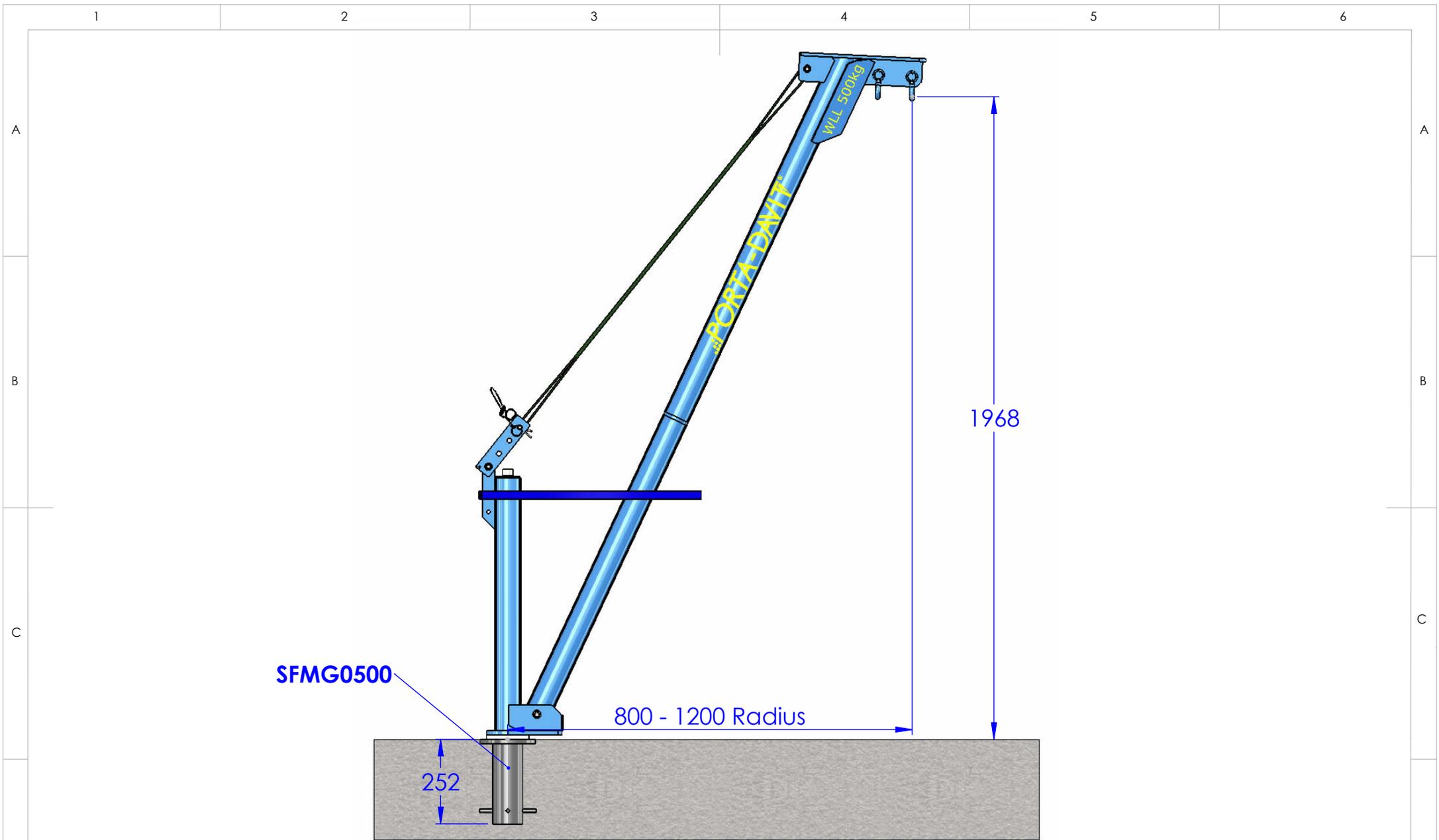


**SFMG0500 - Flush Mount Socket**  
(Cast Into Concrete)



Supplied With Lid/Cover

4 Lugs For Casting  
Into Concrete



DO NOT SCALE DRAWING

REVISION

	NAME	DATE	FINISH:
DRAWN	C.MEEK-WELSH	09/09/2014	Natural

CHK'D			MATERIAL:
APPV'D			

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 DIMENSIONS ARE IN MILLIMETERS  
 GENERAL MACHINING TOLERANCES ± 0.10 mm  
 GENERAL FABRICATION TOLERANCES ± 1.00 mm  
 DEBUR AND BREAK SHARP EDGES

TITLE:

## Porta Davit 500 & Flush Mount (Cast In) Socket

DWG NO. **PDSSF0500-1200 + SFMG0500** A4

Weight: SCALE: 1:15 SHEET 1 OF 1



Reid Lifting Limited, Unit 1, Severnlink, Newhouse Farm, Ind Est, Chepstow, Monmouth, NP16 6UN, UK

Tel +44(0) 1291 620796  
 Fax +44(0) 1291 626 490  
[enquiries@reidlifting.com](mailto:enquiries@reidlifting.com)

**Appendix G**  
**Yorkshire Water Proforma**

TO BE COMPLETED FOR ALL <u>NEW &amp; REPLACED</u> MECHANICAL & ELECTRICAL ASSETS															
YORKSHIRE WATER SERVICES LTD- ASSET INVENTORY (AI) - ASSET DESCRIPTION															
1.	Installation	Whitechapel Road Cleckheaton						2.	Type of Installation	Foul Water					
3.	Process group			4.	Process										
5.	Asset Name							6.	Scheme code						
7.	Location ON SITE	WSP dwg. WCR-WSP-XX-XX-M2-C-0501			8.	New	X	Replacement			Amendment				
							9.	Existing AI Ref. No							
		A	Mechanical Details		B	Other Mech. details		C	Electrical Motor details		D	Other Elec. details			
10.	Equipment Description	Two Submersible Pumps						SQ CAGE		Control Panel					
11.	Manufacturer name	Grundfos						Grundfos		GEMINI					
12.	Model/Frame size	SEV.80.80.40.A.EX4.51D						SEV.80.80.40.A.EX.A.51D 4.0KW		YW SPEC					
13.	P&I Tag No														
14.	Serial No	T B C						T B C		T B C					
15.	Asset Value	£8,000						INCL. IN PUMP COST		£12,000					
16.	Criticality Indicator														
17.	Manufactured Year	2021						2021		2021					
18.	Installed From Date	Provisionally 2021						Provisionally 2021		Provisionally 2021					
NOTES		19.	Speed	2870	RPM	Speed		RPM	Speed	2870	RPM	Speed		RPM	
		20.	Lubricant type	N/A		Lubricant type			Lubricant type	N/A		Lubricant type			
		21.	Rating	4.00	kW	Rating			31.	Haz Equip Class	EXP	Haz Equip Class			
		22.	Size			Size			32.	IP Rating	68	IP Rating			
		22.	Size			Size			33.	Power	4	kW	Power		kW
		23.	Head	14.45	Metres	Head		Metres	34.	Voltage In	400	AC/DC	Voltage In		AC/DC
		24.	Flow	4.75	L/sec	Flow			35.	Voltage Out	400		Voltage Out		AC/DC
		25.	Pressure		bar				36.	Current In	4.8	AMP	Current In		AMP
		26.	Impeller Type	Super Vortex		30.	Ratio		37.	Current Out	4.8	AMP	Current Out		AMP
		27.	No of Stages	Single					38.	Insulation Class	F		Insulation Class		
		28.	Const Material	CAST IRON		Const Material									
		29.	Weight	157	Kg	Weight		Kg	Weight	AS PUMP	kg	Weight	400	Kg	
39.	Name of person filling in sheet	Idi Handem													
40.	Company name & contact Tel No	Pump Design and Services Ltd 01483 930520						41.	Date filled in	09/03/2022					

**Appendix I**  
**Structural Analysis**

# DESIGN CALCULATIONS FOR PROPOSED FOUL WATER PUMPING STATION FOR WHITECHAPEL ROAD, CLECKHEATON

ON BEHALF OF



**PDAS Ltd**

Pump Design and Services Ltd

Date: May '22  
Ref: 6711



## DOCUMENT CONTROL RECORD

Document Issue:

Rev	Date	Issue Status	Prepared by	Checked by
-	18-05-22	First Issue	A Krakowiak BEng (Hons)	J A Kerton BEng CEng MICE



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**Flotation Calculations**

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**Cover Slab Design 300**

**PS/01-03**

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**Pumping Station GA & Details Sheet 2**

**6711-MJA-SW-XX-DR-S-1001-P1**

**Pumping Station GA & Details Sheet 3**

**6711-MJA-SW-XX-DR-S-1002-P2**

**RC Details Sheet 4**

**6711-MJA-SW-XX-DR-S-1003-P1**



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Abingdon Science Park  
Abingdon  
Oxfordshire  
OX14 3YS

	Project:	6711	Calcs by:	AK
	Job No:	Whitechapel Road, Cleckheaton	Chkd by:	JAK
	Client:	PDAS	Date:	02.05.22

### **DESIGN BRIEF**

These design calculations cover the design of the wet well, inlet chamber, valve chamber and the cover slabs to the Foul Water pumping station.

The following calculations have been prepared to ensure that the inlet chamber, wet well and valve chambers do not become buoyant in certain conditions. These being in the permanent condition, when the tank may be considered empty. Long term ground water monitoring has not been undertaken therefore water is considered at worst case of being at ground level; for this condition we have assessed the tank against a factor of safety of 1.1. The chambers have also been assessed against the temporary condition during the construction phase to ensure that the chambers do not become buoyant. For the temporary condition we have assessed the chambers against a factor of safety of 1.0.

The design of the tank has been assessed to ensure that the allowable bearing capacity is not exceeded in the permanent condition with the tank 90% full of water. Ground conditions are Mudstones for deeper chambers. The allowable bearing capacity of this site has been taken as 100kPa. These values are based on Phase I and II Geo-environmental Report, Whitechapel Road, Cleckheaton, Ref: 17036/139, dated August 2018.

The cover slabs have been designed to the chambers to ensure that they do not fail under an accidental wheel load applied.

### **REFERENCES**

- Sewers for Adoption – 6<sup>th</sup> Edition including interim technical addendum No.1
- BS 5911-6: 2004 +A1:2010 Concrete pipes and ancillary concrete products — Part 6: Specification for road gullies and gully cover slabs.
- BS 8110-1:1997 Structural use of concrete. Code of practice for design and construction
- Phase I and II Geo-environmental Report, Whitechapel Road, Cleckheaton, Ref: 17036/139, dated August 2018.



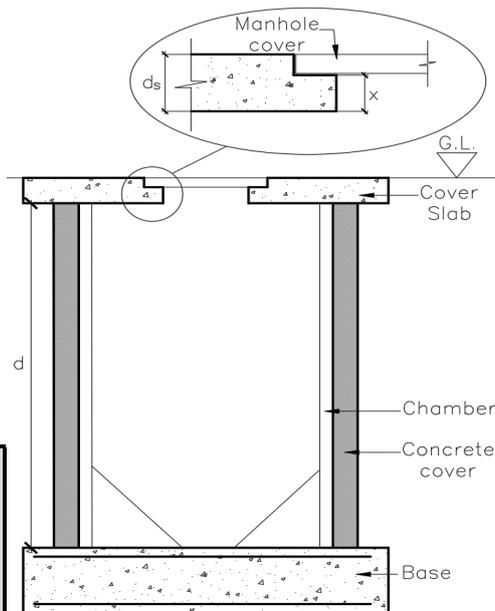
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 Client: PDAS

Calcs by: AK  
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**Wet Well Design (Worst case)**

<b>Chamber</b>	
Wall thickness:	150 mm
Concrete cover:	200 mm
Internal diameter:	2700 mm
Depth (d):	4450 mm
Concrete $\gamma$	24 kN/m <sup>3</sup>
<b>Base</b>	
Depth:	750 mm
Length:	3600 mm
Width:	3600 mm
<b>Cover Slab</b>	
Depth (d <sub>s</sub> ):	350 mm
Length:	3600 mm
Width:	3600 mm
Void Length:	1500 mm
Void Width:	900 mm
Void Depth (x):	210 mm
<b>Ground Conditions</b>	
Water Table:	0.0 m
ABP:	100 kN/m <sup>2</sup>

<b>Checks</b>	
Floatation:	ACCEPTABLE (Perm)
Bearing:	ACCEPTABLE
Rebar required:	975 mm <sup>2</sup> /m
Provide:	3 layers A393 mesh top and bottom A <sub>sprov</sub> = 1179 mm <sup>2</sup> /m



<b>Floatation</b>	
external diameter=	3.40 m
Volume of water displaced	= 57.8 m <sup>3</sup>
∴ mass of water displaced	= 567.4 kN
self weight of chamber	= 702.2 kN
FoS against floatation	= $\frac{\text{self weight} \times 0.9}{\text{mass of water displaced}}$ = $\frac{632.0}{567.4}$ = 1.11
1.11 > 1.1	∴ ACCEPTABLE against floatation
<b>Bearing</b>	
self weight of chamber empty	= 702.2
Assuming 90% full of water	= 225.0
Total	= 927.1 kN
GBP	= 71.5 kN/m <sup>2</sup>
71.5 < 100 kN/m <sup>2</sup>	∴ ACCEPTABLE in bearing
<b>Reinforcement</b>	
ULS	= 983.1 kN
w	= 75.9 kN
M <sub>ult</sub>	= 34.3 kNm
d	= 660 mm
A <sub>s</sub>	= 126 mm <sup>2</sup> /m
A <sub>smin</sub>	= 975 mm <sup>2</sup> /m



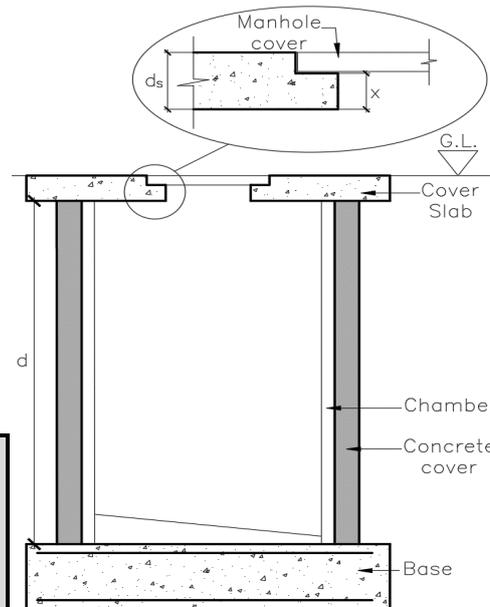
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**Inlet Manhole Design**

<b>Chamber</b>	
Wall thickness:	105 mm
Concrete cover:	150 mm
Internal diameter:	1500 mm
Depth (d):	2655 mm
Concrete $\gamma$	24 kN/m <sup>3</sup>
<b>Base</b>	
Depth:	300 mm
Length:	2200 mm
Width:	2200 mm
<b>Cover Slab</b>	
Depth (d <sub>s</sub> ):	350 mm
Length:	2300 mm
Width:	2300 mm
Void Length:	675 mm
Void Width:	675 mm
Void Depth (x):	180 mm
<b>Ground Conditions</b>	
Water Table:	0.0 m
ABP:	100 kN/m <sup>2</sup>

<b>Checks</b>	
Floatation:	ACCEPTABLE (Perm)
Bearing:	ACCEPTABLE
Rebar required:	390 mm <sup>2</sup> /m
Provide:	1 layers A393 mesh top and bottom A <sub>sprov</sub> = 393 mm <sup>2</sup> /m



<b>Floatation</b>	
external diameter=	2.01 m
Volume of water displaced	= 12.8 m <sup>3</sup>
∴ mass of water displaced	= 125.9 kN
self weight of chamber	= 166.9 kN
	temp = 124.4 kN
FoS against floatation	= $\frac{\text{self weight}}{\text{mass of water displaced}} = \frac{166.9}{125.9} = 1.33$
(Perm) 1.33 > 1.1	∴ ACCEPTABLE against floatation
<b>Bearing</b>	
self weight of chamber empty	= 166.9
Assuming 90% full of water	= 41.4
Total	= 208.3 kN
GBP	= 43.0 kN/m <sup>2</sup>
43.0 < 100 kN/m <sup>2</sup>	∴ ACCEPTABLE in bearing
<b>Reinforcement</b>	
ULS	= 233.7 kN
w	= 48.3 kN
M <sub>ult</sub>	= 6.7 kNm
d	= 210 mm
A <sub>s</sub>	= 78 mm <sup>2</sup> /m
A <sub>smin</sub>	= 390 mm <sup>2</sup> /m



Project: 6711  
 Job No: Whitechapel Road, Cleckheaton  
 Client: PDAS

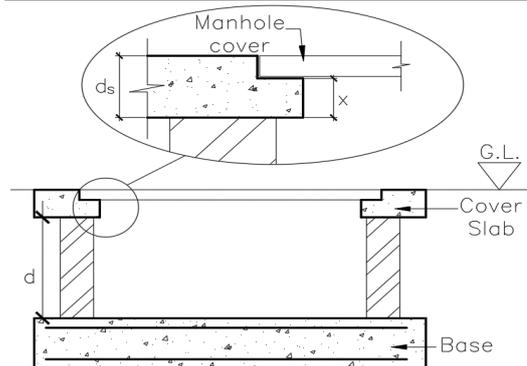
Calcs by: AK  
 Chkd by: JAK  
 Date: 02.05.22

### Valve Chamber Design

<b>Chamber</b>	
Wall thickness:	215 mm
Internal diameters:	1800 mm
by	2400 mm
Depth (d):	1450 mm
Brickwork $\gamma$	22 kN/m <sup>3</sup>
<b>Base</b>	
Depth:	300 mm
Length:	3000 mm
Width:	2400 mm
<b>Cover Slab</b>	
Depth (d <sub>s</sub> ):	350 mm
Length:	3600 mm
Width:	3000 mm
Void Length:	2400 mm
Void Width:	1800 mm
Void Depth (x):	180 mm
<b>Ground Conditions</b>	
Water Table:	0.0 m
ABP:	100 kN/m <sup>2</sup>
Surcharge:	10.0 kN/m <sup>2</sup>
$\phi'$ :	22 °
$\gamma$ :	18 kN/m <sup>2</sup>

<b>Checks</b>	
Floatation:	ACCEPTABLE (Perm)
Bearing:	ACCEPTABLE
Rebar required:	390 mm <sup>2</sup> /m
Provide:	1 layer A393 mesh top and bottom $A_{sprov} = 393 \text{ mm}^2/\text{m}$
Masonry Panel:	ACCEPTABLE

Mortar class:	I (M12)
Masonry unit:	clay bricks (absorption <7%)



<b>Floatation</b>					
Volume of water displaced	=	17.3 m <sup>3</sup>			
$\therefore$ mass of water displaced	=	169.7 kN			
self weight of chamber	=	187.4 kN	temp	=	115.3 kN
FoS against floatation	=	$\frac{\text{self weight}}{\text{mass of water displaced}}$	=	$\frac{187.4}{169.7}$	= 1.10
(Perm)	1.10	>	1.1	$\therefore$	ACCEPTABLE against floatation
<b>Bearing</b>					
self weight of chamber empty	=	187.4			
Assuming 90% full of water	=	<u>57.9</u>			
Total	=	245.3 kN			
GBP	=	34.1 kN/m <sup>2</sup>			
	34.1	<	100 kN/m <sup>2</sup>	$\therefore$	ACCEPTABLE in bearing
<b>Reinforcement</b>					
ULS	=	262.4 kN			
w	=	36.4 kN			
M <sub>ult</sub>	=	13.0 kNm			
d	=	210 mm			
A <sub>s</sub>	=	150 mm <sup>2</sup> /m			
A <sub>smin</sub>	=	390 mm <sup>2</sup> /m			



Project: 6711  
Job No: Whitechapel Road, Cleckheaton  
Client: PDAS

Calcs by: AK  
Chkd by: JAK  
Date: 02.05.22

### Wall design

$$\begin{aligned}K_a &= 0.45 \\K_o &= 0.63 \\P_{a(ULS)} &= 22.9 \\P_{s(ULS)} &= \underline{10.0} \\&= 32.9 \text{ kN/m}^2 \\h/l &= 0.60 \\\mu &= 0.35 \\therefore \alpha &= 0.024\end{aligned}$$

Design bending moment for panel:

$$\begin{aligned}a) \text{ perpendicular to bed joints} &= 4.61 \text{ kNm} \\b) \text{ parallel to bed joints} &= 1.61 \text{ kNm}\end{aligned}$$

$$\begin{aligned}f_{kx} &= 2.0 \text{ N/mm}^2 \\Y_m &= 3.0 \\z &= 7.7 \text{ mm}^3\end{aligned}$$

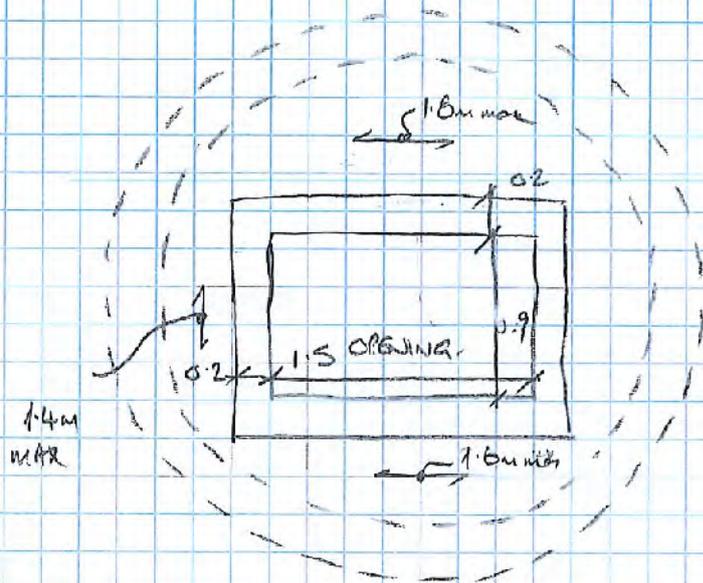
Moment resistance of panel:

$$M_R = 5.1 \text{ kNm}$$

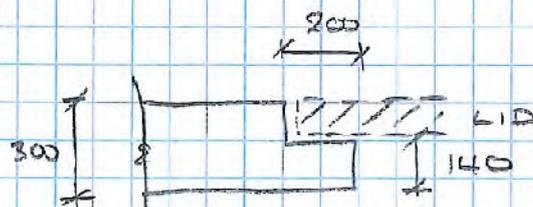
$$5.1 > 4.61 \text{ kNm} \quad \therefore \text{ACCEPTABLE}$$

Project L	Job No.	Date	Page No. PS/01	Rev	
	Member/Location COVER SLABS		Engineer JAK	Checked	

COVER SLABS



IL = 10 kN/m<sup>2</sup> basic + A  
construction loading  
A = 100 kN



COVER SLAB RECESSED FOR  
ACCESS LID ~ 2.0 kN/m<sup>2</sup> IL

• Check shear in ribs

Assume worst case load carried on 2 opposite sides only  
 $ult = (1.4 \times 20 + 1.6 \times 10) \times 1.5/2 = \underline{12.2 \text{ kN/m run each side}}$

$d = 140 - 30 - 10/2 = 105 \text{ mm}$  try HB bars  $100 \pm$   $A_{psl} = 503 \text{ mm}^2/\text{m}$

$v = \frac{12.2 \cdot 10^3}{1000 \times 105} = \underline{0.12 \text{ N/mm}^2}$

$\frac{100 A_s}{bd} = \frac{100 \cdot 503}{1000 \times 105} = \underline{0.48} < 3.0 \therefore \text{OK}$

$\frac{100}{d} = \frac{400}{105} = \underline{3.8}$        $\left(\frac{f_{cu}}{25}\right)^{1/3} = \left(\frac{40}{25}\right)^{1/3} = \underline{1.17}$

$v_c = 0.79 (0.48)^{1/3} \cdot (3.8)^{1/4} \times \frac{1.17}{1.25}$

$= \underline{0.81 \text{ N/mm}^2} \gg 0.12 \text{ N/mm}^2 \therefore \text{Adequate in shear}$

Project	Job No.	Date	Page No. PS/02	Rev	
	Member/Location COVER SLAB	Engineer DARK	Checked		

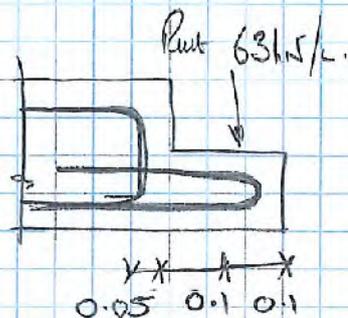
Central PL = 100kN curved on opposite edges

$$\text{ult load} = (1.6 \times 100/2 + 1.4 \times 2.0 \times 1.3/2) = \underline{82kN}$$

$$\text{short edge } 1.8m \text{ lg} \Rightarrow \frac{82}{1.3} = \underline{63kN/m \text{ equivalent line load}}$$

$$D = \frac{63 \cdot 10^3}{10^3 \times 105} = \underline{0.6 \text{ mm}^2} < D_a (0.51) \therefore \text{Adequate}$$

### Nib Bending



$$M_{ult} = 63 \times 0.15 = \underline{9.45kNm}$$

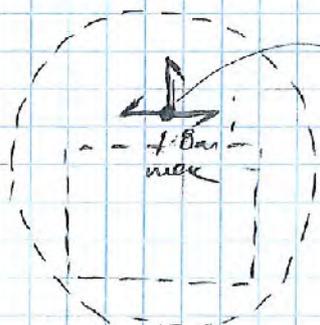
$$\frac{M}{bd^2} = \frac{9.45 \cdot 10^6}{1000 \cdot 105^2} = 0.857 \Rightarrow \underline{z = 0.95d}$$

$$A_{sreq}^0 = \frac{9.45 \cdot 10^6}{0.87 \times 500 \times 0.95 \cdot 105} = \underline{218 \text{ mm}^2/m \text{ min}}$$

$$A_{smin} = 0.13 \frac{bh}{100} = 152 \text{ mm}^2/m < A_{sreq}^0$$

$$\underline{A_{sprov} = 503 \text{ mm}^2/m > A_{sreq}^0 \therefore \text{Adequate}}$$

### Cover Slab Bending



Ignore benefits of side support for general loading

$$DL = 0.3 \times 24 = 7.2 \text{ kN/m}^2$$

$$\text{ult} = (1.4 \times 7.2 + 1.6 \times 10) = \underline{26.1 \text{ kN/m}^2}$$

$$M_{ult} = 26.1 \times 1.8^2/6 \times 1 = \underline{10.6kNm}$$

Project	Job No.	Date	Page No. Ps) 03	Rev	
	Member/Location COVER SLAB	Engineer DAR	Checked		

Point load condition:

$$M_{ult} = 1.4 \times 7.2 \times 1.8 \frac{3}{8} + 1.6 \times 100 \times \frac{1.8}{4} = 4 + 72 = \underline{76 \text{ kNm}}$$

$$d = 300 - 35 - 20 \frac{1}{2} = 255 \text{ mm}$$

$$\frac{M}{bd^2} = \frac{76 \cdot 10^6}{1000 \cdot 255^2} = \frac{1.17}{10} = 1.17 \times 10^{-2} = 0.029$$

$\therefore z = 0.95d$

$$A_{sreq} = \frac{76 \cdot 10^6}{0.87 \cdot 500 \cdot 0.95 \cdot 255} = \underline{721 \text{ mm}^2/\text{m}}$$

$$A_{smin} = 0.13 \times 1000 \times \frac{255}{100} = \underline{332 \text{ mm}^2/\text{m}} < A_{sreq}$$

USE 412 bars @ 100'c

$$\underline{A_{sprov} = 1131 \text{ mm}^2/\text{m}} > A_{sreq} \quad \therefore \text{Adequate}$$

$$f_s = \frac{2}{3} \times \frac{721}{1131} \times 500 = \underline{212 \text{ N/mm}^2}$$

$$m_f = 0.55 + \frac{(477 - 212)}{120(1.17 + 0.9)} = \underline{1.62}$$

$$\text{allowable } s_{p/d} = 20m_f = 20 \times 1.62 = 32$$

$$\text{actual } s_{p/d} = \frac{1800}{255} = \underline{7} < 32 \quad \therefore \text{Adequate}$$

Shear check:

$$V_{ult} = \left( 1.4 \times 7.2 \times 1.8 \frac{3}{2} + 1.6 \times 100 \frac{1}{2} \right) = \underline{89 \text{ kN}}$$

$$V = \frac{89 \cdot 10^3}{1000 \cdot 255} = \underline{0.34 \text{ N/mm}^2}$$

$$v_c = 0.79 (0.44)^{1/3} \cdot (1.57)^{1/4} \cdot \frac{1.17}{1.25}$$

$$= \underline{0.63 \text{ N/mm}^2} > 0.34 \text{ N/mm}^2 \quad \therefore \text{Adequate for shear}$$

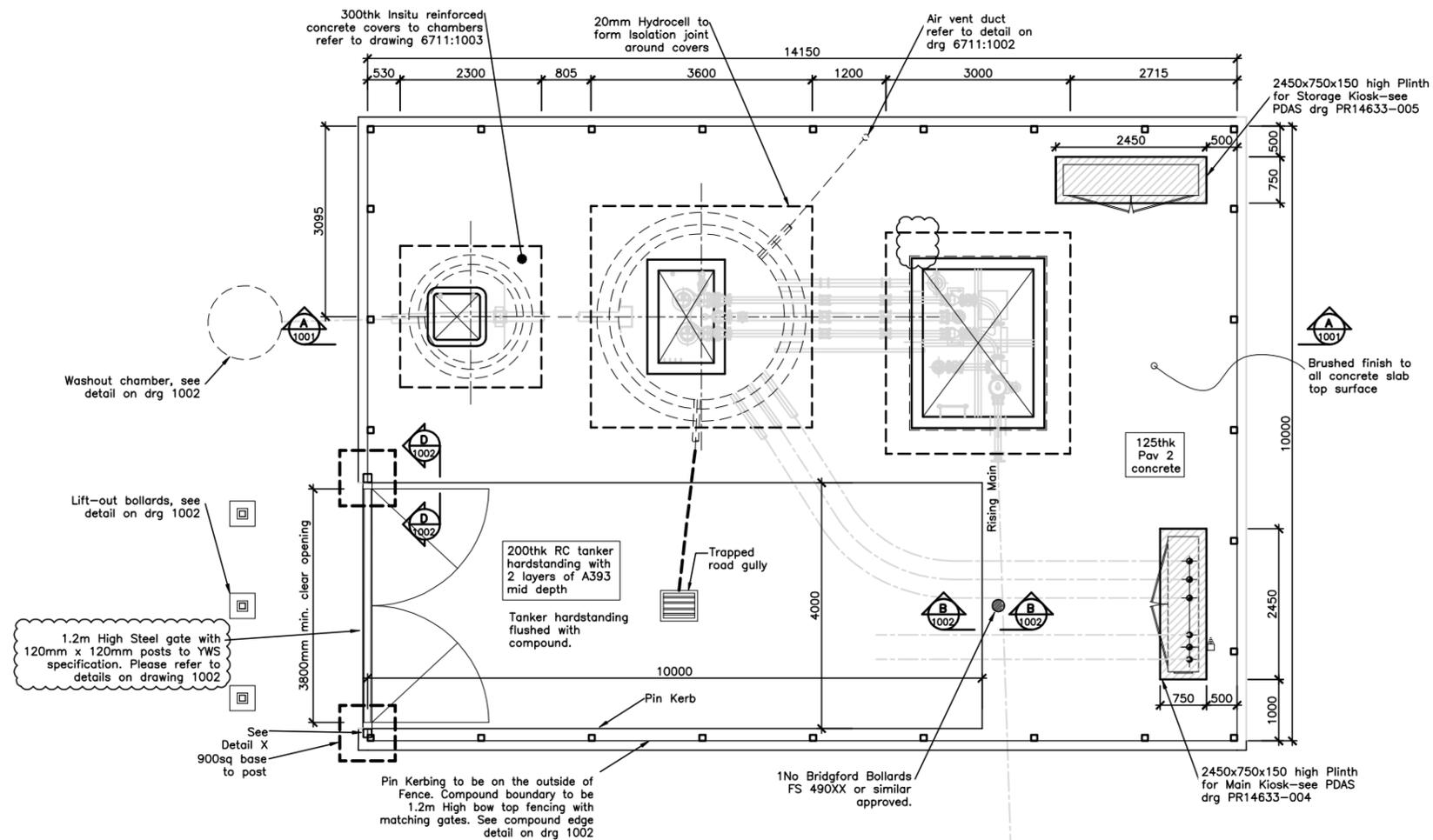
**Reinforced Concrete Notes:**

1. This drawing is to be read in conjunction with PDAS Ltd drawings.
2. Dimensions must not be scaled from this drawing.
3. All reinforced concrete is designed to BS 5400 and all construction is to comply with this code.
4. Reinforced concrete to be Grade: RC40/50 for below ground structure, specified in accordance with BS 8500 & BS 206-1.
- Above ground/hard surface slabs to be exposure class XF2 & provide grade: PAV2 concrete.
- All reinforced concrete below ground level to be exposure classes XD3, XC3/4, design sulphate class AC-2z & DC-2z in accordance with BRE Special Digest No 1:Part 1. Maximum aggregate size: 20mm.
5. Concrete test samples shall be provided in accordance with the requirements of BS EN 12350-1.
6. All excavations for reinforced concrete shall be kept free from water, loose material and rubbish.
7. Reinforcement should comply with BS 4449, 8666, 4482 or 4483. All reinforcement designated 'B' should be high yield high yield in accordance with BS 4482 and BS 4483.
8. Reinforcement shall be free from oils, paint etc (which may adversely affect its bond with the concrete).
9. Cover to reinforcement to be: Nominal 50mm when cast against shutters & blinding, 75mm all other faces. Tolerance Δc=5mm for below ground and for above ground/hard surface slabs nominal cover to be 50mm+Δc
10. Top reinforcement in slabs shall be supported on mild steel chairs to ensure all reinforcement has the required cover of concrete.
11. Spacer blocks are to be made of precast concrete or a suitable plastic alternative. They shall be used to ensure that all reinforcement has the required cover of concrete. Pieces of wood, brick etc are not permitted.
12. It shall be the responsibility of the contractor to check bending schedules against the drawings prior to the ordering of the reinforcement and to notify the Engineer of any discrepancies.
13. The structure is designed to be stable upon completion, temporary stability is the responsibility of the Contractor.
14. Surface finish to contract specification.

Pumping equipment as specified and detailed by PDAS Ltd.

Minimum Laps for Reinforcement	
Bar Dia	Lap Lengths
H8	325 mm
H10	400 mm
H12	475 mm
H16	625 mm
H20	1050 mm
H25	1300 mm
H32	1675 mm

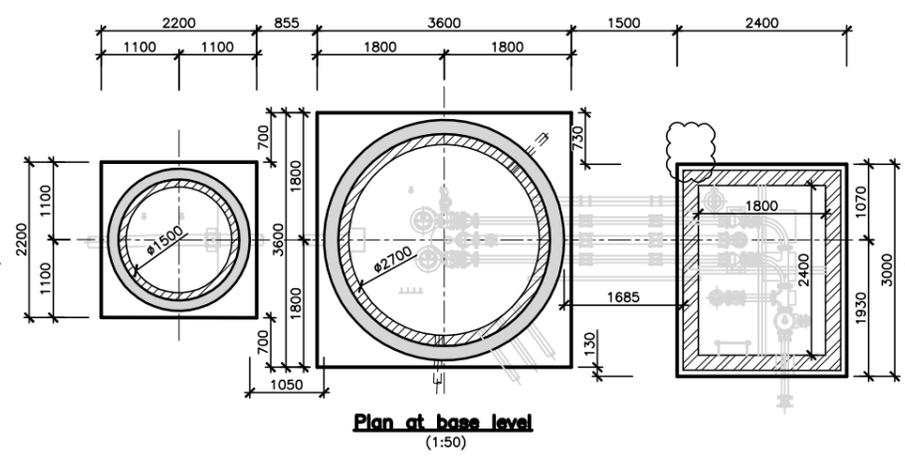
All minimum laps to reinforcement are to comply with the requirements of BS 8110.



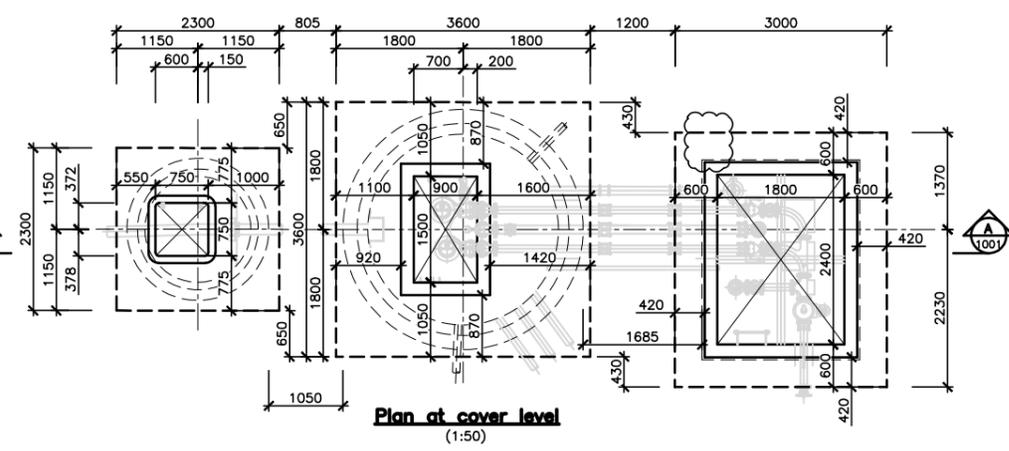
**Compound setting out layout**  
(1:50)

Details in accordance with PDAS Ltd drg PR14633-006 Check against latest drawings before construction

Note: all dimensions indicated are to be confirmed on site  
1 layer of A393 Mesh mid depth in 125thk PAV with 400mm laps (flying ends)



**Plan at base level**  
(1:50)



**Plan at cover level**  
(1:50)

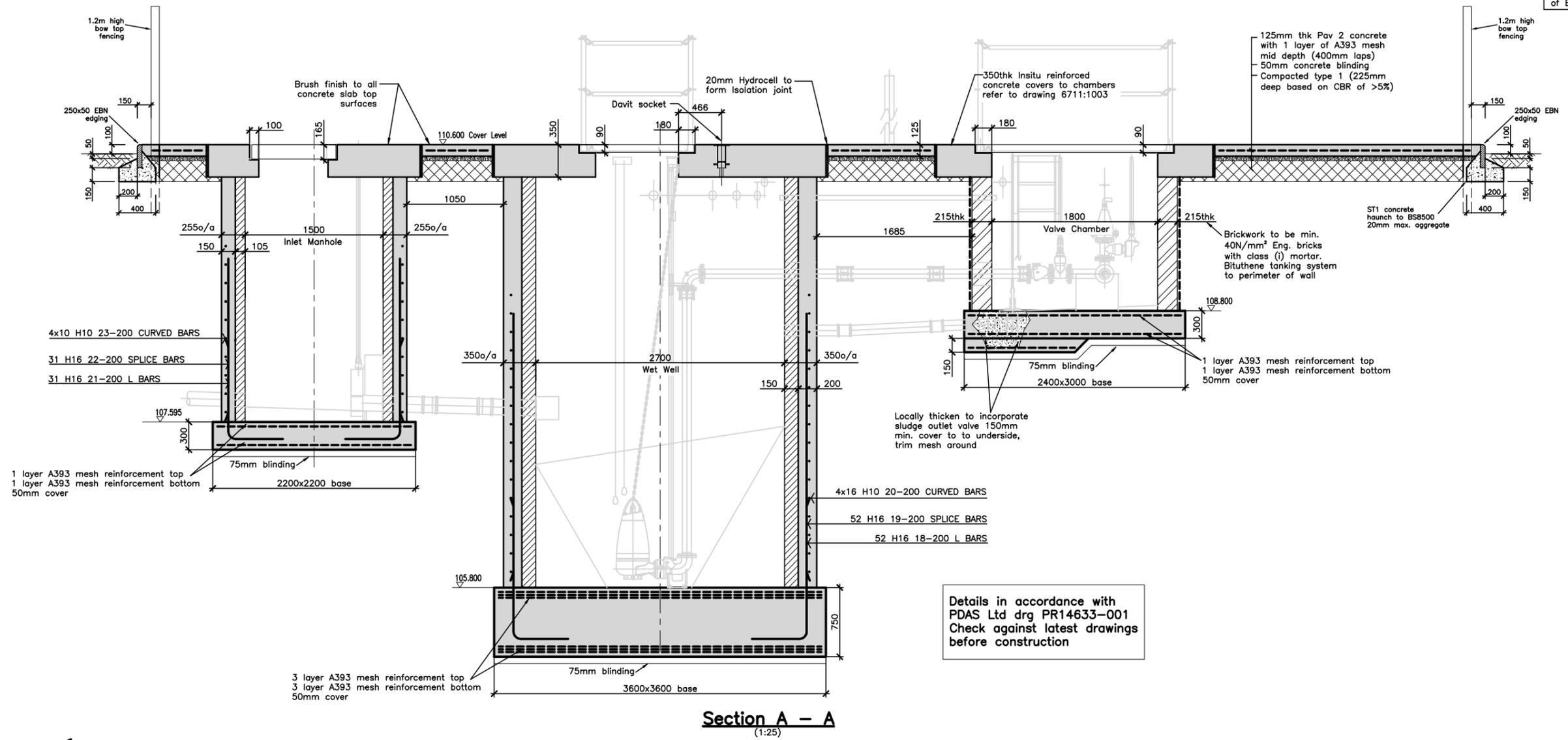
REV. No.	DATE	DESCRIPTION	DRAWN	CHECKED
P2	11/05/22	Air ducts removed from the valve chamber. Gate post size updated.	AK	JAK
P1	05/05/22	Preliminary Issue.	AK	JAK
Client				
Project	Whitechapel Road, Cleckheaton		CIVIL & STRUCTURAL ENGINEERS Ipsium Court, 24 The Quadrant, Abingdon Science Park, Abingdon Oxon, OX14 3YS Tel: 01235 555173 Email: mail@mjaconsulting.co.uk	
Title	Pump Station GA & RC Details Sheet 1		Scale: As shown @ A1	Status: PRELIMINARY
Drawn:	AK	Project Engineer: JAK	MJA Project No: 6711	Date: 04/05/2022
Drawing Number:	6711-MJA-SW-XX-DR-S-1000		Rev:	P2

Pumping equipment as specified and detailed by PDAS Ltd.

**Minimum Laps for Reinforcement**

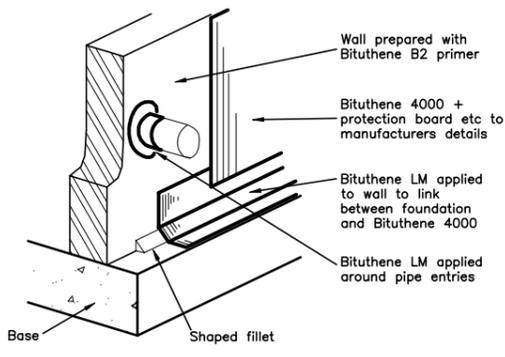
Bar Dia	Lap Lengths
H8	325 mm
H10	400 mm
H12	475 mm
H16	625 mm
H20	1050 mm
H25	1300 mm
H32	1675 mm

All minimum laps to reinforcement are to comply with the requirements of BS 8110.



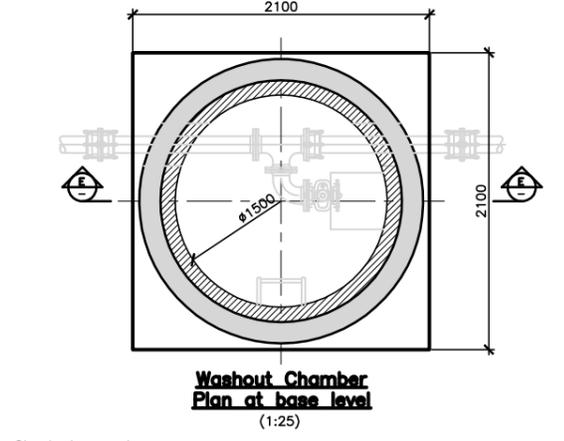
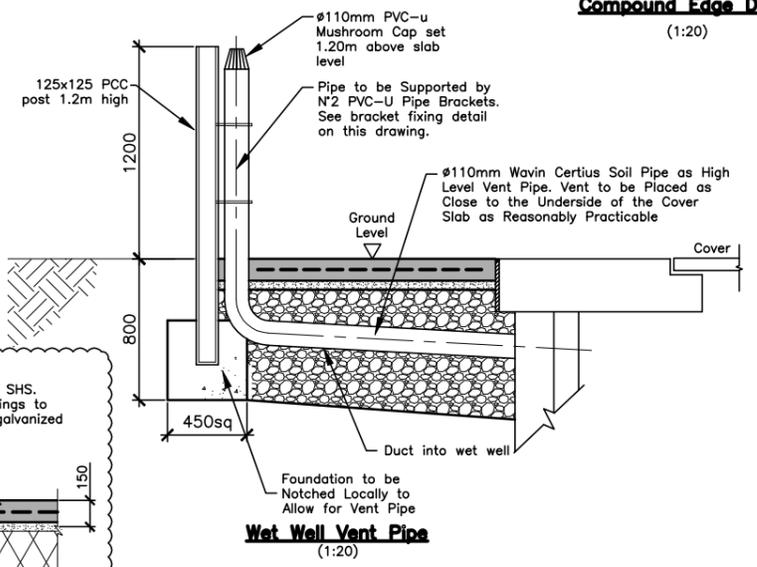
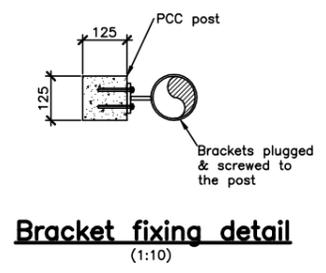
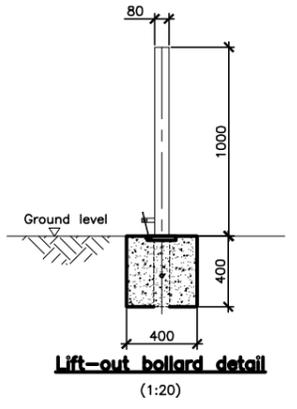
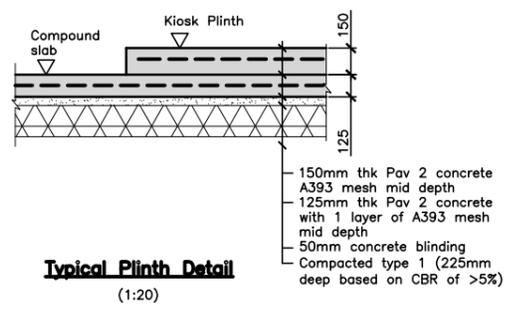
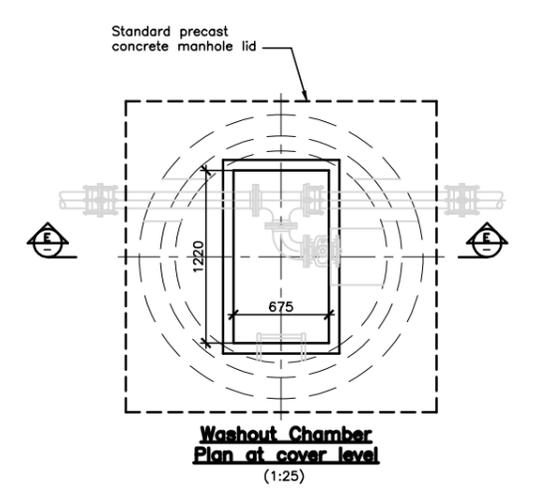
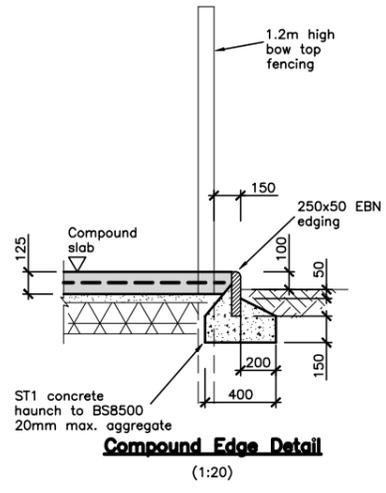
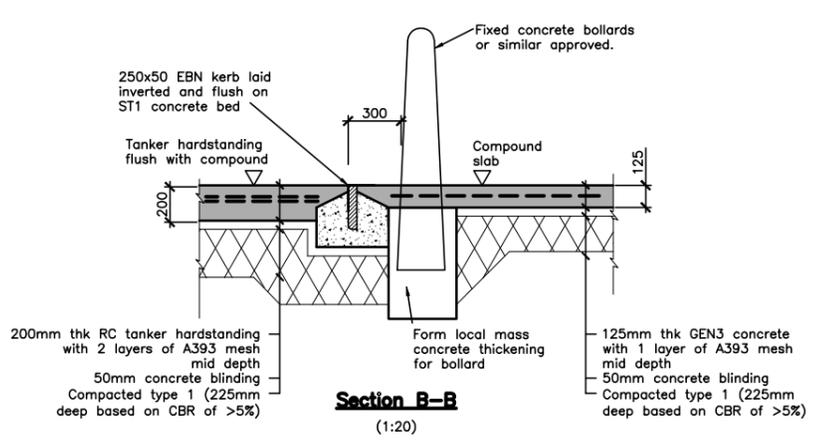
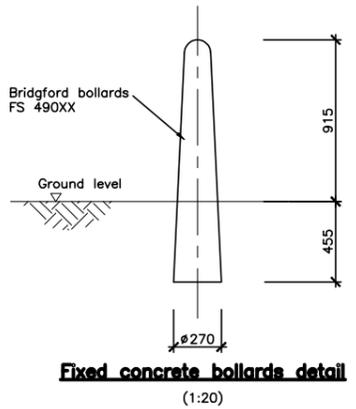
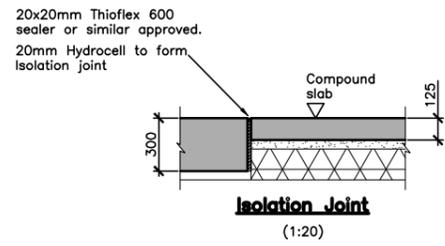
Details in accordance with PDAS Ltd drg PR14633-001 Check against latest drawings before construction

**Section A - A**  
(1:25)



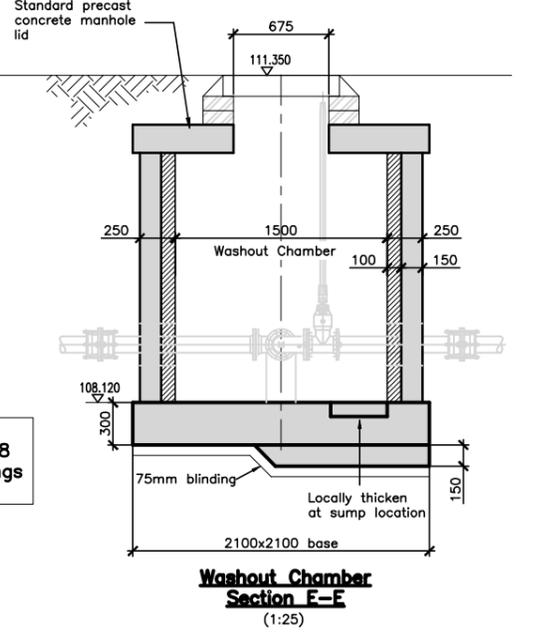
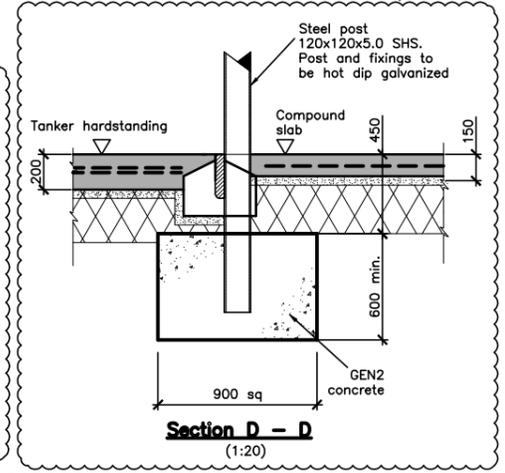
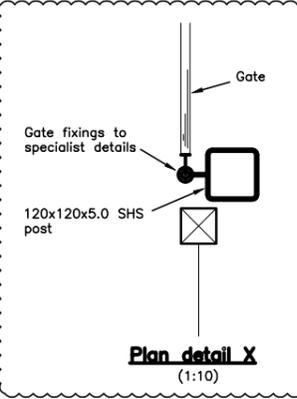
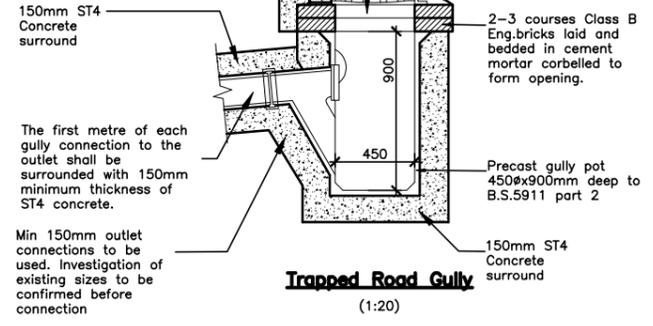
**Isometric view on valve chamber wall**

P1	05/05/22	Preliminary Issue.	AK	JAK
REV. No.	DATE	DESCRIPTION	DRAWN	CHECKED
Client		<p><b>PDAS Ltd</b> Ipsum Court, 24 The Quadrant, Abingdon Science Park, Abingdon Oxon, OX14 3YS Tel: 01235 555173 Email: mail@mjaconsulting.co.uk</p>	<p><b>MJA CONSULTING</b> CIVIL &amp; STRUCTURAL ENGINEERS</p>	
Project			<p><b>Whitechapel Road, Cleckheaton</b></p>	
Title		Scale: <b>As shown@A1</b>	Status: <b>PRELIMINARY</b>	
Drawn:	Project Engineer	MJA Project No:	Date:	
AK	JAK	6711	04/05/2022	
Drawing Number:		Rev:		
6711-MJA-SW-XX-DR-S-1001		P1		

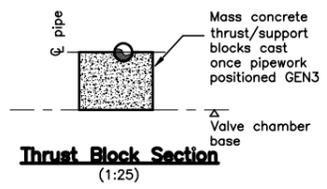
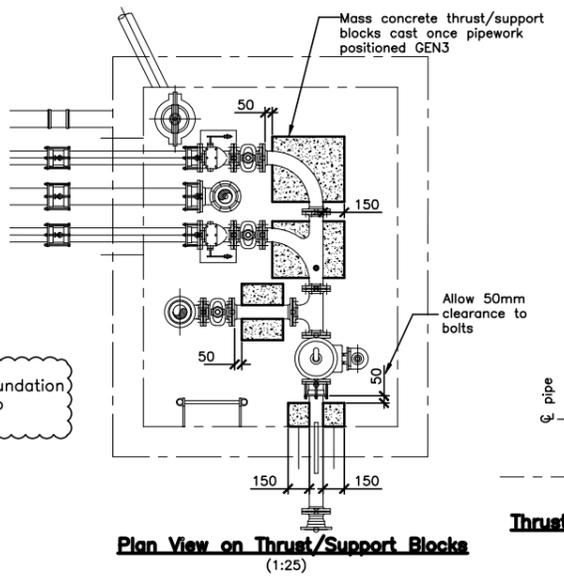
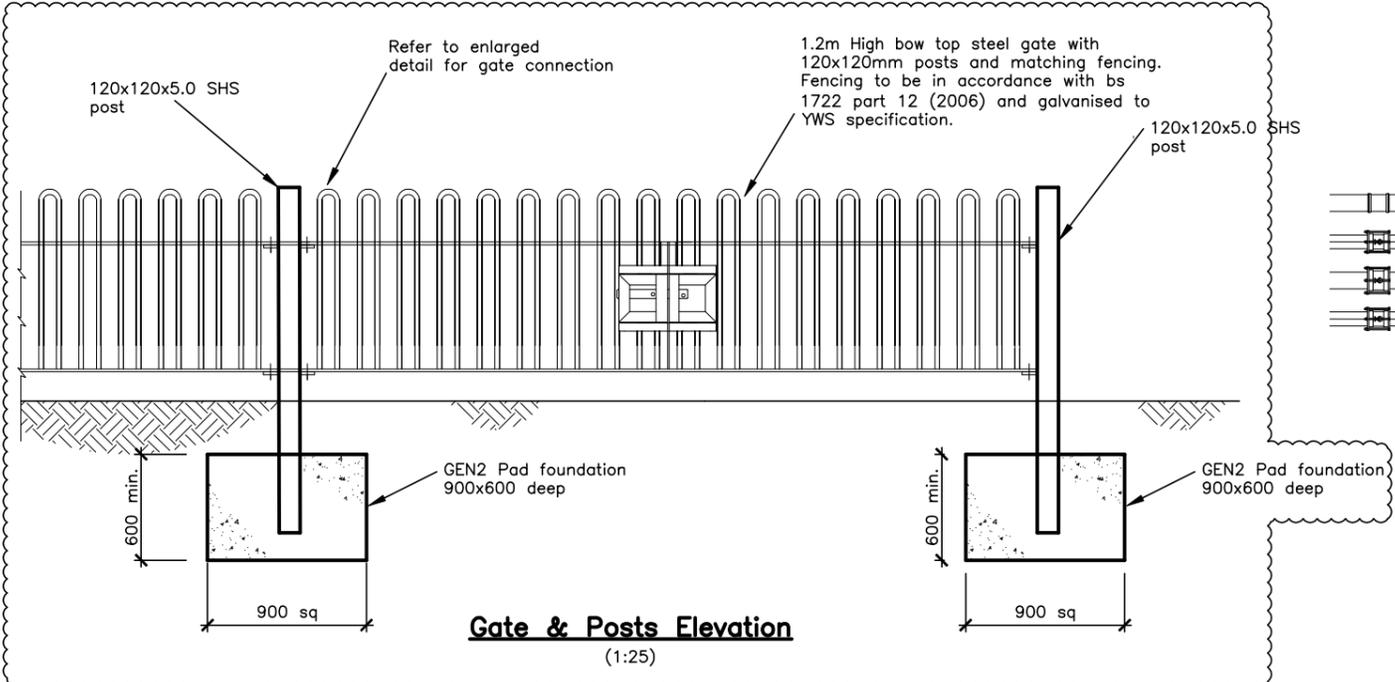


Class D400 end hinged captive Gully grating and frame to B.S.EN 124 Ref.GA2-450 bedded 10-12 Designation (i) cement mortar series 2400.

Any gullies in shared surfaces to have pedestrian grating. Gully Gully grating to be set 15mm below road at kerb face and 5mm at front of grating.



Details in accordance with PDAS Ltd drg PR14633-008 Check against latest drawings before construction



P2	11/02/22	Gate and fence details updated.	AK	JAK
P1	05/05/22	Preliminary Issue.	AK	JAK
REV. No.	DATE	DESCRIPTION	DRAWN	CHECKED
Client				
Project		<b>Whitechapel Road, Cleckheaton</b>		
Title		<b>Pump Station GA &amp; RC Details Sheet 3</b>		
Scale:	As shown	Status:	PRELIMINARY	
Drawn:	AK	Project Engineer:	JAK	Date:
Drawing Number:	6711-MJA-SW-XX-DR-S-1002	MJA Project No:	6711	Date:
				04/05/2022
				Rev: P2

- Reinforced Concrete Notes:**
1. This drawing is to be read in conjunction with PDAS Ltd drawings.
  2. Dimensions must not be scaled from this drawing.
  3. All reinforced concrete is designed to BS 5400 and all construction is to comply with this code.
  4. Reinforced concrete to be Grade: RC40/50 for below ground structure, specified in accordance with BS 8500 & BS 206-1.
- Above ground/hard surface slabs to be exposure class XF2 & provide grade: PAV2 concrete.
- All reinforced concrete below ground level to be exposure classes XD3, XC3/4, design sulphate class AC-Zz & DC-2z in accordance with BRE Special Digest No 1:Part 1. Maximum aggregate size: 20mm.
5. Concrete test samples shall be provided in accordance with the requirements of BS EN 12350-1.
  6. All excavations for reinforced concrete shall be kept free from water, loose material and rubbish.
  7. Reinforcement should comply with BS 4449, 8666, 4482 or 4483. All reinforcement designated 'B' should be high yield high yield in accordance with BS 4482 and BS 4483.
  8. Reinforcement shall be free from oils, paint etc (which may adversely affect its bond with the concrete).
  9. Cover to reinforcement to be: Nominal 50mm cover when cast against shutters & blinding, 75mm all other faces. Tolerance  $\Delta c=5\text{mm}$  for below ground and for above ground/hard surface slabs nominal cover to be  $50\text{mm}+\Delta c$ .
  10. Top reinforcement in slabs shall be supported on mild steel chairs to ensure all reinforcement has the required cover of concrete.
  11. Spacer blocks are to be made of precast concrete or a suitable plastic alternative. They shall be used to ensure that all reinforcement has the required cover of concrete. Pieces of wood, brick etc are not permitted.
  12. It shall be the responsibility of the contractor to check bending schedules against the drawings prior to the ordering of the reinforcement and to notify the Engineer of any discrepancies.
  13. The structure is designed to be stable upon completion, temporary stability is the responsibility of the Contractor.
  14. Surface finish to contract specification.
- Refer to bar schedule 6711-MJA-SW-XX-SH-S-B1003

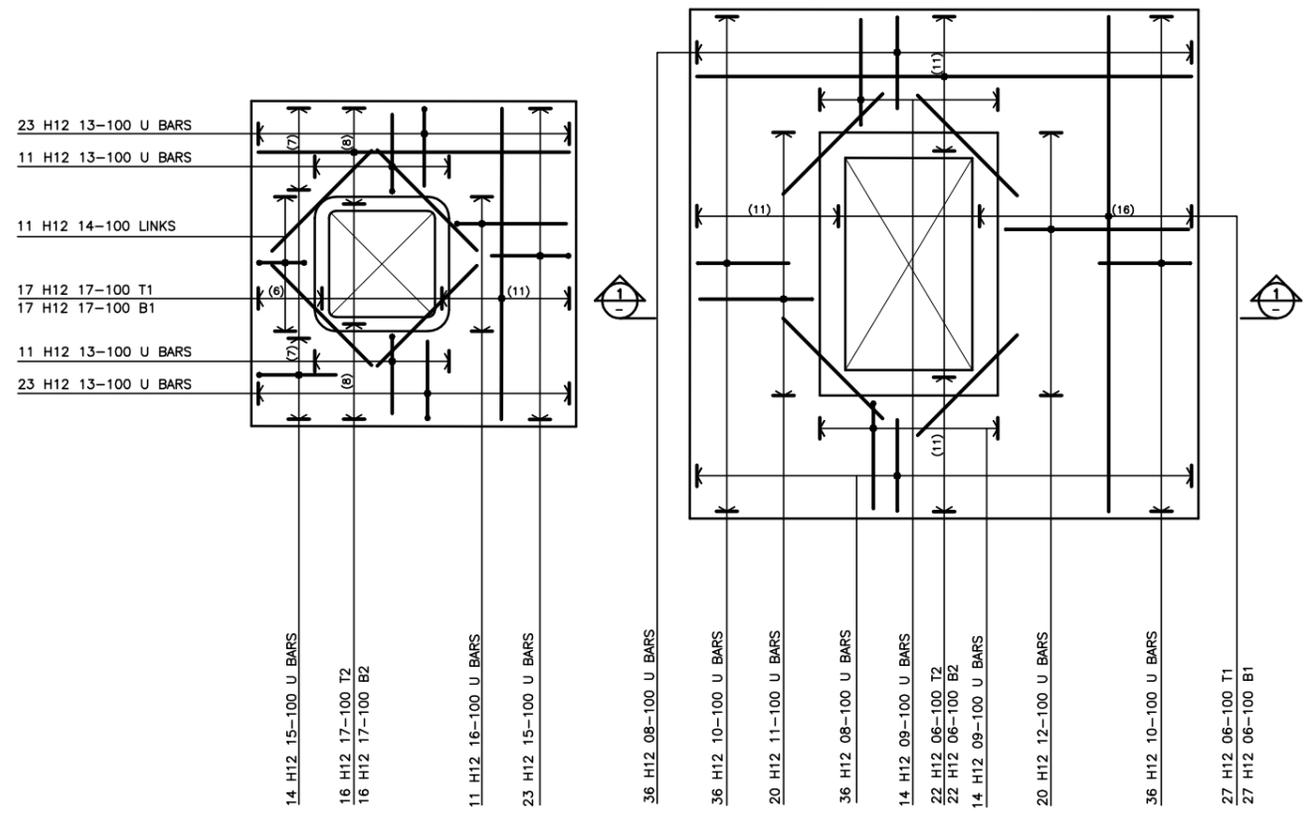
Pumping equipment as specified and detailed by PDAS Ltd.

Minimum Laps for Reinforcement	
Bar Dia	Lap Lengths
H8	325 mm
H10	400 mm
H12	475 mm
H16	625 mm
H20	1050 mm
H25	1300 mm
H32	1675 mm

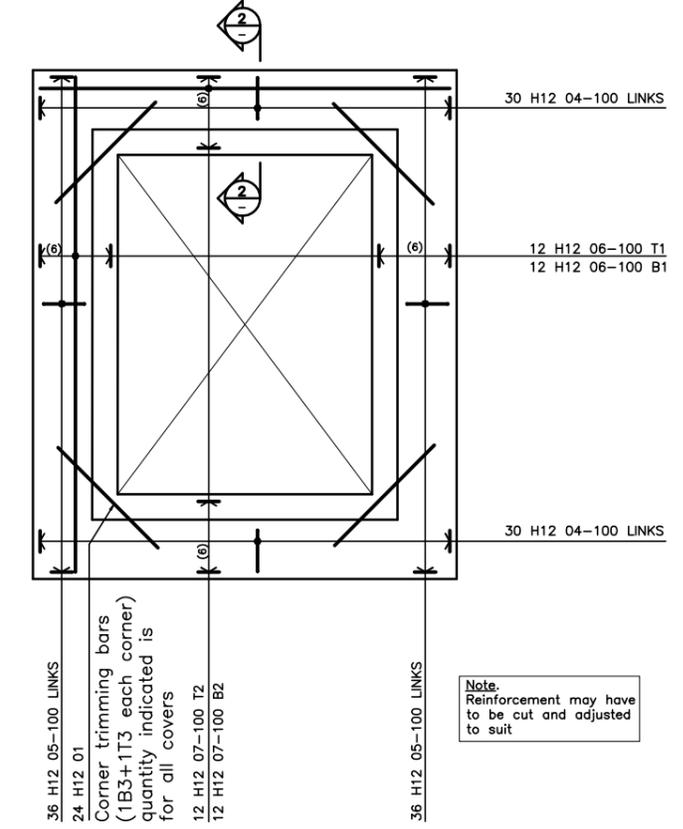
All minimum laps to reinforcement are to comply with the requirements of BS 8110.

Please refer to the following Bar Bending Schedule for beam reinforcement:

BAR BENDING SCHEDULE REFERENCE			
Schedule no:	6711-MJA-SW-XX-SH-S-B1003	Rev:	P1
Date:	05/05/22	Prepared by:	AK
		Checked by:	JAK
		Rev date:	

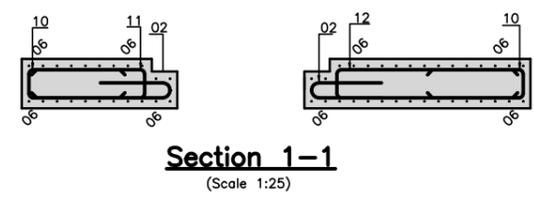


**R.C. Plan Wet Well cover**  
(Scale 1:25)

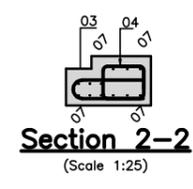


**R.C. Plan valve chamber surround**  
(Scale 1:25)

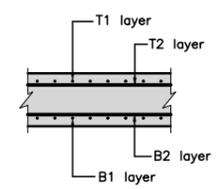
Note:  
Reinforcement may have to be cut and adjusted to suit



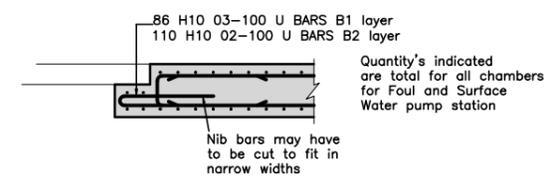
**Section 1-1**  
(Scale 1:25)



**Section 2-2**  
(Scale 1:25)



**Reinforcement layering**  
(1:20)



**Typical edge detail at access holes**  
(1:20)

REV. No.	DATE	DESCRIPTION	AK	JAK
P1	05/05/22	First issue.	AK	JAK

Client	<b>PDAS Ltd</b>	<b>MJA CONSULTING</b> CIVIL & STRUCTURAL ENGINEERS Ipsium Court, 24 The Quadrant, Abingdon Science Park, Abingdon Oxon, OX14 3YS Tel: 01235 555173 Email: mail@mjaconsulting.co.uk
Project	Whitechapel Road, Cleckheaton	
Title	Pump Station RC Details Sheet 4	Scale: As shown @ A1 Status: PRELIMINARY
Drawn:	AK	Project Engineer
Project Engineer	JAK	MJA Project No:
Checked by:	JAK	6711
Date:	05/05/2022	Date:
Drawing Number:	6711-MJA-SW-XX-DR-S-1003	Rev:
		P1

