

**SOUTHERN WATER
TECHNICAL SPECIFICATIONS MANUAL
MECHANICAL AND ELECTRICAL SPECIFICATIONS**

**SOUTHERN WATER SUPPLEMENTARY ADDENDUM
TO SEWERS FOR ADOPTION 7**

1. OBJECTIVE	3
2. GENERAL	3
3. PART D	3
D4.2 SITE ACCESS	3
D4.3 SITE LAYOUT	3
D4.5 STORAGE	3
D4.7 PUMPING STATION DESIGN	3
D5.3 HYDRAULIC DESIGN	4
D5.5 MATERIALS FOR RISING MAIN	4
D6.2 HAZARDOUS AREAS	4
D6.3 WET WELL GENERAL	5
D6.4 WET WELL STRUCTURAL DESIGN	5
D6.5 VALVE CHAMBER	6
D6.6 FLOW METERING	6
D6.7 ACCESS INTO WET WELL, VALVE CHAMBER, CARBON FILTER AND FLOWMETER CHAMBERS	6
D6.9 DAVIT SOCKETS	6
D6.10 KIOSK	7
D6.11 KIOSK CONSTRUCTION	7

4. PART E	7
E2 MATERIALS	7
E6 PRECAST CONCRETE MANHOLES, CHAMBERS AND WET WELL	7
5. PART F	7
F1.2 OPERATION AND MAINTENANCE DOCUMENTATION	7
F2.2 PERFORMANCE REQUIREMENTS AND INFORMATION	8
F3 ELECTRICAL SPECIFICATION SCOPE	9
F3.3 ELECTRICAL ASSEMBLY	11
F3.6 TELEMETRY OUTSTATION	17
F4.1 GATE (SLUICE) VALVES	17
F4.4 MISCELLANEOUS	17
6. ASSOCIATED SOUTHERN WATER STANDARDS	17
7. DETAILS OF CHANGE HISTORY	18

1. OBJECTIVE

This document is Southern Water's addendum to Parts D, E & F of WRc Sewers for Adoption 7th Edition (SFA7), and shall be read in conjunction with that publication.

2. GENERAL

Where conflict exists between SFA7 and this addendum, this document shall take precedence. Section/clause numbers used in this specification are those from SFA7, except where further clauses are added and these use similar numbers added at the end of each SFA7 clause series.

The Developer shall ensure compliance with the latest versions of all appropriate legislation (including Construction, Design & Management Regulations), Codes of Practice etc., and ensure the installation is safe, serviceable and fit for purpose.

3. PART D

D4.2 Site Access

D4.2.4 Access shall allow for a minimum tanker size of 2000 gallons.

D4.3 Site Layout

D4.3.4 The need for a fenced compound, and its type shall be agreed with the Undertaker and local planning authority. Generally a fenced compound shall be provided for Type 2 & 3 pumping stations. The type of compound shall be one of the following:

- 1.8m high galvanised chain link, topped with 3 strands of barbed wire, set on concrete posts in accordance with BS1722: Part 1, GLC 108c
- 1.8m high close boarded morticed fencing, set in concrete posts, with concrete gravel boards, in accordance with BS1722: Part 5, PCR 180B
- 1.8m high brick wall to match surroundings
- 2.4m high palisade fencing, in accordance with BS 1722-12
- Gate posts shall be concrete

D4.3.9 Where permeable hardstanding is shingle, it shall consist of 100mm depth of 20 mm clean shingle laid on geotextile membrane.

D4.3.11 Hardstandings should be laid to falls such that surface water cannot pond.

D4.5 Storage

D4.5.5 An emergency overflow shall only be provided where agreed by the Undertaker and the Environment Agency. Any overflow shall not operate until all of the storage volume specified in Clause 4.5 has been fully utilised.

D4.7 Pumping Station Design

D4.7.1 Pumping station design shall be as follows:

Design	Type 1	Type 2	Type 3	Type 4
Package pumping station in dry chamber	√			
Package pumping station with wet well	√	√	√	
Bespoke pumping station	√	√	√	
Undertaker's specification pumping station				√

- Package pumping stations in dry chambers, shall comply with the Undertaker's specification MED 4142, available from the Undertaker's Policies & Standards Team
- Package pumping stations with wet wells, shall comply with this specification and not WIS 4-04-2
- Bespoke pumping stations, shall comply with Section D6 and Part F of SFA with the relevant Undertaker's addendum as per this specification
- Undertaker's specification pumping stations, shall comply with the Undertaker's Technical Specifications Manual, Commissioning Manual and Works Operating & Maintenance Manual. These manuals are available from the Undertaker's Policies & Standards Team

D5.3 Hydraulic Design

D5.3.3.c Air valves shall comply with the Undertaker's air valve specification contained within standard MED 4100, available from the Undertaker's Policies & Standards Team. Generally they shall be of the double orifice type, fitted with an auxiliary float chamber.

D5.5 Materials for Rising Main

D5.5.2 Rising Mains shall be constructed from Polyethylene to Clause E 2.23 with jointing to Clause E5.5; other materials are not permitted. Rising Mains shall be connected as close as physically possible to pumping station structures and other ancillaries.

D6.2 Hazardous Areas

D6.2.1 For the Undertaker's hazardous zone classification requirements refer to the Undertaker's specification MED 4004 and the following clauses:

Equipment used in classified areas under DSEAR shall be selected in accordance with Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 1996 (or later as amended).

Electrical equipment and systems shall comply with all relevant parts of BS EN 60079 & BS EN 61241 and shall be certified for use in the appropriate zone and for the intended application.

Non-electrical equipment and systems shall comply with all relevant parts of BS EN 13463 and shall be certified for use in the appropriate zone and for the intended application.

If a motor certified for use in a classified area is to be supplied for use with variable speed or other electronic equipment, then it shall be confirmed that the motor certification remains suitable for the application.

Certification information for Hazardous Area equipment shall be clearly presented on a manufacturer's nameplate on the equipment. Where certified equipment as part of a system is not individually identifiable by an existing label (e.g. submersible pumps) an additional label shall be provided to enable identification and tracking for maintenance purposes.

D6.3 Wet Well General

D6.3.9 Velocities within the wet well and valve chamber pipework, shall be between 1.2 m/s and 2.0 m/s.

D6.4 Wet Well Structural Design

D6.4.6 All chambers shall withstand all necessary loads in accordance with BS EN 1990, including the following loads:

- Internal hydrostatic pressure
- External hydrostatic pressure from groundwater up to the finished ground level
- External ground pressure
- External imposed loads

D6.4.7 Where a wet well comprises a prefabricated impermeable liner with in-situ mass/reinforced concrete, it shall be capable of withstanding hydrostatic pressure equal to depth, regardless of any provision of concrete surround.

D6.4.8 Pumping stations shall incorporate fixing devices to prevent rotation or flotation of the empty structures when subject to groundwater pressure up to the finished ground level.

D6.4.9 Type testing of prefabricated impermeable liner wells shall involve the following:

- An internal water pressure test shall be carried out in accordance with EN 12050 Part 1 Clause 8.3.1. If there is no visible leakage from the pumping station during the test, it shall be considered to have passed the test
- The pumping station shall be able to withstand up to 4 m of groundwater pressure, or the equivalent mechanical load, without distortion and without the provision of a concrete surround. If there is no visible leakage, or damage sufficient to cause leakage, in the pumping station during the test, it shall be considered to have passed the test
- A discharge pipe connection test shall be carried out in accordance with EN 12050 Part 1 Clause 8.3.2. If there is no visible leakage of water from the discharge pipe during the test, it shall be considered to have passed the test
- A structural behaviour test shall be carried out in accordance with EN 12566 Part 1 Annex D Clause D.6. For a pumping station made of concrete or GRP, if there is no structural failure during the test and no lack of watertightness is recorded, it shall be considered to have passed the test
- Self cleaning test in accordance with WIS 4-04-02 clause 12.1.9

D6.5 Valve Chamber

- D6.5.2 For Type 1, 2 & 3 pumping stations, where the rising main is horizontally less than or equal to 10 metres in length and has a permanent free discharge (with no risk of surcharge), then the isolation valves, non-return valves and Bauer coupling can be omitted and dual rising mains installed.
- D6.5.3.c The Bauer coupling shall be installed such that the connection of a flexible hose can be made without entry to the valve chamber.
- D6.5.4 The discharge point of the gravity drain shall be fitted with a plastic flap valve having a stainless steel pin.

D6.6 Flow Metering

- D6.6.1 The Undertaker's clarification of this requirement is: where the individual pump rating is equal-to or above 22kW, a suitable electromagnetic flowmeter shall be installed downstream of the valves in a chamber.

D6.7 Access into Wet Well, Valve Chamber, Carbon Filter and Flowmeter Chambers

- D6.7.2.a Where the pumping station is located within 500 metres of a coastline or estuary, then the covers shall be fabricated from 316L stainless steel or galvanised to a total nominal thickness of 120µm as specified for 'Exterior exposed polluted coastal atmosphere' as specified in BS EN ISO 12944 and 14713. Non slip surface shall not be achieved via a surface coating.
- D6.7.2.b Facilities for opening the covers shall be provided, such as eyeholes for standard lifting keys or flush mounted integral handles.
- D6.7.3.b Holes/slots drilled in the chequer plate or open mesh flooring are not permitted as a ventilation option.
- D6.7.3.c&e Assistance to ensure a lifting effort not exceeding 25 kgF shall be via spring and not gas struts.
- D6.7.4 Where the pumping station and vent stack may cause an odour nuisance in a public area or private residential area, a passive activated carbon filter shall be installed between the vent pipe and the vent stack. The activated carbon filter shall be contained in an underground chamber fitted with a drain and manhole cover for access.

D6.9 Davit Sockets

- D6.9.2 The davit socket shall comply with the following additional clauses:
- Lifting test certificates shall be submitted in compliance with the Undertaker's M&E 3015 document, available from the Undertaker's Policies & Standards Team
 - The socket shall be stamped with the following:
 - CE Marking
 - Safe Working Load
 - Serial Number
 - Undertaker's Asset Number, available from the Undertaker's Asset Information Team

D6.10 Kiosk

D6.10.1e For socket details refer to clause F3.4.1.2.

D6.11 Kiosk Construction

D6.11.14 Where double hinged doors are utilised, these shall include shoot bolts fitted to the top and bottom of the left-hand door (when facing the doors from the outside). The right-hand door shall incorporate top and bottom T type handles complete with clamp latches compressing the seal and a cylinder type night latch lock. The lock barrel shall be compatible with the Undertaker's standard access keys for operational sites in that area. Where a single door is utilised then the door shall comply with the right-hand door as above.

D6.11.15 The kiosk security requirement is normally Class C (SR2) when sited within a fenced compound; however this shall be increased to Class B (SR3) if there are any particular security issues (e.g. no fenced compound).

D6.11.16f The site information plate shall include the Undertaker's site reference 'Catalogue' number, available from the Undertaker's Asset Information Team.

4. PART E**E2 Materials**

E Intro Where additional CESWI Clauses are utilised, these shall be with Southern Water Supplementary Clauses, available from the Undertaker's Policies and Standards Team.

E2.43 All pipework 300mm nominal bore and smaller must be certified by a recognised third party test body as proven capable of being jetted using pressures of 4000 psi. All ancillary equipment made of plastic materials such as chambers and elements in association with such pipework must be similarly proven capable of being jetted using pressures of 4000 psi.

E2.44 Pipework of greater than 300mm nominal bore must be certified by a recognised third party test body as proven capable of being jetted using pressures of 2600 psi. All ancillary equipment made of plastic materials such as chambers and elements in association with such pipework must be similarly proven capable of being jetted using pressures of 2600 psi.

E6 Precast Concrete Manholes, Chambers and Wet Well

E6.4.5 Clause deleted, replace with: "Cements are to be selected according to BS EN 8500."

5. PART F**F1.2 Operation and Maintenance Documentation**

F1.2.1 The primary purpose of Operation and Maintenance documentation (O&M) is | to convey information on safe operation of the site, its equipment and systems. The O&M shall comply with the following:

- Shall be designed to provide details of all installed equipment, describe how the pumping station will operate and how it is to be maintained

- Where the site has an overflow, emergency storage capacity or any other unusual system this shall be included in the manual with an explanation of how the system is integrated with the pumping station
- One paper copy of the O & M must be submitted to the Undertaker on issue of the provisional certificate for approval
- Once approved a further two copies of the O&M including all in-date certificates, and one CD copy, must be submitted to the Undertaker one month prior to the pumping station being handed over
- Paper copies should be in an A4 folder or similar. The CD shall contain fully editable files in standard software, e.g. Word, Excel, Autocad
- Manuals shall be produced in accordance with the Undertaker's Works Operation and Maintenance manual (WOM), which is available from the Undertaker's Policies & Standards Team
- The manual shall contain the following sections:
 - Site Health and Safety
 - Overview of pumping station design and site operation
 - Site generator or mobile unit and changeover procedures
 - Maintenance procedures and manufacturers' documentation
 - Ultrasonic level controller configuration (setup) list
 - Flowmeter configuration (where fitted)
 - Telemetry configuration list
 - Pump unit label data and pump system curve
 - Utility account numbers, utility supplier and site telephone number
 - Hazardous Area classification assessment
 - Certificates
 - Drawings and schematic diagrams
 - Asbestos free certificate
 - Phase 1 contaminated land report

F2.2 Performance Requirements and Information

F 2.2.1 Pump units shall be capable of being reversed up to 100% of the normal forward running speed.

F2.2.2 Each pump unit shall be capable of pumping the design flow rate when the sewage level is at the mid-point of the start and stop levels in the wet well, plus an additional 5% flow to take account of fall-off in performance due to wear.

F2.3.2 External Corrosion Protection

F2.3.2.1 Where applicable, all corrosion protection shall be in accordance with WIMES 4.01.

F2.3.4.2 Auto-coupling System (ACS)

F2.3.4.2.1 The ACS shall be manufactured from cast iron and coated in accordance with WIMES 4.01. The effective sealing between pump and ACS shall not rely on rubber seals, o-rings, etc.

F2.3.10 Motors

F2.3.10.6 The minimum insulation class shall be Class H with a Class B temperature rise.

F2.3.11 Information Plate

F2.3.11.1 The pump unit information plate shall additionally have a 'CE' mark.

F2.3.14.3 Lifting Chains

F2.3.14.3 Pump unit lifting chains are not permitted; a lifting location system as described in SFA 7 shall be safely utilised.

F2.3.15 Cable Support System

F2.3.15 Pump flexible cables shall be supported in the wet well by cable socks.

F3 Electrical Specification Scope

F3.1e For the Undertaker's telemetry outstation requirements refer to clause F3.3.9.1.

F3.2.1 General

F3.2.1.1 Where downstream requirements suggest variable speed drives may be required, the design shall be submitted to the Undertaker for approval before construction.

Where electronic starters (variable speed, soft start) are employed, the installation shall comply with the planning levels of Energy Networks Association (ENA) Recommendation G.5/4 (or later as amended) and evidence in the form of detailed calculations and/or test certificate from a certified instrument shall be provided to the Undertaker.

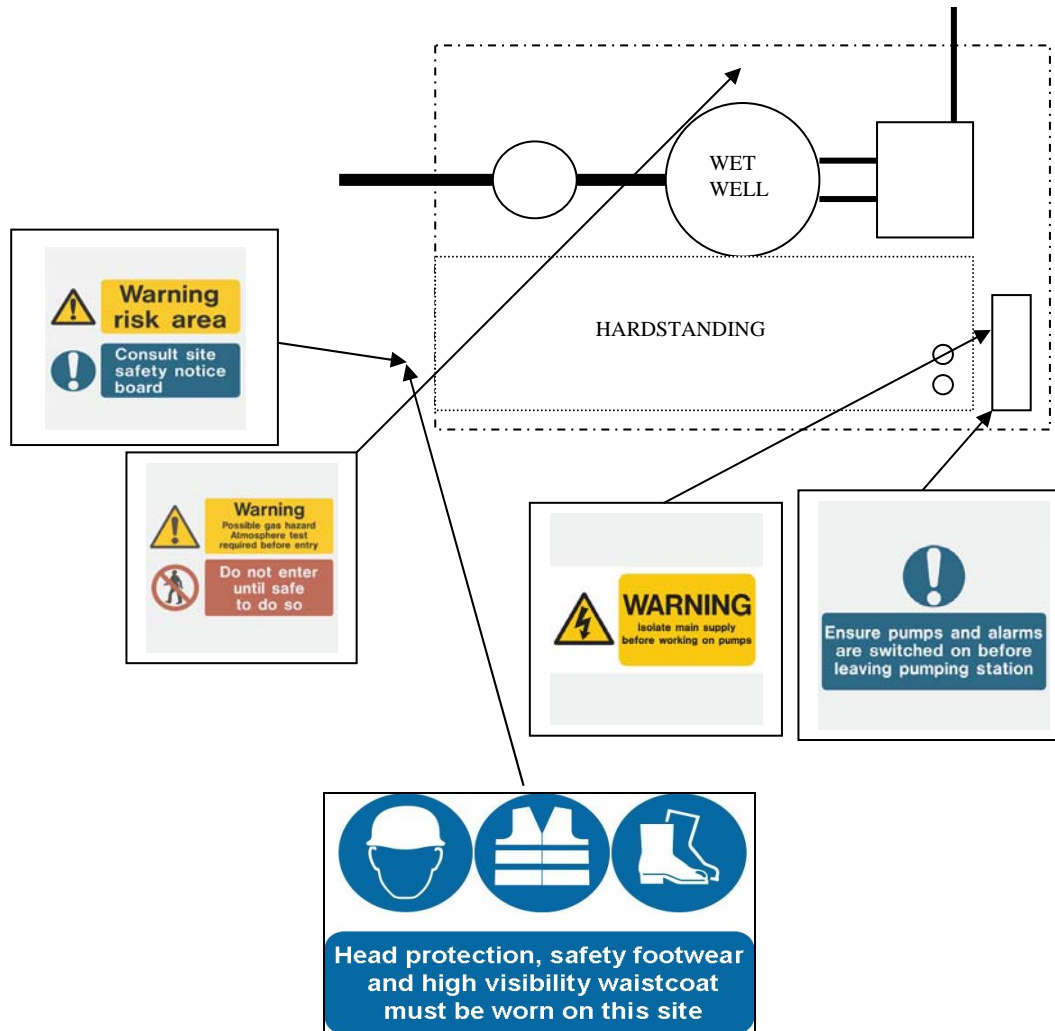
F3.2.1.5 The electrical installation contractor shall be currently enrolled in an approved scheme for electrical installations in hazardous areas, e.g. NICEIC Hazardous Area scheme.

F3.2.1.9 Evidence shall be supplied to the Undertaker that the installation complies with The Electricity Safety, Quality and Continuity Regulations 2002 (or later as amended) and BS EN 50160 regarding supply flicker, i.e. proof of compliance in the form of a test certificate from a certified instrument.

F3.2.1.10 The Developer shall be liable for all remedial works where non-compliance with The Electricity Safety, Quality and Continuity Regulations, BS EN 50160 and/or ENA Recommendation G.5/4 (or later as amended) is proven by the Distribution Network Operator, for a period of 2 years from the date of handover to the Undertaker, provided no material changes have been made to the installation by the Undertaker during that period that may affect this compliance.

F3.2.2 Labels and Safety Signs

The Undertaker requires additional safety signs as shown below.



Signs shall be manufactured from UV stable semi-rigid plastic. The lettering shall be of a size suitable for the application, but not be less than 6mm high.

Warning Risk Area (150mm x 100mm Landscape) and **Head Protection** (400mm x 300mm Landscape) signs shall be positioned externally on the gates.

Warning Possible Gas Hazard (400mm x 270mm Landscape) shall be positioned internally adjacent to the wet well valve chamber.

Warning Isolate Main Supply (150mm x 75mm) shall be positioned on the control panel inside kiosk.

Ensure Pumps (300mm x 200mm) shall be positioned externally on the kiosk doors.

In addition to the above signs a document pouch shall be fixed inside the kiosk for safety information.

F3.3 Electrical Assembly

F3.3.1 General

F3.3.1.2 For sites that come under the scope of MED 4006, the Undertaker has 1 No. Form 2 two pump control panel design and 1 No. Form 4 two pump control panel design. The Form 2 control panel design is detailed in the Wastewater Pumping Station (WPS) Standard Panel Drawings (SPD) Design B 2 Pump Control Panel – up to 15kW. The Form 4 control panel is detailed in the Wastewater Pumping Station (WPS) Standard Panel Drawings (SPD) Standard 2 Pump Panel. All control panel drawings are located in the Design Drawing Manual (DDM). Table 2 – Typical Configuration Of Wastewater Pumping Station (WPS) in MED 4001_B details the form of separation which can be employed at the different pumping station types (SFA Type 1, 2, 3 or 4)

F3.3.3 Assembly Construction

F3.3.3.4.3 A triangular key type lock is required on the electrical assembly doors.

F3.3.6 Indicator Lamps, Push-Buttons and Selector Switches

Indicator lamps shall not form part of a push button or switch. A lamp test facility shall be provided.

The Undertaker’s lamp/button standard colours differ from SfA7 document, hence for safety reasons the Developer shall conform to the following:

F3.3.6.2

Indicator Lamp Colour	Application
Red	Hazardous or dangerous condition, zoned area ventilation failure, gas detected, over pressure, or emergency stop operated
Green	Normal condition, motor running, valve operating, or on
Yellow/Amber	Machine tripped or overloaded, slow rotation, seal leakage, low flow, or level alarm
White	Available, off, heater on, stopped, or valve fully open/closed or duty or standby level reached. Supply On (where fitted)

F3.3.6.3

Push Button Colour	Application
Red	Emergency stop
White	Start/on/inch
White	Valve open/close
Black	Stop/off
Yellow	Lamp test
Blue	Reset

F3.3.7 Connection of a Mobile Generator

Where site-specific requirements indicate a fixed standby generator, contact the Undertaker's Telemetry Team for additional telemetry requirements.

F3.3.8 Abnormal Operation

F3.3.8.2.1 All Pump Protection shall operate in AUTOMATIC, HAND, and BACKUP modes.

F3.3.8.2.1d The hardwired suction protection device used in the Wastewater Pumping Station (WPS) Design B 2 Pump Control Panel (Form 2) and the Standard 2 Pump Panel (Form 4), to prevent 'snoring', shall utilise a load/power monitoring device (in motor starter, appropriate to motor rating, capable of reliably detecting transient conditions when pump begins to draw air). Where the pump is installed in a Zoned area then the monitoring device shall trip the pump within 3 seconds, or faster if required by the pump manufacturer's ATEX approval.

F3.3.8.2.1e Low flow protection signal shall be derived from the flowmeter.

F3.3.8.2.1f Pump unit bearing vibration and temperature protection shall be used only with pumps rated at 55kW or above. Pumps of this rating would only be used in SFA Type 4 pumping stations (where the pump units exceed 30kW).

F3.3.9 Telemetry Signals

F3.3.9.1 The Undertaker's communication standard for telemetry is PSTN line, although wireless options such as GSM may be considered if the cost of provision of PSTN lines is prohibitive. Alternatives to PSTN shall be used only where specifically agreed with the Undertaker on a site-by-site basis.

Where no existing line is available the Developer shall arrange for installation of a line via the Undertaker's preferred telecommunications service provider.

The incoming PSTN line shall be provided with a lightning protection unit (LPU). The LPU shall be installed next to the telemetry outstation and connected to earth in accordance with the LPU manufacturer's recommendations.

The Developer shall provide and install a telemetry outstation with type determined by the Undertaker's Telemetry Team. The telemetry system shall be configured at the Developer's expense and commissioned with the assistance of the Undertaker. This will include Developer participation in point-to-point Input/Output testing to demonstrate the satisfactory operation of the integrated system.

The Developer can obtain further information and a quotation for this work by contacting the Undertaker's Telemetry Team, e-mail address: telenq@southernwater.co.uk.

TableF.3 For provision of the 'Maintenance in Progress' signal, an 'Engineer-on-Site' switch shall be provided by the Developer. This switch shall be independent of an external power source, using a mechanical run-down timer allowing the engineer to select any 'ON' period of up to 120

minutes. When in use the switch provides a status signal to the outstation which will report and inhibit alarms for the selected period of time.

TableF.3 A 'Rising Main Delivery flow' telemetry signal shall also be provided for Type 2, as **derived**-flow pulsed inputs from the level controller.

TableF.3 The Undertaker does not require a 'Rising Main Delivery Pressure' signal.

TableF.4 Remote control select signal shall be set to OFF, except where agreed & enabled by the Undertaker's Telemetry Team.

TableF.5 Pump unit underload signal shall be from suction protection, see F3.3.8.2.1d.

Table F.5 Note 2 shall be 'Only required if each pump unit is rated at or above 55kW'.

F3.3.9.6 Pulsed inputs for high-frequency operation (e.g. derived-flow) shall be solid-state electronic type.

F3.3.10 Ultrasonic Level Controller Specification

F3.3.10.1 The Undertaker envisages that the technical standard adopted by the Developer for ultrasonic level controllers will be compatible with that used by the Undertaker (so as to secure compatibility, and to avoid other substantive functionality issues). At the date of this publication this standard is Siemens Process Instruments' HydroRanger 200 Therefore any proposal for use of alternatives shall be submitted to the Undertaker for prior acceptance.

F3.3.11 Functional Units – Form 4 Assemblies

F3.3.11.4 The Developer, in accordance with BS EN ISO 12100 shall assess the requirement for emergency stop equipment. Measures taken shall be justified by risk assessment of the hazards involved and recorded.

Typical Installation – the following guidelines for submersible pumps lay down the minimum standards to which the Developer shall work when considering the use of emergency stop devices. They form the basis of the risk assessment which is the responsibility of the designer:-

- a. Under normal circumstances there should be no requirement for an emergency stop
- b. Electrical supply must be isolated and locked off at the isolator before the pump is lifted
- c. Pump rotational checks shall normally be carried out from the pump starter control panel: where this is not practicable consideration shall be given to a local 'hold-to-run' push button which shall be justified by a Risk Assessment submitted to and agreed with the Project Manager

Where fitted, emergency stop devices if required shall override all controls whatever their function and cut off the power supply to the drive. The device shall comply with BS EN 418 and shall be of the mushroom headed stay put type with break before latch mechanism, and twist or pull to release. Release

of the mechanical latch shall not permit the plant to restart without appropriate resetting at the controlling Assembly.

- F3.3.11.4.9 Where a fixed speed pump is assessed as likely to block, a system to monitor the pump motor load/torque and reverse the pump as appropriate shall be installed. In defining the specification for the detection of blockage and unblocking cycle the pump manufacturer shall be consulted, as not all pumps are suitable for reversing.

F3.3.12 Functional Units – Form 2 Assemblies

F3.3.12.3 Incomer

- F3.3.12.3.2a The Wastewater Pumping Station (WPS) Design B 2 Pump Control Panel shall incorporate a 125A 4 pole fuse switch, with 'Mains – Off – Generator' positions, with suitably rated fuses. The Design B 2 Pump Control Panel shall incorporate a control circuit test facility as detailed in the Wastewater Pumping Station (WPS) Standard Panel Drawings (SPD) Design B 2 Pump Control Panel.
- F3.3.12.3.2c The phase failure relay shall be fed via an MCB. The Wastewater Pumping Station (WPS) Design B 2 Pump Control Panel shall incorporate a mains supply monitor.
- F3.3.12.3.3a The operating handle for the control panel fuse switch shall be padlockable in the 'OFF' position.
- F3.3.12.3.3b & F3.3.12.3.3c The Wastewater Pumping Station (WPS) Design B 2 Pump Control Panel shall incorporate a Mains Supply Monitor.
- F3.3.12.3.3d & F3.3.12.3.4 The Wastewater Pumping Station (WPS) Design B 2 Pump Control Panel shall incorporate MCB fed circuits as per the Wastewater Pumping Station (WPS) Standard Panel Drawings (SPD) Design B 2 Pump Control Panel, in the DDM.

F3.3.12.4 Control Circuit Supplies

- F3.3.12.4.6 The control circuit transformer (CCT) for The Wastewater Pumping Station (WPS) Design B 2 Pump Control Panel shall have a 230V primary winding and a 110V or 24V secondary winding with one side earthed.

F3.3.12.5 Motor Starters

The Developer, in accordance with BS EN ISO 12100 shall assess the requirement for emergency stop equipment. Measures taken shall be justified by risk assessment of the hazards involved and recorded.

Typical Installation – the following guidelines for submersible pumps lay down the minimum standards to which the Developer shall work when considering the use of emergency stop devices. They form the basis of the risk assessment which is the responsibility of the designer:-

- d. Under normal circumstances there should be no requirement for an emergency stop

- e. Electrical supply must be isolated and locked off at the isolator before the pump is lifted
- f. Pump rotational checks shall normally be carried out from the pump starter control panel: where this is not practicable consideration shall be given to a local 'hold-to-run' push button which shall be justified by a Risk Assessment submitted to and agreed with the Project Manager

Where fitted, emergency stop devices if required shall override all controls whatever their function and cut off the power supply to the drive. The device shall comply with BS EN 418 and shall be of the mushroom headed stay put type with break before latch mechanism, and twist or pull to release. Release of the mechanical latch shall not permit the plant to restart without appropriate resetting at the controlling Assembly.

F3.3.12.5.2 The Wastewater Pumping Station (WPS) Design B 2 Pump Control Panel shall incorporate the following additional motor protection:

- Motor over-temperature protection
- Seal leakage protection
- Dry run protection

F3.3.12.5.4 The equipment mounted on the door of the Wastewater Pumping Station (WPS) Design B 2 Pump Control Panel, shall be as per Wastewater

Pumping Station (WPS) Standard Panel Drawings (SPD) Design B 2 Pump Control Panel – Portrait (Hinged LHS) General Arrangement – SW Drawing No. JN.900002.0E3231 & Portrait (Hinged RHS) General Arrangement – SW Drawing No. JN.900002.0E3251. Both drawings are available in the DDM.

F3.3.12.6 Common Control Section

F3.3.12.6.1d The Wastewater Pumping Station (WPS) Design B 2 Pump Control Panel shall utilise a back-up float switch system.

F3.3.12.6.3 The Wastewater Pumping Station (WPS) Design B 2 Pump Control Panel shall utilise an ultrasonic level controller and a back-up float switch system.

F3.4 Pumping Station Electrical Installation

F3.4.1 Electrical Components and Equipment (excluding the electrical assembly and cables)

F3.4.1.2 Socket Outlet

F3.4.1.2.1 A 13A, 230V, RCD protected socket outlet shall be mounted on the control panel, as per Wastewater Pumping Station (WPS) Standard Panel Drawings (SPD) Design B 2 Pump Control Panel – Portrait (Hinged LHS) General Arrangement – SW Drawing No. JN.900002.0E3231 & Portrait (Hinged RHS) General Arrangement – SW Drawing No. JN.900002.0E3251. All drawings are available in the DDM.

F3.4.1.3 Luminaries

F3.4.1.3.1 Kiosk lighting shall be provided for kiosks containing the Form 2 Wastewater Pumping Station (WPS) Design B 2 Pump Control Panel and the

Form 4 Wastewater Pumping Station (WPS) Standard 2 Pump Panel. The luminaries shall be provided in accordance with MED 4318 and WIMES 3.02. External working areas with pumps and motor drives, in automatic control shall have an Illumination Level of 100 LUX and a CIE Colour Rendering Index of 2. Special care shall be taken to prevent stroboscopic effects.

F3.4.1.4 Anti-Condensation Heaters

F3.4.1.4.1 Kiosk heating shall be provided for kiosks containing the Form 2 Wastewater Pumping Station (WPS) Design B 2 Pump Control Panel and the Form 4 Wastewater Pumping Station (WPS) Standard 2 Pump Panel. The heaters shall be suitably rated, tubular, anti-condensation heaters, controlled tamperproof thermostats.

F3.4.1.5 Junction Boxes

F3.4.1.5.7 The normal connection arrangement for pump flexible cables (power & protection, not instrumentation) shall be a separate weatherproof junction box per pump unit, outside the well, suitable for the hazardous area classification of the area. Cables shall be suitably glanded at the junction box. Disconnection of cables from the junction box shall be possible without entry into the wet well or valve chamber. The junction box shall be at waist height and associated supports shall not obstruct removal of the pump or cause a trip hazard. Junction boxes with doors shall be triangular key lockable, and all junction boxes shall have a label permanently fixed stating:

DANGER – LIVE TERMINALS

Do not test from this point

Voltage bands shall be segregated. Ultrasonic level sensor and float switch cables shall be cabled directly to the electrical assembly. Marshalling of cable terminations shall be logical from each duct.

F3.4.4 Installation of Cables

F3.4.4.13 Cable ducts from the junction box to the control panel shall be sealed at both ends against moisture and explosive/corrosive gas. The type of sealing system used shall be suitable for the assessed risk, prevent the migration of gases and be compliant with WIMES 3.02. Expanding foam shall not be used.

F3.4.4.16 If the installation is a pumping station not located in a secure compound, to mitigate risk of damage/vandalism each pump unit cable shall be directly cabled to the control panel kiosk via the duct provided. Ducts direct from the wet well shall be sealed against moisture and explosive/corrosive gas at the control panel end. If the wet well is designated as a hazardous area, a label shall be fixed adjacent to the duct(s) at the control panel end as follows:

HAZARDOUS AREA DUCT

Duct Sealing System to be retained at all times

A means of retaining the seal shall be provided for when cables are removed.

F3.6 Telemetry Outstation

F3.6.1b The following telemetry outstations shall be provided:

- Wastewater Pumping Station (WPS) Design B 2 Pump Control Panel – Servelec Systems S255. The telemetry outstation shall be mounted on the control panel as per the Wastewater Pumping Station (WPS) Standard Panel Drawings (SPD) Design B 2 Pump Control Panel – Portrait (Hinged LHS) General Arrangement – SW Drawing No. JN.900002.0E3231 & Portrait (Hinged RHS) General Arrangement – SW Drawing No. JN.900002.0E3251
- Wastewater Pumping Station (WPS) Standard 2 Pump Panel (Form 4) – Servelec Systems S250, S255 or S500

F4.1 Gate (Sluice) Valves

F4.1.3 Valves shall additionally comply with the following:

- O-ring sealed
- Resilient seated
- Stainless steel shafts and fasteners
- Paint spec to WIMES 4.01
- Suitable for long periods (> 12 months) of idleness without seizing
- Marked with direction of closure
- Individually tightness tested in accordance with BS EN 12266-1

F4.4 Miscellaneous

F4.4.1 Add sentence: ‘The half-inch BSP plugged tappings shall be installed on the horizontal centreline and fitted with stainless steel quarter-turn ball valves.’

6. ASSOCIATED SOUTHERN WATER STANDARDS

TSM	Technical Specifications Manual, including:-
MED 4001	Mechanical and Electrical General Specification
MED 4003	Condition Monitoring
MED 4004	Hazardous Area Classification
MED 4100	Valves
MED 4131	Ventilation Systems
MED 4138	Lifting Equipment
MED 4140	Mixed Flow Volute Submersible Sewage and Sludge Pumpsets
MED 4142	Micro Pumping Stations
MED 4301	Package Plant and Control Panels rated up to 100 Amps
MED 4408	Telemetry
MED 4415	Liquid Flow Metering
MED 4417	Control of Pumps
MED 4433	Liquid Level Measurement
CED 4001	Hydraulic Design Requirements

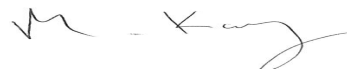
CED 4010	Pressure Pipelines and Rising Mains
CED 4019	Fibre Reinforced Plastic Kiosks
PSWWT 4022	Odour Control – Load Assessment and Dispersion Modelling
COM	Commissioning Manual
WOM	Works Operation & Maintenance Manual
M&E 3015	Procedure for Inspection of Lifting Equipment

7. DETAILS OF CHANGE HISTORY

Issue 2A

Section No.	Paragraph No.	Change	Rational for Change
D6.2.1	1	Added reference to Undertaker's specification MED 4004 Hazardous Area Classification	Ensure alignment with Undertaker's Technical Specifications Manual (TSM)
F3.3.1.	1	Added clause F3.3.1.2 detailing the Undertaker's pump control panel designs	Ensure alignment with Undertaker's Design Drawing Manual (DDM) with reference to the pump control panel drawings
F1.2.1	3	Added requirement for contaminated land report	Ensure that this data is handed over by the developer
F3.3.8.2.1d	1	Added reference which of the Undertaker's pump control panel designs utilise a hardwired suction protection device	Ensure alignment with Undertaker's Design Drawing Manual (DDM) with reference to the pump control panel drawings
F3.3.8.2.1f	1	Clarified pump kW rating when vibration and temperature protection are to be used	Ensure alignment with Undertaker's specification MED 4003 Condition Monitoring
F3.3.9	Table F.5	Clarified pump kW rating when vibration and temperature protection are to be used	Ensure alignment with Undertaker's specification MED 4003 Condition Monitoring
F3.3.10.1	All	Amended to show Siemens Hydromanager 200 as the standard ultrasonic level controller	Ensure alignment with the Undertaker's Standard Asset List (SAL)
F3.3.12.3	All	Added clauses F3.3.12.3.2a, F3.3.12.3.2c, F3.3.12.3.3a, F3.3.12.3.3b, F3.3.12.3.3c, F3.3.12.3.3d, F3.3.12.3.4	Ensure alignment with Undertaker's Design Drawing Manual (DDM) with reference to the pump control panel drawings
F3.3.12.4	1	Added clause F3.3.12.4.6	Ensure alignment with Undertaker's Design Drawing Manual (DDM) with reference to the pump control panel drawings
F3.3.12.5	All	Added detail in regards of the use of emergency stop devices	Ensure the detail in regards of the use of emergency stops applies to Form 2

			Assemblies.
F3.3.12.5	All	Added clauses F3.3.12.5.2 and F3.3.12.5.4	Ensure alignment with Undertaker's Design Drawing Manual (DDM) with reference to the pump control panel drawings
F3.3.12.6	All	Added clauses F3.3.12.6.1d, F3.3.12.6.3	Ensure alignment with Undertaker's Design Drawing Manual (DDM) with reference to the pump control panel drawings
F3.4.1	All	Added clauses F3.4.1.2.1, F3.4.1.3.1, F3.4.1.4.1	Ensure alignment with Undertaker's Design Drawing Manual (DDM) with reference to the pump control panel drawings
F3.6.1b	All	Included information to show which telemetry outstation can be used with the pump control panel designs in the DDM	Ensure alignment with Undertaker's Design Drawing Manual (DDM) with reference to the pump control panel drawings and the Standard Asset List (SAL)



Authorised by.....Mike Kay
Signature