

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

**SOUTHERN WATER SUPPLEMENTARY ADDENDUM  
TO CODE FOR ADOPTION, SEWERAGE SECTOR GUIDANCE,  
APPENDIX C – DESIGN AND CONSTRUCTION GUIDANCE  
(DCG) VERSION 2.1**

<b>1. OBJECTIVE</b>	<b>4</b>
<b>2. GENERAL</b>	<b>4</b>
<b>3. PART D – PUMPING STATIONS</b>	<b>4</b>
D5 PROVISION OF PUMPING STATIONS	4
D5.2 SITE ACCESS	4
D5.3 SITE LAYOUT	4
D5.5 STORAGE	4
D5.7 PUMPING STATION DESIGN	5
D6 RISING MAINS	5
D6.3 HYDRAULIC DESIGN	5
D6.5 MATERIALS FOR RISING MAIN	5
D7 DESIGN OF PUMPING STATIONS	5
D7.2 HAZARDOUS AREAS	5
D7.3 WET WELL GENERAL	6
D7.4 WET WELL STRUCTURAL DESIGN	6
D7.5 VALVE CHAMBER	7
D7.6 FLOW METERING	7
D7.7 ACCESS INTO WET WELL, VALVE CHAMBER, CARBON FILTER AND FLOWMETER CHAMBERS	7
D7.9 DAVIT SOCKETS	8
D7.10 KIOSK	8
D7.11 KIOSK CONSTRUCTION	8
<b>4. PART E</b>	<b>8</b>
INTRODUCTION	8
<b>5. PART F</b>	<b>9</b>
F1.2 OPERATION AND MAINTENANCE DOCUMENTATION	9

F2.2 PERFORMANCE REQUIREMENTS AND INFORMATION	9
<i>F2.3.2 EXTERNAL CORROSION PROTECTION</i>	10
<i>F2.3.4.2 AUTO-COUPLING SYSTEM (ACS)</i>	10
<i>F2.3.10 MOTORS</i>	10
<i>F2.3.11 INFORMATION PLATE</i>	10
F2.3.14.3 LIFTING CHAINS	10
<i>F2.3.15 CABLE SUPPORT SYSTEM</i>	10
F3 ELECTRICAL SPECIFICATION SCOPE	10
<i>F3.2.1 GENERAL</i>	10
<i>F3.2.2 LABELS AND SAFETY SIGNS</i>	11
F3.3 ELECTRICAL ASSEMBLY	12
<i>F3.3.1 GENERAL</i>	12
<i>F3.3.3 ASSEMBLY CONSTRUCTION</i>	12
<i>F3.3.6 INDICATOR LAMPS, PUSH-BUTTONS AND SELECTOR SWITCHES</i>	12
F3.3.6.2	12
F3.3.6.3	13
<i>F3.3.7 CONNECTION OF A MOBILE GENERATOR</i>	13
<i>F3.3.8 ABNORMAL OPERATION</i>	13
<i>F3.3.9 TELEMETRY SIGNALS</i>	13
<i>F3.3.10 ULTRASONIC LEVEL CONTROLLER SPECIFICATION</i>	14
<i>F3.3.11 FUNCTIONAL UNITS – FORM 4 ASSEMBLIES</i>	15
<i>F3.3.12 FUNCTIONAL UNITS – FORM 2 ASSEMBLIES</i>	15
F3.3.12.3 INCOMER	15
F3.3.12.4 CONTROL CIRCUIT SUPPLIES	15
F3.3.12.5 MOTOR STARTERS	15
F3.3.12.6 COMMON CONTROL SECTION	16
F3.4 PUMPING STATION ELECTRICAL INSTALLATION	17
<i>F3.4.1 ELECTRICAL COMPONENTS AND EQUIPMENT</i>	
( <i>EXCLUDING THE ELECTRICAL ASSEMBLY AND CABLES</i> )	17
F3.4.1.2 SOCKET OUTLET	17
F3.4.1.3 LUMINARIES	17
F3.4.1.4 ANTI-CONDENSATION HEATERS	17
F3.4.1.5 JUNCTION BOXES	17
<i>F3.4.4 INSTALLATION OF CABLES</i>	18
F3.6 TELEMETRY OUTSTATION	18

F4.1 GATE (SLUICE) VALVES _____	18
F4.2 CHECK (REFLUX) VALVES _____	19
F4.2.4 ADD SENTENCE: ‘THE HALF-INCH BSP PLUGGED TAPPINGS SHALL BE FITTED WITH STAINLESS STEEL QUARTER-TURN BALL VALVES.’ _____	19
F4.4 MISCELLANEOUS _____	19
F4.5 ISOLATION _____	19
<b>APPENDIX VII ASSOCIATED SOUTHERN WATER STANDARDS _____</b>	<b>20</b>
<b>6. DETAILS OF CHANGE HISTORY _____</b>	<b>21</b>
ISSUE 3 _____	21

## 1. OBJECTIVE

This document is Southern Water's addendum to Parts D, E & F of Water UK's Code for Adoption, Sewerage Sector Guidance, Appendix C – Design and Construction Guidance (DCG) Version 2.1 DCG, and shall be read in conjunction with that publication.

## 2. GENERAL

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

Refer to the Purchaser's standard layout drawings.

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 – PUMPING STATIONS

### **D5 PROVISION OF PUMPING STATIONS**

#### **D5.2 Site Access**

D5.2.4 Access shall allow for a minimum tanker size of 9000 litres (2000 gallons).

#### **D5.3 Site Layout**

D5.3.4 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.

D5.3.5 Where security fencing is deemed necessary, the type of fencing 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 steel

D5.3.9 Where permeable hardstanding is shingle, it shall consist of 100mm depth of 20 mm clean shingle laid on geotextile membrane.

D5.3.11 Impermeable hardstandings should be laid to falls such that surface water cannot pond.

#### **D5.5 Storage**

D5.5.5 [N] 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 has been fully utilised.

**D5.7 Pumping Station Design**

D5.7.1 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 D7 and Part F of DCG 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

**D6 RISING MAINS****D6.3 Hydraulic Design**

D6.3.3.c Air valves shall comply with the Undertaker's air valve specification contained within standard MED 4100, and shall be installed in accordance with CED 4010, both available from the Undertaker's Policies & Standards Team. Generally they shall be of the double orifice type, fitted with an auxiliary float chamber.

**D6.5 Materials for Rising Main**

D6.5.2 [N] 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.

**D7 DESIGN OF PUMPING STATIONS****D7.2 Hazardous Areas**

D7.2.1 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.

### **D7.3 Wet Well General**

D7.3.10 [N] Velocities within the wet well and valve chamber pipework, shall be as follows:

DN	V <sub>min</sub>	Suction		Discharge	
		V <sub>design</sub>	V <sub>max</sub>	V <sub>design</sub>	V <sub>max</sub> *
50	0.30	0.40	1.20	0.50	2.00
75	0.40	0.50	1.20	0.60	2.25
100	0.50	0.60	1.30	0.70	2.50
150	0.60	0.80	1.40	0.90	2.50
200	0.70	0.90	1.50	1.10	2.50
250	0.80	1.10	1.60	1.20	2.50

### **D7.4 Wet Well Structural Design**

D7.4.7 [N] 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

D7.4.8 [N] 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.

D7.4.9 [N] 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.

D7.4.10 [N] Type testing of prefabricated impermeable liner wells shall involve the following:

- An internal water pressure test shall be carried out in accordance with BS EN 12050 Part 1 Clause 5.2.1. 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 BS EN 12050 Part 1 Clause 5.2.3. 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 BS 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

#### **D7.5 Valve Chamber**

- D7.5.2 For Type 1, 2 & 3 pumping stations, where the rising main is horizontally less than or equal to 20 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.
- D7.5.3.c The Bauer coupling shall be installed such that the connection of a flexible hose can be made without entry to the valve chamber.
- D7.5.4 The discharge point of the gravity drain shall be fitted with a plastic flap valve having a stainless steel pin. A hand-operated valve within the gravity drain is not required.

#### **D7.6 Flow Metering**

- D7.6.1 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.

#### **D7.7 Access into Wet Well, Valve Chamber, Carbon Filter and Flowmeter Chambers**

- D7.7.2.a Where the pumping station is located within 500 metres of a coastline or estuary, covers shall be fabricated from mild steel galvanised to BS EN 1461, with a minimum galvanise thickness dependent on Corrosivity Category (refer to WIMES 8.03). Non slip surface shall be achieved via a surface coating.
- D7.7.2.b Facilities for opening the covers shall be provided, such as eyeholes for standard lifting keys or flush mounted integral handles.
- D7.7.2.c Assistance to ensure a lifting effort not exceeding 25 kgF shall be via spring and not gas struts.
- D7.7.3.b Holes/slots drilled in the chequer plate or open mesh flooring are not permitted as a ventilation option.

- D7.7.4 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.

### **D7.9 Davit Sockets**

- D7.9.2 The davit socket shall comply with the following additional clauses:
- Lifting test certificate/report shall be submitted in compliance with the Undertaker's M&E 3015 document, available from the Undertaker's Policies & Standards Team. Where the certificate/report has less than 6 month until its next inspection at the time of Adoption, then a further examination shall be undertaken.
  - 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

### **D7.10 Kiosk**

- D7.10.1e For socket details refer to clause F3.4.1.2.

### **D7.11 Kiosk Construction**

- D7.11.14 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.
- D7.11.15 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).
- D7.11.16f The site information plate shall include the Undertaker's site reference 'Catalogue' number, available from the Undertaker's Asset Information Team.

## **4. PART E**

### **Introduction**

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

E1 General

E1.3.3 [N] All gravity pipework up to and including 300mm shall be certified by a recognised third party test body as proven to withstand a jetting pressure of 2600 psi (180bar). All ancillary equipment made of plastic materials and elements in association



with such pipework must be similarly proven to withstand jetting pressure of 2600 psi (180bar).

## 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**

F2.2.1 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 the DCG 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.

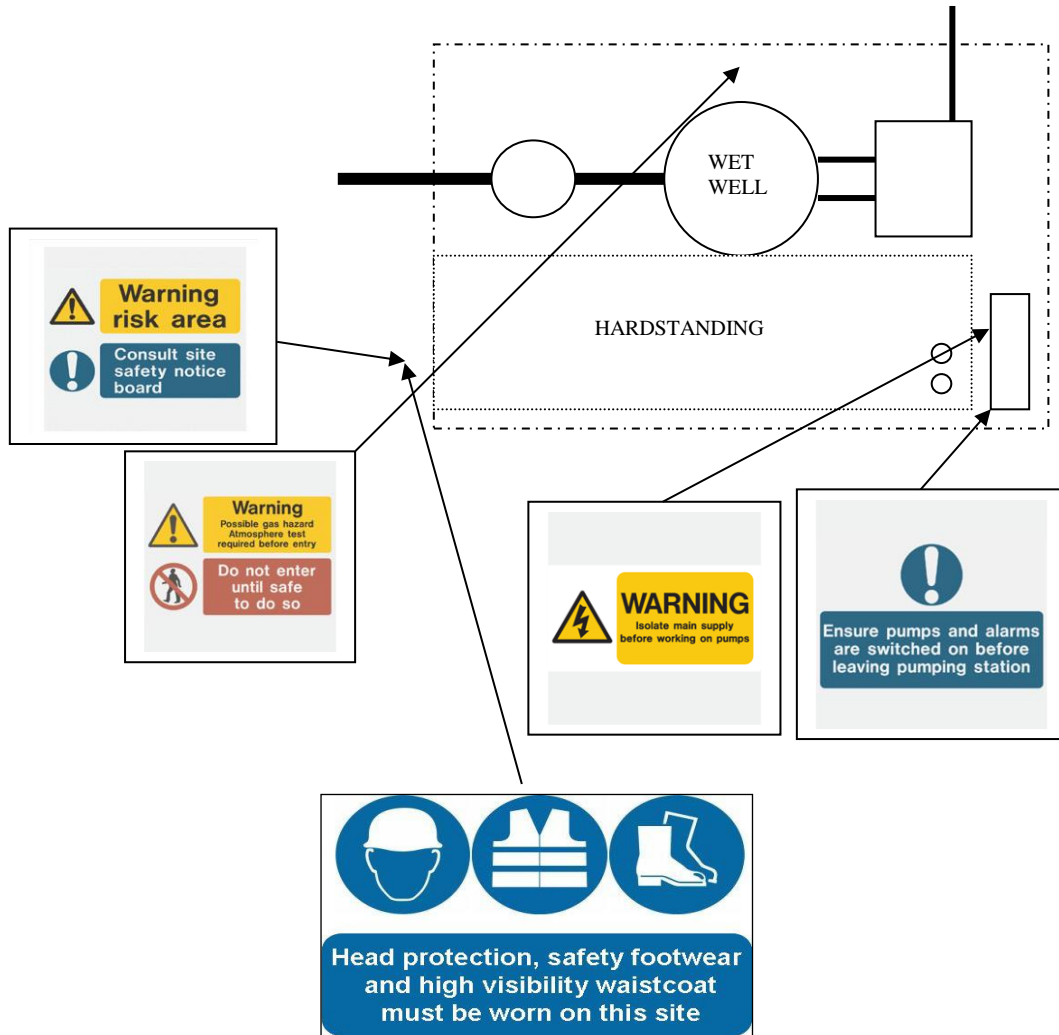
F3.2.1.9 Evidence shall be supplied to the Undertaker that the installation complies with The Electricity Safety, Quality and Continuity Regulations 2002 (or later as amended) and BS EN 50160 regarding supply flicker, i.e. proof of compliance in the form of a test certificate from a certified instrument.

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 2 No. Form 2 two pump control panel designs and 1 No. Form 4 two pump control panel design. The Form 2 control panel designs are detailed in the Wastewater Pumping Station (WPS) Standard Panel Drawings (SPD) Design B 2 Pump Control Panel – up to 15kW and Design C 2 Pump VSD Control Panel – up to 7.5kW. 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 (DCG, Type 1, 2, 3 or 4)

The Undertaker’s preference is for the Developer to utilise the Design C 2 Pump VSD Control Panel (up to 7.5kW). This provides a cost effective solution that has the benefit of providing energy savings, pump blockage protection, pipe flushing, wet well cleaning within a small footprint. The Developer shall seek approval from the Undertaker for the proposed design of the control panel if different from the standard designs outlined above.

#### **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 DCG document, hence for safety reasons the Developer shall conform to the following:

#### **F3.3.6.2**

<b>Indicator Lamp Colour</b>	<b>Application</b>
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

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

4. Where a mobile generator connection point is provided, an earth electrode system for the mobile generator shall be provided and connected to the main earth bar of the assembly. This means there is a permanent earth system in place for the generator and appropriate signage shall be provided.

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), Design C 2 Pump VSD 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 Potentially Explosive Atmospheres approval.

F3.3.8.2.1e Low flow protection signal shall be derived from the pump low flow cut-off signal.

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 DCG 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 ADSL lines. Alternatives to ADSL shall be used only where specifically agreed with the Undertaker on a site-by-site basis.

PSTN lines will be withdrawn from service in December 2025 and thus No new PSTN lines shall be installed.

Where no existing communication line is available the Developer shall liaise with the Undertaker's IT Department for installation of the new line.

On sites where an existing PSTN line exists and is being considered for use for telemetry then it shall be upgraded to an ADSL line as part of the works. The Developer shall liaise with the Undertakers I.T. Department for this upgrade.

The incoming ADSL 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 OT and 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 OT and Telemetry Team, e-mail address: [MailBxTELENQ@southernwater.co.uk](mailto:MailBxTELENQ@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 OT and 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'.

The pumping Station shall have the facility to automatically reset the pumps via the Telemetry Outstation. The Automatic Pump Reset (APR) function is detailed in clause 7.2 of MED 4408.

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

F3.3.11.4.9 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 and Design C 2 Pump VSD 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 and Design C 2 Pump VSD 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 and Design C 2 Pump VSD 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 &  
F3.3.12.3.3d &

F3.3.12.3.4 The Wastewater Pumping Station (WPS) Design B 2 Pump Control Panel and Design C 2 Pump VSD Control Panel shall incorporate MCB fed circuits as per the Wastewater Pumping Station (WPS) Standard Panel Drawings (SPD) Design B 2 Pump Control Panel and Design C 2 Pump VSD 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 and Design C 2 Pump VSD 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:-

- 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.

F3.3.12.5.2 The Wastewater Pumping Station (WPS) Design B 2 Pump Control Panel and Design C 2 Pump VSD 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 and Design C 2 Pump VSD Control Panel, shall be as per Wastewater

Pumping Station (WPS) Standard Panel Drawings (SPD) Design B 2 Pump Control Panel and Design C 2 Pump VSD 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 and Design C 2 Pump VSD 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 and Design C 2 Pump VSD 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 and Design C 2 Pump VSD 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 All kiosks shall be provided with internal lighting. This lighting shall be provided in accordance with the Form 2 Wastewater Pumping Station (WPS) Design B 2 Pump Control Panel, the Design C 2 Pump VSD Control Panel and the Form 4 Wastewater Pumping Station (WPS) Standard 2 Pump Panel. External working areas with pumps and motor drives (including wet wells), 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. The internal and external lighting shall be controlled from a single switch located within the Kiosk. This is to ensure that it is obvious that the lighting is on and needs to be switched off before personnel leave the site. All lighting and luminaries shall be provided in accordance with MED 4318 and WIMES 3.02.

**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, the Design C 2 Pump VSD 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 (IP 65 minimum) 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 S2000 micro or S2000. 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) Design C 2 Pump VSD Control Panel - Servelec Systems S2000 micro or S2000. The telemetry outstation shall be wall mounted within as per the Wastewater Pumping Station (WPS) Standard Panel Drawings (SPD) Design C 2 Pump VSD 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 S2000 micro or S2000.

#### 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

#### **F4.2 Check (Reflux) Valves**

F4.2.4 Add sentence: 'The half-inch BSP plugged tappings shall be fitted with stainless steel quarter-turn ball valves.'

#### **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.'

#### **F4.5 Isolation**

For the purposes of Baseline Mechanical Isolation (in accordance with HSG 253 Safe Isolation of Plant and Equipment), the following shall be applied to achieve Proved Isolation of the Single Block and Bleed:

- NRV: Downstream isolation valve fitted and Bleed (test point) fitted to downstream part of NRV.
- Pumps: Downstream isolation valve fitted and Bleed (test point) fitted to downstream part of NRV. Note pumps and associated pipework are self-draining.
- Rising main, common manifold and flowmeter (where fitted): Drained through Bauer connection and Bleed (test point) fitted to common manifold.
- Wet well: Upstream isolation valve with Bleed via visual leakage into wet well. Final Isolation by temporary means as per task specific risk assessment.

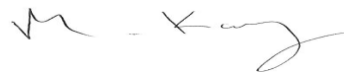
## APPENDIX VII ASSOCIATED SOUTHERN WATER STANDARDS

<a href="#">TSM</a>	Technical Specifications Manual, including:-
<a href="#">MED 4001</a>	Mechanical and Electrical General Specification
<a href="#">MED 4003</a>	Condition Monitoring
<a href="#">MED 4004</a>	Hazardous Area Classification
<a href="#">MED 4100</a>	Valves
<a href="#">MED 4131</a>	Ventilation Systems
<a href="#">MED 4138</a>	Lifting Equipment
<a href="#">MED 4140</a>	Mixed Flow Volute Submersible Sewage and Sludge Pumpsets
<a href="#">MED 4142</a>	Micro Pumping Stations
<a href="#">MED 4301</a>	Package Plant and Control Panels rated up to 100 Amps
<a href="#">MED 4408</a>	Telemetry
<a href="#">MED 4415</a>	Liquid Flow Metering
<a href="#">MED 4417</a>	Control of Pumps
<a href="#">MED 4433</a>	Liquid Level Measurement
<a href="#">CED 4001</a>	Hydraulic Design Requirements
<a href="#">CED 4010</a>	Pressure Pipelines and Rising Mains
<a href="#">CED 4019</a>	Fibre Reinforced Plastic Kiosks
<a href="#">CED 4023</a>	CESWI Amended and Supplementary Clauses
<a href="#">PSWWT 4022</a>	Odour Control – Load Assessment and Dispersion Modelling
<a href="#">COM</a>	Commissioning Manual
<a href="#">WOM</a>	Works Operation & Maintenance Manual
<a href="#">M&amp;E 3015</a>	Procedure for Inspection of Lifting Equipment
RD.000000.0Z3901	2 Submersible Pump - Network with valve chamber
RD.000000.0Z3926	2 Submersible Package Pumping Station - (Network & Site)
RD.000000.0Z3931	Micro Pumping Station

## 6. DETAILS OF CHANGE HISTORY

### Issue 4

Section No.	Paragraph No.	Change	Rational for Change
1.0	All	Design and Construction Guidance (DCG) changed from Version 1.0 to 2.1	Change of DCG from V1.0 to 2.1 – though amendment in V2.1 has no impact in current MED.
Misc	Misc	Change reference from SFA to DCG	SFA now called DCG
Misc	Misc	Change from ATEX to Potentially Explosive Atmospheres Regulations 1996	BREXIT
D7.7.	2a	Requirement for Manhole covers near coastal regions changed from stainless steel to galv	To align with WIMES 8.03



Authorised by .....Mike Kay

Signature

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