

Confluence Design and Construct ECC Works Information

PROJECT TITLE:	A Winning Pumps and Panel Upgrade / Replacement
CONTRACT REF:	CA18/02560
Cost Centre:	3110
Project / Site Code:	EV00353
Account Code:	40102
Capex Code:	501
DOCUMENT REF:	Works Information – Rev 1.0
DATE:	27 July 2017
CA Project Manager:	John Rowlands

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Background

'A' Winning mine water treatment scheme (MWTS), located in Blackwell, Derbyshire, was implemented to prevent pollution of underground water supplies and uncontrolled discharges to surface watercourses. It is an important scheme because it is part of a strategy to protect the Nottinghamshire Permo-Triassic aquifer, the most important aquifer for public water supply in the Midlands. 'A' Winning MWTS is in a strategic location due to its underground interconnections between abandoned coal mines, and a proximity to a surface watercourse.

Introduction

A Winning is a strategic pumping station used to bring down levels across the coal field and this affects MWTS at Woodside where the pumps are required to be lowered as part of a larger scheme to reduce mine water levels.

The work required is to provide design and installation of mechanical and electrical services to the A.Winning Pumping Station to allow the Pumping to be lowered to a new desired water Level and other works to bring the Pumping Station in line with the current Electrical Standards.

The pumping station building contains the following area's (See Layout Map Attached)

- Main Pumping Area containing 2 x Pump Headworks, Pipework & Pump Laydown area, 60T Overhead Crane, Man Hoist, 3 ½ T Overhead Crane, Small Office and Toilet.
- Control Room complete with MCC Panel & Distribution Panel.
- HV/LV Transformer Room.
- HV Switch room.

. The main element of works required is as follows:

- Installation of 2 New Free issue Pumps – Flowserve QN103/7 - 210Kw 110L/sec.
- Installation of New ABS Coated pipework to the required depth.
- Replacement of the Existing HV/LV Transformer and removal of the Existing one and Transport to a Location to be agreed with the Coal Authority.
- Replacement of the Existing Motor Control Centre and removal of the Existing one and Transport to a Location to be agreed with the Coal Authority.
- Replacement of the Existing Building services including Lighting, Power Supplies and Heating.
- Removal of Redundant electrical equipment and dispose off.

This works is for the Procurement, Design, Supply, Installation, Test, Commission and Handover of all elements listed above.

100. Detailed Description of the Work

The pumping infrastructure for the A Winning Mine Water Treatment Scheme (MWTS) was lowered in 2015. Following these works it has become necessary to lower the pumps further at this site, to control the water level within the mining block.

The services to be provided under this contract are the provision of new pumping infrastructure at the A Winning MWTS, to achieve the requirements in Section 320.

The pumps (to be supplied free issue from the TCA Fleet) have been specified to achieve these parameters.

The works consist of the following:

1. Outages: The works needs to be Phased that at no time should the pumping of water to the treatment scheme be allowed to stop for a single period greater than 12 hours, A proposal shall provide a plan outlining any proposed outage period for the pumps; this information shall be provided at least 4 weeks prior to the outage to allow a mitigation plan to be prepared prior to the works. The Employer will arrange for the electricity supply to be disconnected on an agreed date. Within the outage period it will be require all works necessary to install and commission the new pumping equipment to be completed.
2. Removal of existing borehole pumps, risers and cabling. The existing borehole pumps shall be removed, boxed and delivered to Flowserve's facility at Newark.
3. Modification of the existing headwork platform to accommodate and support the new pumps.
4. Installation of new borehole pumps and provision of additional Scotch coated riser pipework to lower the pumps to the required level of 116M below ground level (additional 30M on one and 60M on the other) .
5. Lowering of existing monitoring equipment within the shaft to the new levels, and connection to the new panel.
6. All associated cabling to the New MCC.
7. Removal of the existing panel and handover to the Operator (Severn Trent Services) as part of this Contract.
8. Upgrade to the IET Wiring Regulations 17th Edition of the existing electrical wiring in the building holding the pumps and panel along with the buildings internal wiring including the power to the two gantry cranes and man hoist within the building workshop area.
9. Provide capacity and take off for an external 100amp 3 phase supply from the Building Services DB for future use to power the storage warehouse located within the same compound as the pump house.
10. All electrical works to connect the new panel to the existing supply.
11. Commissioning of the new wiring, pumps, panel and monitoring equipment.
12. Temporary pumping infrastructure if required.
13. Any other works necessary to enable the water levels to be lowered to the specified levels.
14. The Electrical Works shall include but not be limited to design, manufacture, supply, witnessed tests at the factory, installation, tests at site, training for the Employer's operatives, operating and maintenance instructions, record drawings, diagrams and other documentation, commissioning and setting to work.
15. The Contractor shall provide a complete electrical installation design, in accordance with IEE 17th Edition Wiring Regulations, including calculations, diagrams, schedules, drawings and all other documentation required to demonstrate a satisfactory design.

16. The work shall provide for a new updated HV/LV Transformer size to be determined as part of the design and shall be of the following:

- Type - Free Breathing
- Style - Ground Mounted Cable Connected,
- Insulating Fluid - Midel 7131 Transformer Fluid

Existing Transformer Details – see picture of TX Data Panel in Photographs section below.

17. The work shall provide for a new Form 4 motor control centre (MCC) that meets with the Coal Authorities Standard for MCC Panels (see full details provided as part of tender package) Tick Sheets provided separately.

With the following exceptions:

- TPN Feeders required for
 - 60T Crane Rated at 120Amp
 - 3 ½ T Crane Rated at 40 Amps
 - Man Hoist Rated at 30 Amps(Contractor to check these figure/requirements as part of design).
- Building Services DB to be external to Panel so a new suitably sized TPN Feeder is required.

Existing MCC Drawings are being supplied as part of Tender documents.

18. Building Services: The work shall provide for a complete Building Services electrical and wiring installation design, in accordance with IEE 17th Edition Wiring Regulations, including calculations, diagrams, schedules, drawings and all other documentation required demonstrating a satisfactory design.

The installation shall comprise all cables, cable containment and supports utilising hot dipped galvanised Conduit and fittings to BSEN 61386 Class 4, wiring accessories and all other equipment required to provide a complete functional Building Services installation to the existing Building.

The Building Services shall incorporate the following facilities and fixtures:

- Thermostatically controlled heating to be provided to maintain an internal temperature at 5°C. whilst the external temperature is at -10°C to the Control Room and Welfare areas.
- Thermostatically controlled ventilation, Fan assisted ventilation shall be provided to limit the pumping station internal temperature to a maximum value suitable for the equipment installed within. The ventilation system shall be controlled by a tamperproof thermostat, set to activate the system at 20°C. The design shall consider the need for air inlet and outlet louvers to the Control Room and Welfare areas.
- Internal lighting shall be installed to provide an area illumination of 500lux. Corrosion resistant luminaires shall be provided. The luminaires shall provide maintained emergency lighting for a minimum of 3 hours on main electricity supply failure.

- Lighting should be located for ease of future maintenance.
- light switch facilities and emergency test switch.
- Sufficient double socket (BS4343) RCD protected outlets.
- 1 x 110V Transformer complete with sufficient Tool socket outlets.
- Provide capacity and take off for an external 100amp 3 phase supply from the Building Services DB for future use to power the storage warehouse located within the same compound as the pump house.
- TPN Distribution board c/w MCBs and isolator for above electric's plus at least 3 spare ways.
- Security Alarm system with contacts to PLC/Telemetry.
- External Lighting to cover the front main access door and the side maintenance shutter door.

19. Demolition/Removal Works

The existing electrical components are to be disposed in accordance with WEEE Regulations 2010.

Below is the list of items deemed as being redundant and therefore are to be removed and either disposed of, or removed and retained to be transported to a suitable location (yet to be agreed).

- Existing Transformer – Remove and retained.
- Existing MCC Control Panel – Remove and retained.
- Existing Pump & Instrument Cabling - Removed and retained,
- Existing Building Services (Lights & associated equipment /Sockets /Heaters /Fans /Switches /Containment etc.) – Removed and disposed of.
- Existing switchboard – Removed and disposed of.

20. The Contractor is to supply a method statement and risk assessment identifying how the existing equipment will be safely removed from site.

21. Pump & Instrument Cabling

The works shall provide the complete cabling and containment system required in order to ensure that all the newly installed equipment is fully integrated and operational.

The Contractor shall provide a complete electrical and wiring installation design, in accordance with IEE 17th Edition Wiring Regulations, including calculations, diagrams, schedules, drawings and all other documentation required to demonstrate a satisfactory design.

The installation shall comprise all cables, cable containment and supports, wiring accessories and all other plant required to provide a complete functional installation.

Cabling Power

The Contractor shall include within the price for all necessary power cabling to produce a complete and operational site.

Preference shall be given to the use of multicore XLPE insulated armoured cables to BS 5467. Other types of cable may be used with the Client's approval.

Cabling Control

The Contractor shall include within the price for all necessary control and instrumentation cabling to produce a complete and operational site. All analogue signals shall be cabled using screened twisted-pair cable. All spare cores/pairs in multicore/multi-pair cables shall be connected to individual disconnect type terminals. Adequate terminals shall be provided for terminating individual and overall screens, and connection to signal earth where appropriate.

Cable Tray & Cable Containment

The Contractor shall ensure that all cable tray is Hot Dipped Galvanised of Medium Duty Return Flange cable tray. All Cable Containment must be installed to avoid any possible trip hazards.

22. Lifting Gear

There are two items of lifting equipment on site that will be provided by the Employer for work associated with the Pump replacement (60T and 3.5T Gantry Cranes – the Man Hoist is also available if required), It is intended that the works associated with the Installation of the new Transformer and MCC Panel and removal of the old one's will require the use of mobile lifting equipment and it should therefore include for this in his price for providing any lifting equipment deemed necessary for the installation of items of plant or machinery, the work must allow for any lifting eyes required for easy removal of any part of these items supplied for future maintenance purposes.

200. General constraints on how the Contractor Provides the Works

205 General constraints

- Use of the Site
- Access to the Site - Access is via a locked/padlocked gate off Fordbridge Lane.
- Deliveries – shall be programmed to avoid peak hours / school times.
- Working Hours – 07:00 – 19:00 Monday to Saturday.
Sunday – by agreement with the *Project Manager*.

215 Security and protection of the Site

The pumping compound is secured by a combination padlock. The code for this shall be provided to the Contractor at the pre-start meeting for the project.

24 hours security shall be provided out of hours whilst work is being executed.

280 Site operation

Once the site is handed over to the Contractor they shall be responsible for controlling the water level in the shaft at a level below ground level of 86M – current level. The Contractor shall be responsible for operating the site until Completion.

The *Employer* accepts that pumping will have to be stopped at the site to allow the works to be completed. It is anticipated that there is a 2 week period from cessation of pumping until this level is reached. The Contractor shall review the works to minimise the period that pumping is suspended and develop a strategy to enable levels to be controlled by temporary pumping if required. The Employer will draw down levels as far as practicable in advance of the works.

Any temporary pumping measures shall be capable of being brought into service within 24 hours. This constraint applies from the cessation of pumping to implement the works.

The existing borehole pumps shall be removed, boxed and delivered to Flowserve's facility at Newark, Nottinghamshire as part of this contract.

The existing MCC and Transformer shall be dismantled, removed from the building and delivered to the Operator (Severn Trent Services) as part of this Contract (exact location is yet to be agreed).

300. Contractor's design

305 Design responsibility

The Contractor shall be responsible for the design of all of the works.

310 Design submission procedures

The Contractor shall submit the following information for review;

- Detailed drawings (civils, electrical and mechanical).
- Detailed specifications and schedules.

All design information shall be issued via the Conject extranet site.

310 Design approvals from others

The Contractor shall submit the following:

None

320 Employer's requirements

The *Employer's* requirements for the design are as follows:

- Pump to be positioned to allow the water level to be drawn down to 116M below ground level.
- Peak flow rate of 220l/s (Both pumps running).

- Panel / MCC shall be designed in accordance with The Coal Authority Standard Panel Specification.
- MCC Panel location – the Employer’s preference is that the existing location for the MCC Panel is retained and the new panel housed in this area, unless it can be demonstrated that it is impractical or it offers better value to have it installed elsewhere within the building.
- Security / resilience – the site has suffered repeated intrusion, theft and damage. The works shall be designed to reduce the risk of damage or theft.
- The works shall be designed to facilitate and promote maintenance.
- The Contractor shall agree control levels / alarms with the Employer’s Operational staff and
- The Contractor shall agree any telemetry requirements with the Employer’s Operational Staff and Operator as part of the Contractor’s Design.
- Headworks shall be designed to support applied loadings in accordance with design standards, taking account of dead and live loadings including fatigue and any cyclical loadings. Existing headwork pipework / equipment to be retained where possible – see enclosed A.Winning Steel Grillage Structural Calculations forming part of the tender documentation.
- Any other required items associated with and necessary for the installation of the pumping station to lower the ground water levels to 116M below ground level.

400. Completion

Completion of the works shall be achieved once the following is completed.

- The works as identified in Section 100 have been undertaken
- The Contractor shall undertake functionality testing of the site prior to handover. The site will be operated for a period of 5 working days at a flow 150 l/s, without any significant or re-current fault.
- All testing as identified in the specifications has been undertaken and passed.
- Equipment and keys provided to Operator.
- Training of the Employer’s operational contractors staff (Severn Trent Services). Hereafter referred to as the Operator.
- Equipment and keys provided to Operator.
- The following information has been issued:
 - As-built drawings.
 - Information for the Health and Safety File.
 - Operation and Maintenance Manual.
 - Handover Certificate shall be produced.
- Handover Process (detailed below) completed.
-

Handover process

Contractor shall arrange a pre-handover meeting, to be held two weeks before the planned Handover Meeting. Two weeks' notice shall be given to attendees of this meeting.

Any defects identified at the Pre-handover meeting shall have been addressed.

The following are required to be issued prior to the handover meeting and signing of the handover certificate:

- Draft Health and Safety File including:
 - Redline as built drawings.
 - O&M Manual.
 - Electrical test certificates.
- Training for Operator.

The handover certificate will not be accepted until the above information has been supplied, see below.

Handover Certificate:



The following information shall be issued via Conject within 28 days of handover;

- Final Operation and Maintenance Manual.
- Final information for the Health and Safety File, see below:



- Final As-Built drawings.

500. Programme

It is anticipated that the Works will take around 12 weeks to complete and that Completion will be before the end of December 2017.

The pump units are available for delivery to site as soon as required by the PC in their programme.

A programme shall be prepared by the *Contractor* and submitted under CI31 of the contract.

A programme shall be accordance with the contract and shall as a minimum contain:

- All requirements from CI31 NEC PSC.
- The planned dates for submission of information and other things by the *Contractor*;
- The dates of the project meetings including handover and pre-handover meetings;

- The dates for Factory Acceptance Testing (FAT) / Site Acceptance Testing (SAT).
- Procurement periods for key item;
- Identify the critical path for the delivery of the services and activities;
- The period when pumping will not be possible and temporary pumping may be required.
- Any power shutdowns.
- Commissioning periods;
- Training;
- Submission of manuals and drawings for handover;
- Dates when the Operator or *Employer* is required to attend;
- Identify *Employer* acceptance requirements and,
- Include the constraints as stated in Works Information.

The programme is to include a Gantt chart. All elements of the programme are to be submitted in paper and electronic copies. The electronic copies are in:

- The software in which the programme was prepared (preferably MS Project) and
- Adobe acrobat format (pdf).

The *Contractor* ensures that the electronic copy in the software in which the programme was prepared is to be capable of being read by MS Project 2013.

600. Quality assurance

No specific requirements over and above the framework requirements.

700. Tests and inspections

Commissioning shall be undertaken in accordance with 'D&C Framework Volume 4.4 - Specification v5.0'.

Electrical testing to be undertaken in accordance with BS 7671.

FAT & SAT documents shall be provided at least 2 weeks prior to the commencement of commissioning.

TCA Panel Specification.

800. Management of the works

810 Communications

- Conject shall be used for all contract communications and information exchange and design approvals.
- A pre-start meeting will be held at the Employer's Mansfield office.

- A pre handover meeting will be arranged and held 2 weeks prior to projected handover date.
- Handover meeting shall be held on site. Any defects identified at the Pre-handover meeting shall have been addressed.
- A handover meeting to be arranged and held which shall include signing of the Handover Certificate and will conclude the handover of the scheme to the Operator.
- Formal progress meetings will be held monthly.
- Formal progress reporting will be required on a weekly basis.
- Once the site is handed over to the Contractor they shall monitor levels in the shaft on a daily basis and provided this information to the Employer on daily basis (water level in m AOD).

900. Working with the Employer and Others

905 Sharing the Working Areas with the *Employer* or others

A sub-station is located within the *Working Area* (pumping station compound). The power supply company (WPD) has 24 hour access to this. Both the access gate to the track to the site and the main double width gate into the pumping station compound have combination padlocks fitted, and no additional locking shall be added – The codes and keys to the various locks and intruder alarm panels will be issued to the winning contractor as part of the pre-start meeting.

The *Employer's* operator may require access to the site. Once the site is under the control of the *Contractor* this shall be by agreement. No reasonable request shall be refused.

910 Co-operation

The Contractor is required to co-operate and co-ordinate with the Employer's Operator, STS in order to achieve recommissioning of project and subsequent handover.

Contact at STS:

- Charles Anderson.
- Mobile: 07392100792.
- Email: charles.anderson@stservices.co.uk

Contact within the Employer's Operations team:

- Chris Crowe.
- Mobile: 07917 174577.
- Email: chriscrowe@coal.gov.uk

920 Authorities and utilities providers.

The site power supply may need to be isolated by the *Employer's* meter company. The *Employer* shall arrange shutdowns and re-energisations. Dates for these shall be included in the Clause 31 programme. If these dates need to be amended a 4-week notice period is required.

1000. Services and other things to be provided

1005 The Contractor shall provide the following for the use of the Employer, Project Manager or Others :

- Site welfare.
- Storage facilities.
- Medical facilities and first aid.
- Sanitation.
- Security – out of hours security to be provided.
- Utilities, e.g. water and power.
- Once the site is handed over to the Contractor they shall monitor levels in the shaft on a daily basis and provided this information to the Employer on daily basis (water level in m AOD).

1010 Services and other things to be provided by the Employer

- Access to the Site.
- Space for accommodation.
- Two borehole pumps (Flowserve type QN103/7) and cabling are being provided free issue from TCA Fleet of pumps via STS who arrange for the pumps to be delivered and handed over to the contractor.

1100. Health and safety

The Contractor shall comply with the requirements of the Employer's 'Safety, Health and Environment Guideline For Contractors' document:



In addition the Contractor shall be responsible for co-ordinating and managing the electrical shutdown and control of the site once this is handed over to the Contractor.

1200. Subcontracting

There are no restrictions on sub-contracting work.

1300. Employer's work specifications and drawings

2005 Employer's work specification

D&C Framework Volume 4.4 - Specification v5.0.

Flowserve pump datasheet for QN103/7 – Reference.

Coal Authority Panel Specification.

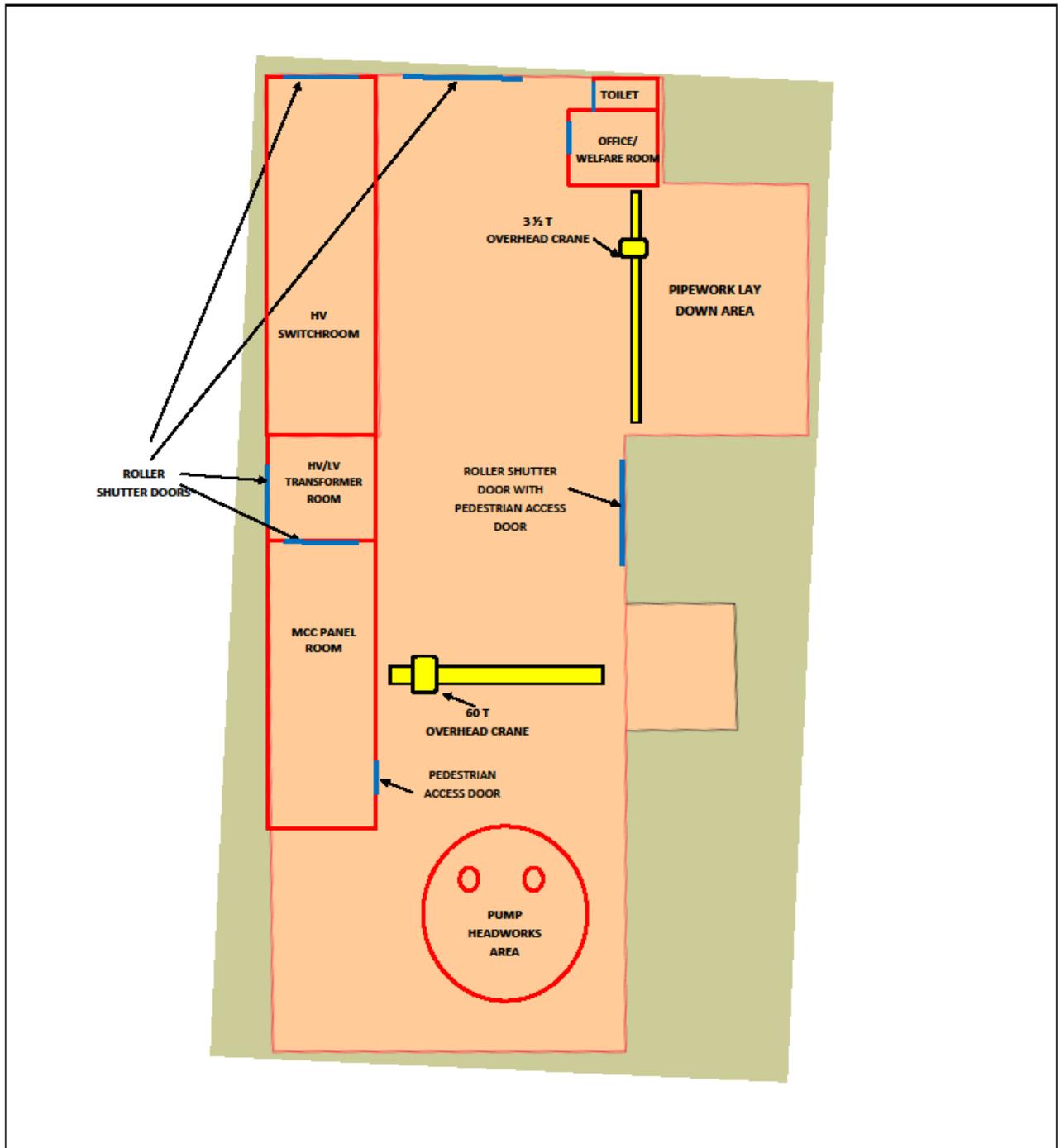
A.Winning Steel Grillage Structural Calculations.

A.Winning Electrical Wiring Diagrams.

The documents listed are all available on the Conject extranet.

2010 Drawings & Photographs

Layout of pump house is
below:



 The Coal Authority 200 Lichfield Rd Berry Hill Mansfield, NG18 4RG	Site Address and nearest Postcode:- Fordbridge Lane, Blackwell, Alfreton, Derbyshire, DE55 5JY	Project Pump Lowering Scheme
	Scale Not to scale	Site A.Winning Pumping Station
		Title General Arrangement

Photos:



Entrance Sign to A Winning Pumping Station



Exterior of Pumping Station Building



Existing Control Room



Existing High Bay Lighting Control Gear



Existing Pump MCC Panel



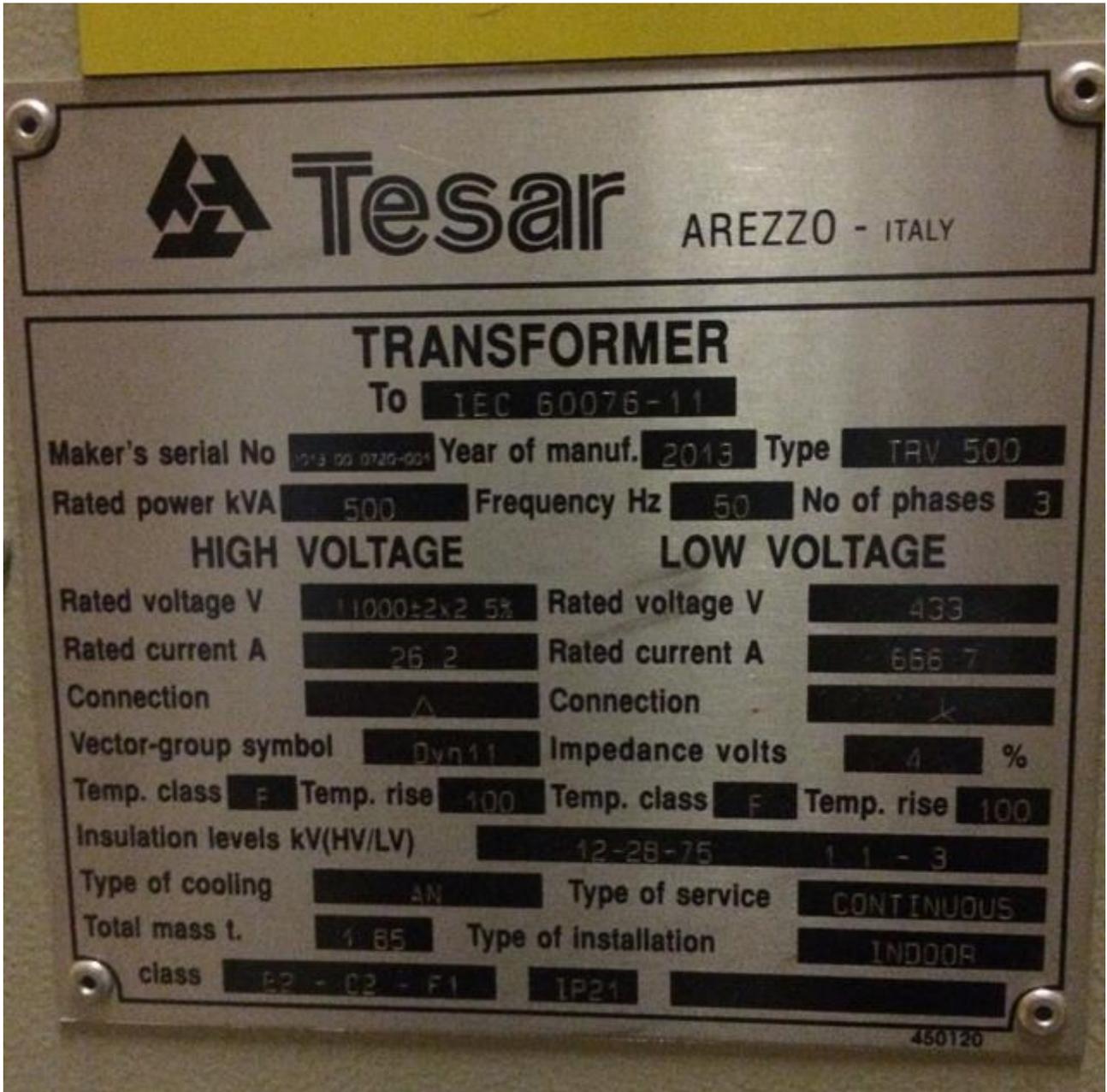
Existing Switchboard



Existing TX HV Side



Existing TX LV Side



Existing TX Data Plate



Headworks Area and 60T Overhead Gantry Crane, with Man Hoist in access ladder.



Pipework Laydown area with 3T Overhead Gantry Crane