

	MATLA POWER STATION				Template Identifier	240-43921898	Rev	6
	SCOPE OF WORK				Document Identifier	14593	Rev	4
					Effective Date	October 2019		
					Review Date	October 2022		

PLANT AREA: Matla Power Station Outside Plant			
TITLE: Matla Power Station Ash Dam Wall Dust Suppression System			
REF: MEA - 06502	Reference Rev No: 0	MULTIDISCIPLINARY: No	Plant Level: All
COMOPILED BY	Name: Bruce Bvuma Systems Engineer	Signature: 	Date: 08-09-2020
	Name: Setati Moyaha Civil Engineer p.p	Signature: 	Date: 08/09/2020
	Name: Johan Veldman Electrical Engineer	Signature: 	Date: 08/09/2020
	Name: Sylvester Mhlongo C&I Engineer	Signature: 	Date: 10/09/2020
	Name: Thando Mbulawa Line Manager	Signature: 	Date: 14/09/2020
APPROVED	Name: Lele Masote Group Manager	Signature: 	Date: 14/09/2020
REVIEWED	Name: Misheck Magama Quality Department	Signature: pp	Date: 2020/09/16
REVIEWED	Name: Mbali Mhlana Environmental Department	Signature: 	Date: 17/09/2020
ACCEPTED	Name: Aaron Masehla Outside Plant Maintenance Manager	Signature:	Date:
ACCEPTED	Name: AIA	Signature:	Date:
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NB: Do not tamper with the template.

GENERAL

- Data books, reviews, reports and diagrams/drawings shall be submitted to Engineering after the completion of the work. Engineering to forward the data books to Quality Department (Document Control)
- All QCP's to be submitted to Engineering and Quality for approval prior to outage/project or maintenance work commencement.

	SCOPE OF WORK DESCRIPTION / ACTIVITY	PROCEDURE, SPECIFICATION, ENG. REQUIREMENTS / DOCUMENTATION	HOLD POINTS, WITNESS, REPORTS	RESPONSIBLE PARTY
1.1	Safety	• All work is to be done in accordance with Matla plant procedures and safety regulations. (GGR 0992). • Matla power station induction must be done before any work commences. • Permit to work must be in place before any work commences. • Worker's register must be completed and daily risk assessment conducted before any work commences.	Eskom to witness.	Contractor
1.2	Environmental Management.	• All activities listed in the National Environmental Act 107 of 1998, EIA Regulations as amended, must have environmental AUTHORISATION before commencement of work. • The contractor shall comply with all applicable legal and other requirements. • The polluter pays principle will be applied. • The contractor manager shall ensure compliance with Eskom Matla Environmental procedures to ensure the prevention of pollution (refer: OMOP 4090 and 4402).	Eskom to witness.	Contractor

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		- The last payment will be processed based on the status of the last housekeeping check sheet (Annexure C: OMOP 4402) of designated area. - EMS file based on ISO14001 will be required.		
1.3	Quality Management	- The contractor/executioner of work will be responsible for drawing up all QCP documentation and this must be approved by engineering and authorised by the Quality Department before commencing with the work. - Contractors/executioner to adhere to QM 58 and OMOP4497 requirements - Number of NCR issued can affect your next tendering process. - The QCP shall be signed progressively by the Engineer/Supervisor, Eskom QC Inspector, Contractor QC Inspector and/or AIA. - No procuring of outage items without the approval of scopes by quality - All outage scopes creep and scopes addition should be approved by quality - No contractor should be in the possession of scopes for execution without the scopes approved by quality - The contractor is subjected to quality auditing at any point in time during execution of scope	Hold point	Contractor
1.4	Inputs from other departments			
1.5	Commissioning reference			

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2	SCOPE OF WORK DESCRIPTION / ACTIVITY	PROCEDURE, SPECIFICATION, ENG. REQUIREMENTS / DOCUMENTATION	HOLD POINTS, WITNESS, REPORTS	RESPONSIBLE PARTY
	This scope of work outlines the system and the supporting subsystems required for the execution of the ash dam side wall dust suppression sprinkler system, which will facilitate with pumping the water from the final cut dam to suppress dust on the ash dam side wall using the sprinkler systems. Refer to Figure 1 for the site arrangement. The scope of work for the project entails the design, supply, fabrication, installation, commissioning and testing of the dust suppression system complete system. The Contractor must provide the suitable system which will be able to pump water and deliver to the sprinklers with minimum losses, with a capability to suppress the dust effectively throughout the dam wall. The scope of work includes but is not limited to the sections below. All standards and specifications stipulated must be adhered during the work execution.		Hold	Contractor
2.1	ASH DAM WATER PIPELINE SYSTEM			
2.1.1	Discharge Pipelines: Supply, install and commission the discharge pipelines with fittings from the final cut dam pump through the dam to the north side of the dam through incline to the dams	Pipeline Size and Specification:	Hold	Contractor

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	to the ash dam wall. The pipeline will be laid on the natural ground, portion crossing through the ash dam ring road will be buried underground, and on the 90 degree bend, supports will be installed. Precast concrete support bases must be provided on the bends and curves, refer to Figures below and the civil scope Section 2.4. All the pipeline segments and bends must be welded with flanges on both ends as per the standards before are chipped to site. Pipeline Segments • From the pump to A, installed inside the final cut dam • From A to B, installed on an final cut dam hill (supported by plinth in section 2.4) • From B to C, installed on the natural ground near the road (supported by plinth in section 2.4) • From C to D, installed under the site ash dam road • From E to onwards, installed on the ash dam wall perimeter midway through the dam wall. The pipeline must be drilled to fit the threaded socket for the sprinkler tap off saddle piping in section 2.1.4 with a spacing of 32m apart. • The northern east side ash dam wall which does not meet the minimum factor of safety (see Figure 1), the main pipeline sprinkler piping inlet pipes must be blanked for at least 20 sprinklers piping on that area.	SABS ISO 4427 of 1996 for HDPE pipe, High Strength Pipe size: HDPE SDR11 PN16, Pipe maximum wall thickness of 20mm Minimum Operation Pressure 8MPa Pipe Length 6000 m @ 225OD, (12 m length each). Operating Pressure – 5bar, Temperature; -4 to 50 degrees. Eskom Standard for Low Pressure Pipelines 240-123801640 Rev 0		
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	Note: The pipeline must be routed as per site arrangement on the final area. All the necessary fitting such as bolts and nuts must be supplied (Refer to Bill of Material below). The aerial survey from the final cut dam through the hill to the ash dam wall must be conducted before the pipeline is installed on the ash dam areas.	Matla PS sonar topography drawing		
2.1.2	Water Pump: Supply, install, test and certify the submersible pump and connection system in the final cut dam. Including all the fitting and connection to the discharge pipeline. The pump must be coated for high corrosion resistance including the fitting used for the pump, as well as a portion of the cable in the final cut dam. Before the pump/motor is supplied, the supplier must conduct a detail calculations and analyses to determine the specified pump/motor rating which will be capable to pump and deliver water throughout the dam wall sprinklers as per specific site arrangement (Correct pump/motor system must be supplied to meet the specified piping arrangement from the final cut to the ash dam wall before supply and installation). Where necessary recommendation on the piping sizing and rating must be provided to provide an efficient system. Supply the reducer for the pump connecting to meet the connection to the HDPE pipeline mentioned in Section 2.1.1 with the specification.	Pump Size and Specification: Submersible Pump Size, Power Required ± 120kW, Ampere –100A, Voltage – 400V, Flow Rate – 820 m³/hr, Head – 80m, Speed – 800 to 2900rpm Mass – 1000kg, Overall Pump Size – (HxWxD) 2000x600x700mm³, Discharge Outlet – 225NB	Hold	Contractor
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		System Operating Pressure – 200kPa, Temperature – Minus 4 to 50 degrees. Pump Cable Length – 400 m (from the dam to the control panel) SANS 52566 Pump Standards		
2.1.3	Isolating Valve: Supply, install, and commission isolating valves along the water pipelines. The valves must be easy to remove and accessible for operating and maintenance of the system. The non-return valve must be installed on the discharge pipeline from the pump. The isolating valves must be installed between the areas along the ash dam wall section with an unstable wall. The non-return valve must be installed on the discharge main pipeline from the pump. The valve must be installed on a position where will be easily accessible to operate.	Size and Specification: Knife and Non Return Gate Valve Size: 225 PN 16 RSV Rising spindle Flange to be drilled to SABS 1123 table 1600/3 Quantity x 1, Non return valve	Hold	Contractor

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2.1.4	Sprinkler Piping: Supply, install, and commission sprinkler piping with saddle clamps. The sprinkler piping must be installed from the main pipeline open hole. All the fitting from the main pipeline must be bolted and fittings between the piping and sprinkler. The sprinkler pipeline stem must be easy to remove during maintenance. Refer to the attached sketch. All the sprinkler pipelines must be installed at an angle perpendicular to the ash dam wall. The sprinkler piping on this section must be supported by the supports mentioned in section 2.4.7. Note: The Contractor must calculate the potential sprinkler and piping sizing which will cater for the frictional losses along the main pipeline to ensure that there is an effective suppression throughout the dam wall. To enhance system performance various sprinkler and piping sizes must be considered during the project phases.	Pipeline Size and Specification: Carbon Steel 32NB wall thickness 2.7mm, SABS 62 Length (height from the main pipe) 1200mm threaded to the saddle with six hole bolts clamping. The piping must be galvanised to minimize corrosion. Refer to SANS 121 (ISO 1461) and the Galvanisation specification below Quantity x 180	Hold	Contractor
2.1.5	Sprinkler System: Supply, install, and commission sprinkler systems. The sprinklers must onto the sprinkler piping. The Sprinklers must be able to spray and rotate to 360 degrees while	Sprinkler Size and Specification:	Hold	Contractor

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	in operation to spray specified areal footprint. All the fitting from the main pipeline must be threaded. The sprinkler and pipeline stem must be easy to remove during maintenance. Note: The Contractor must calculate the potential sprinkler and piping sizing which will cater for the frictional losses along the main pipeline to ensure that there is an effective suppression throughout the dam wall. To enhance system performance various sprinkler and piping sizes must be considered during the project phases.	Flow rate – 4.5m³/hr, Operating range – 16 m radius, Operating pressure – 8 bar, Spacing Apart – 32m, Coverage Areas – 804m² Inlet Piping – (±) 32NB Quantity – x 180		
2.1.6	Pipe Fitting: Supply, and install the pipeline fittings which will be used along the pipeline such as bends, blank and couplings. Tees pipeline fittings from the main pipeline to the 32NB with thread.	Pipeline Size and Specification: SABS ISO 4427 of 1996 for HDPE pipe High Strength Pipe HDPE PN16 SDR11, 90 degrees L Bend – Quantity x 4 Coupling – Quantity x 300	Hold	Contractor

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		Tees – Quantity x 200 Blank – Quantity x 1 Tees for pipelines in Section 2.1.1		
2.1.7	System Operating Philosophy: The pump motor and the protection must be healthy to operate the system and the system must be started by the field operator and stop automatically, the following operating sequences must be implemented on the PLC used to control the pump motor. The logic and protection system must be incorporated onto the design for implementation. Panel and logic design refer to C&I scope in section 2.2. The dust suppression system must be design with various modes of operation such as the following; • Auto, and • Maintenance modes a) Pump motor start and charge the main pipeline manual through the local panel by the field operator, and then b) The pump motor must start automatically to pump the water to the main pipeline. See setting 1 and 2 below. c) Spray system will spray the water throughout the dam wall, After 30 minutes of spraying the pump motor must automatically stop spraying	Control Philosophy: Control philosophy will incorporated in Section 2.2. system for design	Hold	Contractor
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	d) The sequence of operation must continue following clause b), c), and d) throughout the daytime. e) Ash dam site team to inspect the pipeline and spraying nozzle throughout the process for leaks and damages f) The control system must be able to stop after operating for 600 minutes (1 day operation) g) Cycle start again, the pump motor must start after 720 minutes (Next day) Setting 1; Based on the rain focus around Matla PS, the sprinkler system will be operated with at least 25 day (36000 minutes) per month in between early May to end of October. From the auto control, spray system will spray the water throughout the dam wall, start and stop after 30 minutes of spraying the pump motor must automatically stop spraying. The pump motor will stop for 120mins and start again after. Setting 2; Based on the rain focus around Matla PS, the sprinkler system will be operated with at least 18 days (25920 minutes) per month in between early September to end of April. From the auto control, spray system will spray the water throughout the dam wall, start and stop after 30 minutes of spraying the pump motor must automatically stop spraying. The pump motor will stop for 60mins and start again after.			
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2.2	CONTROL AND INSTRUMENTATION The Contractor must provide a fully integrated, working system which meets reliability and operability criteria and be able to performs all required control functions, process interlocking, safety and protection functions. The control and instrumentation system must use industry standards to the maximum extent possible. Supply and install an automation system with a local control panel for the sprinkler system. The Contractor must implement the required automation system to operate and control the plant as per the prescribed philosophy for the sprinkler system in section 2.1.5. UVG Cables to be used for all C&I field equipment. The Contractor provides all required cabling for control and instrumentation. A plastic weatherproof shroud must be fitted to each gland exposed to adverse environmental conditions. The contractor must use the cable racks. All cables must be mechanically supported by the use of a cable gland or clamp at the point of termination. C&I and power cables are not allowed on the same cable rack. Where this is not possible, a minimum distance of 1m between the cables must be maintained	Size and Specification: IEC 62381- Automation systems in the process industry (FAT) 240-56227443 - Requirements for Control and Power Cables for Power Stations 240-56355754 - Field Instrument Installation Standard: Field Installation Requirements 240-56356396 - Earthing and Lightning Protection Standard 240-56355815 - Control & Instrumentation Field Enclosures and Cable Termination Standard	Hold	Contractor
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	Control Signalling: • Binary Signals must be 24VDC • Analog signals must be 4 to 20mA • All commands are pulsed and not sustained • All interface cards are 24VDC • All signals are loop powered, and must be 24VDC • Binary systems must include for the provision of fully automatic, semi-automatic and manual start up and shut down of the plant • Motor control to be 3 wired interposing relays with 24VDC contacts for commands and interface with automation system for control. Local control facility is required, the following distinct modes of operation must be provided: • Automatic • Remote manual • Local manual • Test mode • Emergency mode	240-56355731- Environmental Conditions for Process Control Equipment Used at Power Stations Standard		
		240-109607736 Eskom KKS Key Part Standard		

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	The local control facility and all enclosures must be as per the 240-56355815 - Control & Instrumentation Field Enclosures and Cable Termination Standard with $\geq$IP65. Din rails and spring loaded terminals must be used. The Contractor to label the plant field equipment and cabling and as per 240-109607736 Eskom KKS Key Part Standard. All field equipment and their electrical connections will be rated IP65 or better, or are housed in strong water and dust proof cases rated $\geq$ IP65. Additional hoods and enclosures must protect field equipment. Alarm systems must be designed, implemented and maintained in such a manner that: - Each individual process alarm meets the following criteria: The condition must require plant operator action. The alarm must be the best indicator of the condition's root cause. The alarm must be resulting from an abnormal condition. - Alarm sequence display must display the name of the plant, KKS plant code, description of fault, date and time. Functional Tests	240-56355466 - Alarm Management System Guideline		

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	Conduct the functional test as part of the cold commissioning of the system. Control and instrumentation system and include the checking of all measurement loops, interlocks, sequence controls, and local panel controls.			
2.3	ELECTRICAL			
2.3.1	Power Supply Cable: Supply, install and test one 4-core armoured cable from 400VAC AWR Booster pump board to submersible pump with cross sectional area of 70mm ² and approximately length of 400m to new distribution panel and to the submersible pump. Include the cable tray for the section of the cable along the ash dam substation building section and through the tunnel to the AWR Booster pump switchgear.	Size and Specification: One 70mm ² x 4core Armoured Cable with approximate length 400m Cable to meet SANS 1507	Hold	Contractor
2.3.2	Distribution Panel: Supply, install, test and certify an Orange IP65 distribution panel with single door enclosures with base plate, gland plate and pole mounting brackets. The distribution panel must be earthed with a 25x1.5 cross-section: 37.5mm ² earth copper flat bar.	Size and Specification: IP65, pole-mounted Distribution box with paint finish: X-poxy powder Coated, colour: Electric orange and Material: sheet steel 1.2mm. The steel must	Hold	Contractor
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	All installations will be subjected to and conform to the following regulations: The Contractor will be responsible for erecting metal pole structure on conductive concrete ($\pm 0.2\Omega\text{m}$ resistivity) for mounting of the distribution panel which must include roof top for protection against rain during panel operating. This must be in according to 240-56364545 - Structural Design and Engineering Standard The distribution panel must be fitted with control circuit which must include the following: • Overcurrent and earth fault protection • Direct online motor starting circuit. • LED indications for fault in the system and indication for start/stop of the submersible pump which must be clearly label. Also install and supply alarm siren when the pump failure or start. • Emergency stop button • Water Level sensor circuit for the water level detect sensor switch which the Contractor must also provide. Electrical Testing of the system • Connect the pump and level detect sensor switch to the distribution box. Perform functional test of the system.	be galvanised to minimize corrosion. Refer to SANS 121 (ISO 1461) and the Galvanisation specification below 240-56356396 - Earthing and Lightning Protection Standard SANS 1063: 2010 (earth rods, couplers and connections.) SANS 10199: 2010 (design and installations of earth electrodes.) IEC 62305-3 (protection against lightning – part 3: physical damage to structures and life hazard.)		
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	Supplier must provide Matla Power Station with a COC certificate on completion in accordance with OHS Act. All installations will be subjected to and conform to SANS 60947-4-1:2004 Low-voltage switchgear and control gear Part 4-1: Contactors and motor-starters - Electromechanical contactors and motor-starters Note: The distribution panel and control circuit must be rated for a three phase ±120kW Motor (In referenced to the selected power rating by the supplier as per section 2.1.2)	IEC 62305-4 (protection against lightning – part 4: electrical and electronic systems within structures.)		
2.4	CIVIL			
2.4.1	Plinths Design The pipeline will routed from point A to point D as indicated in the Figure 1, pipeline A to C will be supported by a concrete plinths then pipeline C to D will routed underground crossing the road to the Ash Dam wall. The pipe length from final cut (point A) to the beginning of Ash Dam Wall (point D) will be about 700m long supported by reinforced concrete plinths spaced 32m in between. The concrete plinths will be evenly spaced and installed by keeping the slope constant throughout. All the concrete plinths must be precast and evenly installed onsite. The concrete plinths will only support the 200 mm diameter pipe line A to line C as indicated on the diagram. All the concrete plinths design specifications are	Size and Specification: Concrete Plinths (400×400×500) 200 mm pipe steel saddle clamp, galvanized for corrosion protection 200 x 400 x 28 SOLDER NEOPRENE 25 Rubber based	Hold	Contractor

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	indicated in the Figure 2 below. All the plinths must be installed stable and rigid enough to avoid tilting. The pipe bending angle will be kept at 135° for bend at B and C. Pipe line C to D will be buried underground crossing the road and protrude out at the Ash Dam wall as indicated in the Figure 1 below.	FBN 6/30 bolts to anchor the strap to concrete plinth Reinforcement size Y6@70 SABS 0100-1 Quantity x 200		
2.4.2	Cross Road Piping Trench: The excavation of a pipe trench must comply with the requirements of Sub clause 5.4 of SABS 1200 DB. The Contractor must clear (as specified in SABS 1200 C) an area of sufficient width along the route of the pipeline to ensure that this selection operations are not hampered. Pipe trenches must be excavated in lengths and width specified below to provide at least the appropriate side allowance. The sides of each trench from the bottom up must be as nearly vertical as possible. The bottom of the trench must be compacted at 90% of AASHTO maximum density prior to bedding and pipe laying. The trimming and grading of the bottom of the trench must be such that the barrel of length of pipe can be uniformly supported over its full	Size and Specification: SABS 1200 DB SABS 1200 C Trench width 700 mm Trench depth 1000 mm Trench length 100 m Trench position point C to D – 22m	Hold	Contractor
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	length. Backfilling of pipe trenches must commence after the pipe has been laid and firmly bedded in the specified support. The trench excavation must not be too far ahead of the pipe-laying team to ensure a better control of the trench and for safety reasons. The excavated soil must be placed on one side of the trench leaving the other side, clear for equipment and pipe handling. Foundation A stable foundation must be provided to ensure proper line and grade is maintained Bedding materials. Ensure that any possible ground water or surface water entering the trench does not disturb the bedding materials. Bedding A stable and uniform bedding must be provided for the pipe and any protruding features of its joints and/or fittings. The middle of the bedding may be loosely placed with the remainder compacted to a minimum of 85% AASHTO. Haunching All underground pipes are Soil-Structure Interaction Systems. Proper haunching provides a major portion of the strength and stability to the pipe system. Care must			
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be exercised to ensure placement and compaction of the embedment material in the haunches. Haunching materials must be compacted to 85% AASHTO.

Initial Backfill

Initial backfill will be the same material used in the haunching must be used for the initial backfill. This material requires 90% compaction it is important not to use mechanical compaction equipment directly on the pipe itself.

Final Backfill

The final backfill must be the same material as the excavated material and also compacted 90% AASHTO. The backfill must be compacted to restore the trench as near as practicable to the surface ground level.

Trench Layers Name	Material size	Layers Depth (mm)	Compaction percentage (AASHTO)
Final Backfill	Excavated material	500	90%
Initial Backfill	Filter material type A (20mm unbound mixture)	300	90%
Haunching	Filter material type A (20mm unbound mixture)	100	85%

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	<table><tr><td>Bedding</td><td>Granular bed of broken stones or gravel to pass 10mm – 20mm sieve</td><td>100</td><td>85%</td></tr><tr><td>Foundation</td><td>Natural Trench bottom surface</td><td>Earth surface</td><td>90%</td></tr><tr><td>Trench Length</td><td colspan="3">100 m long</td></tr></table> Table 1: Material selection	Bedding	Granular bed of broken stones or gravel to pass 10mm – 20mm sieve	100	85%	Foundation	Natural Trench bottom surface	Earth surface	90%	Trench Length	100 m long					
Bedding	Granular bed of broken stones or gravel to pass 10mm – 20mm sieve	100	85%													
Foundation	Natural Trench bottom surface	Earth surface	90%													
Trench Length	100 m long															
2.4.3	Steel Pipe Clamp Support: Steel pipe clamps are supports that clamp around a pipe to lift and hang pipes securely throughout the entire dam parameters separated in 10m spacing. The clamps will be made up of two bent pieces of steel that can clamp the pipeline outer circumference, when they are secured with bolts and nuts on opposite ends of the metal shackles they form fully around the pipe. The pipe clamp structure will be mounted on the ground using HIT-V-5.8 m8×150 to secure the pipe stability. The base plate clearance of 9 mm in diameter with 10 mm diameter and 130 mm floor drill depth. Floor drill holes must be dust free before injecting epoxy.	Size and Specification: Refer figure 5 for specifications Galvanisation refer to SANS 121 (ISO 1461) and the specification below	Hold	Contractor												

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	Note: The Contractor must install as per epoxy data sheet. <table border="1"> <thead> <tr> <th>Bold Name</th><th>Baseplate clearance hole</th><th>Floor drill with</th><th>Floor drill depth</th><th>Epoxy</th></tr> </thead> <tbody> <tr> <td>HIT-V-5.8 M8×150</td><td>9 mm</td><td>10 mm</td><td>130 mm</td><td>HIT-CT1</td></tr> <tr> <td>M8 clamp Bold and nut</td><td>9 mm</td><td>N/A</td><td>N/A</td><td>N/A</td></tr> </tbody> </table>	Bold Name	Baseplate clearance hole	Floor drill with	Floor drill depth	Epoxy	HIT-V-5.8 M8×150	9 mm	10 mm	130 mm	HIT-CT1	M8 clamp Bold and nut	9 mm	N/A	N/A	N/A			
Bold Name	Baseplate clearance hole	Floor drill with	Floor drill depth	Epoxy															
HIT-V-5.8 M8×150	9 mm	10 mm	130 mm	HIT-CT1															
M8 clamp Bold and nut	9 mm	N/A	N/A	N/A															
2.4.4	Panel Supports: Supply and install the support beams for panel in section 2.4 and the anchoring points between the panel and the concrete floor structure. Note: Ensure that the panel support meet the electrical requirements in section 2.4.	Size and Specification: Supports Size: Panel volume (lxhwxw) 1.5x1x0.4 m³, Mass 50 kg,	Hold	Contractor															

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		Support height below 2 m from the ground 240-56364545 - Structural Design and Engineering Standard		
2.4.5	Cable Trench: Excavate and open a trench for the cable route that will run from the pump at the final cut to the electric panel. The excavation will be 500 mm wide and 800 mm deep. The cables will run inside 100 mm diameter corrugated PVC pipe as cable protector. After laying cables then pour concrete of about 250 mm which then backfill with the same excavated material of about 550mm refer Figure 6 below for the layout. Note: Detection and inspection for underground electricity cables must be done on the areas before digging takes place.	Size and Specification: Trench depth 800mm Trench width 500mm Trench length 120m 28MPa Concrete layer 250mm thick. 100 mm diameter corrugated PVC pipe 240-56364545 - Structural Design and Engineering Standard	Hold	Contractor
2.4.6	Pump Motor Support Floater and Rope:	Size and Specification:	Hold	Contractor

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	Supply and install the anchor for the rope and the floater of the submersible pump in the final cut dam, the rope must be able to accommodate the weight of the pump and the pipeline.	Mass –1000kg, Overall Pump Size – (hwxwd) 2000x600x700mm ³ , Discharge Outlet 225NB for 5kg/m. 240-56364545 - Structural Design and Engineering Standard		
2.4.7	Sprinkler Piping Supports Fabricate and install the sprinkler pipeline supports, which will be able to withstand the load of the sprinkler and stem piping when suppression system is in operation. Two of the L angle iron must be clamped onto the pipeline and the other two must be assembled to the plinths to support the sprinkler piping. Refer to Figure 7 below. Supply the clamping device to mount the sprinkler piping onto the support steel angle irons	Size and Specification: Steel L angle iron 50x50x5 mm Size, Height 900mm Quality x 1080 L angle irons, and 540 clamps Refer to SANS 121 (ISO 1461) and the Galvanisation specification below		

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3.	Additional Requirements:			
	The following must be considered during the execution of the project. - All piping to be designed in accordance with 240-123801640 Low Pressure Pipelines Standard and 240-105020315, Standard for Low Pressure Valves. - Supply test certificates, commissioning procedures, data sheets, testing procedures and maintenance manuals to the Employer. - The Contractor must conduct the cold and hot commissioning for the completed system after installation. - Supply and install the relevant safety signage where the driven equipment, and for the panels fitted will be fitted for precaution purpose. - Underground cables from the final cut dam to the substation must be scanned to ensure safe routing of the new cables along the final cut dam area. - Provide the equipment master data sheet for the supplied equipment installed. Provide all the necessary on site and off site CoCs, as well as compliance certificates. - Mobile crane must be used for lifting the equipment which all the installed along the dam areas.	Standards and Specifications: Occupational Health and Safety Act, 1993, (Act No. 85 of 1993) Pressure Pipelines Standard and 240-105020315 Structural Design and Engineering Standard 240-56364545 39-98 Rev 1 Safe Use of Lifting Machines and Lifting Tackle	Hold	Contractor

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	All the heavy equipment such as pump(s), pre-casted concrete plinth and pump floating support must be supplied with the lifting lugs to removing purposes.			
4.	General Requirements:			
	Work activity in the drain manhole and on the pipeline must be conducted following the Matla Power Station work instructions. QCPs, method statements, plans and risk assessments must be review and approved before work commence. All the equipment used on site must be tested with valid certificates and safe to use prior work commence.	Standards and Specifications: Occupational Health and Safety Act, 1993, (Act No. 85 of 1993) 36-681 (Rev 2) Generation Plant Safety Regulations	Hold	Contractor

Additional Standards and Specifications

Standard / Specification	Description
240-56227516	LV Switchgear Cntr Gear Assembly Associated Equipment for Voltage 1000VAC and 1500V Standard
240-56227443	Requirements for Control and Power Cables for Power Stations Standard
240-49230111	Hazard and Operability Analysis (HAZOP) Guideline

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Standard / Specification	Description
240-49230046 240-52844017	Failure Mode and Effect Analysis (FMEA) Guideline; Reliability, Availability and Maintainability Analysis
SANS 121 (ISO 1461)	Hot-dip galvanised coating on fabricated iron and steel articles – Specification and test methods.
240-75655504	Corrosion protection standard for new indoor and outdoor Eskom equipment, components, materials and structures manufactured from steel standard
240-56176852	Essential Power Supplies for Power Stations Standard
240-57617975 240-56357518	Procurement of Power Station Low Voltage Electric Motor's Specification Standard
240-64430501	Low Voltage Variable Speed Drive Control Equipment Standard
240-56355815	Junction Box and Cable Termination Standard
240-56364545	Structural Design and Engineering Standard
240-56227443	Requirements for Control and Power Cables for Power Stations Standard
National Building Regulations, Act 107, of 1977	
ISO 9001-Quality Management Systems	
240-101712128	Standard for the internal corrosion protection of water systems, chemical tanks and vessels and associated piping with linings
240-71432150	Eskom Plant Labelling Standard
240-93576498	Eskom KKS Coding Standard;
240-109607736	Eskom KKS Key Part Standard.
240-123801640	Standard for Low Pressure Pipelines
SANS 2001 Series	Civil Work Standards
SANS 10100-1&2	The Structural use of concrete: Parts 1&2

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Standard / Specification	Description
SANS 10139: 2012	Fire Detection and alarm system for buildings
SANS 10142-1	The wiring of premises: Part 1-Low-voltage installations
240-57617975	New Low Voltage Motors Procurement Standard
Occupational Health and Safety Amendment Act, No. 181 of 1993	
Occupational Health and Safety Act, 1993 Ergonomics Regulations, 2019	
Labour Relations Act, No. 66 of 1995,	
36-681	Generation Plant PSR
240-56355754	Field Instrument Installation Standard
240-56355815	Field Instrument Installation Standard for Junction Boxes and Cable Termination
240-56355535	Process Calibration Equipment Standard
240-57859210	Alarm System Performance of Digital Control Systems for Fossil Plant Standard
240-56355754	Field Instrument Installation Standard
240-56355815	Field Instrument Installation Standard for Junction Boxes and Cable Termination
240-56355731	Environmental Conditions for Process Control Equipment Used at Power Stations Standard
240-53114214.	Cabling and racking standard

Bill of Material

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Item	Description	Size	Est. Max. Length	QTY Required	Drawing	Comment
1.	Submersible Pump Motor	±120kW, 820m ³ /hr at 80m	NA	1		
2.	Discharge Pipelines	HDPE, 225NB (Length 12m EA)	6000m	500		
3.	Sprinkler Piping	Carbon Steel, 32NB	1.2m	180		
4.	Sprinklers	22mm Nozzle Rotating Sprinkler	NA	180		
5.	Electrical Cable and Tray	400V, 200A	50m			
6.	Power Panel	400V, 200A	NA	1		
7.	4 Core Supply Power Cable	70 mm ²	400m			
8.	Control Panel			2		
9.	Panel for Supports	L Channel, 50x20x2mm	100m	3		
10.	Pump Stainless Steel Rope	20 mm Diameter	8m	1		
11.	Plinths and Cover Concrete	400 x 400 x 500	10.4m ³			
12.	Bolts and Nuts	Hex Set Screw and Nut 8.8 M20 (Full Threaded)	100 mm	2500 EA		

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Item	Description	Size	Est. Max. Length	QTY Required	Drawing	Comment
13.	Pipe Blank	Flat face blank	225NB Pipe	1		
14.	Pipe Blank	Flat face screw blank	32NB Pipe	25		
15.	Precast reinforced concrete plinths	400x400x500		180		
16.	Pipe steel saddle clamp	200 mm Diameter		70		
17.	SOLDER NEOPRENE 25 Rubber based	200 x 400 x 28		70		
18.	Bolts to anchor the strap to concrete plinth	FBN 6/30		140		
19.	Granular bed of broken stones	Gravel to pass 10mm – 20mm sieve (m ³)		7		
20.	Filter material type A	20mm unbound mixture (m ³)		7		
21.	Non return valve	225NB P16 Flanged End		1		
22.	Filter material type A	20mm unbound mixture (m ³)		21		
23.	Steel pipe clamp support	225 mm Diameter		570		

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Item	Description	Size	Est. Max. Length	QTY Required	Drawing	Comment
24.	HIT-V-5.8	M8x150		1140		
25.	HIT-1	HIT-CT1		25		
26.	Clamp Bolt and nut	M8x50		1140		
27.	Long Corrugated PVC pipe	100 mm Diameter	120m			
28.	Concrete	28MPa	0.25x0.5x22 m			
29.	Mild Steel L Angle Iron	50x50x5 mm Size	Height 900mm	1080		
30.	Clamps	For main pipeline 225mm OD and 32mm NB		360 and 180		
31.	Signage	600 x 600 mm ²		4		

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Figure 1: Site Ash Dam Arrangement

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Figure 1: Site Arrangement Pipe line layout Proposal

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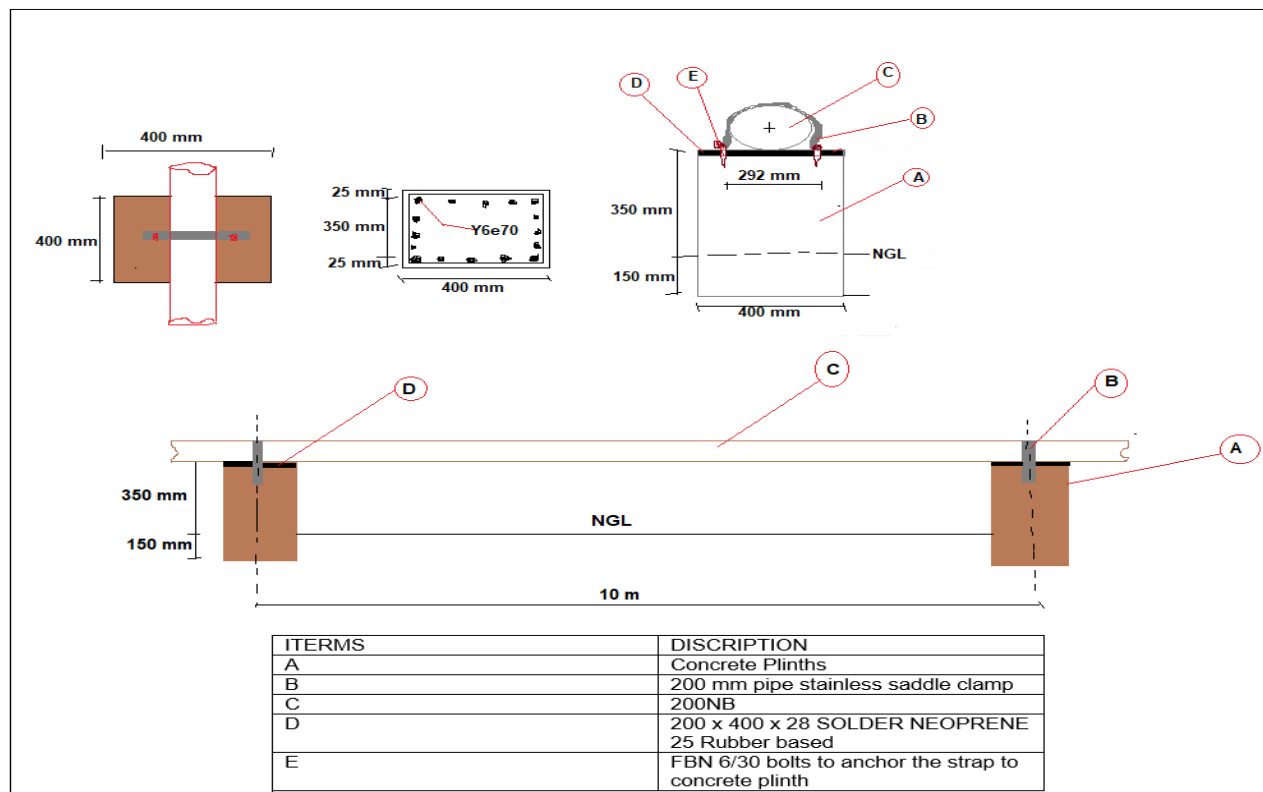


Figure 2: Concrete plinths specification

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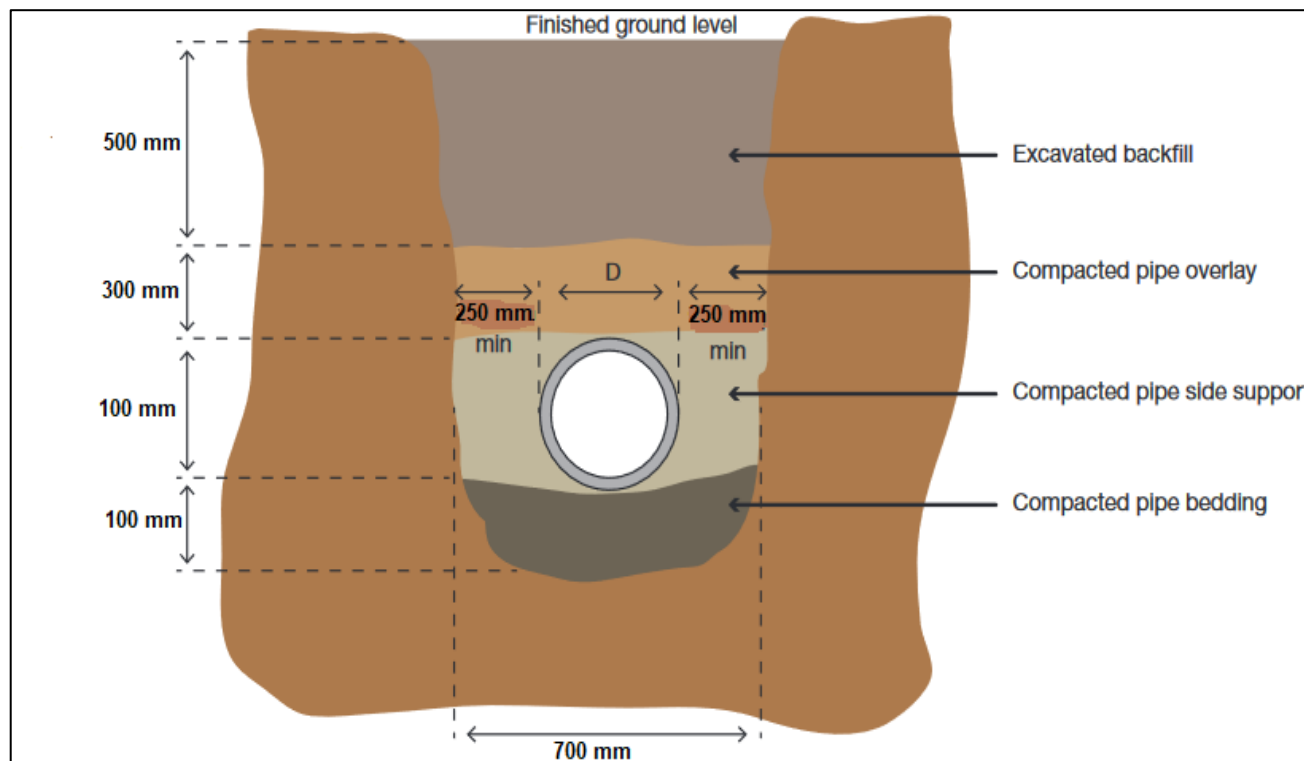


Figure 3: Excavation profile

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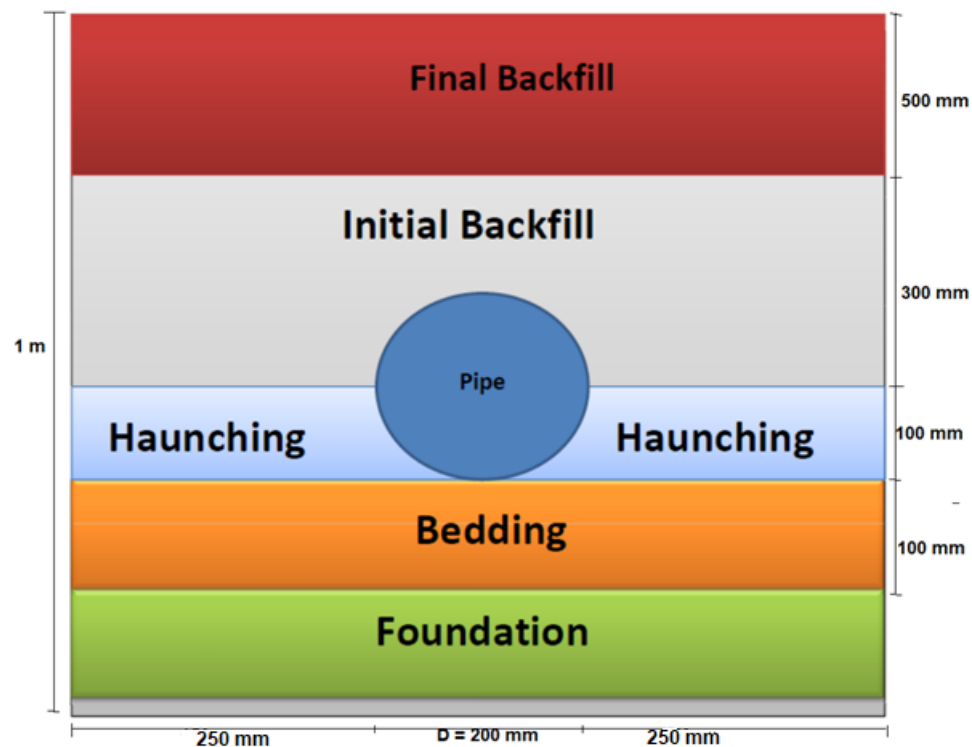
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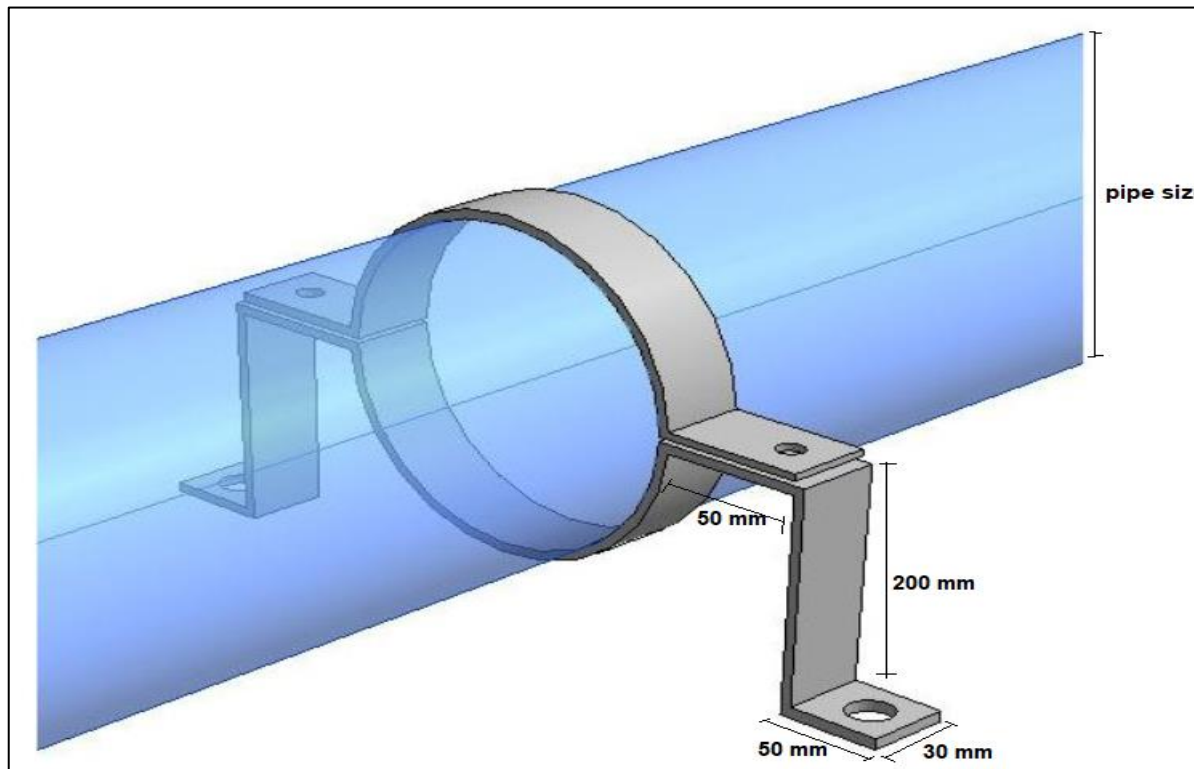


Figure 5: Pipe clamping support

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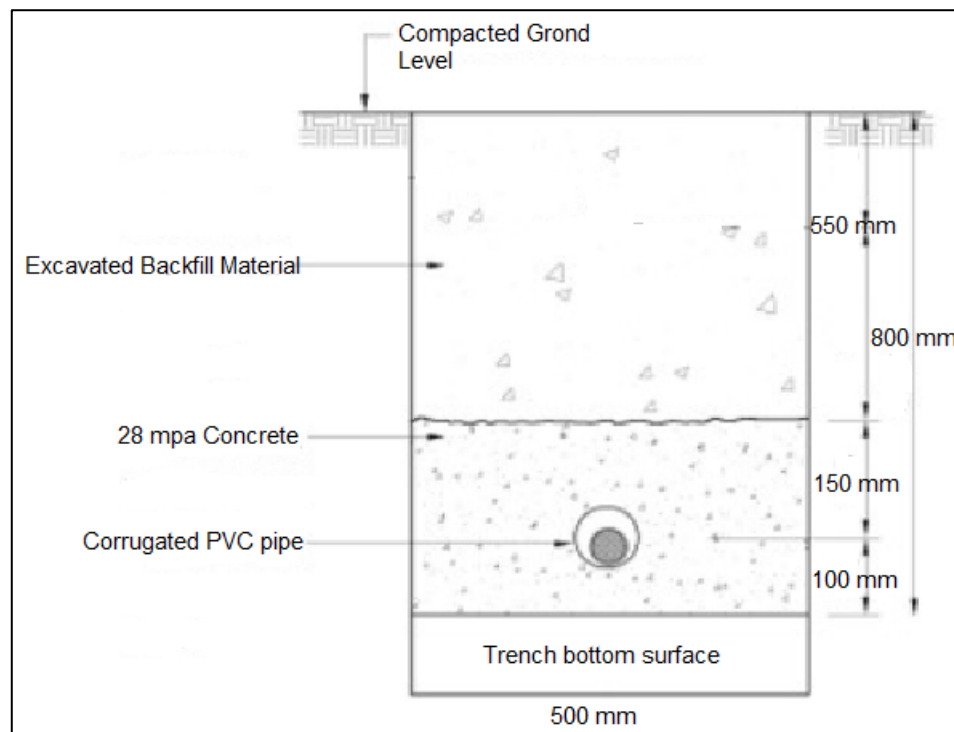


Figure 6: Cable trench layout

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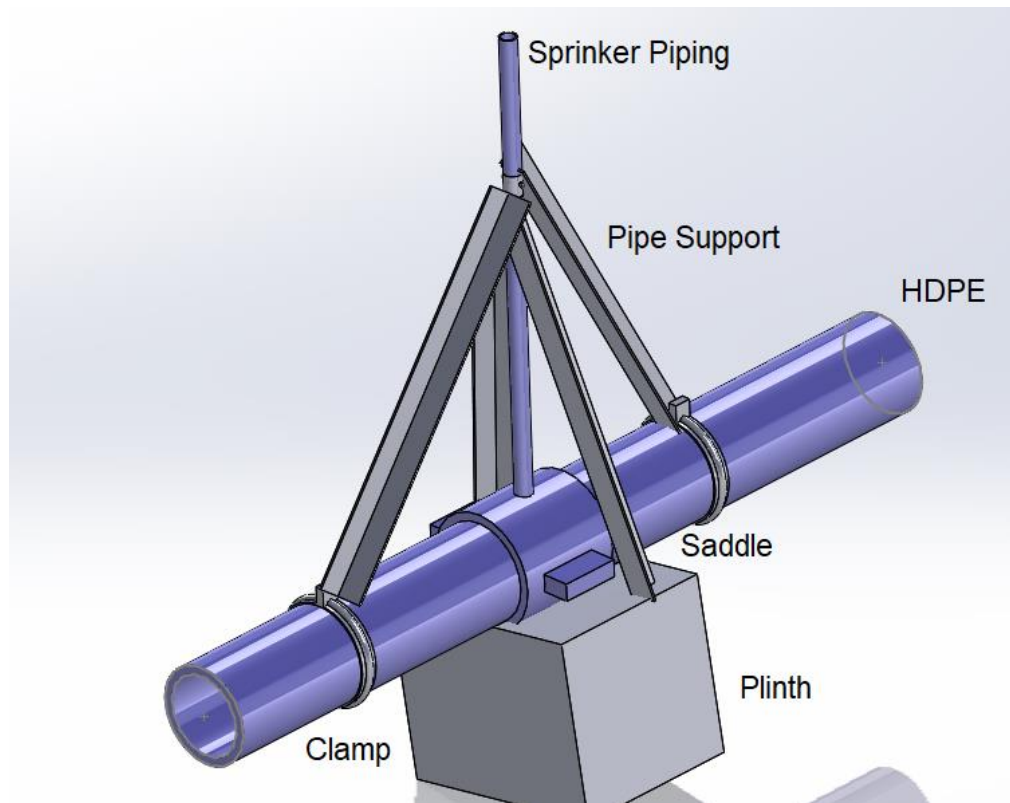


Figure 7: Sprinkler Piping Arrangement

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SCOPE COMOPILATION REFERENCES				
SOURCE & Ref No.	Yes	No	N/A	Comments
Previous outage service reports		X		
Return to service data packages		X		
Maintenance Strategy with Rev number		X		
SAP defects (attach list as appendix)		X		
GHRMS (STEP) reports (Generation Heat Rate Management System)		X		
Online Condition Monitoring		X		
Pre-outage performance test results		X		
Post outage performance test results		X		
GPSS/ Plant Performance data on UCLF incurred		X		
OMS / IIRMS recommendations (Audits Reports)		X		
Risk controls (IRM system)		X		
Previous audits and reviews (e.g. ERAP)		X		
Engineering Change Requests (Projects)		X		
LOPP strategy reports		X		
URS		X		
Philosophy (Outage)		X		

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MATLA POWER STATION

SCOPE OF WORK

Template Identifier	240-43921898	Rev	6
Document Identifier	14593	Rev	4
Effective Date	October 2019		
Review Date	October 2022		

Condition Monitoring Report		X		
VA/PHD Viewer trends		X		
Corrective Actions		X		
CARAB reports		X		
Statutory Requirements		X		
Grid code requirements		X		
Waivers and Exemptions		X		
Calibration requirements		X		
Previous Outage SOW variations		X		
Post Mortems Actions from previous outages		X		
Pre-Outage plant walks		X		
Risk based inspection (RBI) report		X		
Simulation, TOIs, OON, SI		X		

COMMENTS

All interfacing disciplines responsible for electrical, C&I and civil have conducted and completed their respective scopes

Compiled by:

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