ASSAM GAS COMPANY LIMITED
(A Government of Assam Undertaking)
P.O. Duliajan, Pin – 786602
Dist-Dibrugarh, Assam

CORRIGENDUM-3

Reference: 1. Tender No: AGCL/F&S/FHS/2021/47 Date : 04-12-2021

This Corrigendum dated 06-01-2022 is to Tender No. AGCL/F&S/FHS/2021/4, Date : 04-12-2021 for "SUPPLY, INSTALLATION AND COMMISSIONING OF FIRE HYDRANT SYSTEMS FOR ASSAM GAS COMPANY'S COMPRESSOR STATION, INDUSTRIAL AREA AND RESIDENTIAL COLONY" is issued to notify the following changes in Scope of Work & other terms and conditions of the bid document arising out of discussion in pre-bid conference held at Duliajan on 15/12/2021 at AGCL Conference Hall.

The changes in the bid documents are given as **ANNEXURE-I**. Bidders are requested to take note of the same while preparing and submitting their offer. All other terms & conditions of the bid document remain unchanged.

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********** **End of Addendum to Bid Document** **********

ANNEXURE-I

Tender No: AGCL/F&S/FHS/2021/ Date: 04/12/2021

Sub: Offline Pre- Bid meeting queries and AGCL clarification Date: 15/12/2021

Sl.N	Clause No.	Existing Clouse	Pre-bid query	AGCL reply/Clarification
1	BOQ (3.01 TO 3.03)	Pipe required is MS (Seamless)	Whether the CS pipe required is seamless?	The pipe required is ERW not Seamless.
2	Attachment C (Page 50)	Sprinkler system for Compressor Station	Whether DV valve is required or not.	No DV are required. The sprinkler system will be operated manually.
3	GCC: 30.0 (Page 47)	Electrical Cable termination kits for termination of LV cables shall be provided by contractor. Cable glands, boots and lugs for all LV cable connections are in Contractor's scope. All electrical apparatus, instruments items/system shall be suitable for the hazardous area, Zone 2 Gas group IIA/IIB (specially for Compressor Station) classification as per applicable National/ International std. and statutory regulation.	Whether the electrical items required shall be for hazardous area, Zone 2 Gas group IIA/IIB?	The electrical items required outside the industrial area no need to confirm to hazardous area, Zone 2 Gas group IIA/IIB. Please refer **Annexure-F** for electrical SLD and detail of electrical fittings and fixtures requirement.
4	SOW: 11 (Page 33)	Road crossing	Whether hume pipes can be used as casing for road crossing?	Hume pipes are not allowed for road crossing. MS pipe casing with coating wrapping should be used for road crossing. Supply of casing pipes are in contractor's scope.
5	SOW: 3 (Page 31)	Few materials would be issued from AGCL as mentioned in the Annexure- A. The remaining materials, installation charges, civil work etc. which are required for complete execution of the project are to be clearly mentioned in the Technical bid (UNPRICED BID) and same are to be quoted	What are the specifications of materials available with AGCL?	The specification of the available materials including Main water pump and jockey pump are physically verified by the bidders during site visit and after the pre-bids meeting. The successful bidder should follow the

		in the Price Bid (BOQ).		installation and operation manuals/technical data Sheet of both the pumps available with AGCL during installation and commissioning.
6	SOW: 3 (Page 31)	A consolidated list of details of major items (pipes, valves, etc.), equipment, accessories, spares (for pumps, valves, hydrants, monitors, etc.) and consumables that will be typically required in the proposed fire protection system are mentioned in BOQ. However, in case of additional requirement please add the same in the rate column under miscellaneous section	Whether fabricated bends, elbow, reducers are allowed for the construction works How to mention the additional items required for the project.	Bends, elbow, reducers and 'Tee' joints should be readymade. The details engineering should be done in line with the available Main Fire Water Pump (diesel driven), Jockey Pump (electrical driven) and other materials available with AGCL as mentioned in Annexure A (pg no 51 and 52). Since the (Item Description) Column No: 02 of BOQ has been protected, therefore the description of the misc./additional items should be mentioned in the Technical Bid and the corresponding quantity, unit etc. should enter ONLY in the BOQ/PRICE BID.
7	SOW: 17 (Page 34)	All pipes above ground and in exposed locations shall be painted with one coat of red oxide primer and two coats of synthetic enamel paint of fire red colour. All pipes underground shall be protected against soil corrosion by wrapping and coating material as per IS 10221: 1982.	Whether arrow marks are required in the fire hydrant pipelines?	Directional arrow marks are required for the over ground pipelines. And underground pipes should have coating wrapping of 2mm thickness as per tender documents.
8	SOW: 2 (Page 31)	The civil construction include the construction of the Fire Water Tank, water pump house, operator room, boundary walls, approach roads wherever required and all other civil related work required for the complete execution of the project.	Whether pump house shed should be RCC or normal GC sheet and the required height of the foundation for pump house and Fire water tank? Whether iron removal system is required or not? The required size of bore well?	Pump house shed (l x b x h :**20 x 15 x 12 in ft.)** Should be of normal GC sheet. The iron removal system is not required. The required diameter of the bore well is **8 inch (ID: 200 mm)** & depth is 100 meters with UPVC casing pipe ribbed screen. The detail of water tank is enclosed at **Annexure-G**.

9	SOW: 9 (Page 30)	The Contractor shall clean and keep clean the work site from time to time to the satisfaction of the Engineer- in-Charge for easy access to work site and to ensure safe passage, movement and working.	Shifting of pipe stacking at Material Department stock yard will be under whose scope?	Shifting of pipe stacking at Material Department stock yard is under contractor scope .However the shifting should be done in coordination with AGCL Material Department.
10	SOW: 16 (Page 34)	Adequate care should be taken by the Contractor from all sides at the time of lowering the pipes in the trench to avoid any damage in coated and wrapped pipes and also to the nearby utilities.	Laying of Fire hydrant pipe lines near Transformer behind Electrical Department.	The laying of Fire hydrant pipe lines near Transformer behind Electrical Department should be done with proper insulation and in coordination with Electrical Department.
11	Annexure E (Page 56)	Details of Pipe supports for contact area.	The type of insulating support/pads required for the pipe-support contact points.	The point contact between supports and the hydrant lines may be supported by MDPE pipes.
12	SOW (Page 31)	All civil construction works like fire water tank, pump house, boundary wall, land development, grading, hauling & stringing of pipes, welding of joints, joint coating, repairing of coating damage, trenching (Whenever required), lowering & backfilling of pipes including ramming and restoration to the original condition	Restoration of road crossing is under whose scope?	The restorations of the roads etc. to its original conditions are under contractor's scope.
13	SOW: 2 (Page 31)	The civil construction include the construction of the Fire Water Tank, water pump house, operator room, boundary walls, approach roads wherever required and all other civil related work required for the complete execution of the project.	Approach road for the Fire hydrant points are under contractor's scope.	The development of approach roads for the Fire hydrant points are under contractor's scope
14	BOQ: Material supply (3.04)	Supply of submersible pump	What is the power requirement of the submersible pump?	The power of the submersible pump should be 10HP.

15	SOW: 9 (Page 33)	The details of the equipment and machinery, manpower list with ID and address proof must be furnished before starting of the work. The management of the AGCL reserves the right to inspect the equipment prior to starting of work.	The Power supply during execution work.	The electrical power supply for fabrication, lighting etc. during execution works is under contractor's scope (preferably DG sets).

ANNEXURE-F

1. CODES AND STANDARDS

IS : 13947 Specifications for Low-Voltage Switchgear and Control gear.
IS : 13703 Low-voltage Fuses for Voltages not Exceeding 1000 V AC or Part 1 to 4: 1500 V DC.
IS : 2705 Current Transformers. Parts I, II, III
IS : 1248 Electrical Indicating Instruments
IS :5578 Guide for Marking of Insulated Conductors
IS:11353 Guide for Uniform System of Marking and Identification of Conductors and Apparatus Terminals
IS : 5 Colors for Ready Mixed Paints and Enamels
IS : 8623 Specification for Low-Voltage Switchgear and Control gear Part 1 to 3 Assemblies
Tariff and Advisory Committee (TAC) –Fire protection manual.
IS : 1554 (PART – I) PVC insulated (heavy duly) electric cables working voltage up to and including 1100V.
IS : 7098 (PART – I & II) Cross-linked polyethylene insulated PVC sheathed cables for working voltage from 1.1 KV up to and including 33 KV
IS : 8130 Conductor for insulated electric cables and flexible cords.
IS: 5831 PVC insulation and sheath of electric cables
IS : 3975 Mild steel wires, stripes and tapes for armoring of cables.
IS : 2633 Methods of testing weight, thickness and uniformity of coating on hot dipped galvanized articles.
IS : 209 Specification of zinc.
IS : 3961 (PART – II) Recommended current ratings for PVC insulated and PVC sheathed heavy duty cables.
IEC:502 Extruded solid dielectric insulated power cables for rated voltages from 1KV and 30 KV.
IEC:540 & 540A Test methods for insulation and sheaths of electric cables and cords

SCOPE OF ELECTRICAL SYSTEM: The Electrical system for the Fire water hydrant system will be designed based on the requirements for the safe, reliable performance, easy operation and maintenance of all equipments covered in this report and the associated electrical system. The system shall include but is not limited to supply, installation, testing and commissioning(SITC) of electrical cable from control room to motor control center, 100 A Switch Fuse Unit, 100A terminal block for power distribution, SITC of fully automatic jockey pump starter panel, SITC of submersible pump starter panel, SITC lighting DB (minimum 16 way) with double pole MCB, wiring with minimum 2.5 sqmm multistrand PVC cable and cashing capping from main DB to switchboard and with 1.5 sqmm multistrand PVC cable and cashing capping from switchboard to light/fan etc, supply and installation of adequate numbers of light/ fan etc. Control room shall be equipped with minimum 3 numbers of 16A socket for auxillary power supply. Any other work not spelt here but is required for the successful completion of the entire work shall be carried out by the bidder.
Electrical system is designed for a design ambient of 45°C.

2. SITE CONDITIONS

Average Minimum Temperature 16° C
Average Maximum Temperature 33° C
Ambient Pressure 1.033 kg/cm^2
Average Relative Humidity 90 %
Wind Speed >0.5 – 5.5 m/s

Electrical system requirement
415 V System 25 kA 1 second.
240 V System 10 kA 1 second.
IP-55 for indoor
IP-65 for outdoor
Allowable voltage drop From the MCC / Switchboard to motors: 3% for running and 15% during starting.

3. LT MOTOR CONTROL CENTER

3.1 Fire water jockey pump shall be powered from separate Fully Automatic Jockey Pump Starter Panel to be supplied by bidder. Power to Jockey pump panel will be fed from Main Distribution panel located at Electrical Control Room inside Industrial Area. Laying of cable from Electrical Control Room to Motor Control Center including construction of cable trench, installing cable marker shall be in the scope of bidder (Approximate length of cable laying is 400 meters). Incoming cable shall be terminated on a terminal box for power distribution to jockey pump, submersible water pump starter panel, illumination DB etc. The incoming cable to the terminal block shall be terminated in an isolating switch fuse unit incorporating HRC fuses.
3.2 Design ambient temperature for all equipment is 45 Deg. Equipment located inside shall be of minimum IP-55 and the outdoor area shall be of IP-65.
3.3 Start, stop, test push button with indication lamp shall be provided. Incomers shall be with a voltmeter ammeter, indicating lamps (RYB, Trip etc.).
3.4 Pump motor starter panels shall be of DOL/star delta type as per TAC requirement.
3.5 Motors shall be of 415V AC with +10 to -10% percentage variations. Motor starter panels shall be provided with 415V as incoming power supply.
3.6 Contactors, relays, timers etc. for applying automatic starting pulses to the jockey pump, on receipt of a command signal from the pressure switch with starting sequence consisting of three electrical pulses of 5 second duration each spaced at 5 second apart. Jockey pump starter panel shall be fully automatic. However manual switching option shall also be provided.
3.7 All the cables (power and control) shall be of IEC-600331, Flame Retardant Low Smoke type 1.1kV voltage.
3.8 Control wiring inside the panel shall be of 1.5Sq.mm minimum.
3.9 Complete earthing protection system including earthing strips/GI wires and earth pits etc. shall be provided. All the equipment shall be with redundant earthing provisions.
3.10 Light fixtures inside the fire water pump house shall be industrial, anti-corrosive type.
3.11 Power supply for the lighting DB in the fire water pump house is from the terminal box in the pump house. Lighting DB shall be of 230V AC normal power supply.

3.12 Required motor protection: Short circuit and over-current protection, overload protection, phase failure protection, water level controller with dry run protection (for jockey pump).

4.0 TECHNICAL SPECIFICATION OF MOTOR PANELS

4.1 This specification covers design, engineering, manufacture, assembly, stage testing, inspection and testing before supply, installation, testing and commissioning at site of Fire Water Motor Control Center Panels for indoor use.

4.2 The equipments shall conform in all respects to high standards of engineering, design and workmanship and shall be capable of performing in continuous commercial operation, in a manner acceptable to the purchaser, who will interpret the meanings of drawings and specification and shall have the power to reject any work or material which, in his judgment is not in accordance therewith. The offered equipment shall be complete with all components necessary for their effective and trouble free operation. Such components shall be deemed to be within the scope of bidder's supply irrespective of whether those are specifically brought out in this specification and / or the commercial order or not.

4.3 The panel and accessories shall be designed to facilitate operation, inspection, maintenance and repairs. The design shall incorporate every precaution and provision for the safety of equipment as well as staff engaged in operation and maintenance of equipment. The low voltage panels should be industrial type, metal enclosed, factory assembled and type-tested.

4.4 The bidder has to take care that all components and equipments are selected considering easy maintenance, simple and quick diagnosis and long maintenance intervals. All components and equipments shall be designed for continuous duty at rated load and under given climatic condition. Standard industrial high performance systems and components of supplier's standard list shall be used as far as possible. Components and equipment of same kind shall be selected for equivalent functions. The interchangeability must be guaranteed.

4.5 Motor jockey pump starter panel shall be single door**,** floor mounted, free standing, compartmentalized. Appropriate lifting facilities shall be provided. Overall height of panel shall not exceed 2500 mm and minimum operating height shall not be lower than 300 mm and higher than 1800 mm.

4.6 The minimum thickness of steel shall be CRCA 2 mm (14 SWG) for load bearing members, CRCA 1.6mm (16SWG) for non load bearing members and CRCA 3mm for base channel. The doors and covers shall be fabricated from cold rolled sheet steel. Undrilled removable gland plate shall be CRCA 2.5mm.

4.7 All doors and removable covers shall be provided with non-deteriorating neoprene gaskets and the door hinged shall be sealed type with pad locking arrangements. Panel hardware shall be corrosion resistant type with zinc passivated cadmium plating.

4.8 The structure, including doors, insulators and panel, shall be capable of withstanding the internal pressure created by faults within the structure (equal to maximum fault current rating) without danger to the operating personnel. Structure shall be natural ventilating.

4.9 Panel shall be designed and constructed to facilitate easy inspection, cleaning, repair and maintenance and to ensure absolute safety during operation, inspection and maintenance. Similar parts and components shall be interchangeable.

4.10 The overall panel enclosure shall have a degree of protection IP-55 as per IS: 60947/IS8623 to make it dust and vermin proof.

4.11 Cable entry for all incoming and outgoing cable shall be from the bottom of the panel through removable gland plates of 2mm thick.

4.12 LED (Cluster type) indicating lamps shall be used.

4.13 Inscription plates with inscription for all feeders shall be provided.

4.14 Single line diagram should be pasted inside the door inscribed on metallic sheet.

4.15 Panels must conform to Partially Type Tested as per IEC 60439/IS 8623/ IEC 61439.

4.16 All auxiliary devices for control, reset, indication, measurement and protection such as push buttons, control/selector switches, indicating lamps, measuring instruments and protective relays shall be mounted on the front of the respective compartment door. The design shall be such that operations of all ON/OFF Push Buttons, START/STOP Push Buttons, Relay Reset Push Buttons and/or Control/Selector. Switches can be performed without opening the door.

4.17 Panels shall have single door arrangement.

4.18 Panel incomers shall have power monitoring meters and phase indicating lamps for switching and indication purpose as shown in SLDs.

4.19 CLEARANCE, CREEPAGE DISTANCE AND INSULATION LEVEL

As per CEA - Measures relating to Safety and Electricity Supply Regulations, 2010 clearance in between the panel is mentioned as tabulated below.

Distance between Panel and wall: 1000 mm
Distance between panel to panel in side: 750 mm (min) or less than 200 mm
Clearance When Facing each Other of Electrical Panels: 2000 mm

The clearance and creepage shall not be the lesser than values specified below

Phase to phase: 26mm
Phase to earth: 19mm
Phase to neutral: 19mm
Neutral to earth: 19mm
Minimum creepage distance: 28mm
Rated insulation voltage: 660V

4.20 MOULDED CASE CIRCUIT BREAKER (MCCB)

4.20.1 MCCB shall confirm to IS/IEC: 60947 and shall have rupturing capacity as specified in SLD.

4.20.2 MCCB shall be provided with all related auxiliaries such as extended rotary handle, spreader etc. and should be of the same make.

4.20.3 Rating and number of poles for the switch shall be as mentioned in SLD.

4.20.4 MCCBs shall be adjustable type. All MCCBs to be used for pump motors, fan motors and other motor equipment shall be of motor type and shall be capable of handling the starting currents

4.20.5 Interlocking to prevent the compartment door being opened unless the MCCB is in the open position. However, mechanism should be there to defeat the interlocking if required.

4.20.6 MCCBs shall be provided with a tripping device with inverse time characteristic for over load protection and instantaneous characteristics for short circuit protection and all MCCB shall preferably have adjustable settings as per specifications mentioned below conforming to IEC 60947-2

For Thermal Magnetic release with O/L, E/F (LSI) Protection
Ics=100%Icu=Icw for 1 sec at 415V
Adjustable overload: Minimum 80~100%In
Fixed short circuit: Minimum 10 In

4.20.7 'ON' and 'OFF' position of the operating handle of MCCB shall be displayed and the operating handle shall be mounted on the door of the compartment housing MCCB.

4.20.8 Each MCCB shall be provided with minimum 1 NO + 1 NC auxiliary contact and 1NO contact for tripping indication/alarm for owner's use.

4.21 MINIATURE CIRCUIT BREAKER (MCB)

MCB shall provide high mechanical and electrical life, reliable protection of circuits against overload and short circuit and shall have minimum breaking capacity of 10kA unless otherwise specified. Positive ON/OFF indication shall be provided.

4.22 SECONDARY WIRING

4.22.1 Secondary wiring shall be copper PVC insulated 1100 volts grade flexible wire.

4.22.2 Secondary wiring within the panel shall be securely held in position (either bunched or run in conduit/ trunking)

4.22.3 Wiring identification shall be by numbered and / or lettered interlocking sleeve ferrules of insulating material adjacent to the terminals. They shall be indelibly marked and removal without disconnecting the wire from its terminal shall not be possible.

4.22.4 Flexible cables shall be used for connections on door mounted equipment. Wiring shall be bunched, wrapped in flexible conduit and be firmly clamped at both ends to prevent movement at terminations.

4.22.5 The minimum conductor size shall be 1.5 sq.mm cable sheath colour shall be consistent with the phase/neutral/earth circuit to which they are connected. Wiring of all control, indication and measuring circuit shall be done with 1.5 sq.mm PVC insulated copper conductor wires. However, wiring of C.T circuit shall be done with 2.5 sq.mm PVC insulated copper conductor wires.

4.22.6 All wiring for external connections shall be brought out to individual terminal on an easily accessible terminal block.

4.22.7 Only one conductor shall be connected to each side of each terminal, additional linked terminals shall be provided where more connections are required.

4.22.8 All control wiring shall be neatly arranged & properly supported.

4.23 INDICATION LAMP, INSTRUMENT & METERS

4.23.1 Indication for the circuit conditions shall be as per SLDs.

4.23.2 Panels shall have indication lamp for showing the availability of power in all the three phases for incoming. Indication lamps shall be cluster of LEDs. Voltage rating of LED shall be equal to rating of control circuit voltage. Red, Yellow, Blue indication lamps shall be provided for each of the three phases

4.23.3 Electrical indications, with colors as given below, shall also be provided:
Breaker 'Closed'/ ON: Red lamp
Breaker 'Open'/ OFF: Green lamp
Breaker trip: Amber lamp

4.23.4 Push Button

Contacts of push button shall be rated for a minimum of 6 amps at 230 volts AC. Push button must be of illuminating type. Color coding of push buttons shall be as follows:
Green: Start/ On/ Open
Red: Stop/Off/ Close

4.23.5 Measuring Instruments

4.23.6 All measuring instruments shall be of 96 x 96 mm square pattern, flush mounting type for incomer and outgoing feeders in the switchboard. The accuracy class for all instruments shall be 1.0 as per IS: 1248.

4.23.7 All auxiliary equipment such as shunts, transducers, CT, PT, etc. as required shall be included in the supply of the switchboard.

4.23.8 Digital meters shall be provided. All digital meters shall be highly reliable, accurate, compact and self-powered.

4.23.9 Control Switches

All control switches shall be rotary type, having a cam operated contact mechanism. Switch shall have pistol grip handle for circuit breaker control and knob type handle for other applications.
Ammeter selector switches shall have make before break feature on its contacts. The selector switch shall generally have 4 positions, three for reading 3 phase currents and the fourth position for off. The voltmeter selector switch shall also have 4 positions, three positions shall be used to measure phase- to- phase voltage and fourth shall be OFF position.

4.24 FUSES

Fuses shall be non-deteriorating HRC cartridge link type as per IS:9224 use for back up protection.

4.25 AUXILIARY SUPPLY

Auxiliary supply for control, indication etc., shall be normally derived within the panels unless specified otherwise. Vendors shall provide auxiliary control/ supply throughout its length for further distribution.

4.26 NAME PLATE

4.26.1 Permanent non-corrosive nameplate with Black colour background and White Colour Letter shall be provided on the panels. Characters shall be of 12 mm height. Black Anodised Aluminium computerized printed name plate shall be used.

4.26.2 A main name plate shall be affixed in a prominent position on the front of each panel giving the following information:

4.26.2.1 Fully Automatic Fire water Jockey Pump Starter Panel
Manufacturer's Name
System Voltage, Phase, Wires and Frequency
Year of manufacture
Danger Plate

4.26.2.2 Submersible pump starter panel.

4.26.2.3 Label shall be affixed by screws or rivets and not adhesives.

4.27 PANEL EARTHING

4.27.1 All metallic non-current carrying parts of the distribution panel shall be bonded together and connected to the internal earth bus-bar.

4.27.2 All doors shall be bonded to the main structure by means of a flexible copper connection arranged so that it cannot be tapped as the door is opened or closed.

4.27.3 Provision shall be made, adjacent to the cable termination, for cable armour earthing.

4.27.4 Panels shall be supplied with two external M10 brass earth studs complete with nuts, spring and plain washers. The studs are to be internally connected to the earth bus bar.

4.28 PAINTING

All sheet metal work shall undergo a process of Degreasing, Pickling in acid, cold rinsing, Phosphating & Passivating (Minimum 9 Tank Hot Chemical Pretreatment Process). Two primer coats of Epoxy based primer suitable for corrosive (seashore) atmosphere. Two finish coats of painting of RAL7032 (Siemens Grey) colour shade. The interior of panel shall have eggshell white paint.

4.29 TROPICAL PROTECTION

All equipment, accessories and wiring shall have fungus protection, involving special treatment of insulation and metal against fungus, insects & corrosion. Screens of corrosion resistant materials shall be furnished in all ventilating louvers to prevent the entrance of insects.

4.30 PACKING AND DISPATCH

4.30.1 Panels shall be shipped to suit ease of handling for transportation and installation. Each shipping section shall be provided with location of lifting points clearly marked on shipping containers. Each shipping section shall have its weight clearly marked on the container.

4.30.2 Preparation for shipment shall protect the panel, auxiliary devices, accessories, etc. against corrosion, dampness, breakage or vibration injury during transportation and handling. The packing shall be completely suitable for long duration outdoor storage in areas with heavy rains/high ambient temperature.

4.30.3 All consignment must be securely and appropriately packet and should conform to Standard Material Transport Regulations.

4.31 INSPECTION AND TESTING

The Panels shall be inspected / tested at manufacturer's works /factory & all relevant test certificates, catalogues have to be provided during the inspection of the panels by AGCL. Intimation must be sent to ASSAM GAS COMPANY LTD, DULIAJAN (ASSAM) at least 15 days ahead for inspection of the Panels at Manufacturer's premises.
The inspection test and Factory Acceptance Test procedure will also be forwarded to AGCL for their review and approval.

Acceptance tests shall be as follows:

4.31.1 A general visual check shall be carried out. This shall cover measurement of overall dimension, components locations, numbers and type of devices, location and connection of terminals etc.

4.31.2 Manual and electrical operation of Incoming Feeder/ Outgoing Power Feeders shall be checked under the worst conditions with auxiliary supply voltage.

4.31.3 Dry insulation test with power frequency voltage shall be conducted for the main and auxiliary circuits.

4.31.4 Operation check shall be carried out for every control function as per the circuit diagrams by manually simulating fault conditions and operation of control switches/relays etc.

4.31.5 Impulse voltage test: Secondary injection test for release of MCCB shall be conducted.

4.31.6 Insulation resistance test with 500 Volt Megger before and after high potential testing on all power and control equipment.

4.31.7 High voltage test at 2500V, AC for power equipment and 1500V, AC for control equipment for one minute.

4.31.8 Operational test on all feeders to ensure continuity of power and control wiring correctness from bus bars to outgoing terminals.

4.31.9 Test certificates to be submitted for MCCBs, protective relays, meters, CT polarity, closing & trip mechanism of Circuit breakers, Switches, Fuses, overload relays, timers, etc. and the entire equipment as a system.

4.32 COMMISSIONING AND MANDATORY SPARES

4.32.1 List of mandatory spares for the panel shall be provided along with the bid.

4.32.2 Spare for commissioning as required shall be supplied without any extra cost. Mandatory spares consumed during commissioning shall be re-supplied without additional cost. Mandatory spares consumed during warrantee-guarantee period for defects (i.e. which is not a regular consumable and failure is due to regular wear and tear) shall be re-supplied without additional cost.

4.32.3 One set of special tools if required for operation and maintenance of the panels and its switchgear is to be provided as a part of the supply order.

4.33 INSTALLATION, TESTING, COMMISSIONING AND HANDING OVER TO AGCL:

4.33.1 The installation, testing and commissioning of the panel shall be carried out by the bidder in the presence of AGCL representatives. The bidder has to ensure complete compatibility of the Panel and accessories to the existing power system.

4.33.2 Construction of foundation for the Panel including control room, cable trench, drainages, motor etc. will be in bidder scope. However bidder shall submit the layout and foundation drawings required for the installation of the panel such as cable trench, etc. including all other related accessories. The successful bidder shall furnish the foundation details within 15 (Fifteen) days from placement of Work order.

4.33.3 Only competent electrical personnel holding valid electrical license shall be engaged for installation and commissioning job of panel and other electrical installations.

4.33.4 All incoming and outgoing cables as per SLD shall be terminated and commissioned by Bidder. The supplier shall provide all necessary spares such as glands and lugs for incomer and outgoing feeders and tools for carrying out cable termination jobs.

4.34 WARRANTY

The guaranty/warranty period / defect liability period of minimum of 18 (Eighteen) months from date of delivery OR 12 (Twelve) months from date of commissioning shall commence from the date of acceptance of equipment in full at site or issuance of work completion certificate respectively whichever is earlier.

5.0 CABLE SPECIFICATION

ISI Marked cross linked polythene XLPE insulated PVC outer sheathed armoured with galvanized flat steel strip cable with aluminium conductor suitable for rated voltage 1100 volts grade confirming to IS:7098 part I 1998 with latest amendments.

Technical specifications

5.1 Physical parameters specification:

2. Minimum No. of cores X Size in sqmm: 3.5C X 50 sqmm
3. No. of runs from electrical control room to motor control center (Approx 400 metrers): 1
4. Cable code: A2XFY
5. Material: H2/H4 Grade Aluminium as per class 2 of IS 8130 with its latest amendment
6. Shape of conductor: Stranded Compacted Shaped
7. Insulation material: Cross Linked Polyethylene (XLPE) as per IS 7098 (Pt-I)/88 with its latest amendment
8. Insulation nominal thickness (Main/ Neutral): 1.00/0.90 mm
9. Core identification colour: Red Yellow, Blue & Black
10. Inner sheath material: PVC Tape ST-2 as per IS-5831; FRLS Type
11. Inner sheath minimum thickness: 0.30mm

12. Armouring material: Single layer of galvanized flat strip as per IS 3975/88 with latest amendments.
13. Nominal Armour Strip Dimension: 4 X 0.8mm
14. Outer sheath material: FRLS PVC Type ST-2 as per IS: 5831/84 with latest amendment
15. Minimum outer sheath thickness: 1.40 mm
16. Colour of Outer Sheath: Black

5.2 Electrical parameters specification:

1. Voltage grade: 1100V
2. Max. DC Resistance of conductor at 20^0C: 0.641 ohm/km
3. Max. AC Resistance of conductor at 90^0C: 0.820 ohm/km
4. Reactance of cable at 50Hz (Approx): 0.78 ohm/km
5. Capacitance of cable at 50Hz (Approx): 0.24 µF/km
6. Maximum conductor temperature under normal operating condition: 90°C
7. Maximum conductor temperature at the termination of short circuit: 250°C
8. Minimum Short circuit rating of conductor for the duration of 1 sec: 4KA
9. Continuous current carrying capacities in ground at 30°C: Minimum 140A
10. Continuous current carrying capacities in air at 30°C: Minimum 140A
11. Printing on cable: Year/ MANUFACTURER/ 1100V/XLPE/ CABLE SIZE/ CABLE TYPE etc. Sequential marking at every one meter length.

All related items such as lugs, metal glands etc shall be supplied by contractor.

6.0 EARTHING PROTECTION SYSTEM

6.1 Earthing shall be done as per IS 3043 with minimum two numbers of earthing for each equipment. Earthpits shall be inter-connected.
6.2 Electrical equipment shall be provided with two separate and distinct grounding pads, each complete with tapped hole, galvanized bolt and spring washer for connection to station ground conductors.
6.3 From the earthing grid to panels, motors etc. connection shall be provided with G.I flats of 25 x 3 mm, except for smaller items, which will be connected using Copper wire.

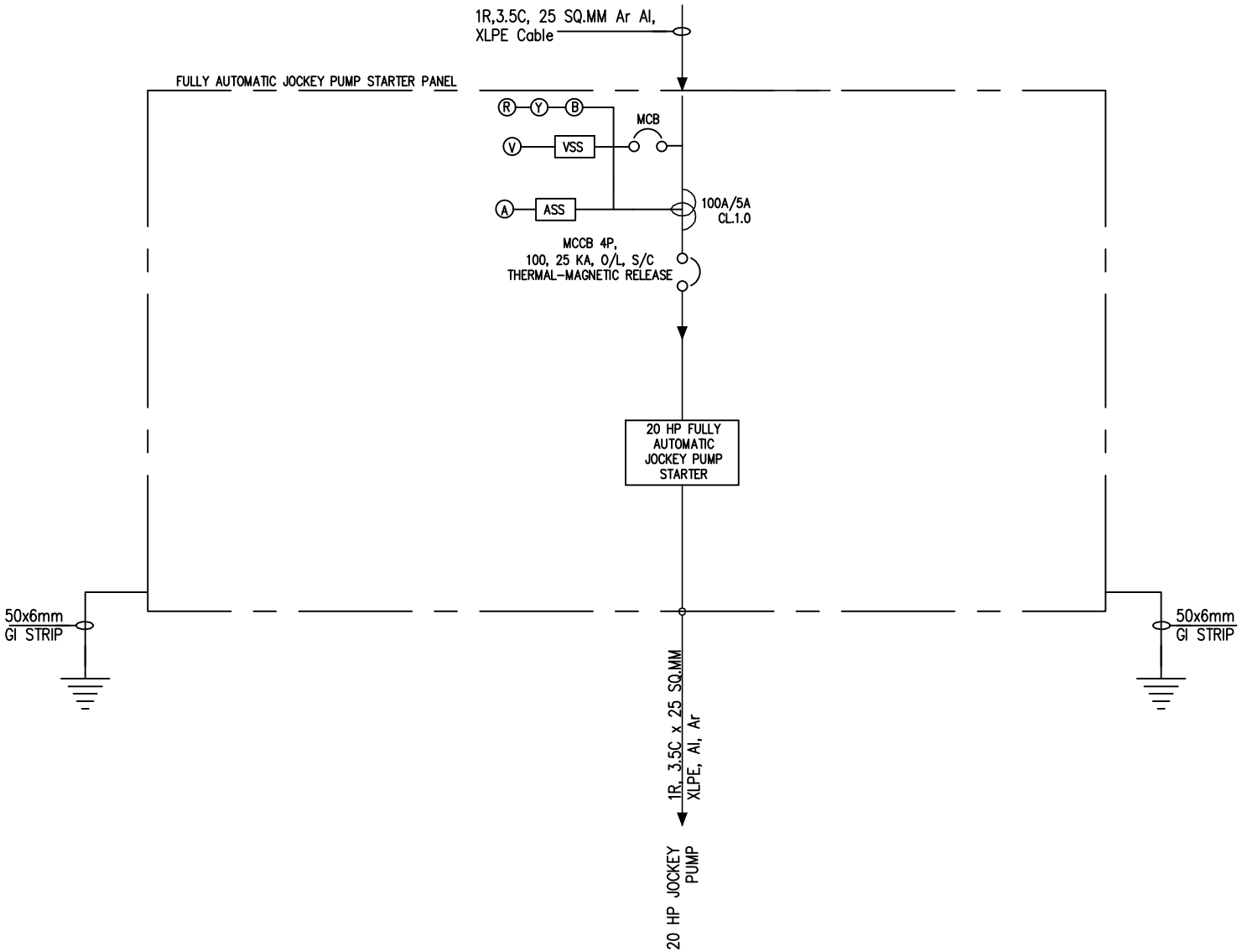
7.0 ILLUMINATION SYSTEM

The system provides lighting and service powers at 240V, single phase 50 Hz to receptacles and single phase feeders to plant areas. The fire water pumping plant illumination system will include normal lighting of the plant. Energy efficient equipments shall only be provided. Illumination shall be as per IS 3646 (Part 1)-1992 with latest amendments.

8.0 PREFERRED MAKES OF EQUIPMENTS

Following is the lists of preferred makes of various items of the panel

SL NO	ITEM	PREFERRED MAKE
1	MCCB with O/L, S/C Thermal Magnetic Release (LSI) with rotary handle and spreader	L&T/ SCHNEIDER/ SIEMENS/ LEGRAND/ ABB/ C&S
2	MCB	L&T/ SCHNEIDER/ SIEMENS/ LEGRAND/ABB/ C&S
3	Contactors	L&T/ SCHNEIDER/ SIEMENS/ LEGRAND/ ABB/ C&S
4	96mmX 96mm Digital Ammeter	L&T/ SCHNEIDER/ SIEMENS/ LEGRAND/ ABB/ C&S
5	96mmX 96mm Digital Voltmeter	L&T/ SCHNEIDER/ SIEMENS/ LEGRAND/ ABB/ C&S
6	Current Transformer	RECO/L&T / SIEMENS/ ABB / Schneider/ AEP / Indcoil / Precise / Current Electricals / Kappa/ Silkaans Electrical Manufacturing Co. Pvt. Ltd, Automatic Electric
7	Selector Switch	Salzer/ Kaycee
8	R,Y,B Indicating Lamp	L&T / Siemens / Alstom Power / Binoy / Tulsi
9	Start/Stop PB illuminated Type	C&S/ Siemens/ Schneider Electric/Teknic Electric/L&T
10	Control cable/ Power cable/ PVC Multistrand cable/ XLPE Armoured cables etc.	Finolex Cables Ltd/ Havells/ Kei Industries Limited/ Kec International Ltd/ Polycab Wires
11	Submersible pump motor starter	L&T/ SCHNEIDER/ SIEMENS/ LEGRAND/ ABB/ C&S



LEGENDS

SYMBOL	DESCRIPTION
	MOLDED CASE CIRCUIT BREAKER/ MINIATURE CIRCUIT BREAKER
VSS	VOLTAGE SELECTOR SWITCH
ASS	AMPERE SELECTOR SWITCH
V	VOLTMETER
A	AMMETER
	CURRENT TRANSFORMER
R Y B	PHASE INDICATOR
TM	THERMAL MAGNETIC RELEASE

IMPORTANT NOTE :

1. PANEL SHALL CONFORM TO IEC 60439/IS 8623/ IEC 61439.
2. MCCB MUST HAVE O/L, S/C (LSI) PROTECTION WITH THERMAL MAGNETIC RELEASE CONFORMING TO IS/IEC 60947-2.
3. MINIMUM 9 TANK HOT CHEMICAL PRETREATMENT PROCESS
4. COLOUR SHADE: RAL7032 (SIEMENS GREY)
5. REQUIRED PROTECTION FOR MOTOR: SHORT CIRCUIT AND OVER-CURRENT PROTECTION, OVERLOAD PROTECTION, PHASE FAILURE PROTECTION, WATER LEVEL CONTROLLER WITH DRY RUN PROTECTION.

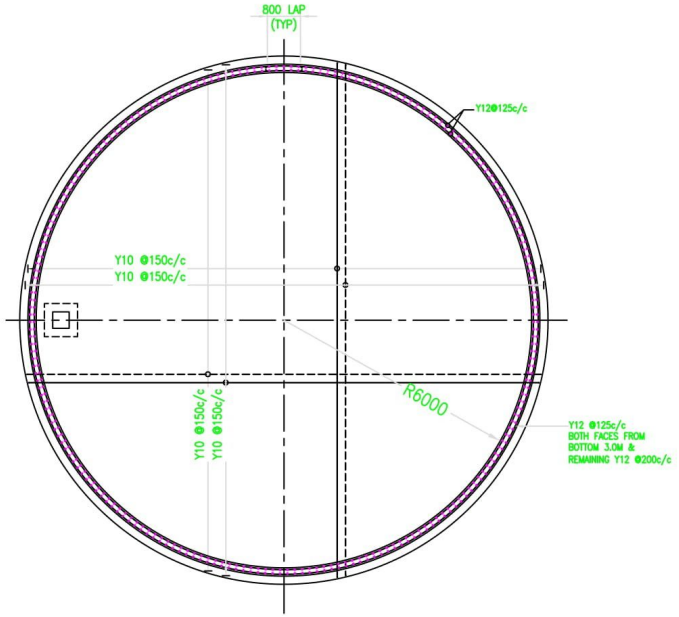
DRAWING DESCRIPTION : FULLY AUTOMATIC JOCKEY PUMP PANEL SLD

DRAWING NO: AGCL/ Elect/ ELP/ 013

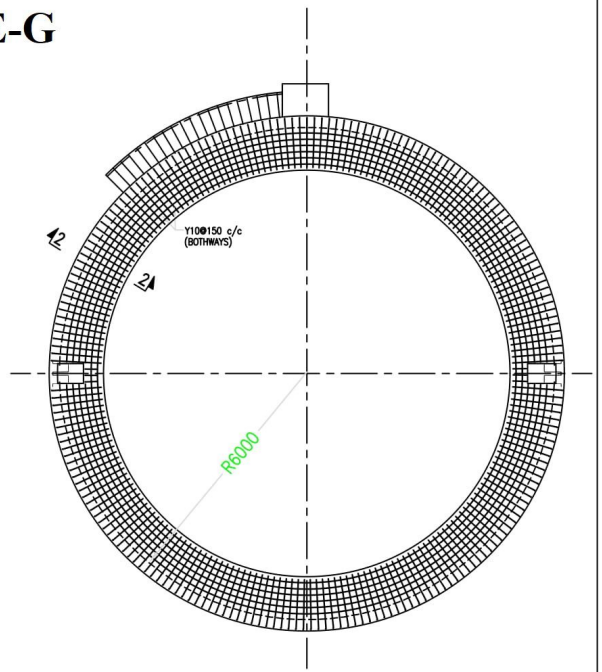
ASSAM GAS COMPANY LIMITED, DULIAJAN

DRAWN BY: SAH	APPROVED BY: PKD

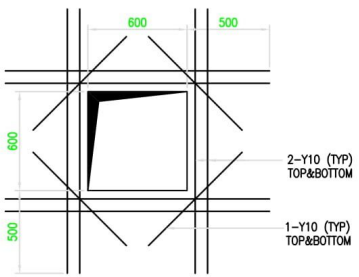
ANNEXURE-G



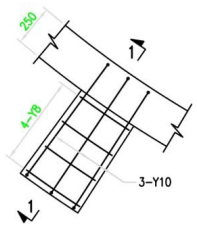
REINFORCEMENT PLAN AT RAFT LEVEL



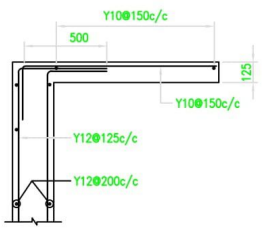
REINFORCEMENT PLAN AT TOP LEVEL



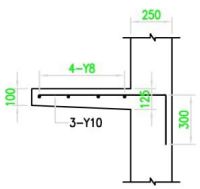
TYPICAL REINFORCEMENT DETAIL
AROUND OPENING
(SCALE 1:25)



TYPICAL REINFORCEMENT DETAIL
FOR STEP
(SCALE 1:25)



SECTION 2–2
(SCALE 1:25)



SECTION 1–1

1 ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METERS.
2 FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE THE DRAWING.

LEGEND

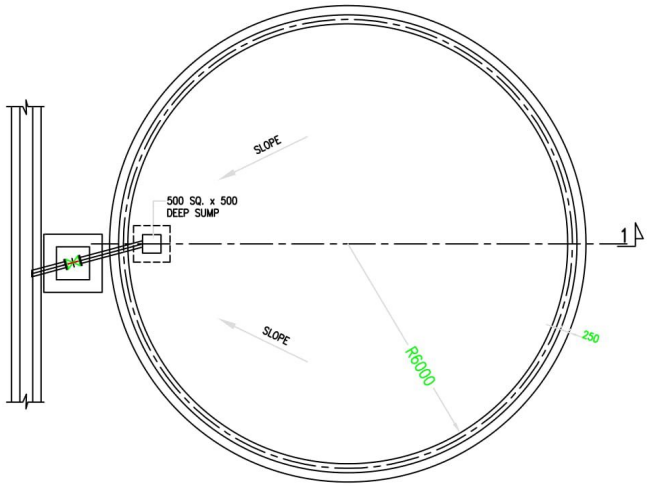
BOTTOM REINFORCEMENT

TOP REINFORCEMENT

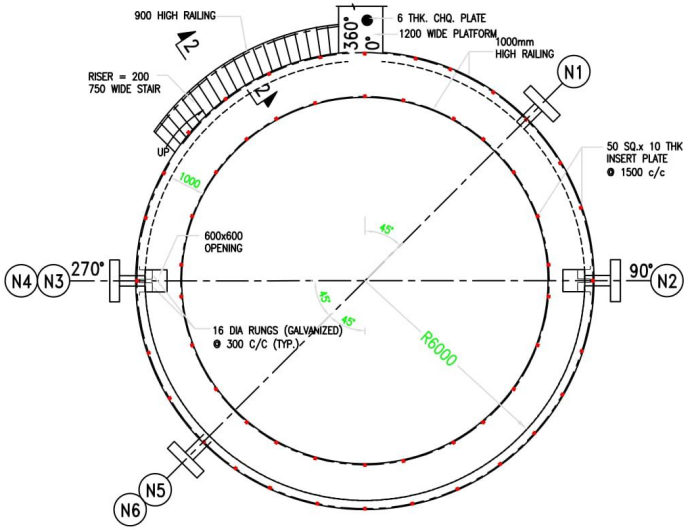
TITLE

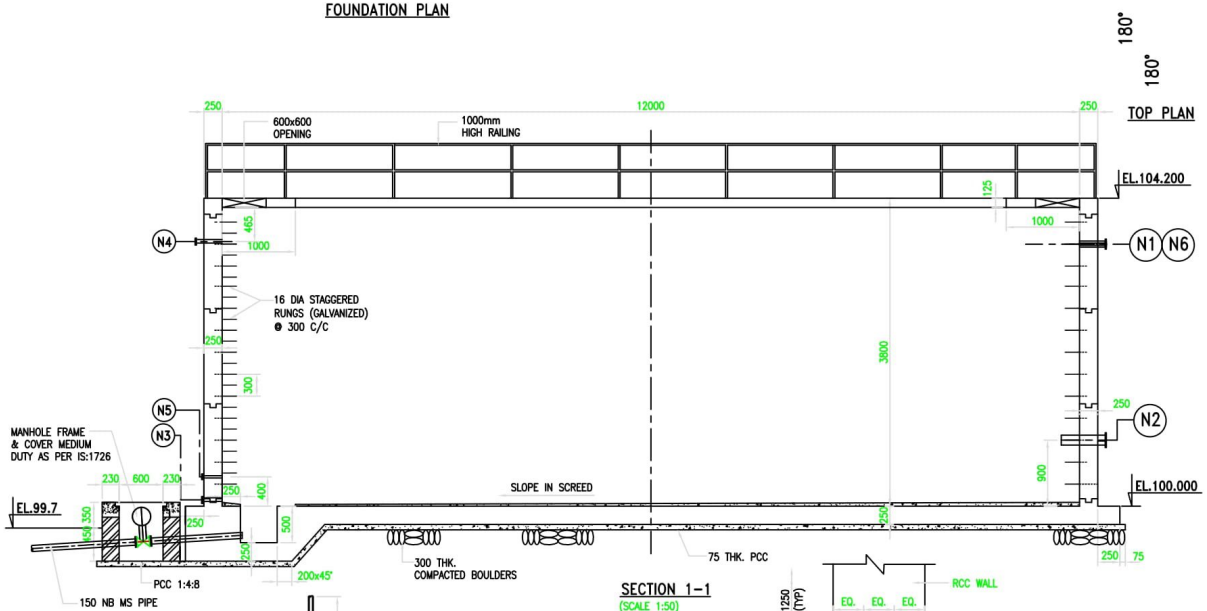
PROPOSED FIRE FIGHTING OVER GROUND WATER TANK FOR ASSAM GAS COMPANY LTD. INDUSTRIAL AREA & COLONY, AT DULIAJAN.

REINFORCEMENT DETAIL PLAN AT RAFT & TOP LEVEL



FOUNDATION PLAN

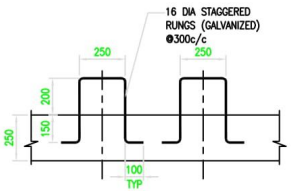




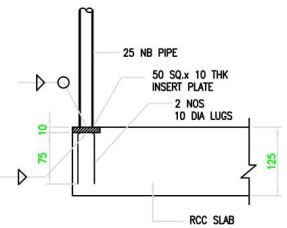
SECTION 1-1
(SCALE 1:50)

TOP PLAN

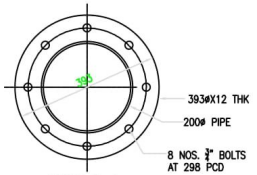
180°
180°



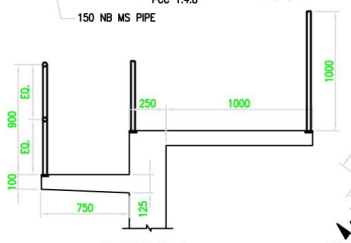
DETAIL OF RUNGS



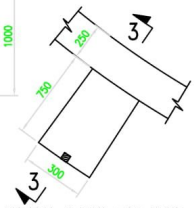
FIXING DETAIL OF RAILING



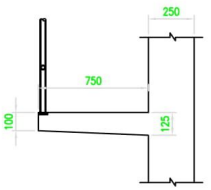
VIEW 4-4
(SCALE 1:10)



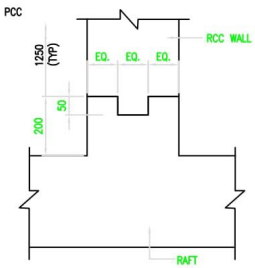
SECTION 2-2



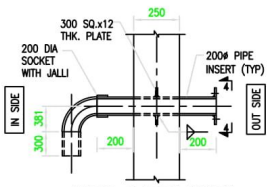
TYPICAL DETAIL FOR STEP



SECTION 3-3



TYPICAL DETAIL OF
CONSTRUCTION JOINTS



DETAIL OF PIPE INSERT
(SCALE 1:20)

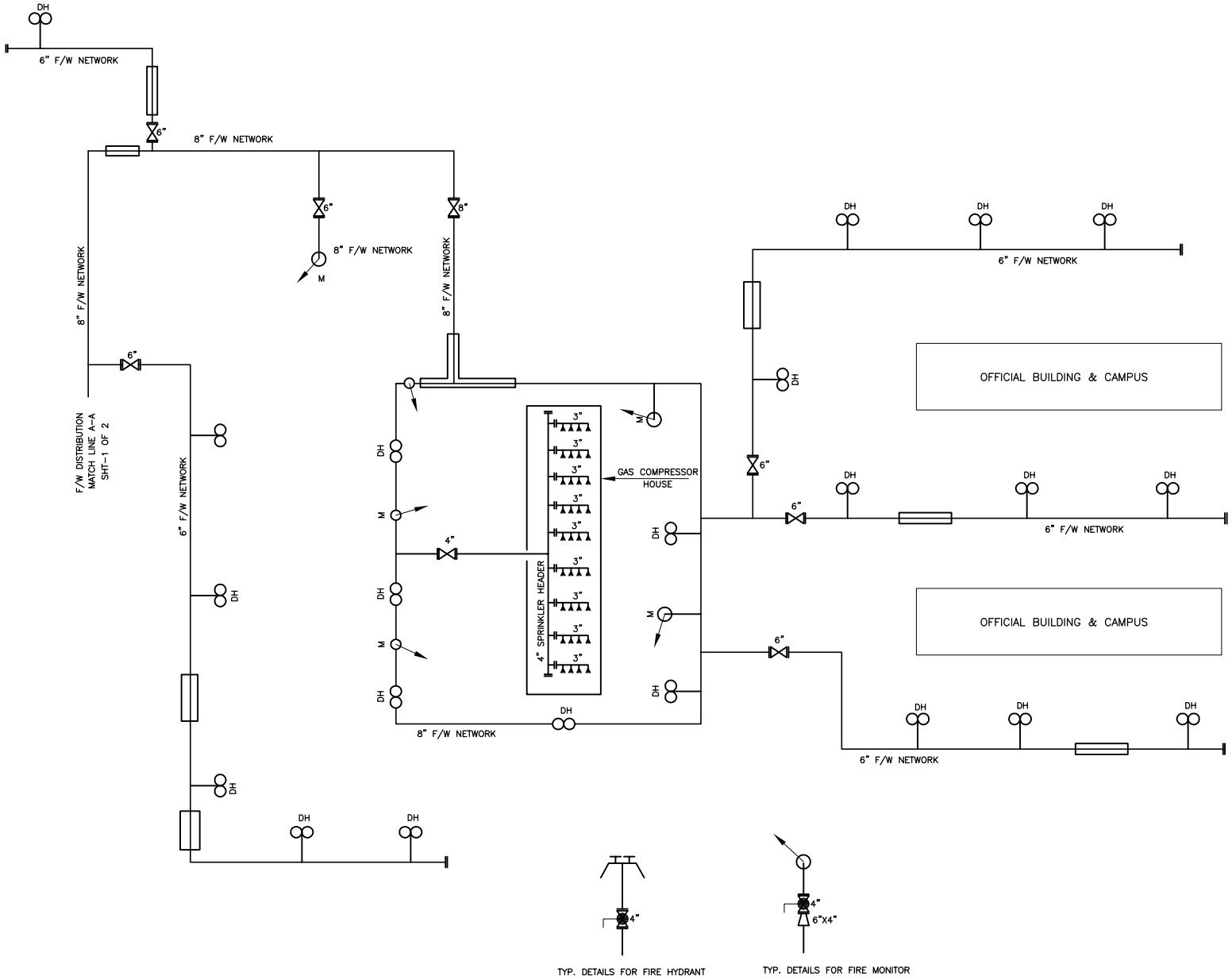
NOTES

1 ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METERS.
2 FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE THE DRAWING.
3 TANK WILL BE TESTED FOR WATER TIGHTNESS AS PER IS CODE 3370.
4 INTEGRAL WATER PROOFING COMPOUND TO BE USED.
5 ALL LEAN CONCRETE SHALL BE 75MM THK. IN 1:4:8.

TITLE

PROPOSED FIRE FIGHTING OVER GROUND WATER TANK FOR ASSAM GAS COMPANY LTD. INDUSTRIAL AREA & COLONY, AT DULIAJAN.

PLAN, SECTION & STRUCTURAL DETAILS



NOTES: –

1. 22 NOS DOUBLE HYDRANT
2. 6NOS MONITOR
3. 36NOS OF SPRINKLER NOZZLE 1.5M RANGE

LEGENDS:–

- GATE VALVE
- BUTTERFLY VALVE
- DOUBLE HYDRANT
- MONITOR
- SPRINKLER SPRAY NOZZLE
- ENCASING

CLIENT : ASSAM GAS COMPANY LTD.

CONTRACTOR :

TITLE: P&ID FOR FIRE WATER NETWORK

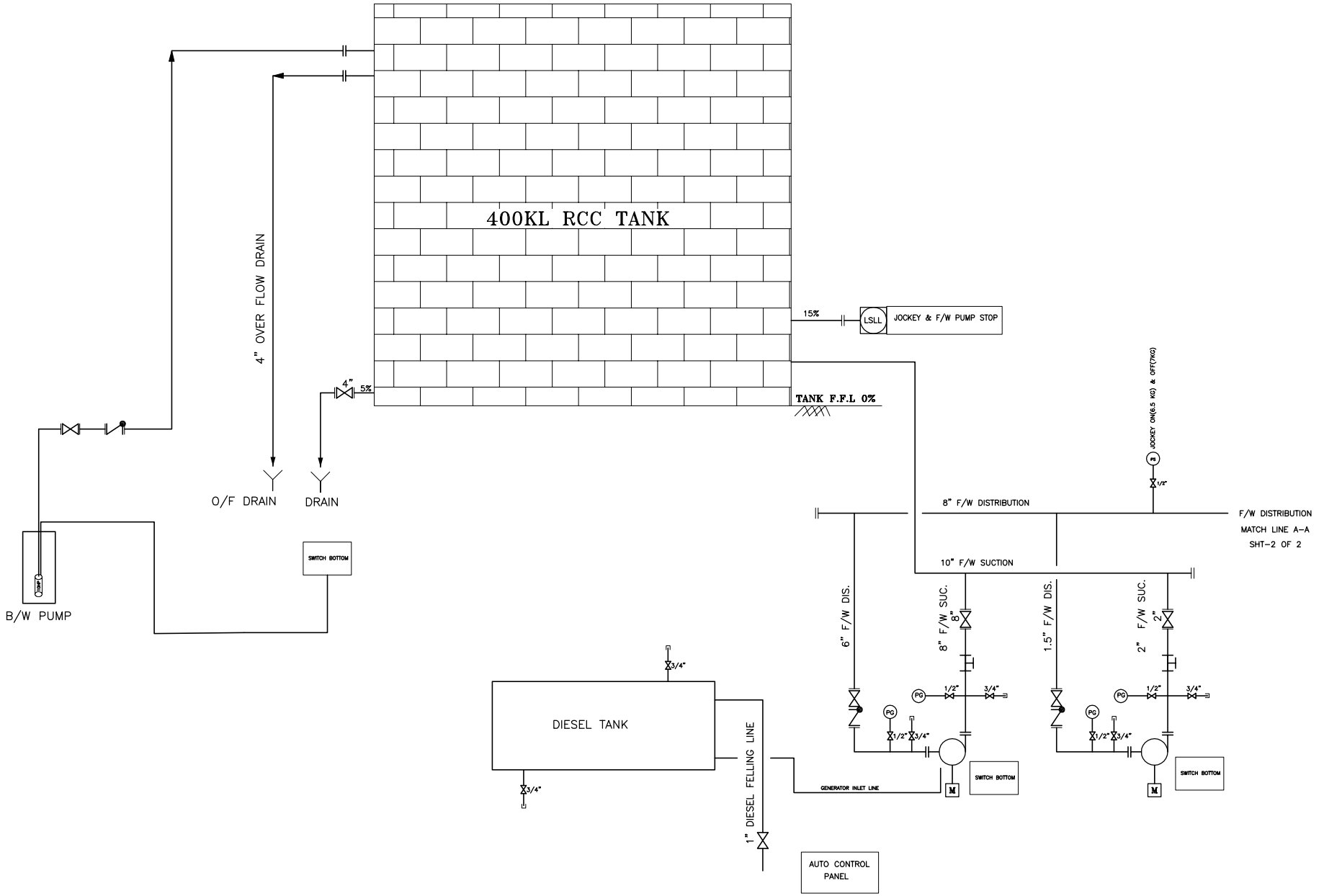
PREPARED BY:

DRAWN BY:

REV. : 0

SCALE : NTS

SHT. 2/2



NOTES: –

1. ALL DIMENSION ARE IN MM.
2. FIRE WATER PUMP TO BE MAINTAIN EXCLUSIVELY FOR FIRE FIGHTING PURPOSE ONLY.
3. AUTO CUT ON/ CUT OFF FACILITY SHOULD BE PROVIDED FOR JOCKEY PUMP TO BE MAINTAIN THE LINE PRESSURE
4. ALL PUMP SHALL HAVE MANUALLY START IN ADDITIONAL TO AUTO START.
5. BOREWALL PUMP SHOULD HAVE AUTO START IN 75% AND 95% CUT OFF IN WATER TANK LEVEL

LEGENDS:–

GATE VALVE

STRAINER

CHECK VALVE(NRV)

PUMP

LEVEL SWITCH

CLIENT : ASSAM GAS COMPANY LTD.

CONTRACTOR :

TITLE: P&ID FOR PUMP AND TANK

PREPARED BY:

DRAWN BY:

REV. : 0

SCALE : NTS

SHT. 1/2