



# Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)

Tiruchirappalli – 620014, TAMIL NADU, INDIA

MATERIALS MANAGEMENT / CAPITAL EQUIPMENT

An ISO 9001  
Company

<b>ENQUIRY NOTICE INVITING TENDER</b>	Phone: +91 431 257 7653 Fax : +91 431 252 0719 Email : <a href="mailto:skaruna@bheltry.co.in">skaruna@bheltry.co.in</a> Web : <a href="http://www.bhel.com">www.bhel.com</a>
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<b>TWO PART BID</b>	<b>Enquiry Number:</b>	<b>Enquiry Date:</b>	<b>Due date for submission of quotation :</b>
Tender to be submitted in Two Parts	<b>2741300002</b>	<b>27.02.2013</b>	<b>27.03.2013</b>

You are requested to quote the Enquiry number date and due date in all your correspondences. This is only a request for quotation and not an order.

Please note that under any circumstances both delayed offer and late offers will not be considered. Hence vendors are requested to ensure that the offer is reaching physically our office before 14.00 Hrs on the date of tender opening.

Item No.	Item Description	Quantity
10	Fire Alarm System for Power Plant Piping Unit at Thirumayam as per the technical Specification, & commercial conditions applicable (to be downloaded from web site <a href="http://www.bhel.com">www.bhel.com</a> or <a href="http://tenders.gov.in">http://tenders.gov.in</a> )	01 Set

Important Points to be taken care during the submission of offer:-

1. The Technical Specification to be duly filled (as Point wise reply) and enclosed with offer.
2. Check list to be filled and enclosed along with the offer failing which, the offer will not be considered for evaluation.
3. The EMD shall be submitted as indicated in the Commercial Checklist.

BHEL's General guidelines /instructions including bank guarantee formats and list of consortium banks, commercial terms checklist can be downloaded from BHEL web site <http://www.bhel.com> or from the government tender website <http://tenders.gov.in> (public sector units > Bharat Heavy Electricals Limited page) Tender Enquiry reference "2741300002".

Tenders should reach us before 14:00 hours on the due date Tenders will be opened at 14:30 hours on the due date Tenders would be opened in presence of the tenderers who have submitted their offers and who may like to be present	Yours faithfully, For BHARAT HEAVY ELECTRICALS LIMITED  Engineer / MM / Capital Equipment
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**Technical Specification  
For  
Fire Alarm System**

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## ***Scope***

The scope of work under this Tender includes design, supply, installation, testing, commissioning, training and handing over of the Analog addressable fire detection system for BHEL-Thirumayam.

- a) The work under this system shall consist of design, supply, installation, testing, training & handing over of all materials, equipment, hardware, software appliances and necessary labour to execute the said system, complete with all the required components strictly as per the enclosed tender specifications and design details. It shall also include laying of cables necessary for installation of the system as indicated in the specification and Bill of materials.
- b) The offered system should be of reputed make, meeting ISI standards, meeting the specification and field proven. The OEM/bidder should enclose the client list and the contact details where similar installation has been carried out. Local service support must be available for optimum upkeep of the system.
- c) All components and devices of Fire Alarm system shall be either products of a single manufacturer or their compatibility is guaranteed by the bidder.
- d) In order to ensure a substantial useful life of the components and devices of FAS, the supplied products shall have their manufacturing dates within six months prior to placement of purchase order. The original manufacturer's label containing the make, model no., serial number, batch number, date of manufacturing and certification mark shall be preserved carefully so that originality, genuineness, newness and certification could be verified.
- e) Any opening in the wall/ceiling required to be made for the installation shall be made good in appropriate manner.
- f) The bidder shall provide APIs for interfacing with existing emergency management system (Avaya Notification System).
- g) Fire alarm system should interface with the existing Ethernet LAN. Centralised alarm monitoring system deployable over LAN shall be provided.
- h) The system shall have one year warranty from the date of commissioning.

## **Eligibility Criteria**

- a) Bidder shall either be a manufacturer of intelligent addressable fire alarm system or authorized system integrator of the system manufacturer.
- b) Bidder should be a profitable company earning profit for the last 3 years. Supporting documents to be submitted.
- c) Bidder shall have at least five years of experience in the field of supply, installation, commissioning and testing of intelligent addressable fire alarm system or similar fire alarm system, relevant Purchase orders to be enclosed.
- d) Bidder should have executed at least two intelligent addressable fire alarm system projects with at least 200 smoke detectors, within the last 3 years as on the date of this tender and the commissioning reports shall be submitted. Purchase orders and installation certificates are to be enclosed.

- e) Bidder shall have a valid ISO 9001:2008 certificate. Copy of the certificate to be enclosed.
- f) Bidder (if the bidder is not the manufacturer) should submit authorisation letter from OEM to quote on behalf of OEM for this tender.

### **Vendor Submittals - Technical**

Vendor shall submit mandatorily along with the bid the following documents.

- Point By Point Compliance / Deviation Statement to the Technical Specifications.
- System Configuration – Site specific schematic which shall include each component required for the system and shall clearly show the compliance of the system requirement mentioned in this document.
- Catalog, Data Sheet, Technical Specifications, valid Approval Certifications for each product quoted.

### **Approvals**

The system shall have proper listing and/or approval from one of the following nationally recognized agencies:

- UL Underwriters Laboratories Inc
- ULC Underwriters Laboratories Canada
- FM Factory Mutual
- VDS Verband Deutcher Electrotechniker
- NFPA National Fire Protection Association
- EN54

## *Specification*

### **Fire Alarm Panel (FACP)**

#### **General**

The main FACP Central Console shall contain a microprocessor based Central Processing Unit (CPU). The CPU shall communicate with and control the following types of equipment used to make up the system, intelligent addressable smoke and thermal (heat) detectors, addressable modules, panel modules including initiating circuits, control circuits, and notification appliance circuits, local and remote operator terminals, annunciators, and other system controlled devices.

The bidder shall undertake the responsibility of the complete installation, commissioning, user trials, training and maintenance of the system as required. The bidder shall take all responsibility for preparation and installation of system software into the FACP. The software shall be such so as to be easily operated by the client's personnel and secured against software errors, ability to be upgraded so as to incorporate more features at a later date.

The control panel shall be capable of expansion via Loop cards. Each loop shall support a minimum of 125 analog addressable detectors /devices. The System shall be fail safe and adequate safe guards should be under taken that in the event of a failure of a part of the System, say a loop card or CPU, it shall not handicap the complete System. The Loop Control Module shall contain its own microprocessor and shall be capable of operating in a local/degrade mode (any addressable device input shall be capable of activating any or all addressable device outputs in that loop) in the unlikely event of a failure in the main CPU. Panel should have Ethernet interface for connecting to LAN.

All addressable units shall be connected to the FACP through the Loop Cards and shall be addressed through individual numbers. Bidder shall provide sufficient number of loops to meet the requirement and also one more loop to meet future requirement. The FACP shall be able to obtain analogue value for all detectors in the circuit through a pulsed digitalized current data. The FACP shall be able to analyse all analogue inputs from all addressable units, and through its own software and ambient level screening the FACP shall be able to identify fire, possible fire or fault conditions. The unit supervision shall be dynamic and continuous.

The Panel shall have capability to display duplication of address, mismatch on the detector type. The panel shall have provision to restore factory default.

The FACP shall also give adequate warning signal whenever there is dust accumulation in detectors, and up to the point of its replacement it should be possible to change the level of ambient alarm calibration condition either by the use of software program operable by the owner or by resetting the detector.

Short / Open circuit units shall also be reported at the FACP. In such cases, the system through the use of fault isolators shall be able to isolate that segment between the two fault isolators. The missing Detectors/Devices shall also be reported at the FACP with identification of the location.

The FACP shall also be able to discriminate between false alarms and fire conditions, as well as priority selection of alarm in case alarm activates in two or more remotely located units simultaneously. In such cases, the Manual Call Points shall have the highest priority.

The FACP shall have its own Battery Backup of a minimum of 4 hours in normal run and 15 min in alarm condition. The Battery shall be of sealed lead acid rechargeable maintenance free type. Necessary battery calculations for the system shall be provided along with the bid.

The Fire Alarm Control Panel shall include a full featured operator interface control for the field programming and control of the fire alarm system. All programming or editing of the existing program in the system shall be achieved without special equipment and without interrupting the alarm monitoring functions of the fire alarm control panel.

### **Panel Controls/ Indication**

**Display & Indication** : The backlit LCD display shall at least be of 160 characters that indicate all information associated with the fire alarm condition, including the type of alarm point and its location within the protected premises. It shall also provide Light-Emitting-Diodes (LEDs), that indicate the status of the following minimum system parameters: POWER STATUS, TEST STATUS, FIRE ALARM, FAULT, CPU FAILURE, POINTS DISABLED etc.,

**Alarm Acknowledge**: Activation of the control panel acknowledge function in response to new alarms and/or troubles shall silence the local panel piezo electric signal and the associated LED on the panel shall be turned ON.

**Signal Silence**: Signal Silence function shall cause all programmed alarm notification appliances and relays to return to the normal condition. The selection of notification circuits and relays that are silenceable by this switch shall be fully field programmable within the confines of all applicable standards.

**System Reset**: Depression of System Reset switch shall cause all electronically latched initiating devices to return to their normal condition and the system reset operation starts. The associated Yellow LED shall flash during this operation to inform the user of the progress status of the reset cycle. The LED shall flash fast during the smoke detector power down sequence, then it shall flash slowly during the restart phase, and shall illuminate steadily for the restoral phase. The LED shall go out completely when the system is back to normal mode.

**Evacuation/ Fire drill**: Depression of the Drill switch shall activate all programmed notification appliance circuits. The drill function shall latch until the panel is silenced or reset.

**Lamp Test**: The Lamp Test function shall activate all local system LEDs, light each segment of the liquid crystal display to check all the components are working OK.

## Panel Functions

The FACP shall minimum perform the following functions:

Supervise and monitor all intelligent addressable detectors and monitor modules connected to the system for normal, trouble and alarm conditions. System response to any alarm condition must occur within 3 seconds, regardless of the size and the complexity of the installed system.

Supervise all initiating signalling and notification circuits throughout the facility by way of connection to monitor and control modules.

Detect the activation of any initiating device and the location of the alarm condition. Operate all notification appliances and auxiliary devices as programmed. Visually and audibly annunciate any trouble, supervisory, security or alarm condition on operator's terminals, panel display, and annunciators.

Upon alarm activation of any area smoke detector, heat detector, manual call point, the following functions shall automatically occur:

The internal audible device shall sound at the FACP.

Display the alarm event on the Fire Graphics workstation.

The LCD Display shall indicate all applicable information associated with the alarm condition including: zone, device type, device location and time/date.

All remote or local annunciator LCD/LED's associated with the alarm zone shall be illuminated.

Activate visual strobes /Sounders based on programmed sequence. The visual strobe shall continue to flash or the sounders will hoot until the system has been reset/alarm acknowledged.

## Panel Features

The system shall be fully supervised for all fault conditions with distinctive alarm operated for fault and fire conditions. Test buttons and software features shall be provided to test the electronic circuits and detector health.

**System Programming:** All System operational software is to be stored in FLASH memory. Time and Date Stamps of all modifications made to the program must be included to allow full retention of all previous program version data. Control Panel disassembly and replacement of electronic components of any kind shall not be required in order to upgrade the operations of the installed system to conform to future application code and operating system changes. It shall have the ability to download/upload all system applications programs and "firmware" from/to a computer through a single point in the control panel.

The panel shall provide means for all Signaling Line Circuits (SLC) devices on any SLC loop to be auto programmed into the system by specific address. The system shall recognize specific device type ID's and associate that ID with the corresponding address of the device.

**Event Buffer:** The panel shall maintain a history file of at least the last 1000 events, each with a time and date stamp. History events shall include all alarms, troubles, operator actions, and programming entries.

**Early warning capability:** To obtain early warning of incipient or potential fire conditions, the system shall support a programmable option to determine system response to real-time detector sensing values above the programmed setting.

It shall be possible to set individual smoke detectors for pre-programmed pre-alarm thresholds. If the individual threshold is reached, the pre-alarm condition shall be activated and an alert displayed on the panel.

When the detector reaches a level exceeding the pre-programmed level, the control panel shall indicate an action condition. Sounder bases installed with either heat or smoke detectors shall automatically activate on action Pre-Alarm level, with general evacuation on alarm level.

**Alarm verification delay:** The Fire alarm control panel (FACP) shall provide means to cause alarm signals to only sound in specific areas/groups with a delay of the alarm after start of alarm processing. If the alarm is not acknowledged within programmed delay, all local and remote outputs shall automatically activate immediately. The control panel shall ignore the alarm verification timer if another alarm is detected during the verification period.

**Enable/ Disable points:** The FACP shall allow the operator to restore a disabled point (device) in the system, allowing that point (device) to operate as originally intended by the application program of the system. Additionally, the system shall allow the operator to restore/enable/disable any group function, function, Panel, system module, "software - defined zone", operator control, or time control function.

The FACP shall allow the operator to disable any point (device) in the system, inhibiting that point (device) from operating as originally intended by the application program of the system. Additionally, the system shall allow the operator to disable any group function, function, Panel, system module, "software - defined zone", operator control, or time control function within the system.

**Check/Alter parameters:** The system shall allow the operator to manually turn on any system output point, or system function. Alter Smoke Detector sensitivity, message routing within the system shall be modifiable with this simple command from the control panel.

The system shall allow the operator to restore the primary (application program defined) operation to the Smoke Detector sensitivity and the message routing functions with this simple command from the control panel.

The system shall allow the operator to manually command and control relays. Relays shall be able to be commanded to "Latch", to energize as a "High Priority", or as a "Low Priority", to "Energize", or to "De-Energize".

**Sensitivity Adjust:** The system shall provide Automatic Detector Sensitivity Adjust based on Day/Night schedules.

**Environment Drift Compensation:** The system shall automatically compensate for the drift in the sensitivity that can occur due to dust & environment changes. Environmental compensation shall mean that the sensing element adapts to long-term changes caused by dirt, humidity, aging etc. It shall even compensate for small amounts of normal ambient smoke. The detector shall periodically adjust and update the sensitivity (% obscuration) baseline for its photoelectric sensing element. Periodically this information shall be written to its permanent memory. When the detector accumulates dust in the chamber above the allowed limit, the control panel shall indicate a maintenance urgent warning.

**System Status Display:** The system shall allow the operator to determine the status of individual system components, including active points, disabled points, and active points by panel.

The LCD shall show the system time, and the number of active points and disabled points in the system in this section of the LCD Display.

The LCD shall show the first active event of the highest priority. The text shall show the sequence number in which the displayed event was received, as well as its event type. It shall also display an identification message related to the displayed event.

The LCD shall show the total number of active events in the system, by event type. The Main LCD shall include queues for each of the System Event Types. The Main LCD shall allow the operator to access to the System Status information contained within those queues by pressing an associated select switch. Whenever there is an unacknowledged event in any of the System Event queues, the associated Status LED shall flash. Viewing each event listed in a queue shall acknowledge all events in that queue, and shall cause the associated LED to illuminate steady.

**Passwords and Users:** The system shall support at least two password levels, master and user.

**Report Generation capability:** The system shall have the capability to connect to a printer to print at least the following

It shall give a detailed description of the status of certain system parameters for corrective action, or for preventative maintenance programs.

The system shall provide a report that gives a sensitivity listing of all detectors that have less than 75% environmental compensation remaining.

The system shall provide a report that provides a sensitivity listing of any particular detector or all detectors

The system shall provide a listing of all of the firmware revision listings for all of the installed network components in the system.

**One-Man Walk Test:** The system shall provide walk test for testing the entire fire alarm system. The walk test shall allow a single operator to run audible tests on the panel. When points are activated, each initiating event shall latch the input. The test shall be audible and shall be used for pull station verification, magnet activated tests on input devices, input and output device and wiring operation/verification.

**Response based on event:** The panel software functions shall provide means to program a variety of output responses based on various initiating events.

The system shall support at least 150 general purpose software zones for linking inputs to outputs. When an input device activates, any zone programmed into that device's zone map will be active and any output device.

**Maintenance Menu:** The Main display in the FACP shall also allow the System Operator to access system maintenance functions through a multi level password system.

**Enclosures:** The control panel shall be housed in cabinet suitable for surface or semi-flush mounting. The cabinet and front shall be corrosion protected, given a rust-resistant prime coat, and manufacturer's standard finish.

The back box and door shall be constructed of steel with provisions for electrical conduit connections into the sides and top.

The door shall provide a key lock and shall include a glass or other transparent opening for viewing of all indicators. For convenience, the door may be site configured for either right or left hand hinging.

The FACP shall have any of the specified approvals.

## **Detectors**

The Detector shall be analogue addressable type. The chamber should be easily removable for the purpose of easy maintenance. The address programming shall be done at site only. The detectors shall have a common base to allow easy interchange of various types of detectors.

### **Addressable Smoke cum Heat Detector**

All Smoke cum Heat detectors shall be fitted with plug-in system type connections, from the maintenance and compatibility point of views. An alarm release will not effect a detector's good functioning. After resetting the alarm, the detector will resume operations without readjustment of any kind. The smoke cum heat detector shall have a linear response over all types of fire. It shall be possible to use only a single detector type/model for both above and below false ceiling applications. The detector shall be capable of detecting fast flaming fires and slow smouldering fires equally well.

The smoke cum heat detector shall be able to sense incipient fire by detecting the presence of visible and invisible products of combustion. The detector shall be suitable for low voltage (17 to 31V DC) two wire supply. The detector shall be provided with Twin LED indication and the sensitivity of the detector shall not vary with change in ambient temperature, humidity, and pressure or voltage variation.

Its performance shall not be affected by air current up to 1.52 mtr per second. The detector shall be suitably protected against dust accumulation/ ingress and it shall be free from maintenance and functionally tested at intervals. All detectors shall be identical in construction design and characteristic to facilitate easy replacement.

The Smoke cum heat detector shall be Analogue Addressable type and be able to send analogue output to the FACP regarding its condition. It shall be able to communicate with the FACP by the pulses emitted from the FACP. It shall have in-built locking mechanism to check the removal and pilferage of the detector. The quiescent current flow must not exceed 400 micro amps and alarm condition current shall be maximum 40 milli amps. The base of the Detector shall be electronics free and interchangeable with other smoke or heat detectors.

It shall be able to withstand temperature variations from -10 degree centigrade to 50 degree centigrade. Further, Relative Humidity (non-condensing type) up to 95% shall not hamper its performance. The voltage rating shall be from 17V to -31V DC though the voltage may be changed depending upon the working voltages of a proprietary FACP. The smoke Detector shall have any of the specified approvals.

The detector shall have twin LED's for 360 degree viewing angle. LED on the detector shall blink each time the sensor is scanned by the FACP. If the FACP determines that the sensor is in alarm, the FACP will command the sensor LED to remain on to indicate the same. Each sensor will be capable of being tested for alarm via command from the FACP. Each sensor shall respond to FACP scan with the information about its type for identification. The detector shall be programmed using a hand-held programmer and address stored in a non-volatile memory within the sensor or by a decade /Rotary switch.

### **Manual Call Point**

The Manual Call Point shall be addressable type with built in input modules to define the location.

The device shall be of durable extruded aluminium or moulded poly carbonate construction, red in colour and suitable for surface or flush mounting. The word FIRE shall appear in front of the Station in white colour.

Activation of Manual Call Point shall initiate operation of the alarm detection circuit. The manual station shall have normally open fire alarm and annunciator contacts and these contacts shall close on activation. Contacts shall remain closed until station is manually reset. Resetting shall be accomplished by repositioning the handle / pull station door and relocking the key lock.

The address of the Pull station shall be done through the built in DIP, Decade, Rotary switch or thro electronic addressing.

The Manual Call Station shall be fully addressable with its own addressable module and operated by digitised signals from the FACP. The voltage range shall be from 17V to 31V. The operating temperature range shall be minimum from 0 degree C to 50 degree C.

The Manual call point shall have any of the specified approvals

### **Short Circuit Isolator**

This unit shall be placed on the loop preferably after every 20 devices and shall be able to isolate electrical short circuit in the wiring. All the other detectors shall remain functional because of the Class A wiring of the loop.

Isolator modules/Base shall be provided to automatically isolate wire-to-wire short circuits on an SLC Class A or Class B branch. The isolator module shall limit the number of modules or detectors that may be rendered inoperative by a short circuit fault on the SLC loop segment or branch. At least one isolator module shall be provided for each floor or protected zone of the building.

If a wire-to-wire short occurs, the isolator module / Base shall automatically open-circuit (disconnect) the SLC. When the short circuit condition is corrected, the isolator module shall automatically reconnect the isolated section.

The isolator module / Base shall not require any address-setting, and its operations shall be totally automatic. It shall not be necessary to replace or reset an isolator module after its normal operation.

It shall provide a single LED that shall flash to indicate that the isolator is operational and shall illuminate steadily to indicate that a short circuit condition has been detected and isolated. The Isolator shall have any of the specified approvals.

### **Sounder cum Strobe**

The sounder cum strobe shall be electronic type and shall give discontinuous/ intermittent audible alarm from a command from the Addressable Bell relay modules whenever any detector or call box operates.

The sound output from the sounder should not be less than 100 decibels at the source point. It shall be capable of being directly mounted on the wall/ceiling. The sounder cum strobe shall be programmed to get activated in event of an alarm from a single detector/device or a group of detectors/ devices.

The strobes shall be an electronic visible warning signal device that flashes at least once every 1.5 secs in an event of an alarm. The strobe light shall use Xenon flash tube with low current requirements. The outer cover of the Strobe shall have a printed fire signal warning. The electronic circuits inside the strobes shall be compatible with DC alarm supervision & meet the required safety standards. The strobes shall be mounted on the sounder or on the wall/ceiling.

It shall be capable of being directly mounted on the wall/ceiling. The sounder relay module shall be programmed to activate the sounders in a wing in event of an alarm from a single detector/device or a group of detectors/ devices.

The Sounder & Strobe shall have any of the specified approvals.

### **Addressable Control Relay Module**

Output module shall mean addressable points from the FACP with potential free contacts for tripping of AHUs, Operating Strobe lights, tripping power supply etc. as required. The system shall also be able to handle separate modules to interface the speakers of the Public Address System.

The Module shall have any of the specified approvals.

### **Addressable Input Module**

The input modules shall be used for interfacing Fire status of Gas release panel, Fire, Fault status of VESDA, Sprinkler flow status etc. with the proposed fire alarm system. Sufficient quantity of such modules for providing connectivity from not less than 10 devices shall be provided.

The Module shall have any of the specified approvals.

### **Integration with Access Control System**

In an event of a Fire Alarm the fire alarm panel from its in built programmable relays shall send a signal through a potential free contact to the nearest access door controller and in turn the Access Controller will transmit the door open command to all the doors for automatic opening of all doors. Sufficient quantity of such modules for providing integration with not less than 10 access controllers shall be provided.

### **Integration with PA system with the Fire Control Panel**

Necessary interface unit/modules shall be provided for integrating the PA system. In the event of fire, the fire alarm system shall trigger the PA to generate a tone, make a pre-programmed announcement & end with a tone.

### **Cables**

The cables shall be PVC insulated copper, armoured, multi strand, ATC, FRLS, Twisted Pair, mylar tape shielded, 650V grade and shall generally conform to IS – 8130, IS – 5831 & IS –694 and meet the standard signal cabling requirement. The cable conductor shall be of 48/ 0.2 mm size with 1.64 mm dia with at least 10 Twist per meter. 1.5 sq mm, 2-core, 16 strands, twisted pair, Fire Resistant armoured copper cable only shall be supplied.

Cables shall be laid by skilled and experienced workmen. Great care shall be taken while laying cables to avoid kinks. At all changes in directions (vertical & horizontal planes) the cables shall be bent smooth with a radius as recommended by the manufacturers. Cabling shall be properly clamped. Cabling between UPS point to the FACP shall be in the scope the Vendor.

### **Power Supply Unit**

The Power Supply Unit shall have an inbuilt trickle and boost charger. An indication shall be provided to indicate the availability of AC power source. An inbuilt buzzer shall be provided which shall indicate that the battery is in deep discharge condition. This power supply unit status shall be monitored by the FACP. Necessary addressable modules shall be considered for the same while quoting for power supply unit.

### **Fire Graphics Software**

- a) The Fire Graphics Software shall be capable of integrating with the fire alarm panels through existing LAN.
- b) From the Fire Graphics PC, it shall be possible to monitor all the status, faults, parameters and alarms of all detectors & devices, modules that are displayed in all the Fire Alarm Panels.
- c) It shall be possible to reset the fire alarm panels (only if necessary)

- from the fire graphics station.
- d) The graphics software should be integrated with fire alarm system to provide clear & precise real-time information of alarm on PC workstation with use of text, floor & map.
  - e) The graphics software shall make it easy for the user to locate the affected area and to make efficient response to emergency.
  - f) The software shall constantly monitor incoming alarm/trouble data and in case of alarm/trouble the particular floor plan shall pop-up automatically and the respective triggered device shall flash with change of colour.
  - g) The software shall have provision to add, edit and zoom in and out the floor plan. It shall permit the user to use floor plan/map in the format of .bmp, .JPEG, .gif.
  - h) The software shall have password protection feature to allow only authorized personnel to login/logout/change password.
  - i) The PC and the fire alarm system shall use the existing LAN connection for communication.
  - j) The software shall record event-logs, history with time & date and shall have option to print real-time events for operation.
  - k) The vendor shall take the necessary software & hardware interfaces on the Fire Alarm Panel & software side for achieving the above integration. This shall also integrate with the existing Emergency notification system.
  - l) PC for installing Fire Graphics Software will be provided by BHEL.

### ***Bill of Material (BOM)***

<b>Slno</b>	<b>Description of Item</b>	<b>Unit</b>	<b>Quantity</b>
1	Intelligent networkable analog addressable modular Fire Alarm Control Panel based on microprocessor with colour graphics software	No	1
2	Intelligent Addressable Photo-electric cum thermal Smoke Detector along with detector base	No	550
3	Response Indicator	No	180
4	Addressable Manual Call point	No	20
5	Addressable loop powered Sounder cum strobe	No	24
6	Short circuit isolators	No	30
7	Fire graphics software	No	2
8	30" LCD/LED display	No	1
9	Supply and laying of 1.5 sq.mm 2core FRLS cable	m	8000

**Note:**

1. SI No. 9 is a tentative quantity and the actual consumption will be billed. However, the quantity given in the BoM will be taken for price comparison.
2. Items that are essential for completion of the project (with all the features mentioned in the specification), but not mentioned in the BOM, are under the scope of the bidder.

## **Drawings**

The drawings enclosed with the tender document are indicative and provide the tentative locations of the various components of the above systems and the extent of work covered in the tender. The bidder shall visit the site before submitting the offer to have a clear understanding of the requirement.

The successful vendor shall submit 3 sets of detailed shop color drawings made in AUTOCAD required for the execution of the project to the client/ Project Managers for their approval. A CD containing the drawings shall also be submitted along with the hard copies.

The location of the various ceiling/ false ceiling mounted components such as smoke detectors, etc., shall be done by the successful vendor. The drawings shall indicate the detailed cable routing, fittings etc. The successful vendor shall also submit the detailed dimension of each Controller/ Panel / Component along with the power consumption of each of them. Each Controller/ Panel / Component shall be located in a convenient location for easy access & serviceability.

Approval of drawings is a part of the contractual obligation.

## **Testing**

Bidder shall submit their proposed test procedures for approval and shall not commence testing without such approval is given. Vendor shall also test the Systems as indicated in this Tender Documents.

Bidder shall ensure that no tests are applied which may stress equipment above the limits for field testing recommended by the manufacturer. Bidder shall be responsible for any damage to personnel or equipment resulting from improper test procedure. Defects due to poor workmanship revealed through field testing, shall be corrected at bidder expense without affecting the completion of the project.

Bidder shall visually inspect all equipment for defects immediately results upon arrival at site. The tenderers shall note that all the rates quoted by them are including the testing charges for doing the tests for all the systems. Client will not reimburse separately any amount for any testing of materials.

## **Training**

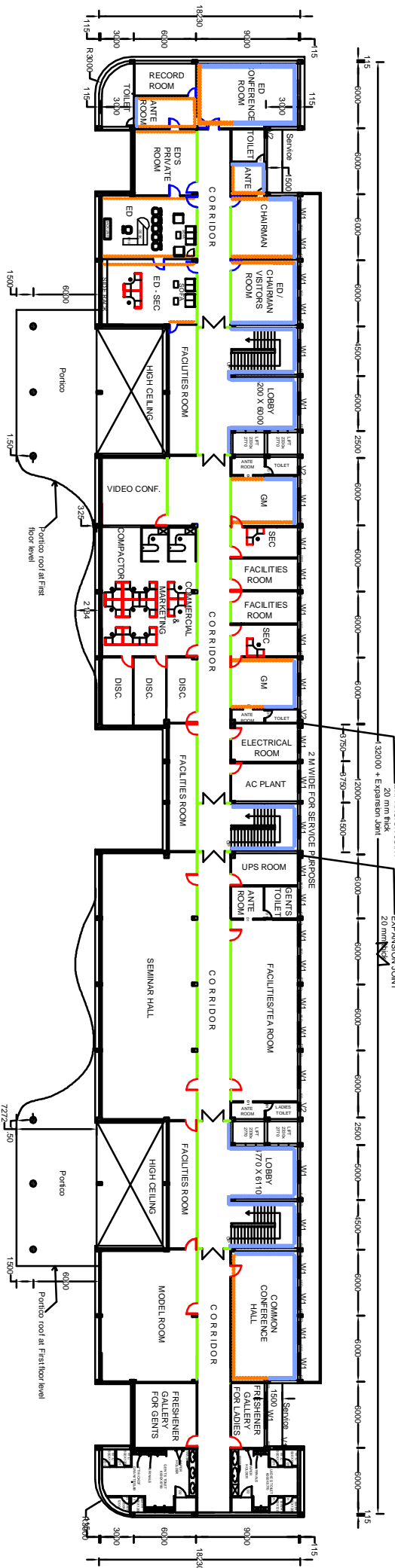
The successful contractor shall fully train Owners' personnel in operation and routine maintenance of all the systems installed by the vendor. Such training shall be imparted during installation of the system and also, after commissioning.

## ***Warranty conditions***

- a) The contractor should carry out four quarterly service and also the emergency calls to be attended whenever required.
- b) The materials required for testing is in the scope of the contractor.
- c) During warranty period, any defective component shall be replaced by the contractor free of cost.



# PROPOSED MODULAR LAYOUT IN FIRST FLOOR OF ADMIN BLDG /PPPU



NO OF SEATS	STAFF					TOTAL
	DGM/SDGM	GM	ED	TRAINEES		
15	02	02	01	-	20	

MODULAR SIZE= 1500mm x 1500mm x 1200mm  
 SR EXECUTIVE'S MODULAR SIZE =3000mm x 2400mm x 1200mm  
 ALL DIMENSIONS ARE IN mm

- FULL HEIGHT GLASS PARTITION
- HALF HEIGHT GLASS PARTITION
- FULL HEIGHT GLASS DOOR WITHOUT ACCESS CONTROL - 1000 x 2100
- FULL HEIGHT GLASS DOOR WITH ACCESS CONTROL - 1000 x 2100
- HALF HEIGHT GLASS DOOR WITHOUT ACCESS CONTROL - 1000 x 1000
- HALF HEIGHT GLASS DOOR WITH ACCESS CONTROL - 1000 x 1000
- DRYWALL PARTITION WITH GLASS WOOL
- DRYWALL PARTITION WITH OUT GLASS WOOL
- DRYWALL PARTITION WOODEN FINISH
- WALL PANELING

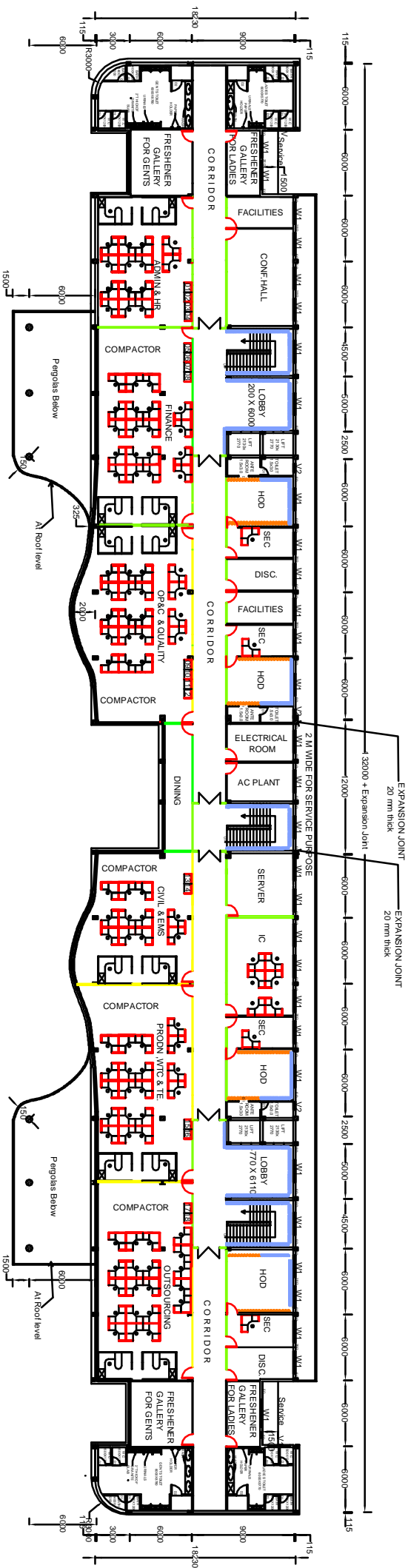
NOTE:  
 MS Layouts indicate location feasibility only. Any other clearance /approval required for legal /statutory , etc. compliances need to be taken separately.

**Bharti Heavy Electricis Ltd**  
**MANAGEMENT SERVICES**  
 TIRUCHIRAPPALLI-620 014

DRAWN	S.ANAND/ASST ENGG I
CHECKED	G.MADHURAM/AN/SM
APPROVED	M.P.BALASUBRAHAM/ANYAN/AGM

DATE: 07/09/2012    SCALE: 1:1    **DWG NO: MS:RP:PPPU:ADMN:FF/33**

# PROPOSED MODULAR LAYOUT IN 2nd FLOOR OF ADMIN BLDG /PPPU



NO OF SEATS	STAFF	DGM/SDGM	AGM	GM	TRAINEES	TOTAL
	112	12	04	-	18	146

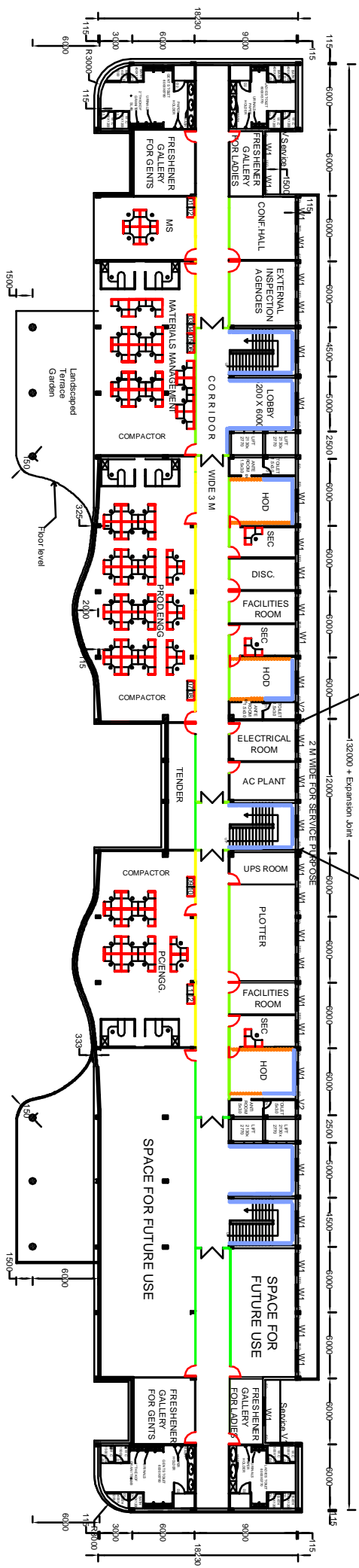
- FULL HEIGHT GLASS PARTITION
- HALF HEIGHT GLASS PARTITION
- FULL HEIGHT GLASS DOOR WITHOUT ACCESS CONTROL - 1000 x 2130
- FULL HEIGHT GLASS DOOR WITH ACCESS CONTROL - 1000 x 2130
- HALF HEIGHT GLASS DOOR WITHOUT ACCESS CONTROL - 1000 x 1000
- HALF HEIGHT GLASS DOOR WITH ACCESS CONTROL - 1000 x 1000
- DRYWALL PARTITION WITH GLASS WOOL
- DRYWALL PARTITION WITH OUT GLASS WOOL
- DRYWALL PARTITION WOODEN FINISH
- WALL PANELING

MODULAR SIZE = 1500mm x 1500mm x 1200mm  
 SR EXECUTIVES MODULAR SIZE = 3000mm x 2400mm x 1200mm  
 ALL DIMENSIONS ARE IN mm

**NOTE:**  
 MS Layouts indicate location feasibility only. Any other clearance /approval required for legal /statutory , etc. compliances need to be taken separately.

 <b>Bharat Heavy Electricals Ltd</b> <b>MANAGEMENT SERVICES</b> TROUSHERPALLI-620 014	DRAWN	S ANAND/ASST ENGGI
	CHECKED	G.MADHURAMANISIM
	APPROVED	M.P.BALASUBRAHMANNYAN/AGM
	DATE: 07.09.2012	SCALE: 1:1

# PROPOSED MODULAR LAYOUT IN 3rd FLOOR OF ADMIN BLDG /PPPU



NO OF SEATS	STAFF	DGM/SDGM	AGM	GM	TRAINEEES	TOTAL
	70	06	03	-	12	91

- FULL HEIGHT GLASS PARTITION
- HALF HEIGHT GLASS PARTITION
- FULL HEIGHT GLASS DOOR WITHOUT ACCESS CONTROL - 1000x 2130
- FULL HEIGHT GLASS DOOR WITH ACCESS CONTROL - 1000 x 2130
- HALF HEIGHT GLASS DOOR WITHOUT ACCESS CONTROL - 1000x 1000
- HALF HEIGHT GLASS DOOR WITH ACCESS CONTROL - 1000x 1000
- DRYWALL PARTITION WITH GLASS WOOL
- DRYWALL PARTITION WITHOUT GLASS WOOL
- DRYWALL PARTITION WOODEN FINISH
- WALL PANELING

MODULAR SIZE= 1500mm x 1500mm x 1200mm  
 SR EXECUTIVES MODULAR SIZE = 3000mm x 2400mm x 1200mm  
 ALL DIMENSIONS ARE IN mm

**NOTE:**  
 MS Layouts indicate location feasibility only. Any other clearance /approval required for legal /statutory ,etc. compliances need to be taken separately.

<b>Shree Heavy Electricals Ltd</b>	
<b>MANAGEMENT SERVICES</b>	
TRICHYRAJAL-620 014	
DRAWN	S.ANAND/ASST ENGG I
CHECKED	G.MADHURAMANI/SM
APPROVED	M.P.BALASUBRAHMANYAN/AGM
DATE:07.08.2012	SCALE: 1:1
DRG NO:MS:RP:PPPU:ADMN:3F/73	