SECTION-K
SCOPE OF WORKS
FIRE ALARM & VOICE ANNUNCIATION SYSTEM

1. General:

The Fire Alarm and Voice Annunciations (FAVA) system Contractor is required to undertake the complete scope of works detailed in the Invitation to Tender. The Scope of Works is to indicate the generality of the works required but does not limit to the works to be undertaken under this Contract.

2. Strategy Outlines:

In general, the FAVA installation will include all works for all project areas within the KEM-Parel Sale portion.

The Contractor shall take up design review with respect to the tender documents & update as necessary to complete FAVA system as required. Contractor shall provide value engineering options (pre-Tender submission) of Tender Drawings & development, design for specialist work, supply, optimization, co-ordination, selection of equipment's, detailed calculations required if so, install, test, commission and handover the complete services installations in accordance with the Contract Conditions and as described within specification, general technical preliminaries specification, applicable sections of the standard specification for FAVA Engineering Services and as outlined on the Tender drawings. The Contractor is deemed to be competent enough to understand the complexity of the job with regard to the scope of work listed below and is **responsible for all co-ordination with other trades, security, Elevators, MEP, structure and architectural finishes related to design, installation, testing & commissioning of the all work included in FAVA Tender Package**.

The Contractor shall visit the site to envisage site wide logistic and accessibility.

The scope of work shall comprise, but is not be limited to the following:

- Supply, installation, Testing, witness and commissioning of the entire KEM-Parel Sale Tower FAVA systems
- Integrated Fire and Voice alarm system with Fireman Telephone system
- Demonstration and handover to the Employer
- Testing, witness and commissioning of all systems
- Provision of handover documentation including Operating and Maintenance manuals, provision of warranties, service agreements and Planned Preventative Maintenance schedules
- Training of Employer's staff
- Defect Liability Period
- Co-ordination with utility supplier/agency

Provide all necessary project management personnel, skilled labour and trained installation technicians required to complete the works in accordance with the main Contract program

complying to Project Specifications, Drawings, Technical documents & Local authority requirements.

In addition to the above the Contractor shall allow for the following Miscellaneous / Auxiliary items:

- The Contractor shall carry out design check to ensure correction & bring to the notice of the Employer any discrepancy prior to award of contract. If Contractor does not issue any such notification he shall be deemed to undertake design and performance responsibility.
- Preparation of shop drawings and technical submittals with detailed equipment schedule.
- Development of specified Design and preparation of shop fabrication and erection sequence drawings. Contractor shall submit only stamped drawings for review and approval.
- FAVA contractor to coordinate with Electrical Contractor for Containment & Power supply for FAVA systems
- The Contractor is deemed to undertake the responsibility of mobilizing resources to follow Civil Contractor schedule for casting of structure pertaining to time stated and agreed together with Civil Contractor and Employer's representative.
- Provide for comprehensive acoustic calculations to validate spacing and selection of speakers and sounders
- The Contractor is responsible for preparation of detailed schematic drawings for FAVA systems and site wide network schematic.
- Complying to the codes mentioned herein and specifications together with local authority requirements is deemed to be responsibility of the Contractor.
- Site mock-ups indicating installation details.
- Record drawings, operating and maintenance manuals, training documentation, log-books, schematics, mimic diagrams, design development of the FAVA Cause and Effect Matrix.
- Delivery of Equipment / materials to site, site storage including safety and security of their materials till final handing over.
- Provision of all plant and equipment as per their requirement. Those equipment will include but will not be limited to welding machine, Scaffolding, Scaffold less climbers, trailers, pick-up's etc.
- Supply, erection, moving and removal of access scaffolding and/or scaffold less platforms up to 8 meters.
- Provision of samples in acceptable condition.

- Provision of required interface or co-ordination with the Security system, Electrical system, HVAC system, Lift systems, DG AMF panel, fire fighting, lift system and all networking interfacing and programming with the site wide Main Fire Command Centre located in Podium 3 as per specification and project requirements. All co-ordination& interface issues are deemed included in FAVA Contractor scope of works

- Any touch up's to the paint on site after erection. All supports shall be cold galvanized (Galvafroid or Equivalent zinc rich paint) painted after removal of all cuts and burrs.

- Allowance of free access to 3rd Party Surveyor-appointed by Employer's representative-in order to check any works whether completed or in progress and whether related to the Structural Steel works or not and to liaise with such surveyor in terms of any queries/issues he might has.

- Multiple visits to site during construction of all area's pertaining to FAVA Package.

- Provision of Safety arrangements during the full installation period and provision of safety fall arrest nets, edge protection, barricades and the likes as necessary in addition to the supply of safety equipment and protection means for the Contractor's manpower on site. Protection of others work and other Contractor's personnel as necessary whilst carrying out works e.g. whilst lifting equipment / material. Contractor to submit Project Safety Plan listing all activities and provisions employed to restrict any incident occurring.

- Design Verification, optimization and validation of sizes of cable trays/containment, etc.

- The Contractor shall be responsible for ensuring that the engineering services comply with all statutory requirements, together with the requirements of the Specification suiting the space requirement as per site condition with regard to structural penetration.

- The Contractor shall also be responsible for supply, installation, testing & commissioning of a Fire Mans Telephone system as per drawings and specifications.

- The Contractor shall ensure that the systems are adequately co-ordinated and liaised with the Civil, Architectural, all Mechanical Contractor and all Specialist Sub-Contractors and that all items necessary to provide a fully complete installation are included. Any additional costs resulting from failure to provide a fully complete installation shall not be provided. Any additional costs resulting from failure to comply with this clause shall be borne by the Contractor. Detailed co-ordination of the FAVA services with the other services but not limited to sections mentioned here in shall be the responsibility of the Contractor

- The Contractor to ensure that all requested builders work opening shall be duly fire stopped with approved fire stopping material. Contractor to undertake and facilitate inspection of all fire stops from approved vendor with each fire stopped signed off from approved vendor/material manufacturer.

- SITC an integrated intelligent addressable fire detection and alarm with voice alarm annunciation & Fireman telephone system to all areas.

- Networked Fire and Voice Alarm Panels system shall be provided throughout the building, providing full voice coverage to all common accessible areas. Areas such as large stores, plant rooms, etc., shall be provided with sounders & strobe only for alarm notification

- Installation warrantees and materials guarantees as detailed in the specification.
- The Contractor to follow approved vendor list under the division specifications.
- During Tender the Contractor shall submit a comprehensive list of his proposed vendors selected from approved vendor list.
- Handover of the completed works to allow other Contractors to follow on, snagging and obtaining the final inspection for the work.
- Daily housekeeping of the area of work and shifting the same to a common dumping bin failing which action shall be initiated by Employer's representative and all associated cost shall be recovered from the Contractor.
- The Contractor shall undertake all painting and identification of different services under the scope of work as mentioned herein or elsewhere.
- The Contractor to ensure that all requested builders work opening shall be duly fire stopped with approved fire stopping material. Contractor to undertake and facilitate inspection of all fire stops from approved vendor with each fire stopped signed off from approved vendor/material manufacturer.
- Warranties on equipment and installation shall commence after issue of letter for handover of the system (partial/complete) after due testing and commissioning and witness by Employer's representative.
- Certification from the manufacturer for the compliance to code & installation as per manufacturer's

3. Co-ordination:

- The Contractor shall liaise with common area Electrical & HVAC Contractor, Plumbing & Drainage, Fire Fighting, Elevator & any other agencies not mentioned herein however required to complete the job. The Contractor shall submit overall co-ordinated combined services drawings as required by Employer's representative for final submission and approval from Employer's Representative.
- The Contractor shall provide all inputs to the Electrical Contractor to prepare co-ordinated services drawings as required by Employer's representative for final submission and approval from Employer's representative & Consultants
- The Contractor shall appoint an experienced co-ordination manager who will be required to attend weekly co-ordination meetings (MOM to be issued officially) with all other services Contractors. The co-ordination manager is deemed to undertake full responsibility for their scope of work and the co-ordination of same (Inc. all interfaces) with all relevant parties.

- The Contractor shall submit approved services drawings to Electrical contractor for final services co-ordination drawings after which each contractor authorized representative shall sign off the final drawing for submission to Employer's representative
- Embedded conduit & vertical containment for FAVA system shall be carried out by electrical contractor. FAVA contractor to coordinate with electrical subcontractor.
- Final connection in all respect between interface devices & other system panels i.e. HVAC, firefighting, access control panel, lift shall be done by FAVA contractor.
- FAVA subcontractor to coordinate with other system to make provisions in their system to integrate with FAVA system.
- FAVA contractor to prepare an interface schedule listing required interface requirement with others services as per Tender document. Interface schedule shall be signed off by the FAVA contractor & other subcontractor involved. Interface schedule must be submitted to Lodha for approval.

4. Procedures and Documents:

- The Contractor will comply with the Conditions of Contract and all procedures and requirements as required by Employer's representative including: Quality Management (QA/QC,ITP, NCR's etc), Environmental Management, Design Management, Document Control, Materials Management, Procurement, Construction, Commissioning and Handover, Post Completion, Project Control, Logistics, Method statements, Health and Safety, Cost Management, Planning, Programming and Reporting.

5. Certification:

- Have Code Authority acceptance inspection performed. Verification that such tests have been completed, all corrective work accomplished and installation approved for issuance of a permit to operate shall be required before acceptance of any unit. As mentioned in the relevant specifications and to the requirements elsewhere the Contractor is responsible to submit Code compliance certificates issued from UL/ASTA/KEMA/BASEC/CPRI/etc to Employer's representative's.
- The Contractor is responsible for the relevant Requests for Inspection at least 48 hours in advance.
- The Contractor will be required to participate in obtaining the Building Completion Certificate where applicable to the scope of works. The Contractors involvement with this may include but not be limited to participating and/or providing the relevant information required for the following: (1) Local Authorities (Electrical Inspector) including Final Inspection (2) Fire Department Inspection.

6. Technical Submittals:

- The Contractor shall submit Shop Drawings & material submittal, samples, etc for all sections and sub elements of the Works within the Contract scope as detailed under

specifications. These Shop Drawings & technical submittal will be reviewed and commented on by the Lodha CM team , Lodha Design Team & Design Consultant.

- The Contractor shall be responsible for the development of design, design (as mentioned in specifications) and co-ordination of the complete engineering services installation as detailed in this Specification. The Contractor shall be responsible for ensuring that the engineering services comply with all statutory requirements, together with the requirements of the Specification.

- Provide layouts of all equipment indicated in the tender drawings fully coordinated with the other mechanical and electrical services. The drawings shall be provided by the Contractor to meet the following Requirements:

  - General arrangement drawings - scale 1:50
  - Plant rooms - scale 1:20
  - Specialist details - scale 1:10
  - Schematics - not to scale
  - Core risers (layouts and elevations) - scale 1:20
  - IT rooms, communication room, security rooms - scale 1:20
  - Detailed wall elevations noting all FAVA equipment – scale 1:20
  - Site specific Standard Details for builders works – scale NTS
  - Site specific Equipment Installation Details – scale NTS
  - Fully detailed layouts with T3-IBMS room.

- 7 complete sets (6nos A1and 1nos A3 size) of the above shall be submitted to the Engineer for approval well in advance to any work commencing on site.

- Technical Submissions shall be provided and issued to the Employer's Representative for comment for all items of work and procurement of systems, plant and items of equipment. This includes all drawings, wiring diagrams, samples of materials, samples of products, manufacturer's technical literature, calculations and supporting documentation. Contractor shall submit 3 sets of Technical submittal for review and approval by the Employer/ Employer's Representative. All submittals shall be done at Lodha site office.

- Each technical submission shall consist of the following documentation:

  - Covering issue sheet with individual tracking number or reference
  - Material or product sample
  - Drawings or diagrams
  - Manufacturers literature
  - Technical catalog sheet with highlighted model reference
  - Specification reference with compliance & stamp from subcontractor
  - BOQ reference with compliance & stamp from subcontractor
  - Approved make list with compliance & stamp from subcontractor
  - Manufacturer written confirmation for the availability of spares
  - Test certificates

- Technical submissions shall be submitted to Employer's representative office in accordance with the Procurement schedule complying to Program Of Works (Contract & Construction) allowing a minimum of 21 days for comment by Employer's representative. Three copies of all documents/drawings shall be provided.

- The Contractor shall prepare operating and maintenance instruction in accordance with these conditions. These shall consist of Operating and Maintenance Manuals and As-Installed/Built Drawings.

- The maintenance and operating instruction manuals shall include:

  - General descriptions of all systems installed.
  - Setting up and operating instruction for all equipment and systems installed and for emergency operation.
  - Control sequences for all systems installed.
  - Copies of all commissioning certificates.
  - Frequency and details of routine maintenance requirements for all plant and equipments shown on a set of schedules produced for this purpose.
  - Fault finding charts for each plant and system.
  - Manufacturers literature, test certificates, detailed drawings, printed operation and maintenance instructions for all specific items of equipment and plant supplied and
  - Systems consisting of such equipment and plant.
  - Schematic drawings of each system indicating the principal item of plant and equipment with the number code and asset register of each item indicated.
  - Spare parts lists and recommended spare parts holding.
  - Manufactures guarantees or warranties.
  - Test reports and certificates.
  - Contents and checklists.
  - Schedule of all “As Installed” drawings and SLDs including specifications and details as to their location.
  - Schedule of test certificates.
  - Planned preventative maintenance schedule.

- The content and layout of the manuals shall comprise the following sections which shall be separated in the manuals by dividers:
  - Contractual Details
  - Equipment Schedule
  - Parts Identified and Recommended Spares
  - Test and Commissioning Data
  - Names, addresses and contact details of all Manufacturers
  - Index of Plans and Drawings.
  - Manufacturers Literature

- The manuals shall comprise loose-leaf, A4 pages on good quality paper of weight at least 100g/sq m. Loose-leaf four ring binders shall be used for the binding constructed from PVC covered, heavy weight card. Dividers between sections and parts shall be stepped, overlapping, printed card. An information sheet shall be provided in the front of the manual listing the name and address of the installation, the name and address of the author, the Company, the Authority, the Contractor and the contract number. Manual details, logos, addresses, contact number (where applicable), and other relevant information shall be provided on the front cover or the spine. Any written material prepared on computer shall be retained by the Contractor on a CD. A copy of this disk shall be handed to the Employer.

- The "As-Installed/As-Built" drawings shall include, but not be limited to, the following information (where applicable to the service concerned):
  - The location of the incoming service connections for all FAVA services.
  - The location of all main isolating points for all FAVA services, either inside the building or outside.
  - Comprehensive system, circuit and wiring diagrams for all engineering systems illustrating the configuration, interconnection, and method of operating and control.
  - The detailed layout, exact location, method of installation of all FAVA services showing the type and size of cabling and equipment, the layouts must denote the as-built addressable label of each device.
  - The detailed layout, exact location, method of installation and service of all cables, trunking and conduit showing the reference, type, number of cores and size of all cable, type, size and contents of all trunking and conduit, provision, and the location, type, of all isolators, switches and protection devices.
  - All "As-Installed" drawings shall be correlated to ensure that the terminology and reference used are consistent with those used in the identification of plant equipment labels or in other record documents, in particular the Operating and Maintenance Instruction Manuals. Standard symbols and notations used shall be in accordance with details shown in the relevant schedules.
  - Drawings shall be produced using latest AUTOCAD software at the time of submission, and stored on CD. Provide PDF copy on a separate CD for archiving.
  - The Contractor shall issue 6 no. proof copies of the Operating and Maintenance Manuals and 6 no. proof sets of the "As-Installed" drawings to the Engineer for checking and review 4 weeks prior to final commissioning & taking over date specified in the Program.
  - The proof documents shall be complete excepting test certificates and final commissioning data not available at the time of the issue. The Employer's Representative shall be comment within 4 weeks on the proof documents upon receipt.
  - On receipt of comments from Employer's representative Contractor shall update the documents and finally submit the following:
    - 6 copies of the Operating and Maintenance Manuals
    - 4 set of "As-Installed" drawings at full size
    - 2 set of "As-Installed" drawings at A3 size - bound together.
    - 3 CD set containing all drawings and documents in original format.
    - 3 CD set containing all drawings and documents in archive PDF format.
    - 6 copies of tests made on completion
    - 6 sets of all manufacturers information and literature for all products installed on the Project

7. Setting Out and Surveying

- The Contractor shall satisfy himself in good and sufficient time before commencing any part of the works as to examine and verify that no irregularities exist that would effect quality of execution of works as specified and shall promptly advise the Employer in writing if any such previous work is out of position, wrongly dimensioned or in any other way unsuitable.

- The Contractor shall inspect the works on regular basis (at least twice per month) to check the work progress and to answer/report to the Employer any discrepancies that may impact the permanent installation.

- The Contractor site engineering and survey team is to cooperate with the Civil Contractor's survey team/s when necessary and jointly work together and share data throughout the construction process.

8. Project Requirement Summary

Project requirements include but are not limited to the following:

- Compliance with the conditions of contract, general and particular divisions of the specification, drawings and other documents detailed in the Invitation to Tender.
- The complete management of the Contractor direct and sub contracted works.
- Planning of the works in conjunction with the Employer and other Contractors.
- Co-ordination with the overall site works including interface with other work package and external Contractors employed on and associated with the project,
- Preparation of shop drawings and technical submittal.
- Value engineering studies including technical and financial evaluation.
- Preparation of mock-up- if necessary
- Provision of samples.
- Submittal and obtain the Employer's Representative / Local authority approval.
- Procurement of materials and services to complete the works.
- Off site visits
- Delivery to site of all items necessary to complete the works.
- Installation of the works in accordance with the Employer's Representative overall program and any subsequent amendments.
- Provision of all labour, supervision and management required
- Provision of all plant and equipment including, fuel, maintenance and operators.
- Testing of materials/ equipments in accordance with the specifications
- Testing and commissioning of the complete works, phased to meet the overall project requirements and interfaces with other packages.
- Provision of operation and maintenance documentation prior to completion of the works.
- Maintain a record of changes to the working drawings –in CAD format-and prepare as built drawings as the works are completed.
- Maintenance of the works and attendance to defects as per the specifications.
- Installation warrantees.
- Provision of spares, tools and consumables
- Training of the Employer's facility management staff.
- Installation warrantees as per the specification commencing on issue of partial/complete handover certificate from Employer's representative.
- Temporary works until the permanent works are completed i.e. any propping, temporary supports etc and the responsibility for the design thereof Handover of the completed works to allow other Contractors to follow on, snagging and obtaining the final inspection for the work.
- Final Cleaning: Upon completion of the Contract Works, the Contractor shall dismantle and remove from the Site all plant, temporary buildings and temporary works, surplus materials and rubbish and make good all work disturbed or damaged. However prior to the completion of the Project the Contractor will carry out final cleaning, replace any damaged and make good his works to the Employer approval.

9. Key Works Package Interface:

The FAVA Package Contractor will interface with all other Contractors and attend meetings and provide information to fully coordinate the FAVA Package works with that of all other Contractors working on the project, including but not limited to:

- Civil Contractor
- Sale Tower Electrical Contractor
- HVAC Contractor (common area)
- Interior finishes Contractor (common areas)
- Fire Fighting Contractor
- DG Supplier & Installer
- STP consultants, supplier & Installer
- Plumbing & Drainage
- Elevator Contractor
- Security access control system (Under separate Package)
- Any other Contractor not mentioned herein.

END OF SECTION