RFP No.: TUFIDCO/CCC/738/AM(M)/2017

**Date: 14/02/2018**

REQUEST FOR PROPOSAL

# *Request for Proposal for Selection of Master System Integrator to Design, Develop, Implement and Maintain the Common Cloud Based DC and DR, Citizen Application and E-Governance Application along with Integrated Command and Control Center (ICCC) for ten smart cities (Coimbatore, Madurai, Salem, Thanjavur, Tiruchirapalli, Vellore, Tirunelveli, Tiruppur, Thoothukudi and Erode) of Tamil Nadu*

# Important Dates

| S. No. | Activity | Deadline |
|---|---|---|
| 1 | Release of RFP | 14 Feb 2018 |
| 2 | Last date of receipt of queries on RFP | 01 Mar 2018 |
| 3 | Pre-bid Meeting date | 01 Mar 2018 |
| 4 | Publication of response to Pre-Bid Queries | 07 Mar 2018 |
| 5 | Last date for submission of Bids | 04 Apr 2018 |
| 6 | Date of opening of technical bids | 10 Apr 2018 |
| 7 | Date of opening of Commercial bids | 18 Apr 2018 |

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# *Definitions/Acronyms*

| Sr. No. | Abbreviation | Description |
|---|---|---|
| 1. | **ACD** | Automatic Call Distributor |
| 2. | **AHU** | Air Handling Unit |
| 3. | **BAS** | Building Automation System |
| 4. | **BOM** | Bills of Material |
| 5. | **BoQ** | Bills of Quantity |
| 6. | **CCC** | Command and Control Center |
| 7. | **CCA** | Command and Control Application |
| 8. | **ICCC** | Integrated Command and Control Center |
| 9. | **CCTV** | Close Circuit Television |
| 10. | **CERTIN** | Indian Computer Emergency Response Team |
| 11. | **DFMD** | Door Frame Metal Detector |
| 12. | **DHCP** | Dynamic Host Configuration Protocol |
| 13. | **DMS** | Distribution Management System |
| 14. | **DNS** | Domain Name Server |
| 15. | **EMS** | Employee Monitoring System |
| 16. | **ERP** | Enterprise Resource Planning |
| 17. | **ESS** | Employee Self Service |
| 18. | **FMS** | Facility Management Service |
| 19. | **FRS** | Functional Requirement Specification |
| 20. | **GIS** | Geographical Information System |
| 21. | **GOI** | Government of India |
| 22. | **GoTN** | Government of Tamil Nadu |
| 23. | **HVAC** | Heating, ventilation and air conditioning |
| 24. | **IBMS** | Integrated Building Management System |
| 25. | **ICT** | Information and Communication Technology |
| 26. | **IED** | Intelligent Electronic Device |
| 27. | **IEEE** | Institute of Electrical and Electronics Engineers |
| 28. | **IT** | Information Technology |
| 29. | **ITMS** | Intelligent Transport Management System |
| 30. | **KPI** | Key Performance indicators |
| 31. | **LDAP** | Lightweight Directory Access Protocol |
| 32. | **LUN** | Logical Unit Number |
| 33. | **MPLS** | Multiprotocol Label Switching |
| 34. | **MSA** | Master Service Agreement |
| 35. | **MSI** | Master System Integrator |
| 36. | **MTBF** | Mean Time Between Failures |
| 37. | **MW** | Mega Watt |
| 38. | **NOC** | Network Operation Center |
| 39. | **OEM** | Original Equipment Manufacturer |
| 40. | **OFC** | Optical Fiber Cable |
| 41. | **OWASP** | Open Web Application Security Project |
| 42. | **PABX** | private automatic branch exchange |

| | | |
|---|---|---|
| 43. | **RAID** | Redundant Array of Inexpensive Disks |
| 44. | **RTU** | Remote Terminal Unit |
| 45. | **SAN** | Storage Area Network |
| 46. | **SCADA** | Supervisory Control and Data Acquisition |
| 47. | **SDC** | State Data Center |
| 48. | **SITC** | Supply Installation Testing and Commissioning |
| 49. | **SLA** | Service Level Agreement |
| 50. | **SNMP** | Simple Network Management Protocol |
| 51. | **SPV** | Special Purpose Vehicle |
| 52. | **SRS** | Software Require Specification |
| 53. | **SSL** | Secure Sockets Layer |
| 54. | **STQC** | Standard, Testing and Quality Certification |
| 55. | **TUFIDCO** | Tamil Nadu Urban Finance and Infrastructure Development Corporation |
| 56. | **UAT** | User Acceptance Testing |
| 57. | **UADD** | Urban Administration and Development Department |
| 58. | **VLAN** | Virtual Local Area Network |
| 59. | **VM** | Virtual Machine |
| 60. | **DC** | Data Center |
| 61. | **DR** | Disaster Recovery |
| 62. | **SaaS** | Software as a Service |
| 63. | **PaaS** | Platform as a Service |
| 64. | **IaaS** | Infrastructure as a Service |

# 1. Introduction

## 1.1 Bidding Data Sheet

| Particulars | Details |
|---|---|
| **Name of Purchaser** | Tamil Nadu Urban Finance and Infrastructure Development Corporation |
| **Name of the Engagement** | Request for Proposal for Selection of Master System Integrator to design, develop, implement and maintain Common Cloud Based DC and DR system, Citizen Mobile Application and E-Governance Application along with Integrated Command and Control Center (ICCC) for Ten smart cities (Coimbatore, Madurai, Salem, Thanjavur, Tiruchirapalli, Vellore, Tirunelveli, Tiruppur, Erode and Thoothukudi) of Tamil Nadu. |
| **Release Date of RFP by TUFIDCO** | 14 February 2018 |
| **Pre-bid meeting** | 01 March 2018 11:00 |
| **Last date & time (deadline) for submission of the bid** | 04 April 2018 15:00 |
| **Opening of the Bid responses** | 04 April 2018 17:00 |
| **Opening of Technical Bids** | 10 April 2018 11:00 |
| **Presentation and Demo / POC by Bidders** | 11 April 2018 to 17 April 2018 |
| **Opening of Financial Bids** | 18 April 2018 17:00 |
| **Validity of Proposal** | 180 Days from the Last Date of Submission of the Bid |
| **Method of Selection** | Least Cost System - LCS |
| **Address of Communication** | Tamil Nadu Urban Finance and Infrastructure Development Corporation<br>Registered office:<br>490, Anna Salai,<br>Nandanam, Chennai-35.<br>Phone : 044 – 24329800 / 01 / 02<br>E-Mail:-tufidcopw@gmail.com |

| | |
|---|---|
| **Bidding in Consortium** | The Bidder can either be a Single Company or a Consortium of companies / corporations. Maximum number of parties allowed in consortium are 3 including lead bidder. |
| **Sub-Contracting** | Sub-Contracting not allowed except for:<br>• Cloud Service Provider (CSP)<br>• Cabling and fixtures work, and all civil work during implementation<br>• Support Staff at City Level ICCC & State level ICCC<br>• Creating physical infrastructure of Command and Control Center |
| **Tender Fees** | Tender shall be downloaded free of cost from portal<br>http://www.tenders.tn.gov.in/<br>http://cma.tn.gov.in<br>http://www.tufidco.in/ |
| **Earnest Money Deposit** | EMD is Rs. 50,00,000 (Rs.Fifty Lakhs). EMD should be valid for 90 days from the last submission date. EMD should be submitted in the form of Demand Draft (DD) payable at Tamil Nadu. EMD is Refundable. |

***Note***

1. The date of opening of the technical and financial bids will be intimated to the qualified Bidders through email or Telephone.
2. TUFIDCO (Tamil Nadu Urban Finance and Infrastructure Development Corporation) reserves the right to change any schedule of bidding process.

# 1.2 Objective of the RFP

Government of Tamil Nadu has embarked on an ambitious journey of developing various cities of the state as Smart Cities. This initiative includes 10 cities identified as part of the Smart City Mission of Government of India and state identified cities over and above these 10 cities. The 10 cities selected/planned to be as part of Smart City Mission and as part of this RFP are –

- Coimbatore
- Madurai
- Salem
- Thanjavur
- Tiruchirapalli
- Vellore
- Tirunelveli
- Tiruppur
- Thoothukudi
- Erode

Through this RFP, TUFIDCO intends to select a Master System Integrator (MSI) by following competitive bidding process to:

- Upgrade, Implement, Roll-out and Maintain State level Governance Application
- City based Citizen Services Mobile Application
- Enhance and maintain GIS platform for ten cities of Tamil Nadu integrated with Command and Control Center
- Design, develop, implement and maintain a Common Cloud based Command and Control Platform
- Provide a Cloud based Platform as a Service (PaaS) for Data Center and Data Recovery Center for all 10 smart cities of the state
- Design, develop and Maintain the Integrated Command and Control Center (ICCC) at the 10 cities with city based controls and analytics and A State level Integrated Command and Control Center (ICCC) with state level controls and analytics
- Integration of the existing and future ICT based urban solutions and other city applications

The scope may be expanded to include more cities by the state in future or during the project period.

Bidders are expected to carefully read the contents of RFP. For reference purposes, wherever TUFIDCO name appears, it shall be read as “for and on behalf of 9 Smart Cities of the State of Tamil Nadu”.

This document contains the details of following schedules:

a. Schedule 1 – Instruction to Bidders
b. Schedule 2 – Detailed Scope of Work
c. Schedule 3 – General Conditions of the Contract & Service Level Agreements

d. Schedule 4 – Annexures

This RFP document provides a high-level overview of the technology approach for setting up a Cloud based common DC/DR for the state and City based ICCC and includes in-depth details of the functional roles of system components, and the interactions between roles, to achieve an end-to-end system design and project objective.

The Common Cloud based Data Center and Data Recovery Center for Smart Cities shall be a platform, for management for the operations of the currently identified 10 smart city of the state. The city specific ICCC will be helpful in managing the Smart City Operations and emergency response in respective cities. The hosting of all applications and database will be done at cloud and DR will also be cloud based.

# 1.3 Project Vision & Objectives

Tamil Nadu Urban Finance and Infrastructure Development Corporation Ltd. (TUFIDCO) was incorporated under the Companies Act, 1956 on 21-03-1990. The main objective of the corporation is providing financial assistance and guidance to Local Bodies, Corporations, Boards, Authorities and parastatal agencies for their development schemes. It is also a Nodal Agency to implement Government program/schemes in the State.

TUFIDCO has undertaken the release of Request for Proposal (RFP) for Common Cloud Based DC and DR, Citizen Application, and E-Governance Application along with Integrated Command and Control Center (ICCC) for ten smart cities of Tamil Nadu state selected under the smart cities challenges of MoUD.

The Cloud based DC & DR will be connected with various city level ICCCs and various applications of the city from where feeds are to be received (except video feeds). It will host common command center application platform for all 9 cities. It will also host other common applications like integrated analytical layer / BI engine. Eventually all the smart components / applications deployed in the cities will be integrated with the common platform layer for managing smart city operations using the Open API Structure.

Cloud based DC & DR will eventually become single source of truth for all the 9 cities and its operations. It will help ICCC of each smart city to make it happy and livable place for its citizens.

Cloud based DC & DR is required to be scalable for hosting more applications and services in future for managing smart cities more effectively.

Cloud based DC & DR will help in managing the utilities for ABD areas of smart cities and in future capable of managing utilities of the entire cities through city ICCC.

TUFIDCO has also planned a Citizen Mobile Application for providing various services to the citizens of Tamil Nadu.

The Citizen Mobile Application will serves as a single unified platform for the citizens to engage with the government, avail citizen centric (G2C & B2C services), register municipality related complaints, receive

issue resolution, access live city feeds through the city dashboard, learn about governance schemes, projects, and initiatives. The four main components of the planned platform are: *Citizen Collaboration, Grievance Redressal, Citizen Service Delivery (G2C & B2C services) and City Dashboard*

The Citizen Mobile Application will receive grievances and inputs from both citizen and the Government, using multiple channels (including external social media) to drive the different redressal services, and in turn disseminate information using external media and the platform itself as channels. All the discussion topics, surveys, polls, blogs are specific to discussion groups. Hence, separate Government departments can create and moderate different discussion groups and the discussion topics, surveys, polls and blogs can be created within these discussion groups and moderated by the concerned Government department using the admin console. The solution also boasts of a robust analytical engine, a dedicated team to monitor and update the collaboration platform and TUFIDCO stakeholders about the citizen sentiment/feedback on various discussion topics/polls on regular intervals.

The Enhancement and integration of Existing E-Governance platform with Cloud based Dc & DR is also in the scope of MSI. The MSI is required to enhance the current application and add the missing modules of E-Governance application which are required for seamless operations for all the ULBs and departments of Ten Cities of Tamil Nadu.

For seamless operations of Cloud based DC & DR, it will also have cloud based DR. This DR is also required to be located in India and better seismic zone than Data Center.

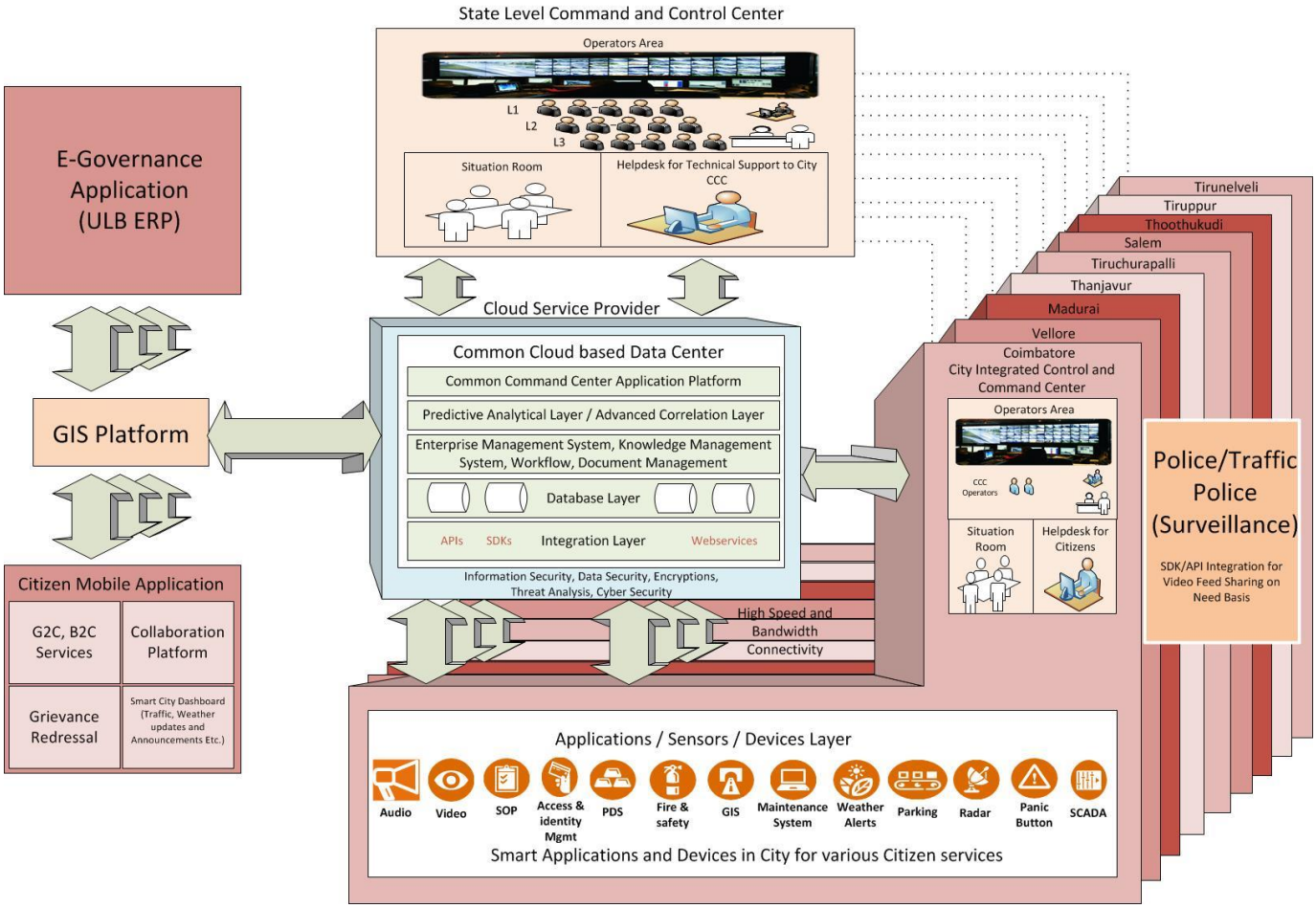
The Facility to be used for making high quality Cloud based DC & DR shall at a minimum have:

- Cloud Service Provider must be empaneled by GOI MEITY
- Cloud Service Provider must have Data Centre in the State of Tamil Nadu
- Conform to at least Tier III standards or equivalent
- Cloud platform should be certified for the latest version of ISO 27001 (year 2013) or equivalent
- Cloud platform should be complaint for Payment Card Industry Data Security Standards
- Reports of periodic third party inspections/audits and the certifications should be available online or shared on demand for scrutiny.
- Compliant with IT Act 2000 (including 43A) and amendments thereof

Each ICCC for the smart cities will have, on basis of city SPV requirements, a video wall of minimum 8 display panels of 55” inches as per the specifications mentioned in schedule – 2 , ICCC will have seating capacity of minimum 8 operators, however, for the go-live stage only upto 2 operators will be required. ICCC will have minimum 9 nos. of Desktop computers with all the required software licenses as per the specification mentioned in schedule – 2.

Each ICCC in the State for smart cities will have physical capacity for future activities like expansion of services and its infrastructure based on the agreed plans between city SPV and implementing agency.
The ICCC setup should meet ISO 11064 Standard.

## Concept Diagram for Common Smart City Software Platform for ICCC & Cloud based DC & DR



## *1.4 Overview of 10 cities under this project*

### *Coimbatore*

Coimbatore's economy built on traditional strengths in Engineering / Textiles has emerged a favorable destination for Services. District economy ranks fourth in State and sixth in per capita terms. Coimbatore is an Education/Healthcare hub with one primary school for every 1500 population and one secondary school per 2115 population reflecting its superiority on education indicators. Coimbatore is home to 7 universities, 54 engineering colleges, 2 medical colleges, 35 polytechnics and over 70 other colleges. With over 750 hospitals and 5000 beds, Coimbatore scores well vis-a-vis norms. Coimbatore's City Development Plan (2014) and City Mobility Plan (2015) capture the city's long term development agenda. Notwithstanding its high private vehicle ownership, Coimbatore has a fairly extensive bus system that supports over 40% of the motorized passenger trips in the city. Coimbatore benefits from active citizen and industry forums that have provided catalytic inputs for the city's development.

***City Vision and Goals*** - Coimbatore will be an Inclusive, Secure and Effectively Governed Metropolis that offers the Highest Quality Of Living for its progressive and diverse populace by providing Universal Best-In-Class Civic Services, enabling Seamless Mobility, fostering a Dynamic Vibrant Economy and nurturing Clean, Resilient And Sustainable Environment.

***Pan City components envisaged for Coimbatore smart city are:***

1) An extensive CCTV network
2) Seamless IT connectivity to relay information
3) Data Center – Command Centers equipped to process/relay information using
4) Intelligent applications for crime prevention and traffic management
5) Air Quality monitoring sensors at select locations
6) City-side Energy efficient LED street lighting. The structures used for street lighting will serve to mount equipment/sensors the rest of the system

### *Madurai*

Madurai being a cultural capital for more than 2500 years is a treasure trove of cultural and architectural history. The historical dimensions clearly indicate the reign of the Pandyas, Vijayanagaras, Islamic and the English in the region. Nearly 202 lakhs of tourists and 766 lakhs of floating population visit the place annually. City provides 11 traditional crafts with potential economic values. Madurai has 94% work force population in Tourism and trade. Madurai is known for propagating language antiquity from time immemorial. Presently the city holds 10 engineering colleges, 5 medical colleges, 24 arts and Science College, 4 nursing college, 14 polytechnic and 181 schools in the city. The literacy rate of the city is 78.58%. It is already an established Tier 2 Software city. The hospital industry in Madurai Provides world class

health facilities to its citizens. Apollo, Meenakshi Mission, KGS, Vadamalayan caters the entire down south of the state. Corporation maintains 17 Maternity homes, 17 urban health post and 19 dispensaries within the ULB Limits. Apart from these, there are Allopathy, Siddha, and Ayurvedic Dispensaries maintained by the Corporation.

***City Vision and Goals -*** Madurai city, along with fostering its heritage and distinctive character, will provide an all-round, enriching and world-class experience for its visitors; ensure the physical, economic and social well-being of its citizens through renewal of the urban fabric in an environment-friendly and sustainable manner, promoting economic growth and providing efficient governance systems and citizen services.

***Pan City components envisaged for Madurai smart city are:***

1) Smart water and sewerage management system
2) Intelligent public transport system
3) Intelligent parking system
4) Intelligent traffic management system
5) City Surveillance system
6) Emergency response system
7) Waste Collection & Transportation monitoring system

## ***Salem***

Salem is the sixth largest city in Tamil Nadu by population with an area span of 91 sq.km. Salem has the proximity to major urban centers like Bangalore, Erode, Coimbatore, Namakkal and Dharmapuri aids in ease of resource flow. The city is well connected through road network which comprises of 3 National Highways viz. NH-7, NH-47 and NH-68 along with six arterial roads. Salem is the headquarters of Tamil Nadu State Transport Corporation (TNSTC) and has two major bus-terminals within the city limits. City is rich in natural resources such as high quality granite, magnesite, bauxite, limestone, quartz and iron ore. The city receives abundant water supply from Cauvery-Mettur Dam which is an outcome of the Dedicated Water Supply Scheme carried out under the Tamil Nadu Urban Development Projects. Salem boasts of a large Sago industry since 90% of sago supplies to the country are produced in this region. The city is renowned for handlooms, especially silk and cotton. It is one of the main textile centers in the state and comprises of more than 125 spinning mills. The city has adequate educational institutions which includes 2 universities, 2 medical colleges , 7 engineering colleges and many others , which produces trained professionals to meet the growing competitive scenario.

***City Vision and Goals -*** To establish Salem as commercial cum industrial hub with a diversified economic base that provides equitable opportunities to all and to provide paramount quality services through leading edge technology on the foundation of New Urbanism principles.

***Pan City components envisaged for Salem smart city are:***

1) Intelligent Solid Waste Management (ISWM)
2) Intelligent Transportation System (ITS)
3) Smart Water system equipped with smart metering and SCADA
4) E-governance
5) Safety & Surveillance

6) Health Care and Education

## ***Tirunelveli***

Tirunelveli is 2,000 years old ancient city situated in the southern state of Tamil Nadu. City is known for its resplendent history and indigenous heritage, having a number of monuments with Nellai Appar temple being the most famous one in the world which was built during 7th century at an extent of 14 acres attracts tourists from all over the world. Tirunelveli is well connected through air, rail, road and ports in the region. The district has a literacy rate of 76.97%, which is above the National average of 74.04%. As of 2005–2006, the district has a total of 2,494 schools. It has one university, 4 government colleges, 11 government-sponsored colleges and 7 private colleges. Tamirabharani, a perennial river located at the city is the main strength for the water sources and sustaining City's Growth. The district possess minerals like Limestone, granite and garnet sand. With a total of 407 mines and quarries. Tirunelveli has adequate health facilities with 31 hospitals and 9 primary health centers.

***City Vision and Goals -*** To develop an attractive, inviting, and secure city for its citizens by promoting heritage value, urban mobility, diversified economy and exploitation of the full potential of the renewable energy resource and digital technology.

***Pan City components envisaged for Tirunelveli smart city are:***

1) Variable Message Sign and Synchronized Signals
2) CCTV surveillance at important locations, traffic junctions within the city (80 nos.)
3) Intelligent pedestrian crossing system at educational zones, solar blinkers etc.
4) Transport operation and information service
5) GPS Based Bus Locator and e-rickshaw sharing app
6) E-Governance Portals
7) Information and response center
8) Smart Classrooms
9) Tele - Medicine

## ***Vellore***

Vellore City is a key gateway into Northern Tamil Nadu and an important corridor city of strategic relevance. The city’s proximity to Bangalore and Chennai coupled with the presence of vibrant industrial leather belts in the region has catapulted the city’s growth. Large residential pockets are developed in the periphery of the city to shelter residents working in large scale industries like BHEL, Leather Taneries in Ranipet, TEL, SIPCOT, etc. Vellore hosts India's two most premiere educational institutions namely Vellore Institute of Technology and Christian Medical College (CMC). The city and the periphery areas also has a number of iconic spots for tourism such as Vellore Fort, Golden Temple, Government Museum, Science Park, Vainu Bappu Observatory, Amirthi Zoological Park & Yelagiri Hills. The city already sees an average tourist footfall of 2.2 Lakh people which is steadily increasing at a rate of 3% YoY.

***City Vision and Goals -*** A Model Swachh City with Improved, Responsive and Inclusive Service Delivery that promotes Medical, Educational & Heritage Tourism.

***Pan City components envisaged for Vellore smart city are:***

1) Improved last mile connectivity in the city
2) Intelligent Public Transport Systems
3) Decentralized Waste Management Systems
4) Traffic research and modelling center
5) Public Information Systems

## ***Thanjavur***

City has abundant surface water sources for water supply (River Vadavar, River Vennar, Grand Anaicut and Colleroon) and uninterrupted power supply due to 100% battery backup facility for energy distribution for the entire city. All the structures in the city (32,029 structures including 623 government buildings) have 100% rain water harvesting facility. Thanjavur district is also called the 'Rice Bowl' of Tamil Nadu. City is rich architectural and cultural heritage since it was ruled by mighty Chola Kings, Thanjavur Nayaks and Marathas.

***City Vision and Goals -*** To develop Thanjavur as a city with resilient infrastructure, sustainable environment as well as enhance its identity as the 'Cultural Capital' of Tamil Nadu and quaint tourist city set against the backdrop of Hoary Chola Tradition to enhance tourism sector.

***Pan City components envisaged for Thanjavur smart city are:***

1) Smart Tourism
2) E - Governance & Smart Urban Services
3) Smart Traffic Management
4) Energy Efficiency
5) Smart Street Lighting
6) Surveillance and Safety
7) Internet connectivity via city-wide OFC network & Wi-Fi hotspots

## ***Tiruchirapalli***

Tiruchirapalli is the fourth largest municipal corporation and the fourth largest urban agglomeration in the state with an area span of 167.23 sq.km. The strength of Tiruchirapalli is its rich endowment of heritage sites and monuments. According to the National Urban Sanitation Policy, Tiruchirappalli was listed as the third-cleanest city in India in 2016 and second cleanest city in 2015. The city is served by an International airport, it handles fivefold more international air traffic than domestic services, thus making it the only airport in India with this huge variation. Tiruchirappalli is a major engineering equipment manufacturing and fabrication hub in India. It is also home to India's largest public sector engineering company, Bharat Heavy Electricals Limited, shortly referred as BHEL. BHEL has extensive operations in Tiruchirapalli with three functional plants. Tiruchirappalli has been recognized in India as an important educational center since the time of British rule. The tier-II city, always known for its excellence in school education, already boasts of

an Indian Institute of Management (IIM), a National Institute of Design (NID), a National Law School (NLS), a National Institute of Technology (NIT), Bharathidasan Institute of Management and Anna University of Technology.

***City Vision and Goals -*** Nurturing religious and heritage tourism, to bring out vibrant communities and dynamic economy that is all supported by smart infrastructure which would yield healthy, clean and livable place for all.

***Pan City components envisaged for Tiruchirapalli smart city are:***

1) Smart Surveillance System
2) E-Transportation
3) IT Connectivity
4) E-Governance
5) Technological Development
6) City Mobile App

## ***Thoothukudi***

Traditionally known as "Pearl City" on account of Pearl fishery, has a fascinating history with salt pans in and around the city, contributing to economy of the city. The salt pans in and around the city produce 1.2 million tons of salt every year, contributing to 90% of the salt produced in the state and 50% needed by the chemical industries of Tamil Nadu. The city has several major shipping, fishing and agricultural, power and chemical industries. The city has been serving as an educational hub for the entire region. High literacy rate of 81.70%. There are 12 government schools & 62 private schools, 5 arts & science colleges, 3 polytechnics, Central Marine Fisheries Research Institute, Spices Laboratory, Government engineering college and many private engineering colleges in the city. Private health providers are increasing. The sex ratio of 1010 female's for every 1000 male's (above national average of 929). The slum population is 18.54% of the total city population.

***City Vision and Goals -*** Thoothukudi aspires to leverage its industrial city identity by investing in inclusive and transformative solutions that enhance the quality of life for its citizens.

***Pan City components envisaged for Thoothukudi smart city are:***

1) ITS - Intelligent Transit System
2) PMS - Parking Management Systems
3) ATCS - Area Traffic Control System
4) SSP - Safety And Security Platform
5) FONCCB - Fibre Optic Network And City Communications Backbone
6) CCPSSP - Common City Payments And Services Processing Platform

## ***Tiruppur***

Tiruppur is known as the knitting city of India. Tiruppur has gained universal recognition as the leading source of hosiery, knitted garments, casual wear and sportswear. More than 6000 textile units which predominantly consist of knitting and garments. Exports of over USD 1.5 billion (90% of India's knitwear exports). European countries are the major importers of Tiruppur textile products (majorly knitted variety). Fifth largest urban agglomeration in Tamil Nadu and administrative headquarters of Tiruppur district, it is a regional, economical and political hub with excellent rail & road connectivity and is a part of proposed Coimbatore - Salem Industrial Corridor (CSIC).

***City Vision and Goals -*** Tiruppur aspires to be a city where the local government is in-sync with the citizenry that is in turn aware and has a sense of ownership for the city.

- Aspire: Strengthening Tiruppur as knitwear hub of India
- Leverage: Tiruppur shall leverage its strengths for socio-economic development
- Inclusive: Engaging citizens - "Citizen Connect" in inclusive planning that benefits all.
- Transformative: Design and implement sustainable and technology oriented solutions to usher in a paradigm shift in how the city functions, engages with citizens, delivers services, mobility, safety and revives the economic character around heritage & culture to benefit the citizens and administration on the lines of "doing more with less"
- Quality of life: A holistic approach based on pragmatic solutions to provide a better quality of life through improved physical and social infrastructure

***Pan City components envisaged for Tiruppur smart city are:***

- E-Governance and Citizen Services
- Waste Management
- Water Management
- Energy Management
- Urban Mobility

## ***Erode***

Erode district has a balanced economy and is the ninth largest economy in Tamil Nadu in per capita terms. With a strong manufacturing base across textiles and leather and a strong agriculture and agro-processing base (Erode is a turmeric hub and several crops including cereals and cash crops are grown here). Erode also has several leading educational institutions. With the proposed Salem Coimbatore industrial corridor, Erode with ongoing initiatives like Tex-valley and other industrial estates/parks has potential to be a growing and vibrant economy

***City Vision and Goals -*** Erode will offer the Highest Quality of Living to its populace through transparent governance, effective urban planning, provision of inclusive efficient best-in class services and seamless mobility while nurturing a balanced economy and a pristine and resilient urban environment

***Pan City components envisaged for Erode smart city are:***

- Web-enabled E-governance / Mobile apps based e-governance
- City wide fibre networks and WiFI Hotspots
- Underground electric cabling, ducting for utilities
- Energy efficient street lighting
- CCTV surveillance
- Waste Processing / Waste- to Energy

# 1.5 Implementation Activities

**Implementation Phase:**
**Track I -** Implementation of Common Cloud based DC and DR for all 10 cities along with implementation of Citizen Mobile Application and Integration of Existing E-Governance platform.

**Activities related to Common Cloud based Data Center and Data Recovery Center for all 10 Smart Cities along with implementation of Citizen Mobile Application and Integration of Existing E-Governance platform.**

- Implementation of common applications on Cloud based DC & DR and integration as per the agreed FRS, SRS and SOPs.
- Creation of city specific interface for accessing the common applications.
- Integration of city specific applications with common command center platform.
- Facilitating user acceptance testing and conducting the pre-launch security audit of applications
- Develop provisions for a scalable system which can integrate with more devices of the same kind (as those deployed today) and can integrate with future applications and sensors through open standards and data exchange mechanisms.
- Planning, implementation and integration of all the necessary modules of Citizen Mobile Application

**Implementation of the missing modules and enhancement of the current modules in existing E-Governance application:**

- Accounts
- Administration

- Non-Tax
- Profession Tax
- Property Tax
- Trade License
- Birth & Death
- Water Supply
- UGD
- Grievance Redress System
- Citizen Facilitation Centre
- Audit
- Asset Management
- Employee Self Service
- File Management System
- Legal
- Inventory and Material Management
- Personnel Management System
- Solid Waste Management System
- Vehicle Management System
- Procurement System
- Building Permission System
- School Management System
- Citizen Portal
- Ward Works
- Hospital Management System
- Assembly Questions and Answers

**Track II -** Implementation of ICCC for all 10 cities, State level ICCC in Chennai and integration with Cloud based DC and DR

**Activities related to City & State ICCC**

- Physical Setup of ICCC in the respective smart cities and a State level ICCC as per the layout agreed with the City SPV. This includes activities like false flooring, false ceiling, partitions, network cabling, electric fitting, Inline UPS, DG Set, Auto on-off lighting system and other facilities as mentioned above along with required furnishing of the complete Cloud based DC & DR facility
- A Centralized Helpdesk and a Situation room will only be setup in State level ICCC
- IT and Non IT Infrastructure installation, development, testing and production environment setup
- Safety and security of IT and Non IT Infrastructure is responsibility of MSI
- Housekeeping facility for ICCCs.
- Software Application customization (if any), data migration, integration with third party services/application (if any)
- Preparation of User Manuals , training curriculum and training materials
- Role based training(s) on the Smart City Solutions

- SoP implementation, Integration with City GIS Platform, Integration of solutions with Command and Control Center
- Network connectivity establishment and configuration between Cloud based DC & DR , City ICCC, State ICCC and various other city command centers / applications (which are to be integrated with Cloud based DC & DR and City ICCC).
- User training and roll-out of solution
- Integration of the various services & solution with Cloud based DC & DR and ICCC platform
- Submit Monthly Progress reports as per the defined format to City SPV along with invoices.
- Submit Joint Monthly Progress reports of all cities after approval as per the format defined to TUFIDCO along monthly progress report on common cloud based DC and DR along with total invoices.
- Go-Live of City ICCC and State ICCC will happen in this phase only, where complete setup of the ICCC will be required to be done along with complete integration with minimum 1 service.

**Post Implementation Scope for the Operation and Maintenance Phase:**

**Activities related to Common Cloud based Data Center and Date Recovery Center for Smart Cities**

- Operations and maintenance of Cloud based DC & DR facility.
- Annual technical support for all hardware and software components for the O & M period.
- Conducting disaster recovery site testing through regular mock drills
- Overall maintenance of the Cloud based DC & DR facility and continuity of operations as per SLAs.

**Activities related to City ICCC**

- Deploying manpower at city level and State level ICCC for solution maintenance and monitoring support which includes change request management, bug tracking and resolution, production support, performing version and patch updates
- Integration of various services of the city based on the requirements of the city
- Annual technical support for all hardware and software components for the O & M period
- Preventive, repair maintenance and replacement of hardware and software components as applicable under the warranty and AMC services during the contract period
- Provide a Helpdesk and Incident Management Support at State level till the end of contractual period
- Recurring refresher trainings for the users and Change Management activities
- Provide facility, information and required access to TUFIDCO / Municipal Corporation / Smart City SPV or its authorized agency for doing various kinds of Audits as and when required
- Preventive, repair maintenance and replacement of non ICT components as applicable under the warranty and AMC services during the contract period
- LAN at ICCC
- Overall maintenance of the ICCC facility and continuity of operations as per SLAs
- Overall maintenance of housekeeping and physical security at Cloud based DC & DR
- Provide necessary security to the ICCC premises and its setup during the period of contract
- Submit Monthly Progress reports as per the defined format to City SPV along with invoices

- Submit Joint Monthly Progress reports of all cities after approval as per the format defined to TUFIDCO along monthly progress report on common cloud based DC and DR along with total invoices

**Exclusions**

- Development of basic civil infrastructure of the building for the City ICCC

## *Expectations from Integrated Command and Control Center Platform*

ICCC platform shall be the 'heart' of the state of Tamil Nadu that assists in enhancing efficiencies of city operations and management of all smart cities. It provides a holistic view of all city operations allowing monitoring, control and automation of various functionalities at an individual system level along with enabling cross-system analytics.

This application will be required to be installed on the common cloud based data center and data recovery center for smart cities. This application platform will be common to all cities with different instances of each city.

The business requirements that the Integrated Command and Control Center Application Platform shall achieve are:

- Shall enable cross-system and cross-agency coordination to monitor, operate and manage the city in an integrated manner
- Shall enable different agencies and departments of State and Cities to monitor and utilize information of other departments for delivering services in an integrated and more efficient manner
- All systems being provided as part of this RFP and by others (mentioned in this RFP) shall be integrated with Command Center Application as per the requirements of the Project
- The platform shall enable various visualization and analytics of city operations to improve decision making. These analytics shall be achieved via cross-system integration of various systems and as per the standard operating procedure (SOPs) discussed and agreed upon with the Client. Analytics shall include both prescriptive, predictive analytics and cognitive analytics.
- Command Center Application shall provide reporting capabilities for city administrators to keep record of city operations
- Command Center Application shall ensure that integrity and confidentiality of all information gained is secure at all times
- Command Center Application at the State level ICCC shall provide overall data analytics and comparison for the 10 smart cities
- Command Center Application platform shall be the integration point at which data from across the city converges for processing. This shall allow all information to be managed within the same network, eliminating many communication problems that are faced by working in siloes
- Command Center Application shall provide shift based operations for an overall 24x7 support
- Map and integrate all systems to city specific GIS platform being provided as part of this RFP
- The system shall be scalable to accommodate future growth and support hardware and software additions and upgrades.

- Command Center Application shall support an Open API (Application Programming Interface) Structure.

Command Center shall leverage information provided by multiple city systems to support an integrated, seamless, proactive and comprehensive response mechanism for day-to-day city operations and challenges. The platform shall provide a combination of system layers that when combined shall make use of Data, ICT and ITS infrastructure, advanced computing, analytics, and visualization to enhance the city's intelligence. In addition, it shall provide the tools for the city decision makers to better manage the services they provide to its citizens.

There are a number of functions and systems that shall be managed out of the Command Center Application. Depending on the type of systems and functions, they shall be monitored and/or controlled from the Command Center Application, and will have the option of sharing a feed to another agency as required via the platform. This shall integrate all the City Systems procured under the Smart City Mission, which include systems procured through this project and system which are/will be procured as other projects. In addition to systems identified in this RFP, the Command Center Application shall seamlessly integrate the following system being procured separately by each city, but not limited to:

- E-Governance
- DIAL 100
- DIAL 108
- Traffic Management System
- Safe City Cameras Feed
- Emergency Response and Disaster Management
- Met Department
- Smart Parking
- Public Bike Sharing
- Smart Pole
- Smart Lighting
- Solid Waste Management Services
- Intelligent Transport Management System
- Municipal Corporations Call Center
- Municipal Corporations Services Portal
- City GIS Platform
- City Application
- Water Management System
- Fire Brigade Control System

**Note**: Responsibility of integration is of the MSI, whereas MSI providing other application which is to be integrated will be responsible for providing interface layer / API / SDK in its system for doing the application. City SPV will be responsible for getting required interface layer / API / SDK for particular application from respective vendor / SI for MSI to integrate with Common Command Center Application.

**Expectations from Cloud based Data Center and Data Recovery Center**

Refer Annexure 18: ICCC Capabilities envisaged under Cloud Operations - compliance is mandatory.

Following are the expectations from Cloud based Data Center and Data Recovery Centers:

- Cloud based DC & DR is required to host common command center Cloud based DC & DR will save data related to common command center applications
- Cloud based DC & DR will not host any smart application (implemented in smart cities) which is being integrated with command center application. This smart application (which is being integrated with command center application) is responsibility of the respective vendor / SI the city who is managing the particular application implementation and rollout.
- Cloud based DC & DR will also host common applications like Integration Layer, Analytical Layer, EMS, KM, Information & Cyber Security applications, etc. required for Command Center Applications and ICCC working. These applications will be offered as "Software as a Service (SaaS).
- Cloud based DC & DR will save data coming from the applications.
- Cloud based DC & DR should be able to receive information (ex: from the field devices) and send the information to the ICCC platform or visualization layer.
- Cloud based DC & DR will only save log of the transactions performed with common command center application.
- Cloud based DC & DR will also have dashboard views of the applications (integrated with command center application) for historical data as required by the city.
- Cloud based DR incase of IaaS for intermediate servers alone will have a capacity of 50% of Cloud based DC
- For Cloud based Platform as a Service DR should be part of the inclusive offering

# 1.6 Roles and Responsibilities of various stakeholders under this RFP

**TUFIDCO** as overall governing body, act as a facilitator, monitoring, contract management and payment agency.
**CEOs** of smart cities as part of steering committee
**City SPVs / ULB:** will manage & monitor their respective ICCC implementation

**Other Roles and Responsibilities during execution of Project**

| Stage | City SPV | TUFIDCO | Other Departments |
|---|---|---|---|

| | | | |
|---|---|---|---|
| **Pre – Implementation** | • Provide necessary information, approvals to MSI for doing surveys<br>• Facilitate Interaction with other Departments for getting the required integration<br>• Help MSI get necessary approvals for implementing ICCC at City level<br>• Help MSI finalize the protocols for data exchange between ICCC and various other systems.<br>• Review the documents submitted by MSI and provide feedback<br>• Review and approve/reject monthly invoice along with progress report<br>• Process the approve monthly invoice submitted along with progress report for particular city<br>• Pay MSI for the usage of Citizen Mobile Application | • Facilitate in getting necessary information to MSI for doing surveys for implementing common cloud based DC and DR<br>• Assist MSI get necessary approvals for implementing common cloud based DC and DR<br>• Assist MSI finalize the protocols for data exchange between various systems.<br>• Process the approve joint monthly invoice submitted along with progress report for common CAPEX component<br>• Review the Citizen Mobile application architecture submitted by the MSI and approve the design layout of the application<br>• Review the documentation submitted by MSI for enhancement/addition of modules in existing E-Governance application | • Provide necessary information to MSI for doing future integrations.<br>• Provide necessary information to MSI for finalizing the data exchange between the systems. |
| **Implementation** | • Provide building structure for setting up ICCC (based on agreed plan)<br>• Assist MSI get necessary electricity and water connections at ICCC premises<br>• Assist MSI get necessary network connections established between ICCC, common cloud based DC and DR with all the applications to be integrated with common Command and Control | • Process the approved joint monthly invoice along with progress report for common CAPEX component | • Provide necessary access to the current ICT setup for integration with ICCC. |

| | | | |
|---|---|---|---|
| | center application<br>• Review and approve/reject monthly invoice along with progress report<br>• Process the approved monthly invoice submitted along with progress report for particular city<br>• Approve / Reject & Process the Change Request for particular city | | |
| **Post – Implementation** | • Facilitate Interactions with other Departments for getting the required integration.<br>• Assist MSI get necessary feeds for ICCC and get it integrated with command center and other common applications hosted on common cloud based DC and DR<br>• Assist MSI get necessary approvals (if any).<br>• Approve / Reject Change request<br>• Review the documents submitted by MSI and provide feedback<br>• In case of any incident or disaster facilitate communication from ICCC to field agents (in case of absence of ICT setup with field agents)<br>• Process the approved monthly invoice submitted along with progress report for particular city<br>• Approve / Reject & Process the Change Request for particular city | • Assist MSI get necessary feeds for common applications hosted on common cloud based DC and DR.<br>• Assist MSI get necessary approvals (if any).<br>• Review the documents submitted by MSI and provide feedback<br>• Process the approved joint monthly invoice submitted along with progress report for common CAPEX components only. | • Provide and receive (if applicable) data feeds to/ from ICCC to their current ICT setup in the predefined formats.<br>• Perform needful action in case of any incident or disaster |

# Schedule 1 – Instruction to Bidders

## 1. Instruction to Bidders

### 1.1 General

a. While every effort has been made to provide comprehensive and accurate background information, requirements and envisaged solution(s) specifications, Bidders must form their own conclusions about the solution(s) needed to meet the TUFIDCO's requirements. Bidders and recipients of this RFP may wish to consult their own legal advisers in relation to this RFP.

b. All information supplied by Bidders as part of their bids in response to this RFP, may be treated as contractually binding on the Bidders, on successful award of the assignment by TUFIDCO on the basis of this RFP.

c. No commitment of any kind, contractual or otherwise shall exist unless and until a formal written contract has been executed by or on behalf of TUFIDCO. Any notification of preferred bidder status by TUFIDCO shall not give rise to any enforceable rights by the Bidder. TUFIDCO may cancel this public procurement at any time prior to a formal written contract being executed by or on behalf of TUFIDCO.

d. Sealed bids shall be received by the TUFIDCO Office at - 490, Anna Salai, Nandanam, Chennai-35. before the time and date specified in the schedule of the tender notice. In the event of the

e. specified date for the submission of tender offers being declared a public holiday by the Government of Tamil Nadu, the offers will be received up to the appointed time on the next working day. The TUFIDCO may, at its discretion, extend this deadline for submission of offers by issuing corrigendum and uploading the same on e-Procurement portal.

f. Bids submitted through Telex, cable, email or facsimile will be rejected.

## 1.2 Eligible Bidders

Bids may be submitted by either of the following categories of bidders only:

The Bidder can be either a Single Master System Integrator (MSI) or a Consortium of companies/ corporations as described below.

**a. Sole Bidder**

The Sole Bidder must be a System Integrator company which has the capabilities to deliver the entire scope as mentioned in the RFP- under- Scope or Work. The Sole Bidder cannot bid as a part of any other consortium bid under this RFP.

**b. Consortium of Firms**

Bids can be submitted by a consortium of firms. A consortium should not consist of more than three parties (including the Lead Bidder). One of the Firms would be designated as a "Lead Bidder". The Lead Bidder would have the sole responsibility of ensuring the delivery of products and services mentioned in this RFP. The Lead Bidder would also be responsible for ensuring the successful execution of integrated solution including meeting the SLAs. The names of the Consortium Members needs to be declared in the bid which cannot be changed by the bidder later on. Any change in the consortium partner will need to be approved by TUFIDCO.

**The Lead Bidder will be responsible for:**

i. The management of all consortium members who are part of bid and
ii. The supply, delivery and installation of all products and services submitted in their bid as part of the contract.

Bids submitted by consortium should comply with the following requirements also:

i. The Lead Bidder shall be authorized through a duly executed power of attorney to incur liabilities and receive instructions for and on behalf of any and all consortium members. Entire execution of the Contract, including payment, shall be done exclusively by/with the Lead Bidder except payment to Network Service Provider which shall be done as per the tripartite agreement (as per format provided in Annexure 17 of this RFP).

ii. Any of the Lead Bidders cannot be a Consortium Member with another bidder in a separate bid

iii. Internal arrangement between the Consortium Members is left to the bidders. It is the responsibility of the lead Bidder to ensure that all the other Consortium Members in the bid are compliant to all the clauses as mentioned in the bid, failing which bid can be disqualified.

iv. Any of the Consortium Member cannot be a Consortium Member/Lead Bidder with another bidder in a separate bid.

**The Consortium Members will be responsible for:**

i. Responsible for the delivery of project components as per agreed roles & responsibility as defined in Consortium Agreement (as per Annexure 9 of this RFP).

## 1.3 Compliant Bids/Completeness of Response

a. Bidders are advised to study all instructions, forms, terms, requirements and other information in the RFP documents carefully. Submission of the bid shall be deemed to have been done after careful study and examination of the RFP document with full understanding of its implications.

b. Failure to comply with the requirements of this paragraph may render the bid non-compliant and the Bid may be rejected. Bidders must:

   i. Include all documentation specified in this RFP, in the bid

   ii. Follow the format of this RFP while developing the bid and respond to each element in the order as set out in this RFP

   iii. Comply with all requirements as set out within this RFP

## 1.4 Bidder to Inform

The Bidder shall be deemed to have carefully examined the Terms & Conditions, Scope, Service Levels, Specifications, and Schedules of this RFP. If bidder has any doubts/clarifications as to the meaning of any portion of the Conditions or the specifications he shall, before the last date for Submission of Pre-Bid Queries, set forth the particulars thereof and submit them to TUFIDCO in writing in order that such doubt may be removed or clarifications are provided.

## 1.5 Bid Preparation costs

The Bidder shall bear all costs associated with the preparation and submission of its bid, including cost of presentations etc. for the purposes of clarification of the bid, if so desired by the TUFIDCO.

## 1.6 Pre-bid meeting & Clarification

Bidders are required to submit their queries before the due date of pre-bid meeting. Any query raised after the due date will not be accepted by the authority.

## 1.7 RFP Document Fee

RFP can be downloaded free of cost from the website http://www.tenders.tn.gov.in/

## 1.8 Earnest Money Deposit (EMD)

EMD shall be paid only through a Demand Draft in favor of CMD, TUFIDCO payable at any scheduled bank in Chennai. EMD should be valid for 90 Days. Scanned copy of EMD should be submitted on e-procurement system and physical copy should be submitted to TUFIDCO along with the hardcopy of the bid as per timelines given in this RFP. No exemption for submitting the EMD will be given to any agency. EMD in any other form will not be entertained.

### A. EMD Refund

***For Unsuccessful bidders*:** The EMD of all unsuccessful bidders would be refunded without interest by TUFIDCO on finalization of the bid in all respects by the successful bidder.

***For Successful bidders:*** The EMD, for the amount mentioned above, of successful bidder would be returned without interest upon submission of Performance Bank Guarantee by the successful bidder.
The above mentioned refund would be completed within 1 month of the selection of the MSI.

In case bid is submitted without the bid security then TUFIDCO reserves the right to reject the bid without providing opportunity for any further correspondence to the bidder concerned.

### B. EMD Forfeiture

The EMD may be forfeited in any of the following circumstances:

a. If a bidder withdraws its bid during the period of bid validity.

b. In case of a successful bidder, if the bidder fails to submit the performance bank guarantee and/or sign the contract in accordance with this RFP.

## 1.9 Bid Validity Period

Bid shall remain valid for the time period mentioned in the Bidding Data Sheet.

On completion of the validity period, unless the Bidder withdraws his bid in writing, it will be deemed to be valid until such time that the Bidder formally (in writing) withdraws his bid. – Not to be deemed

## 1.10 Contents of Bid

Bids must be submitted in the hard copy format to below TUFIDCO Office Address.

Tamil Nadu Urban Finance and Infrastructure Development Corporation
Registered office: 490, Anna Salai, Nandanam, Chennai-35.

| Document Set | Name of the Document | Content |
|---|---|---|
| One | RFP Document fee & Bid Security/Earnest Money Deposit (EMD) | Bid Security/Earnest Money Deposit (EMD) receipt |
| Two | Pre-Qualification Bid | a. Pre-Qualification bid as per this RFP along with the required Supporting Documents.<br>b. Total Responsibility Declaration as per Annexure 4<br>c. Technology Stack Declaration as per Annexure 4 |
| Three | Technical bid | a. Technical Bid<br>(2 hard copies &<br>1 Soft Copy in USB Drive) |
| Four | Commercial Bid | a. Commercial Bid |

a. Please note that Prices should NOT be indicated in any of the Document Set but should only be indicated in the Financial Bid.

b. All the pages of the bid must be sequentially numbered. The bid documents must contain in the beginning of the document, a list of contents with page numbers. Any deficiency in the documentation may result in the rejection of the Bid.

c. The original bid shall be prepared in indelible ink. It shall contain no interlineations or overwriting, except as necessary to correct errors made by the Bidder itself. Any such corrections must be initialed by the person (or persons) who sign(s) the bids.

d. All pages of the bid shall be initialed and stamped by the person (or persons) who sign the bid. Foreign bidder can sign and Stamp in their own language

e. Failure to submit the bid before the submission deadline specified in the Fact Sheet would cause a bid to be rejected.

f. TUFIDCO will not accept delivery of bid by fax, or e-mail.

## 1.11 Bid Formats

### 1.11.1 Pre-Qualification Bid Format

| Section | Section Heading | Details |
|---|---|---|
| 1 | Pre-qualification checklist | As per format provided in Annexure 4A |

| | | |
|---|---|---|
| 2 | Pre-Qualification Bid Covering letter | As per format provided in Annexure 4B |
| 3 | Consortium Agreement | As per format provided in Annexure 9 |
| 4 | About Bidder | As per format provided in Annexure 4C |
| 5 | Legal | Copy of Certification of Incorporation/Registration Certificate As per Pre-qualification criteria – Sl # 1 |
| 6 | Annual Turnover | Details of annual turnover with documentary evidence. As per Pre-qualification criteria – Sl # 2 |
| 7 | Self-certificate for non- blacklisting clause | As per format provided in Annexures As per Pre-qualification criteria – Sl # 6 |
| 8 | Power of Attorney | Documentary evidence as per format provided in Annexure 10 |
| 9 | Project Experience | As per format in Annexure 4H |
| 10 | Total responsibility certificate | Citation details of projects as per format in Annexure 4F |
| 11 | Technology Stack Declaration | As per format in Annexure 4G |
| 12 | Anti-Collusion Certificate | As per format provided in Annexure 5 |

### 1.11.2 Technical Bid Format

| Section | Section Heading | Details |
|---|---|---|
| 1 | Technical Bid Checklist | As per format provided in Annexure 5 |
| 2 | Technical Bid Covering Letter | As per format provided in Annexure 5 |

| | | |
|---|---|---|
| 3 | About Bidder | Details about bidder (whether sole bidder or consortium) Bidder's General Information as required in Technical Criteria 3.6 |
| 4 | Understanding (including Governance Structure, Exit Management Framework and Transition Management Framework) | Details as required in Technical Criteria 3.6 |
| 5 | Solution proposed | Details as required in Technical Criteria 3.6 Please refer to Annexure 5 |
| 6 | Project/credential summary | As per format provided in Annexure 5 |
| 7 | Bidder's Experience | Project citation as per format provided in Section - Annexure 5 and supporting documentary evidences and Self-certifications as per format in Annexure 4 as applicable |
| 8 | Project Plan and Resources | · Project plan as per format provided in Annexure 5<br>· Manpower Plan as per format provided in Annexure 5<br>· Summary of resources as per format Annexure 5 |
| 9 | Manufacturers'/Producers' Authorization Form | As per format provided in Annexure 5 |
| 10 | Unpriced Bill of Material (BoM) | As per format provided in Financial Bid, without any price / quote (masked price bid) |
| 11 | Certifications (as desired in RFP for OEMs) | Bidder is required to get relevant certificate from the OEM of a particular product and submit the copy of same along with Technical Proposal. |
| 12 | Non-disclosure agreement | As per format provided in Annexure 8 |

### 1.11.3 Financial Bid Format

The Bidder must submit the Financial Bid in the format specified in Annexure of this RFP.

## 1.12 Language

The bid should be prepared and submitted by the bidders in English language only. If any submitted supporting documents are in any language other than English, translation of the same in English language is to be provided (duly attested) by the Bidders. For purposes of interpretation of the documents, the English translation shall govern.

## 1.13 Authentication of Bids

An authorized representative of the Bidder shall initial all pages of the Pre-Qualification, Technical and Financial Bids.

Bid should be accompanied by an authorization in the name of the signatory of the Bid. The authorization shall be in the form of a written power of attorney accompanying the Bid or in any other form demonstrating that the representative has been duly authorized to sign.

## 1.14 Amendment of Request for Proposal

At any time prior to the due date for submission of bid, TUFIDCO may, for any reason, whether at its own initiative or in response to a clarification requested by prospective bidder(s), modify the RFP document by amendments. Such amendments shall be uploaded on the e-procurement portal website http://www.tenders.tn.gov.in/ through corrigendum and shall form an integral part of RFP document. The relevant clauses of the RFP document shall be treated as amended accordingly.

It shall be the responsibility of the prospective bidder(s) to check the procurement portal http://www.tenders.tn.gov.in/ from time to time for any amendment in the RFP document. In case of failure to get the amendments, if any, TUFIDCO shall not be responsible.

In order to allow prospective bidders a reasonable time to take the amendment into account in preparing their bids, TUFIDCO, at its discretion, may extend the deadline for submission of bids. Such extensions shall be uploaded on procurement portal http://www.tenders.tn.gov.in/

## 1.15 Bid Price

Financial Bid shall be as per the format provided in Section 8. Bidders shall give the required details of all applicable taxes, duties, other levies and charges etc. in respect of direct transaction between TUFIDCO and the Bidder.

Bidders shall quote for the entire scope of contract on a “overall responsibility” basis such that the total bid price covers Bidder’s all obligations mentioned in or to be reasonably inferred from the bidding documents in respect of providing the product/services.

Prices quoted by the Bidder shall remain firm during the entire contract period and not subject to variation on any account. A bid submitted with an adjustable price quotation shall be treated as non-responsive and rejected.

## 1.16 Deviations and Exclusions

Bids shall be submitted strictly in accordance with the requirements and terms & conditions of the RFP. The bidder is required to submit s declaration to this effect.

## 1.17 Total Responsibility

Bidder should issue a statement undertaking total responsibility for the defect free operation of the proposed solution as per the format mentioned in Section 6.6.

## 1.18 Late Bids

Late submission will not be entertained and will not be permitted by the e-Procurement Portal.

The bids submitted by telex/telegram/fax/e-mail etc. shall not be considered. No correspondence will be entertained on this matter.

TUFIDCO shall not be responsible for any non-receipt/non-delivery of the documents due to technical snag whatsoever at Bidder's end. No further correspondence on the subject will be entertained.

TUFIDCO reserves the right to modify and amend any of the above-stipulated condition/criterion.

## 1.19 Right to Terminate the Process

TUFIDCO may terminate the RFP process at any time and without assigning any reason. TUFIDCO makes no commitments, express or implied, that this process will result in a business transaction with anyone. This RFP does not constitute an offer by TUFIDCO.

## 1.20 Non-Conforming bids

A bid may be construed as a non-conforming bids and ineligible for consideration:

a. If it does not comply with the requirements of this RFP.

b. If a bid does not follow the format requested in this RFP or does not appear to address the particular requirements of the solution.

## 1.21 Acceptance/Rejection of Bids

a. TUFIDCO reserves the right to reject in full or part, any or all bids without assigning any reason thereof. TUFIDCO reserves the right to assess the Bidder's capabilities and capacity. The decision of TUFIDCO shall be final and binding.

b. Bid should be free of over writing. All erasures, correction or addition must be clearly written both in words and figures and attested.

In the event of any assumptions, presumptions, key points of discussion, recommendation or any points of similar nature submitted along with the Bid, TUFIDCO reserves the right to reject the Bid and forfeit the EMD.

If there is any discrepancy in the financial bid, it will be dealt as per the following:

a. If, in the price structure quoted for the required goods/services/works, there is discrepancy between the unit price and total price (which is obtained by multiplying the unit price by the quantity), the unit price shall prevail and the total price shall be corrected accordingly.
b. If there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected.
c. If there is a discrepancy between words and figures, the amount in words shall prevail.
d. If there is such discrepancy in an offer, the same shall be conveyed to the bidder with target date up to which the bidder has to send his acceptance on the above lines and if the bidder does not agree to the decision of TUFIDCO, the bid is liable to be disqualified.

## 1.22 Confidentiality

All the material/information shared with the Bidder during the course of this procurement process as well as the subsequent resulting engagement following this process with the successful bidder, shall be treated as confidential and should not be disclosed in any manner to any unauthorized person under any circumstances. The employees of the successful bidder who are proposed to be deployed on the project need to furnish a Non-Disclosure Agreement (NDA) as per RFP.

## 1.23 Disqualification

The bid is liable to be disqualified in the following cases or in case bidder fails to meet the bidding requirements as indicated in this RFP:

a. During validity of the bid, or its extended period, if any, the bidder increases its quoted prices

b. The bidder’s bid is conditional and has deviations from the terms and conditions of RFP

c. Bid is received in incomplete form

d. Bid is not accompanied by all the requisite documents

e. Information submitted in technical bid is found to be misrepresented, incorrect or false, accidentally, unwittingly or otherwise, at any time during the processing of the contract (no matter at what stage) or during the tenure of the contract including the extension period if any
f. Financial bid is enclosed with the same document as technical bid.

g. Bidder tries to influence the bid evaluation process by unlawful/corrupt/fraudulent means at any point of time during the bid process

h. In case any one party submits multiple bids or if common interests are found in two or more bidders, the bidders are likely to be disqualified, unless additional bids/bidders are withdrawn upon notice immediately

i. If any of the Lead Bidder is also partner in any other bid, then all the affected bids shall be disqualified

## 1.24 Key Personnel

TUFIDCO has identified certain key positions and minimum qualifications for each of the positions that should be part of project team of the bidder (hereby referred to as “key personnel”). Details of these key positions are provided in manpower plan in Annexure 5.

### 1.24.1 Initial Composition; Full Time Obligation; Continuity of Personnel

Bidder shall ensure that each member of the Key Personnel devotes substantial working time as per the staffing schedule/ manpower plan to perform the services to which that person has been assigned as per the bid.

Bidder shall not make any changes to the composition of the Key Personnel and not require or request any member of the Key Personnel to cease or reduce his or her involvement in the provision of the Services during the defined term of the engagement unless that person resigns, is terminated for cause, is long-term disabled, is on permitted mandatory leave under Applicable Law or retires.

In any such case, the TUFIDCO/ City SPV's prior written consent would be mandatory.

### 1.24.2 Replacement

In case any proposed resource resigns, then the Bidder has to inform TUFIDCO or the respective City nodal officer within one week of such resignation.

Bidder shall promptly initiate a search for a replacement to ensure that the role of any member of the Key Personnel is not vacant at any point in time during the contract period, subject to reasonable extensions requested by Bidder to TUFIDCO or City nodal officer.

Before assigning any replacement member of the Key Personnel to the provision of the Services, Bidder shall provide TUFIDCO / City SPV with:

a. a resume / curriculum vitae and any other information about the candidate that is requested by TUFIDCO / City SPV; and

b. An opportunity to interview the candidate.

The bidder has to provide replacement resource of equal or better qualification and experience as per the requirements of this RFP.

If TUFIDCO/ City SPV objects to the appointment, Bidder shall not assign the individual to that position and shall seek an alternative candidate in accordance with the resource requirements of this RFP.

The bidder needs to ensure at least 4 weeks of overlap period in such replacements. TUFIDCO /City SPV will not be responsible for any knowledge transition to the replacement resource and any impact/escalation of cost incurred by the bidder due to resource replacement.

### 1.24.2 High Attrition

If in the first 6 month period from the Contract Effective Date and in any rolling 12 months period during the Term of contract, 15 percent or more of the members of the Key Personnel cease or reduce their involvement in the Services for any reason other than with TUFIDCO/ City SPV's prior written consent, Bidder shall:

a. provide TUFIDCO/ City SPV with a reasonably detailed explanation as to the reasons for such change, including, where applicable and permitted, notes from any exit interviews conducted by Bidder with any departing member of the Key Personnel; and

b. if such change to Key Personnel has or is likely to have any material adverse impact on the provision of the Services or any substantial part thereof, undertake, at its own costs, such remediation acts as are reasonably necessary in order to improve the retention of the Key Personnel including making reasonable changes to the human resources policies and procedures applicable to the Key Personnel (including those related to compensation, benefits and other conditions so that they are competitive with the market) as may be necessary to ensure that such policies and procedures comply with Good Industry Practice.

## 1.25 Fraud and Corrupt Practices

a. The Bidders and their respective officers, employees, agents and advisers shall observe the highest standard of ethics during the Selection Process. Notwithstanding anything to the contrary contained in this RFP, TUFIDCO shall reject a Bid without being liable in any manner whatsoever to the Bidder, if it determines that the Bidder has, directly or indirectly or through an agent, engaged in corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice (collectively the "Prohibited Practices") in the Selection Process. In such an event, TUFIDCO shall, without prejudice to its any other rights or remedies, forfeit and appropriate the EMD or PBG, as the case may be, as mutually agreed genuine pre-estimated compensation and damages payable to TUFIDCO for, inter alia, time, cost and effort of TUFIDCO, in regard to the RFP, including consideration and evaluation of such Bidder's Bid.

b. Without prejudice to the rights of TUFIDCO under Clause above and the rights and remedies which TUFIDCO may have under the LOI or the Agreement, if a Bidder is found by TUFIDCO to have directly or indirectly or through an agent, engaged or indulged in any corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice during the Selection Process, or after the issue of the LOI or the execution of the Agreement, such Bidder shall not be eligible to participate in any tender or RFP issued by TUFIDCO during a period of 3 years from the date such Bidder is found by TUFIDCO to have directly or through an agent, engaged or indulged in any Prohibited Practices.

c. For the purposes of this Section, the following terms shall have the meaning hereinafter respectively assigned to them:

i. *"corrupt practice"* means (i) the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence the action of any person connected with the Selection Process (for avoidance of doubt, offering of employment to or employing or engaging in any manner whatsoever, directly or indirectly, any official of TUFIDCO who is or has been associated in any manner, directly or indirectly with the Selection Process or the LOI or has dealt with matters concerning the Agreement or arising there from, before or after the execution thereof, at any time prior to the expiry of one year from the date such official resigns or retires from or otherwise ceases to be in the service of TUFIDCO , shall be deemed to constitute influencing the actions of a person connected with the Selection Process); or (ii) save as provided herein, engaging in any manner whatsoever, whether during the Selection Process or after the issue of the LOA or after the execution of the Agreement, as the case may be, any person in respect of any matter relating to the Project or the Award or the Agreement, who at any time has been or is a legal, financial or technical consultant/adviser of TUFIDCO in relation to any matter concerning the Project;

ii. *"fraudulent practice"* means a misrepresentation or omission of facts or disclosure of incomplete facts, in order to influence the Selection Process;

iii. *"coercive practice"* means impairing or harming or threatening to impair or harm, directly or indirectly, any persons or property to influence any person's participation or action in the Selection Process;

iv. *"undesirable practice"* means (i) establishing contact with any person connected with or employed or engaged by TUFIDCO with the objective of canvassing, lobbying or in any manner influencing or attempting to influence the Selection Process; or (ii) having a Conflict of Interest; and

v. *"Restrictive practice"* means forming a cartel or arriving at any understanding or arrangement among Bidders with the objective of restricting or manipulating a full and fair competition in the Selection Process.

## 1.26 Conflict of Interest

a. A bidder shall not have a conflict of interest that may affect the Selection Process or the Solution delivery (the "Conflict of Interest"). Any Bidder found to have a Conflict of Interest shall be disqualified. In the event of disqualification, TUFIDCO shall forfeit the EMD, if available, as mutually agreed genuine pre-estimated compensation and damages payable to TUFIDCO for, inter alia, the time, cost and effort of TUFIDCO including consideration of such Bidder's Bid, without prejudice to any other right or remedy that may be available to TUFIDCO hereunder or otherwise.

b. TUFIDCO requires that the bidder provides solutions which at all times hold TUFIDCO's interests paramount, avoid conflicts with other assignments or its own interests, and act without any consideration for future work. The bidder shall not accept or engage in any assignment that would be in conflict with its prior or current obligations to other clients, or that may place it in a position of not being able to carry out the assignment in the best interests of TUFIDCO.

## 1.27 Sub-Contracting

The bidder would not be allowed to sub-contract / outsource work, except for the following:

- Cloud Service Provider (CSP)
- Cabling and fixtures work, and all civil work during implementation
- Facility Management & Physical Security Staff at ICCC & State level ICCC
- Non – Technical Manpower during O&M Phase

Sub-contracting / Outsourcing shall be allowed only with prior written approval of TUFIDCO. However, even if the work is sub-contracted / outsourced, the sole responsibility of the work shall lie with the lead bidder. The lead bidder shall be held responsible for any delay/error/non-compliance etc. of its sub-contracted vendor. The details of the sub-contracting agreements (if any) between both the parties would be required to be submitted to TUFIDCO.

## 1.28 Eligible Goods and Services, and OEM Criteria:

a. For purposes of this Clause, the term "goods" includes commodities, raw material, machinery, equipment, and industrial plants; and "related services" includes services such as insurance, transportation, supply, installation, integration, testing, commissioning, training, and initial maintenance.
b. The Bidder shall quote only one specific make and model from only one specific OEM, for each of the goods. Providing more than one option shall not be allowed. All goods quoted by the Bidder must be associated with item code and names and with printed literature describing configuration and functionality. Any deviation from the printed specifications should be clearly mentioned in the offer document by the Bidder.
c. The OEM for each products or technology quoted should be in the business of that product or solution or technology for at least 3 years as on the date of release of the RFP.

d. All the OEMs should have authorized presence in India either directly or through channel partner(s) as on the date of release of RFP.

e. Bidder must quote products in accordance with above clause “Eligible goods and related services.

Adequate supporting documents pertaining to the above points, along with a summary compliance table, should be submitted in the technical proposal by the Bidder.

## 1.29 Right to vary quantity

a. At the time of award of contract, the quantity of goods, works or services originally specified in the bidding documents may be increased not more than 10%. It shall be without any change in the unit prices or other terms and conditions of the Bid and the bidding documents.

b. If the TUFIDCO does not procure any subject matter of procurement or procures less than the quantity specified in the bidding documents due to change in circumstances, the bidder shall not be entitled for any claim or compensation except otherwise provided in the bidding document.
c. Repeat orders for extra items or additional quantities may be placed, if it is provided in the bidding document, on the rates and conditions given in the contract if the original order was given after inviting open competitive bids. Delivery or completion period may also be proportionally increased.

## 1.30 Withdrawal, Substitution, and Modification of Bids

a. A Bidder may withdraw its Bid or re-submit its Bid (technical and/ or financial) as per the instructions/ procedure mentioned at e-Procurement website

b. Bids withdrawn shall not be opened and processed further.

## 1.31 Site Visit

The Bidder may wish to visit and examine the site or sites and obtain for itself, at its own responsibility and risk, all information that may be necessary for preparing the bid and entering into the Contract. The costs of visiting the site or sites shall be at the Bidder’s own expense.

b. The City SPV will arrange for the Bidder and any of its personnel or agents to gain access to the relevant site or sites, provided that the Bidder gives the TUFIDCO adequate notice of a proposed visit of at least fourteen (14) days. Alternatively, the TUFIDCO may organize a site visit or visits concurrently with the pre-bid meeting, as specified in the RFP. Failure of a Bidder to make a site visit will not be a cause for its disqualification.

c. No site visits shall be arranged or scheduled after the deadline for the submission of the Bids and prior to the award of Contract.

# 2. Selection Process for Bidder

## 2.1 Opening of Bids

The Bids shall be opened by TUFIDCO in presence of those Bidders or their representatives who may be present at the time of opening.

The representatives of the bidders should be advised to carry the identity card or a letter from the bidder firms to identify that they are bona fide representatives of the bidder firm, for attending the opening of bid.

There will be three bid-opening events

**a. Set 1 (RFP Document fee & Bid Security/EMD) and Set 2 (Pre-Qualification bid)**

**b. Set 3 (Technical bid)**

**c. Set 4 (Financial bid)**

The venue, date and time for opening the Pre-qualification bid are mentioned in the Bid Data sheet.
The date and time for opening of Technical & Financial bid would be communicated to the qualified bidders.
The Technical Bids of only those bidders will be opened who clears the Pre-qualification stage.
The Financial Bids of only those bidders will be opened who score equal to or more than qualifying marks in Technical Bid.

## 2.2 Preliminary Examination of Bids

Evaluation Committee shall examine the bids to determine whether they are complete, whether the documents have been properly signed and whether the bids are generally in order. Any bids found to be nonresponsive for any reason or not meeting any criteria specified in the RFP, shall be rejected by Evaluation Committee and shall not be included for further consideration.

Initial Bid scrutiny shall be held and bids will be treated as non-responsive, if bids are:

a. Not submitted in format as specified in the RFP document

b. Received without the Letter of Authorization (Power of Attorney)

c. Found with suppression of details

d. With incomplete information, subjective, conditional offers and partial offers submitted

e. Submitted without the documents requested

f. Non-compliant to any of the clauses mentioned in the RFP

g. With lesser validity period

## 2.3 Clarification on Bids

During the bid evaluation, TUFIDCO may, at its discretion, ask the Bidder for any clarification(s) of its bid. The request for clarification and the response shall be in writing, and no change in the price or substance of the bid shall be sought, offered, or permitted.

## 2.4 Evaluation Process

The Evaluation Committee shall evaluate the responses to the RFP and all supporting documents/documentary evidence. Inability to submit requisite supporting documents/documentary evidence by bidders may lead to rejection of their bids.

The decision of the Evaluation Committee in the evaluation of bids shall be final. No correspondence will be entertained outside the process of evaluation with the Committee. The Evaluation Committee may ask for meetings or presentation with the Bidders to seek clarifications or conformations on their bids.

The Evaluation Committee reserves the right to reject any or all bids. Each of the responses shall be evaluated as per the criteria and requirements specified in this RFP.

The steps for evaluation are as follows:

### 2.4.1Stage 1: Pre-Qualification

a. Evaluation Committee shall validate the Set 1 “RFP Document fee & Bid Security/Earnest Money Deposit (EMD)”.

b. If the contents of the Set 1 are as per requirements, TUFIDCO shall open the “Pre-Qualification Bid**”. Each of the Pre-Qualification condition mentioned in Section 3.5 is MANDATORY**. In case, the Bidder does not meet any one of the conditions, the bidder shall be disqualified.

   Bidders would be informed of their qualification/disqualification based on the Pre-Qualification criteria through Email and Phone and subsequently, the Bid Security amount shall be returned to the respective disqualified Bidders after the submission of Performance Bank Guarantee by the successful Bidder.

c. Technical and Financial bids for those bidders who don’t pre-qualify will not be opened. Financial bid will not be opened for those bidders, who don’t qualify the technical evaluation. Bid Security

amount shall be returned to those who don't qualify the financial evaluation stage and after PBG is submitted by successful bidder.

### 2.4.2 Stage 2: Technical Evaluation

a. Set 3 "Technical bid" will be evaluated only for the bidders who succeed in Stage 1.

b. Evaluation Committee will review the technical bids of the short-listed bidders to determine whether the technical bids are substantially responsive. Bids that are not substantially responsive are liable to be disqualified at TUFIDCO's discretion.

c. The bidders' technical solutions proposed in the bid document shall be evaluated as per the requirements specified in the RFP and technical evaluation framework as mentioned in Section 3.6.

d. Bidders may be asked to give demonstration of the envisaged solution to TUFIDCO as per the demo scripts that shall be shared with the Bidders who qualify the Pre-Qualification Stage.

e. Bidders shall present the bid to TUFIDCO as per the agenda mentioned in Section 3.6.2 (Point no. C) – "***Approach & Methodology & Solutions proposed*** "

f. Each Technical Bid will be assigned a technical score out of a maximum of 100 marks. Only the bidders who get an Overall **Technical score of 80%** or more in the Technical Evaluation Framework as given in Section 3.6 will be known as technically qualified bidders and they will qualify for financial evaluation stage. Failing to secure minimum marks shall lead to technical rejection of the Bid.

g. In case none of the bidders achieve 80% technical score the tender inviting authority may opt for revision of the cut-off for technical qualification or retender as per TUFIDCO discretion.

h. Technical bids of the Bidders qualifying in the Pre- Qualification criteria will be opened and will also be invited for doing the technical presentation.

### 2.4.3 Stage 3: Financial Evaluation

a. All the technically qualified bidders will be notified to participate in Financial Bid opening process.

b. The Financial bids for the technically qualified bidders shall then be opened on the notified date and time and reviewed to determine whether the financial bids are substantially responsive. Bids that are not substantially responsive are liable to be disqualified at TUFIDCO's discretion.

c. The bidder with the least quote will be the successful bidder

d. Financial Bids that are not as per the format provided in Section 8 (Annexure 4) shall be liable for rejection.

1. The bid price will exclusive of all taxes and levies and shall be in Indian Rupees and mentioned separately.
2. Any conditional bid would be rejected
3. Errors & Rectification: Arithmetical errors will be rectified on the following basis:
    a. "If there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected.
    b. If there is a discrepancy between words and figures, the amount in words will prevail."
    c. If the Bidder does not accept the error correction, its Bid will be rejected and its EMD may be forfeited.
    d. Kindly note e that the indicative/estimated quantity provided in the RFP would be used for evaluation purposes; however the payment would be done on actual usage basis.

### 2.4.4 Stage 4: Final score calculation through LCS

The final score will be calculated through Least Cost selection method

1. The technically qualified bidder with the lowest commercial value quoted shall be treated as the Successful bidder.

2. In the event the financial quotes are 'tied', the bidder with the highest technical score will be adjudicated as the Best Value Bidder for award of the Project.

## 2.5 Pre-Qualification Criteria

### Pre -Qualification Criteria for MSI and its Consortium Partner

| # | Parameter | Pre-qualification criteria description | Evidence required | Applicability |
|---|---|---|---|---|
| 1. | **Legal Entity** | • The Sole Bidder OR Consortium (Max 3 companies are allowed in a consortium)<br>• One of the consortium member should lead the consortium and should be registered in India under Companies Act 1956/2013 or as amended<br>• All the consortium members are equally responsible and jointly & severally liable under this RFP for:<br>  ○ The delivery of products & services<br>  ○ Successful completion of this entire Project<br>  ○ Meeting the SLAs<br>• Other consortium members either should be registered in India under Companies Act 1956/2013 or as amended or Registered Abroad under any other suitable Act | • Copy of Certificate of Incorporation / Registration under Companies Act, 1956/2013 or any suitable Act abroad<br>• Consortium agreement clearly stating the roles and responsibilities of each member | Single Bidder<br>or<br>In case of consortium the<br>Lead Bidder &<br>Consortium Member |

| | | | | |
|---|---|---|---|---|
| **2.** | **Turnover** | • Bidder should have an average annual turnover of at least INR 200 Crores in over last 3 financial years (FY 2014-15, 2015-16 and 2016-17) from Annual Turnover from IT systems / IT System integration / ICT / system integration services / ICT based utility management / Transport management / command & control center implementation / Network Operating Center (NOC) / MeiTY empanelled Cloud services in India<br>• In case of Single bidder, the average annual turnover should be 200 Crores for the last three years.<br>• In case of Consortium:<br>o The lead bidders should have average annual turnover of minimum Rs 120 Crores<br>o Each of the consortium members should have average annual turnover of minimum Rs 10 Crores<br>o Together the lead bidder and the consortium members should have an average turnover of Rs 200 Cr | Certificate from the Statutory Auditor. | Single Bidder<br><br>Or<br><br>In Case of Consortium, Lead bidder & Consortium Members |
| **3.** | **Positive Net Worth** | The Positive Net Worth (PNW) in Indian Rupees as on 2016-17 financial year end<br>• For Sole Bidder – Rs.30 Cr<br>• For Consortium<br>o Lead Bidder should have minimum Rs. 25 Cr PNW<br>o Each consortium partners should have a Networth of Rs. 1 Crore, together | Certificate from the Statutory auditor/ CA clearly specifying the net worth of the firm | Single Bidder<br><br>Or<br><br>In Case of Consortium, Lead bidder & Consortium Members |

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| | | should have Rs. 30 Cr PNW | | |
| **4.** | **Blacklisting** | Lead Bidder and its Consortium partner including its subsidiary/group companies should not have been blacklisted by Multi Lateral Funding Agency / Govt. Of India / Govt. of Tamil Nadu / by any other State Government / PSU's on the date of bid submission. | Self-certificate on company's letter head duly signed by company secretary. | Single Bidder<br><br>Or<br><br>In Case of Consortium, Lead bidder & Consortium Members |
| **5.** | **Earnest Money Deposit (EMD)** | The bidder should furnish, as part of its proposal, an Earnest Money Deposit of Rs. 50 Lakhs. | EMD to be submitted in the name of CMD, Tamil Nadu Urban Finance and Infrastructure Development Corporation (TUFIDCO) in the form of Demand Draft | Single Bidder<br><br>Or<br><br>In Case of Consortium, Lead bidder shall take responsibility and provide a single DD. |
| **6** | **Turnover Smart Elements** | The aggregate Turnover from the Smart Elements (TSE) projects for last 3 audited financial years (2014-15, 2015-16, 2016-17).<br>• For Sole Bidder – 30 Cr (Indian Rupees)<br>• For Consortium<br>o Lead Bidder should have minimum 20 Cr from TSE<br>o Each of the consortium members should have minimum Rs. 2 Cr from TSE<br>o Together the lead bidder and the consortium members should have 30 Cr TSE<br>o Smart Elements Projects includes Command & Communications /Control, City Surveillance System, Red Light Violation detection System, Environmental Sensors, Public Address System, | • Certificate from the Statutory Auditor / CA clearly specifying the annual turnover from Smart Elements projects for the specified years.<br>• Proof of the projects undertaken (work order & partial (85% completion of project scope)/ final financial completion certificate from client) | Single Bidder<br><br>Or<br><br>In Case of Consortium, Lead bidder & Consortium Members |

| | | | | |
|---|---|---|---|---|
| | | Emergency Box, Variable Messaging Displays, GPS based vehicle tracking system, Smart Data Center/Disaster Recovery Center Projects, Utility Infrastructure such as water supply, power, gas, sewerage, drainage etc. | | |
| **7** | **Certifications** | The sole Bidder or the Lead bidder in case of a Consortium, should possess CMMi Level 5 and any one of the below valid Certifications which are valid at the time of bid submission:<br>• ISO 20000:2011 for IT Service Management<br>• ISO 27001:2005 for Information Security Management System | • Copies of valid certificates in the name of the sole bidder or the Lead bidder in case of a Consortium | Single Bidder<br><br>Or<br><br>In Case of Consortium, Lead bidder |
| **8** | **CSP Empanelment with Meity** | Cloud Service Provider (CSP) should be empaneled by GI Cloud– Cloud Computing Initiative of MeitY | Letter of Empanelment/Audit report | Proposed CSP |
| **9** | **Data Center Location of Cloud Service Provider** | The CSP should have Data Center within the state of Tamil Nadu | Tier III Certification for Data Center in Tamil Nadu | Proposed CSP |

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|---|---|---|---|---|
| **10** | **Experience in implementation of Smart Elements** | The sole Bidder or the any of the Consortium Members should possess experience / completion certificates for implementing and integrating with the CCC, atleast any of the seven smart elements as mentioned in Annexure 16. | Copies of valid completion certificates and Work Order | In the name of the sole bidder or any of the Consortium Members |

**Note:**

1. All the above 9 Pre-Qualification Criteria's has to be fulfilled by the participating bidders inorder to be eligible for Technical Evaluation of their submitted bids.

2. For projects where fee has been received in any currency other than Indian Rupees, than the foreign currency conversion rate available on Reserve Bank of India's portal as on the date of publication of the tender document shall be used for conversion of amount in foreign currency to Indian Rupees equivalent.

3. Bidders are allowed to submit experience in terms of technical qualification of their holding company and/or subsidiary company only. However, the parent/ subsidiary company of the Bidder should on its own meet the technical experience as stipulated in this RFP and should not rely for meeting the technical experience criteria on its sister subsidiary/ co-subsidiary company or through any other arrangement like Technical Collaboration agreement. For the purpose of this clause,

    a. a 'holding company', in relation to one or more other companies, means a company of which such companies are subsidiary companies; and

    b. a 'subsidiary company' in relation to any other company (that is to say the holding company), means a company in which the holding company— (a) controls the composition of the Board of Directors; or (b) exercises or controls more than one-half of the total share capital at its own

4. For the purpose of evaluation criteria, if the bidding company (the lead bidder in case of consortium) is 100% subsidiary of an international or Indian company then the lead bidder's parent company's or parent company's other subsidiary relevant experience can be considered as lead bidder's experience.

5. Projects executed for bidder's own or bidder's group of companies shall not be considered.

6. For the above criteria bidder means MSI or its consortium partners (in case of consortium)

## 2.6 Technical Evaluation Framework

The Bidder's technical solution proposed in the Technical Evaluation bid shall be evaluated as per the evaluation criteria in the following table.

| Section | Evaluation Criteria | Total Marks |
|---|---|---|
| A | Bidder's Organizational Strength and Experience | 60 |
| B | Proposed Solution, Approach & Methodology (Common Cloud based DC and DR approach, Innovation, Command Center Platform Support during the contract period – L1, L2 and L3, etc.) | 5 |
| C | Project Governance, Exit Management and Transition Management | 5 |
| D | Common Command Center Application Platform OEM | 30 |
| Total | | 100 |

**Important:** Qualification criteria for technical evaluation and progression to financial evaluation stage.

- Minimum 80% marks of the overall technical score.

N.B- Evaluation Committee (or a nominated party) reserves the right to check/validate the authenticity of the information provided in the Pre-qualification and Technical Evaluation criteria and the requisite support must be provided by the Bidder.

**OEM representative should be present at the time of Technical Presentation at TUFIDCO.**

The following sections explain how the Bidders shall be evaluated on each of the evaluation criteria.

Technical bids of the Bidders qualifying in the Pre- Qualification criteria will be opened and will also be invited for doing the technical presentation.

### 2.6.1 Bidder's Organizational Strength and Experience (Total Mark -60)

| # | Criteria | Criteria Details | Documentary Evidence | Marks Allotted |
|---|---|---|---|---|
| **1.** | Bidder should have an average annual turnover of at least INR 200 Crores in any of the 3 financial years (FY 2014-15, 2015-16 and 2016-17) | Annual Turnover from IT systems / IT System integration / ICT / system integration services / ICT based utility management / Transport management / command & control center implementation / Network Operating Center (NOC) /MeiTY empanelled Cloud services<br><br>In case of Consortium, aggregated turnover of the consortium may be considered with 60% (minimum) of the lead bidder and 40% (maximum) of the consortium partners<br><br>>200 Crores to <= 250 Crores – 1.5 Marks<br>>250 Crores to <= 350 Crores – 3 Marks<br>>350 Crores to <= 500 Crores –4.5 Marks<br>>500 Crores to <=650 Crores – 6 Marks<br>>650 Crores – 7.5 Marks | Certificate from the Chartered Accountant.<br><br>The said certificate also needs to be counter signed by authorized signatory of the bidder. | 7.5 |

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|---|---|---|---|---|
| **2.** | **Experience in Implementation and maintenance of large scale ICT based Utility Management System / Municipal Services in India** | Lead Bidder or its consortium members having experience in Implementation & maintenance of large Utility Management System / Municipal Services Project in last ten (10) financial years. Value of each project should be at least of INR 20 crores.<br>• 3 citations 7.5 marks,<br>• 2 citation =5 marks<br>• 1 citation 2.5 marks<br>• else 0 Marks | • In Case of ongoing project - Case study + Copy of work order + Assignment Details as per the format provided.<br>• In Case of completed project - Case study + Copy of work order + Assignment Details as per the format provided.+ Completion Certificate<br>• In case of NDA, Company Secretary / Chartered Accountant Signed Certificate providing details of Scope of work and Value and phase of project.<br>• In case the experience shown is that of the bidder's parent / subsidiary company, then the following additional documents are required:<br>o Letter from the Company Secretary of the bidder certifying that the entity whose experience is shown is parent/subsidiary Company.<br>o Shareholding pattern of the bidding entity as per audit reports<br>o Parent Company and subsidiary company shall be construed as defined under company's act 2013 | 7.5 |

| | | | | |
|---|---|---|---|---|
| **3.** | **Experience in Implementation & maintenance of application in cloud hosted environment in India or abroad** | Lead Bidder or its consortium members having experience in Implementation & maintenance of application in the cloud hosted environment in last ten (10) financial years. Value of each project to be at least INR 20 crores.<br>• 3 citations =7.5 marks,<br>• 2 citation = 5 marks<br>• 1 citation = 2.5 marks<br>• else 0 Marks | • In Case of ongoing project - Case study + Copy of work order + Assignment Details as per the format provided.<br>• In Case of completed project - Case study + Copy of work order + Assignment Details as per the format provided.+ Completion Certificate<br>• In case of NDA, Company Secretary / Chartered Accountant Signed Certificate providing details of Scope of work and Value and phase of project.<br>• In case the experience shown is that of the bidder's parent / subsidiary company, then the following additional documents are required:<br>o Letter from the Company Secretary of the bidder certifying that the entity whose experience is shown is parent/subsidiary Company.<br>o Shareholding pattern of the bidding entity as per audit reports<br>o Parent Company and subsidiary company shall be construed as defined under company's act 2013 | 7.5 |

| | | | | |
|---|---|---|---|---|
| **4.** | **Experience in Implementation of integrated ICT based Smart City / Emergency Services for city / Law Enforcement / Telecom / Defense including Command and Control Center (CCC) / Network Operating Center (NOC) in India or abroad** | Lead Bidder or its consortium members having experience in Implementation & maintenance of Command & Control Center Project in last ten (10) financial years. Value of each project to be at least of INR 20 crores.<br>• 3 citations =7.5 marks,<br>• 2 citation =5 marks<br>• 1 citation = 2.5 marks<br>• else 0 Marks | • In Case of ongoing project - Case study + Copy of work order + Assignment Details as per the format provided.<br>• In Case of completed project - Case study + Copy of work order + Assignment Details as per the format provided.+ Completion Certificate<br>• In case of NDA, Company Secretary / Chartered Accountant Signed Certificate providing details of Scope of work and Value and phase of project.<br>• In case the experience shown is that of the bidder's parent / subsidiary company, then the following additional documents are required:<br>○ Letter from the Company Secretary of the bidder certifying that the entity whose experience is shown is parent/subsidiary Company.<br>○ Shareholding pattern of the bidding entity as per audit reports<br>○ Parent Company and subsidiary company shall be construed as defined under company's act 2013 | 7.5 |

| | | | | |
|---|---|---|---|---|
| **5** | **Live Demo / POC** | Bidders will be required to do the Demo / POC of a maximum of 15 smart city use cases. Bidder will be given minimum of 1 week to establish setup for infrastructure doing the Demo / POC at Tamil Nadu. Bidder will be provided with a room from TUFIDCO to do the required setup. Details of the use cases are provided in the Annexure 16 of this RFP. | For each successful demonstration of a use case, 2 marks shall be provided. | 30 |
| **Total** | | | | **60** |

**Note:**

1. For parameter 2,3,4,

   i. Bidders are allowed to submit experience in terms of technical qualification of their holding company and/or subsidiary company only. For the purpose of this clause,

      a. a 'holding company', in relation to one or more other companies, means a company of which such companies are subsidiary companies; and

      b. a 'subsidiary company' in relation to any other company (that is to say the holding company), means a company in which the holding company— (a) controls the composition of the Board of Directors; or (b) exercises or controls more than one-half of the total share capital at its own

   ii. For the purpose of evaluation criteria, if the bidding company (the lead bidder in case of consortium) is 100% subsidiary of an international or Indian company then the lead bidder's parent company's or parent company's other subsidiary relevant experience can be considered as lead bidder's experience.

   iii. For projects where fee has been received in any currency other than Indian Rupees, than the foreign currency conversion rate available on Reserve Bank of India's portal as on the date of publication of the tender document shall be used for conversion of amount in foreign currency to Indian Rupees equivalent Projects executed for bidder's own or bidder's group of companies shall not be considered.

   iv. For the above criteria bidder means Lead Bidder or its consortium partners (in case of consortium)

### 2.6.2 Proposed Solution, Approach and Methodology (Total Marks-05)

Bidder has to provide answers of the below mentioned questions in form of write-up (maximum 3 A4 sheets per question except for question no 10, for which max 50 sheets are permitted) as a part of Technical Proposal evaluation.

| Sr # | Questions | Maximum Marks |
|---|---|---|
| **1.** | High level Architecture of the solution proposed for the complete project as per the RFP and Proposed solution for common cloud based DC and DR to meet the functionalities as given in RFP. | 1 |
| **2.** | Proposed solution for networking along with Network Architecture between City ICCC and common cloud based DC & DR to meet the functionalities as given in RFP | 1 |
| **3.** | Major risks for the project and also propose suitable mitigation plan for each of these risks. | 1 |
| **4.** | How the proposed solution ensures the fool proof security to the system from various threats including hacking attempts, internal threats, etc? Please explain in detail approach towards the security of the overall solution from external and internal threats | 1 |
| **5.** | ICCC platform OEM roadmap for next 10 years along with planned L1, L2 and L3 support | 1 |
| **Total** | | **5** |

### 2.6.3 Project Governance, Exit Management and Transition Management (Total Marks-05)

| # | Criteria | Criteria Details | Marks Allotted |
|---|---|---|---|
| 1 | **Project Governance Framework** | **State Level**<br>Bidder is required to submit the Governance framework in line with this RFP for the State level, it must include the following:<br>• Organization Structure of the common resources deployed across the state<br>• Resource Reporting mechanism<br>• Format of the reports (to be submitted at the state level for the common components and project progress)<br>• Frequency of the reporting<br>• Structure of the review meeting with the Management Committee of this project<br>All the above mentioned line items are to be submitted along with technical proposal as Project Governance Mechanism.<br>This should also be part of the technical presentation.<br>It is expected that at the time of actual execution of this RFP, all the commitments given by bidder will be adhered.<br>**City Level**<br>Bidder is required to submit the Governance framework in line with this RFP for the City level, it must include the following:<br>• Organization Structure of the resources deployed at the city level<br>• Resource Reporting mechanism<br>• Format of the reports (to be submitted at the state level for the city level components and project progress)<br>• Frequency of the reporting<br>• Structure of the review meeting with the City level steering Committee of this project | 5 |

| | | | |
|---|---|---|---|
| | | All the above mentioned line items are to be submitted along with technical proposal as Project Governance Mechanism.<br>This should also be part of the technical presentation.<br>It is expected that at the time of actual execution of this RFP, all the commitments given by bidder will be adhered. | |
| **Total** | | | **5** |

### 2.6.4. Common Command Center Application

| # | Criteria | Criteria Details | Marks Allotted |
|---|---|---|---|
| 1 | **Number of deployments on cloud across the globe** | Proposed platform for City Control and Command Center by bidder should have been deployed in India or abroad in last 5 years, with each project of value Rs.5 Cr and above<br><br>The platform should be deployed with atleast any 3 unique and relevant use cases of the following like Smart Lighting, Parking, environment, Parking video nodes, Video Surveillance, Smart Card, Wi-Fi , Smart Energy, Smart Water, Smart Waste Management, Environment Monitoring, Citizen Service Delivery, Mobile work-force management, KPI Monitoring & Executive Dashboards and law enforcement.<br><br>• 5 citations (with 2 hosted on cloud) = 10 mark,<br>• 4 citations = 8 marks,<br>• 3 citations = 5 marks,<br>• 2 citation = 2 marks<br>• else 0 Marks<br><br>Bidder to submit Case study + Copy of work order/Client certificate detailing Scope & value from platform OEM along with name of cities and details of use cases being handled.<br><br>In Case of ongoing project - Case study + Copy of work order + Assignment Details as per the format provided.<br>In Case of completed project - Case study + Copy of work order + Assignment Details as per the format provided.+ Completion Certificate<br><br>In case of NDA, Company Secretary / Chartered Accountant Signed Certificate of OEM providing details of Scope of work and Value & phase of project. | 10 |
| 2 | **Cloud Service Provider (CSP) Experience** | The experience of Cloud Service Provider (CSP) in provisioning various services through cloud on their Cloud for Government in India or Globally<br><br>• 4 projects (minimum 2 for Indian Government client (Center / State / PSU))= 10 marks<br><br>• 3 Projects (minimum 2 for Indian Government client (Center / State / PSU))= 8 marks | 10 |

| | | | |
|---|---|---|---|
| | | • 2 projects (minimum 1 for Indian Government client (Center / State / PSU))=5 marks<br>Bidder to submit relevant documentation for the CSP experience.<br>In Case of ongoing project - Case study + Copy of work order + Assignment Details as per the format provided.<br>In Case of completed project - Case study + Copy of work order + Assignment Details as per the format provided.+ Completion Certificate<br>In case of NDA, Company Secretary / Chartered Accountant Signed Certificate of CSP providing details of Scope of work and Value & phase of project. | |
| **3** | **Cloud Service Provider (CSP) Capabilities** | CSP is required to have min 3 or maximum 5 of the following Capabilities:<br>• Geographical Location of the Disaster Recovery Environment in different seismic zone from the production environment<br>• ISO 27001 - Data Center and the cloud services should be certified for the latest version of the standards<br>• The NOC and SOC facility must be within India for the cloud environment and the managed service quality should be certified for ISO 20000:1<br>• PCI DSS - compliant technology infrastructure for storing, processing, and transmitting credit card information in the cloud<br>• Data Transfer Bandwidth: Bandwidth utilized to transfer files/objects in/out of the providers infrastructure supporting a minimum of 10GB of data transferred (in and out) within 1 hour via the network<br>• ITIL Framework for service delivery<br>2 marks for each capability. | 10 |
| **Total** | | | **30** |

# 3. Award of Contract

## 3.1 Notification of Award

Smart City SPV will notify the successful Bidder in writing by e-mail followed by courier to be confirmed by the Bidder in writing by email followed by courier.

## 3.2 Signing of Contract

After the notification of award, TUFIDCO will issue Purchase Order (PO)/Letter of Intent (LOI). Accordingly, a contract shall be signed between successful bidder and TUFIDCO or the agency designated by TUFIDCO. As an acceptance of the PO/LoI, the Bidder shall sign and return back a duplicate copy of the Purchase Order to TUFIDCO or the agency designated by TUFIDCO. The bidder shall return the duplicate copy along with a Performance Bank Guarantee within 15 working days from the date of issuance of PO/LoI.

On receipt of the Performance Bank Guarantee, Smart City SPV or the agency designated by Smart City SPV shall enter into a contract with the successful bidder. The Master Service Agreement is provided in RFP.

**Methodology for executing the project by TUFIDCO and respective cities**

- Each City to agree and finalize the scope of work and BoQ with selected MSI
- Each city will issue its Work Order (WO) to initiate work in the respective city.
- On receipt of the Work Orders, MSI will be required to engage with each city as per terms and conditions of this RFP.

## 3.3 Performance Bank Guarantee (PBG)

Within fifteen (15) working days from the date of issuance of LoI, the successful Bidder shall at his own expense submit unconditional and irrevocable Performance Bank Guarantee (PBG) to the TUFIDCO. The PBG shall be from a Nationalized Bank or a Scheduled Commercial Bank in the format prescribed in Section 9 - Annexure 5 (a), payable on demand, for the due performance and fulfilment of the contract by the bidder.

This Performance Bank Guarantee shall be for an amount equivalent to 10% of total financial bid value (as per the financial bid format of the RFP). PBG shall be invoked by TUFIDCO, in the event the Bidder:

a. fails to meet the overall penalty condition as mentioned in RFP or any changes agreed between the parties,

b. fails to perform the responsibilities and obligations as set out in the RFP to the complete satisfaction of TUFIDCO,

c. Misrepresents facts/information submitted to TUFIDCO

The performance bank guarantee shall be valid till satisfactory completion of Post Implementation Support (3 months from the expiry of the term of the contract.). The performance bank guarantee may be discharged/returned by TUFIDCO upon being satisfied that there has been due performance of the obligations of the bidder under the contract. However, no interest shall be payable on the performance bank guarantee.

In the event of the Bidder being unable to service the contract for whatever reason(s), TUFIDCO shall have the right to invoke the PBG. Notwithstanding and without prejudice to any rights whatsoever of TUFIDCO under the contract in the matter, the proceeds of the PBG shall be payable to TUFIDCO as compensation for any loss resulting from the bidder's failure to perform/comply its obligations under the contract.

TUFIDCO shall notify the bidder in writing of the exercise of its right to receive such compensation within 40 days, indicating the contractual obligation(s) for which the bidder is in default. TUFIDCO shall also be entitled to make recoveries from the bidder's bills, performance bank guarantee, or from any other amount due to him, an equivalent value of any payment made to him due to inadvertence, error, collusion, misconstruction or misstatement.

In case the project is delayed beyond the project schedule as mentioned in RFP, the performance bank guarantee shall be accordingly extended by the Bidder till completion of scope of work as mentioned in RFP.

This Performance Bank Guarantee shall be valid only up to 3 months from the expiry of the term of the contract.

On satisfactory performance and completion of the order in all respects and duly certified to this effect by the Project Coordinator, Contract Completion Certificate shall be issued and the PBG would be returned to the Bidder.

### 3.4 Warranty & Maintenance

Bidder shall also provide complete warranty and maintenance support for all the proposed integrated solution, software development/deployed as outlined in this RFP for a complete duration of this project i.e. 60 months from Go-live date.

"Go-live" is the date on which the proposed solution is completely operational as per the requirements provided in this RFP and all the acceptance tests are successfully concluded to the satisfaction of City SPVs (for City ICCC) and TUFIDCO (for Common Cloud Based DC and DR).

During the warranty period, the bidder shall warrant that the goods supplied under the contract are new, unused, of the most recent version/models and incorporate all recent improvements in design and materials unless provided otherwise in the contract. The bidder further warrants that the goods supplied under this contract shall have no defects arising from design, materials or workmanship.

TUFIDCO or designated representatives of the bidder shall promptly notify successful bidder in writing of any claims arising under this warranty. Upon receipt of such notice, the bidder shall, within the warranty period and with all reasonable speed, repair or replace the defective systems, without costs to TUFIDCO and within time specified and acceptable to TUFIDCO.

If the successful bidder, having been notified, fails to remedy the defect(s) within the period specified in the contract, TUFIDCO may proceed to take such reasonable remedial action as may be necessary, at the successful bidder's risk and expense and without prejudice to any other rights, which TUFIDCO may have against the bidder under the contract.

During the comprehensive warranty period, the successful bidder shall provide all product(s) and documentation updates, patches/fixes, and version upgrades within 15 days of their availability and should carry out installation and make operational the same at no additional cost to TUFIDCO / City SPVs.

The successful bidder hereby warrants TUFIDCO that:

The implemented integrated solution represents a complete, integrated solution meeting all the requirements as outlined in the RFP and further amendments if any and provides the functionality and performance, as per the terms and conditions specified in the contract.

ii. The proposed integrated solution shall achieve parameters delineated in the technical specification/requirement.

iii. The successful bidder shall be responsible for warranty services from licensers of products included in the systems.

iv. The successful bidder undertakes to ensure the maintenance of the acceptance criterion/standards in respect of the systems during the warranty period.

### 3.5 Failure to agree with the Terms & Conditions of the RFP

Failure of the successful bidder to agree with the Terms & Conditions of the RFP shall constitute sufficient grounds for the annulment of the award, in which event TUFIDCO may award the contract to the next best value bidder or call for new bids.

In such a case, TUFIDCO shall invoke the PBG and/or forfeit the EMD.

# Schedule 2 – Detailed Scope of Work

## 1 Introduction

MSI (along with its consortium partner) will be responsible for implementation and maintain the Cloud based common DC and DR along with City Integrated Command and Control Center (ICCC) for 9 Smart Cities of Tamil Nadu. The 10 cities are- Coimbatore, Madurai, Salem, Thanjavur, Tiruchirapalli, Vellore, Tirunelveli, Tiruppur, Erode and Thoothukudi and a State level ICCC at Chennai. The scope includes software/solution development and implementation, Information Technology (IT) and required Non IT infrastructure procurement, deployment, implementation and maintenance of the city ICCC systems and a common cloud based data center. DR of this data center will be on cloud based technology. MSI will also provide necessary network connectivity between all the city command and control center and cloud based data center for efficient operations.

TUFIDCO, on behalf of other cities and State, may ask for addition of more cities under this project during the project duration.

The maintenance phase will be for a period up to 5 (five) years from the Go-Live.

MSI needs to design, implement and operate the common cloud based DC and DR along with city ICCC. MSI needs to do the appropriate solution design and sizing for the project as per the scope of work and other terms and conditions of the RFP. In case MSI has not considered any component/service which is necessary for the project requirement, the same needs to be brought by the MSI at no additional cost to TUFIDCO / City SPVs.

***Integration / Intermediate Service can be implemented under Infrastructure as a Service***

Development and Integration of various services pertaining to E-governance platform for Citizens and ULBs of various cities is the key component of scope of work of MSI. For all the services which belongs to other department (other than Municipal Corporations) like DIAL 100- Police Department or DAIL 108 - etc., providing the necessary information, access and approvals will be the responsibility of TUFIDCO. In the event for any reasons (beyond the control of TUFIDCO or MSI for particular service) the approvals are not provided by the other government department, the scope and the fee would be adjusted proportionately.

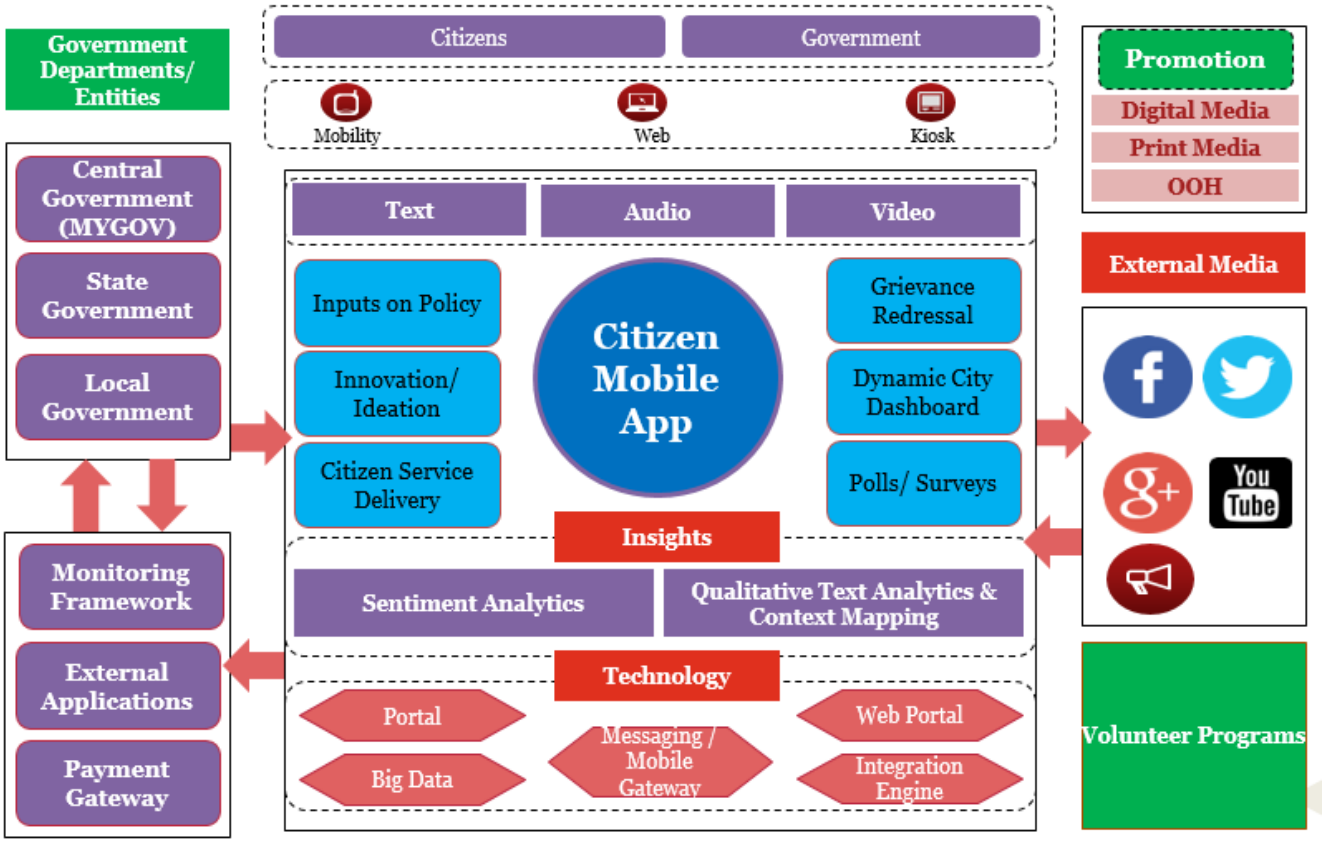
MSI has to adhere to the standards as per the guidelines mentioned in http://egovstandards.gov.in/guidelines for Policy, Framework, Smart City design, supply, configuration and custom API development for integration.

### 1.1 Citizen Services Mobile Application

The Citizen Mobile Application will serves as a single unified platform for the citizens to engage with the government, avail citizen centric (G2C & B2C services), register municipality related complaints, receive issue resolution, access live city feeds through the city dashboard, learn about governance schemes, projects, and initiatives. The four main components of the planned platform are: *Citizen Collaboration, Grievance Redressal, Citizen Service Delivery (G2C & B2C services) and City Dashboard*

Citizen application will have separate frontend as per city's requirements whereas the backend engine will remain common for all the cities.

The Citizen Mobile Application will receive grievances and inputs from both citizen and the Government, using multiple channels (including external social media) to drive the different redressal services, and in turn disseminate information using external media and the platform itself as channels. All the discussion topics, surveys, polls, blogs are specific to discussion groups. Hence, separate Government departments can create and moderate different discussion groups and the discussion topics, surveys, polls and blogs can be created within these discussion groups and moderated by the concerned Government department using the admin console. The solution also boasts of a robust analytical engine, a dedicated team to monitor and update the collaboration platform and TUFIDCO stakeholders about the citizen sentiment/feedback on various discussion topics/polls on regular intervals.




**1.2** **Common Cloud based DC and DR** – Common Cloud based DC & DR will be a PaaS (Platform as a Service) Component of the smart city project. Functional requirements related to Common Cloud based DC & DR are provided in Annexure -1 of the Schedule – 4

## 1.3 City Level ICCC

City level ICCCs will be integrated with State level ICCC for sharing the City Dashboard and major analytics. City level ICCC will have a helpdesk for citizen grievances. City level ICCC will include sitting arrangement of 9-10 persons. ICCC operators will include staff from various line departments of Tamil Nadu.

## 1.4 E-Governance Application

The Enhancement and integration of Existing E-Governance platform with Cloud based DC & DR is also in the scope of MSI. The MSI is required to enhance the current application and add the missing modules of E-Governance application which are required for seamless operations for all the ULBs and departments of Ten Cities of Tamil Nadu.

## 1.5 GIS Platform

Each city may have its own GIS application for providing GIS MAP based services. The MSI should be able to integrate these GIS layers on user interface of command and control software application. Existing ArcGIS software available with urban local bodies should be reused / upgrade as needed. Procurement of GIS Software only if urban local bodies need additional modules and user licensing

## Overview of Scope

The snapshot of scope is as below:

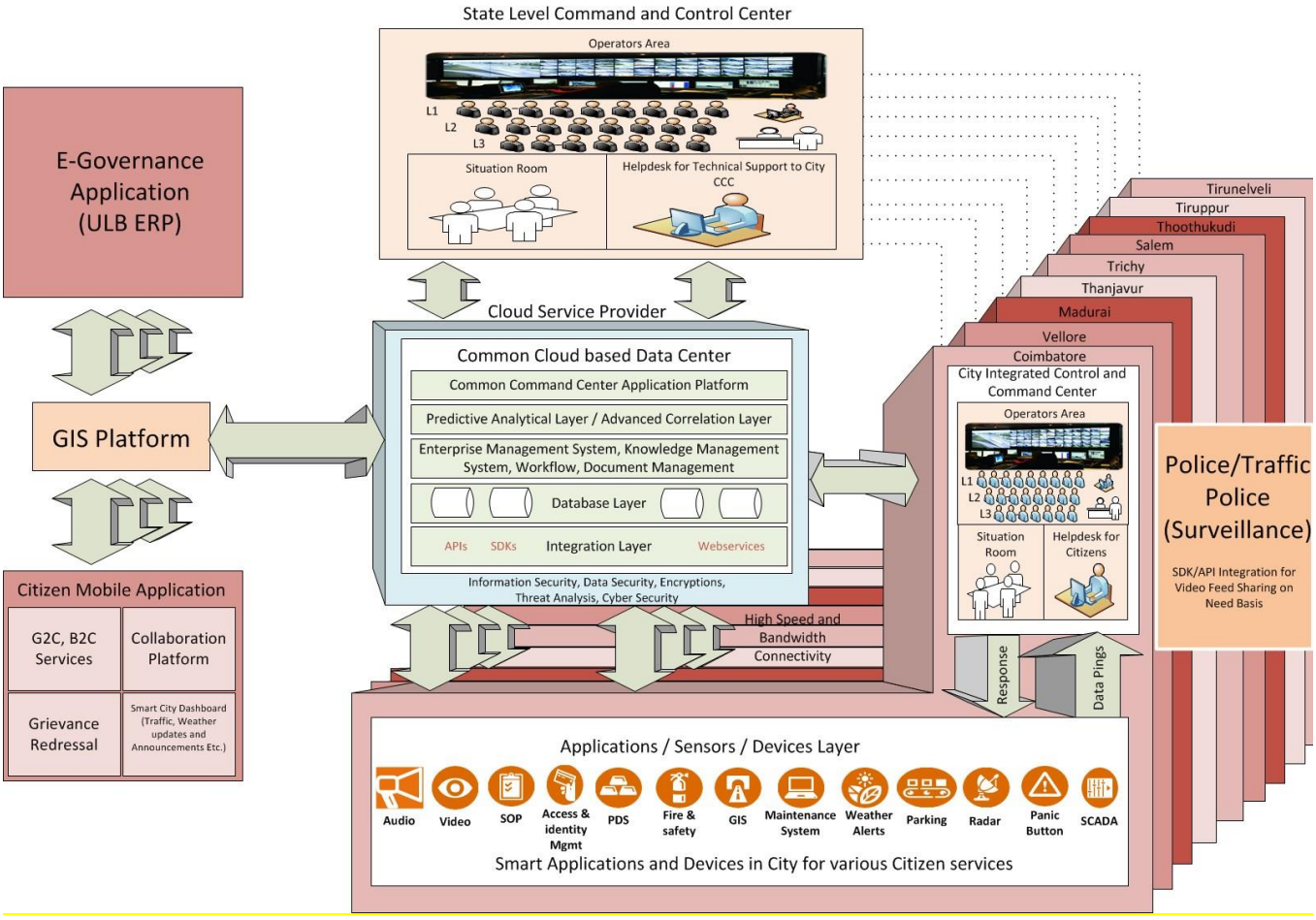
1. The MSI will conduct a detailed assessment and design a comprehensive technical architecture and project plan including:

    a. Design and establishment of state level Cloud based common data center and DR for all 10 cities. Disaster recovery will also be cloud based for this data center.
    b. Design and development of comprehensive application for city command and control operations. This application will also have an integrated platform (state and city level) for city operations for 10 cities and dashboard application that integrates various Smart City use cases on this platform.
    c. The common smart city software platform would be hosted at cloud.
    d. This platform would have facility of comprehensive viewing and performing operations at state level.
    e. There will be a provision for generating configurable reports through dashboard and also real time monitoring at state level.
    f. City ICCC Module will have provisions for future integration with various city level projects/initiatives.
    g. Implement an API Management platform that provides Modelling, designing policies that govern API externalization (consumption) and capabilities to monitor its usage, report with analytics, secures and governs the access to APIs and provides portal interface to facilitate partner/developer onboarding.

h. Conduct Integration test cases to achieve seamless integration with envisaged smart city systems and applications.
i. Design and Develop the E-governance portal leveraging the existing web based application for ULBs and citizens of Tamil Nadu. Existing E-Governance Application/Platform can be accessed by using the url
j. Citizen Services Mobile application
k. MSI will design and implement an common framework based portal for each smart city

**2.** MSI will design, supply, Configure and maintain the ICCC software platform with integration of smart city components.

Following is the Concept diagram which depicts the City Integrated Command and Control Center integrated with various other IT components of 10 Smart Cities of Tamil Nadu.




A. MSI will design, supply, install and maintain City Command and Control Center for each city comprising of:

1. Video Wall & controller system
2. Integrated Command and Control Center Application.
3. Operator Workstation and accessories

4. Situation Room
5. Civil Work like false floor, ceiling, ducting, DG Set, UPS, furniture, fixtures, LAN etc.

B. MSI will be required to conduct the city survey of the existing systems and accordingly define the implementation roadmap for ICCC for each city.

1. Assessment of the business requirements and IT Solution requirements for city ICCC
2. Design and build the solution for city ICCC as per the Design Considerations
3. Design and build the Cyber Security infrastructure
4. Plan for development, configuration and customization of software products
5. Conduct Integration test cases to achieve seamless integration with envisaged smart city systems and applications

C. MSI will design, supply, install and commission the network and backbone connectivity
D. MSI will supply, install and maintain Infrastructure including Hardware and Application Software
E. MSI will supply, install and maintain Infrastructure including ICT and non- ICT components

F. MSI will provide and maintain the Hardware and Software IT infrastructure services at Data Center/ Recovery Center hosted on cloud for recovering the data in case of crash of server at the city ICCC.

G. MSI will manage and maintain the outbound calling facilities in City ICCC for managing incidents / disasters. However the lines for outbound calling facilities will be arranged by City SPV.

H. MSI will be required to provide Help Desk for all cities ICCC for following activities:

1. Technical and operational support of the system
2. Maintenance of the IT and Non-IT Infrastructure
3. Technical & Operational Manpower for smooth running of the system

I. MSI will provide the design and area specific requirement for the Physical building for city ICCC for all 10 Cities. MSI must appoint Civil Architect and Interior designer for doing a designing and defining the requirements for each city ICCC (with maximum rea of 4,000 sq. feet).

J. ICCC design must be futuristic in nature keeping in view the future requirements of physically collocating all the other Command and Control centers under one roof.

K. MSI should present design of the ICCC using 3D modelling, which can be refined and present the final view of the actual ICCC (with maximum area of 4,000 sq. feet).

L. MSI will supply, install and maintain the Integrated Building Management System (IBMS) with following sub systems for ICCC building:

1. Access control system
2. Surveillance System
3. Physical security system

4. Building Management System for controlling and monitoring the building's mechanical and electrical equipment such as HVAC, Water supply, fire systems etc.

## 1.6 Detailed Scope of Work for Cloud based DC, DR, City ICCCs and State ICCC

### 1.6.1 Standard Approach for Preparation of detailed technical architecture and project plan for all components

After signing of contract, the MSI needs to deploy the team proposed for the project at site during development phase to ensure that a Project Inception Report is submitted to TUFIDCO/ City SPV which should cover following minimum aspects:

a. Project Charter, Project concept understanding
b. Names of the Project Team members, their roles & responsibilities
c. Approach & methodology to be adopted to implement the Project (which should be in line with what has been proposed during bidding stage, but may have value additions / learning in the interest of the project)
d. Define an organized set of activities for the project and identify the interdependence between them.
e. Establish and measure resource assignments and responsibilities
f. Highlight the milestones and associated risks
g. Responsibility matrix for all stakeholders
h. Communicate the project plan to stakeholders with meaningful reports.
i. Measure project deadlines and performance objectives.
j. Detailed Project Plan, specifying dependencies between various project activities / sub-activities and their timelines.
k. Define Project Progress Reporting Structure which should cover the following parameters:
    i. Cumulative deviations from the schedule date as specified in the finalized Project Plan
    ii. Corrective actions to be taken to return to planned schedule of progress
    iii. Plan for the next week
    iv. Proposed revision to planned schedule provided such revision is necessitated by reasons beyond the control of MSI
    v. Support needed
    vi. Highlights/lowlights
    vii. Issues/Concerns
    viii. Risks/Show stoppers along with mitigation

l. Identify the activities that require the participation of client personnel (including TUFIDCO / City SPV, the Program Management Unit etc.) and communicate their time requirements and schedule early enough to ensure their full participation at the required time.

#### *1.6.1.1 Requirement Gathering Stage*

The MSI shall conduct the detailed assessment of the business requirements and IT Solution requirements for ICCC (in each city) and cloud based common DC and DR as mentioned in this

RFP. Based on the understanding and its own individual assessment, MSI shall develop & finalize the System Requirement Specifications (SRS) in consultation with TUFIDCO and city SPV. For city specific needs MSI will consult city SPV and other relevant stakeholders, TUFIDCO will play role of facilitation as project execution agency. While doing so, MSI is expected to do following:

a. MSI shall study and revalidate the requirements given in the RFP with TUFIDCO and submit as an exhaustive FRS document.
b. MSI shall translate all the requirements as captured in the FRS document into SRS.
c. All the documents created for City ICCC will be submitted to CITY SPV and for common Cloud based DC and DR along with common applications will be submitted to TUFIDCO for review and approval.
d. MSI shall develop and follow standardized template for requirements capturing and system documentation.
e. MSI must maintain traceability matrix from SRS stage for the entire implementation.
f. MSI must get the sign off from user groups formed by TUFIDCO / City SPV.
g. For all the discussion with TUFIDCO / City SPV team, MSI shall be required to be present at TUFIDCO / City SPV office with the requisite team members.
h. TUFIDCO / City SPV will provide necessary support for gathering required information and obtaining required data access for future technical integrations of external systems with ICCC from other departments.
i. TUFIDCO / City SPV or its appointed PMC will help MSI define the fields of data to be stored on cloud based DC and DR for each service.
j. MSI will prepare interoperability traceability matrix with third party systems (existing legacy systems with city ICCC) in consultation with TUFIDCO / City SPV and other relevant stakeholders (of external systems). Interoperability is an ability of one system to interact with another system. This matrix will cover all the use cases of system interaction and data movement.

#### *1.6.1.2 **Design Stage***

The MSI shall design and build each city ICCC and common DC and DR (cloud based hosting) as per the Design Considerations detailed in **Annexure – 1,2 and 12**. The solution proposed by MSI should comply with the design considerations requirements as mentioned therein.

#### *1.6.1.3 **Development Phase***

The MSI shall carefully consider the scope of work and provide a solution that best meets the proposed city ICCC requirements.

The implementation of the application software for Common Command Center applications will follow the procedure mentioned below:

a. Software Products (Configuration and Customization): In case MSI proposes software products the following need to be adhered:

i. MSI shall be responsible for supplying the application and licenses of related software products and installing the same so as to meet ICCC requirements.

ii. MSI shall have provision for procurement of licenses in a staggered manner as per the actual requirement of the project.

iii. The MSI shall perform periodic audits to measure license compliance against the number of valid End User software licenses consistent with the terms and conditions of license agreements, volume purchase agreements, and other mutually agreed upon licensed software terms and conditions. The MSI shall report any exceptions to license terms and conditions at the right time to TUFIDCO. However, the responsibility of license compliance solely lies with the MSI. Any financial penalty imposed on TUFIDCO during the contract period due to license non-compliance shall be borne by MSI.

iv. The MSI shall deploy a tool which can simulate unavailable systems across the software development lifecycle (SDLC), allowing developers, testers, integration, and performance teams to work in parallel for faster delivery and higher application quality and reliability.

v. MSI shall also supply any other tools & accessories required to make the integrated solution complete as per requirements. For the integrated solution, the MSI shall supply:

- Software & licenses.
- Supply tools, accessories, documentation and provide a list of the same. Tools and accessories shall be part of the solution.
- **System Documentation**: System Documentation both in hard copy and soft copy to be supplied for City ICCC and common command center applications to be hosted on cloud along with licenses (wherever applicable), document updates and shall include but not limited to following:
    - Functional Requirement Specification (FRS)
    - High level design of whole system
    - Low Level design for whole system / Module design level
    - System Requirements Specifications (SRS)
    - Any other explanatory notes about system
    - Traceability matrix
    - Technical and product related manuals
    - Installation guides
    - User manuals
    - System administrator manuals
    - Toolkit guides and troubleshooting guides
    - Other documents as prescribed by TUFIDCO
    - Quality assurance procedures
    - Change management histories

- Version control data
- SOPs, procedures, policies, processes, etc. developed for City SPV for each service integration.
- Programs:
  - Entire source codes (for the Bespoke customization, APIs etc build / customized for this project)
  - All programs must have explanatory notes for understanding
  - Version control mechanism
  - All old versions to be maintained
- Test Environment:
  - Detailed Test methodology document
  - Module level testing
  - Interoperability Testing
  - Overall System Testing
  - Acceptance test cases

- The above mentioned documents are required to be updated and to be maintained updated during entire project duration. The entire documentation will be the property of TUFIDCO.

b. Bespoke (Custom Developments – wherever applicable)

i. The successful MSI shall identify, design and develop the customization for components/functionalities that are required to address the requirements mentioned in this RFP.

ii. The MSI shall supply the following documents along with the developed components:

- Business process guides
- Program flow descriptions
- Data model descriptions
- Sample reports
- Screen formats
- Frequently asked question (FAQ) guides
- User manual
- Technical manual
- Any other documentation required for usage of implemented solution

#### *1.6.1.4 **Integration & Testing Phase***

The common cloud based Command and Control Center Application (CCCA) at ICCC should be integrated with data feeds of the various Smart City systems envisaged under the each Smart City Programme.

Illustrative example for Tamil Nadu Smart City:

i. Integration with Smart Parking

ii. Integration with Public Bike Sharing
iii. Integration with Smart Pole & Smart Lighting
iv. Integration with Solid Waste Mgmt. Services (Tracking of Solid Waste Vehicles)
v. Integration with Intelligent Traffic Management System (Police)
vi. Integration with Municipal Corporations Call Center & Municipal Corporations Services
vii. Integration with Smart MAP (GIS)
viii. Integration with Citizen Mobile Application
ix. Integration with DIAL 100
x. Integration with DIAL 108
xi. Integration with Transport Management System (BCLL)
xii. Integration with CCTV Surveillance (Police Deptt.)
xiii. Integration with Dynamic Market Place (Mayor Express)
xiv. Integration with Emergency Response and Disaster Mgmt.
xv. Integration with Water Management System
xvi. Integration with Met Department (Local Weather Forecast)
xvii. Integration with Area Based Development (ABD) Services
- Utilities
- Lighting
- Metering
- Surveillance

xviii. Integration with Crowdsourcing Data
xix. Integration with Fire Brigade Control System
xx. Integration with Solar Roof Top System
xxi. Any other services implemented in near future during the project period*

For the Ten Smart Cities of Tamil Nadu these initiatives are mentioned in Annexure of this RFP

*These other services will be additional work and will be taken up as “Change request” following the process defined in Schedule 3 of this RFP. Change request will be given by each individual city based on their requirement.

Broadly there are four kinds of data feed possible from all of the above systems. The software solution provided by MSI should have the capability to integrate these all four types of data.

| | |
|---|---|
| **Video Feed** | CCTV Cameras or other Cameras |
| **Sensor Data** | SCADA Sensors, Environmental Sensor, SWM Vehicles, Smart Lights Sensor Data, Smart Parking Sensor Data |
| **Structured Data Packets** | SCADA GIS Data, DIAL 100 (GPS Co-ordinates of vehicles), Alert messages, ITMS, Citizen Mobile App, |
| **Voice Call** | Calls from DIAL 108 call center, DIAL 100, IVRS System. |

The MSI shall provide the testing strategy including traceability matrix, test cases and shall conduct the testing of various components of the software developed/customized and the solution as a whole. The testing should be comprehensive and should be done at each stage of development and implementation.

The detailed testing requirements are mentioned in subsequent section.

#### *1.6.1.5 Integration of Future IT initiatives*

The software solution should be scalable and modular in structure and should be able to integrate other future IT initiative of various Smart Cities of MP. The bidder should estimate and provide estimated cost of extra service integration in terms of man month rate (Rate Card). The Rate card will be valid for 5 (five) years. This rate card will be for extra work only and it should not be the part of Financial bid.

#### *1.6.1.6 Go-Live Preparedness and Go-Live*

a. MSI shall prepare and agree with TUFIDCO / City SPV, the detailed plan for Go-Live for each city ICCC which should be in-line with City SPV's implementation plans.

b. MSI shall prepare and agree with TUFIDCO / City SPV, the detailed plan for Go-Live for cloud based common data center which should be in-line with State's implementation plan as mentioned in RFP.

c. As per clause 1.3.21 Go-Live for ICCC will be considered when the identified 1 services is integrated, tested, and operational from ICCC.

d. This service may be different for each city.

e. The MSI shall define and agree with City SPV, the criteria for Go-Live for each city ICCC.

f. The MSI shall ensure that all the system integration is done with existing systems of agreed 10 services.

g. MSI shall submit signed-off UAT report (issue closure report) for each city ICCC ensuring all issues raised during UAT are being resolved prior to Go-Live.

h. MSI shall ensure that Go –Live criteria as mentioned in User acceptance testing section is met and MSI needs to take approval from TUFIDCO/ City SPV team on the same.

i. Go-live of the application shall be done as per the finalized and agreed upon Go-Live plan.

### 1.6.2 Standard Procurement, Supply, Installation and Commissioning of IT infrastructure at City ICCC and State Level ICCC

The MSI shall be responsible for procurement, supply and installation of entire ICT hardware and software infrastructure at each City Integrated Command and Control Center (ICCC) for successful operations of the systems. The Primary Data Center and Date Recovery Center of all the smart cities will be on cloud. The ICT infrastructure includes Video walls, Desktop Computers, Networking & Security equipment, operating systems, database, enterprise management system and other related IT infra required for running and

operating the envisaged system. A Centralised Helpdesk will only be established in the State ICCC by the MSI. The ICT infra procurement will be planned considering the below factors:

a. Ensure redundancy for all the key components to ensure that no single point of failure affects the performance of the overall system
b. Support peak loads
c. MSI will not procure Infrastructure including Hardware, COTS Software licenses and other system software etc. at the start of the project, but will procure after discussion and receipt of go ahead from TUFIDCO / City SPV.
d. MSI shall optimize procurement of ICT infrastructure i.e. the equipment shall not be procured earlier than its requirement.
e. Virtualization technologies to be used to reduce the physical space required for hosting and storage at city ICCC.
f. ICT infra deployed for ICCC should be dedicated for the project and MSI shall not use the same for any other purpose.
g. The ownership of infrastructure for Cloud based common DC and DR along with licenses of common hosted applications for all 9 smart cities command centers shall get transferred to TUFIDCO after “Acceptance and Go Live” of such items by TUFIDCO/ appointed TPAs.
h. The ownership of infrastructure for City ICCC shall get transferred to City SPV after “Acceptance and Go Live” of such items by city SPV/ appointed TPAs.
i. MSI to ensure warranties/AMCs are procured for all the hardware components for entire duration of the project. For software components the support from OEM to be obtained for prescribed components. There would be a mechanism to verify these details on annual basis.

1. Following are the benchmark requirements which the MSI shall comply while designing the ICCC:

a. Design, Supply, Installation and Commissioning of IT Infrastructure including site preparation of ICCC.
b. Establishment of LAN and WAN connectivity with cloud based data center, ICCC and connectivity of individual Command centers with State ICCC.
c. Application Integration Services within each city ICCC building premises
    - Indoor CCTV Cameras would be required to be installed to monitor the physical access of the system from remote location
    - Physical Access to the building of Command and Control Center should be armed and it must be possible to even depute police personnel for physical security of the premises if felt necessary.
    - Networking & Security Infrastructure and other associated IT Components.
d. 24 x 7 Helpdesk and other monitoring and management services.
e. Purchase of all the Non IT and IT Equipment for the ICCC.
f. Physical infrastructure components for each city ICCC such as UPS, Diesel Generator Units, Power, and cabling for power and data connectivity, etc. The recurring charges of diesel consumption for DG set will be borne by MSI.
g. IT Infrastructure components such as Desktop Computers, Video Walls, Operating System, Networking & Security components, Storage Solution, Software and other IT components required for the ICCC Project.

h. No Products supplied under the RFP should be nearing their date of "end of life". The MSI is supposed to provide the declaration at the time of delivery and installation.
i. All IT equipment models offered should be latest released with bundled version update.
j. Seamless Integration with other Smart City Systems and applications with city ICCC.
k. Procurement and supply of requisite licenses (Commercial off the shelf - COTS), Installation and implementation (including configuration /customization and Testing) of proposed ICCC.
l. All documentation generated inclusive of IT architecture, functional specifications, design and user manuals of the IT solution and documentation of non-IT components during design, installation and commissioning phase shall always be made available to the TUFIDCO.
m. Standard business process management framework should be followed for workflow management with capabilities of configurability at user level.
n. Acceptance of the source code is by installing and generating the object code on a test environment performing identically to that of the production environment.

2. The MSI shall provide system integration services to customize and integrate the applications procured. The ICCC application proposed by the MSI should have open APIs and should be able to integrate and fetch the data from other third party systems already available or coming up in the near future.

3. As part of preparing the final bill of material for the physical hardware, the successful bidder will be required to list all passive & active components required in the command and control center.

   a. The bill of material proposed by the MSI bidder will be approved by TUFIDCO for its supply and installation. Indicative IT Infrastructure to be commissioned as part of the ICCC project at Command and Control Centers are as under:

      i. Application & System Software (for Common Cloud based Command and Control Applications)
         - Integrated Command and Control Center Application
         - GIS software

      ii. Other systems (for local server room – if applicable)
         - Core and Access Switches
         - KVM Switches
         - IP Phones
         - Indoor Fixed Dome Cameras
         - All required Passive Components

   b. The above are only indicative requirements of IT & Non-IT Infrastructure requirements at command and control Center. The exact quantity and requirement shall be proposed as part of the technical proposal of the MSI.

4. The MSI shall prepare the overall data center establishment & their operational plan for this project. The plan shall comprise of deployment of all the equipment required under the project. The implementation roll-out plan for setting up the data center shall be approved by TUFIDCO. The detailed plan shall be also comprise of the scalability, expandability and security that such data center will implement under this project.

5. The MSI shall establish a state of the art Command Center, the key components of the Command Center will be as follows:
    i. Video Walls
    ii. Operator workstations
    iii. IP Phones
    iv. Network printer
    v. Indoor Fixed Dome Cameras for Internal Surveillance
    vi. Active Networking Components (Switches, Routers)
    vii. Passive Networking Components
    viii. Electrical Cabling and Necessary Illumination Devices
    ix. Fire Safety System with Alarm
    x. Access Control System (RFID/ Proximity based, for all staff)
    xi. Full Biometric System to control entry / exit
    xii. Office Workstations (Furniture and Fixtures)
    xiii. Comfort AC
    xiv. Inline UPS (30 minutes backup) – 100% for ICT equipment and 50% for lighting
    xv. Furniture and fixtures

6. Benchmark specifications for various items mentioned above are given in the **Annexure 1 and 2** to this RFP document. The MSI is required to size and provide IT infra to meet the project functional requirements and Service Level Agreements (SLAs).

7. The MSI shall be required to submit a detailed installation report post installation of all the equipment at approved locations. The report shall be utilized during the acceptance testing period of the project to verify the actual quantity of the equipment supplied and commissioned under the project.

### 1.6.3 Components for City ICCC

**This section to be read with Annexure 2 and 12 of this RFP.**

#### 1.6.3.1 Design, Supply, Installation and Commissioning of Network & Backbone Connectivity between cloud based common data center and various city ICCC

1. Network & Backbone Connectivity is one of the most important components of the project and needs very careful attention in assessment, planning and implementation. It is important not only to ensure that the required connectivity is provisioned within the required timelines but also ensure that it is reliable, secure and supports the required SLA parameters of Latency, Jitter, Packet Loss and Performance.

2. It is envisaged that the each city ICCC system shall leverage Network Backbone infrastructure that is being created by TUFIDCO under other smart city initiatives.

3. It is proposed that the MSI would procure bandwidth as a service for the entire duration of project period for the various locations (city) based on the approval from TUFIDCO.

4. MSI should provide the network backbone infrastructure requirements for connectivity between individual command center and cloud based common data center.

Illustrative Example for Tamil Nadu Smart City is listed below:

a. Integration with Smart Parking
b. Integration with Public Bike Sharing
c. Integration with Smart Pole & Smart Lighting
d. Integration with Solid Waste Mgmt. Services (Tracking of Solid Waste Vehicles)
e. Integration with Intelligent Traffic Management System (Police)
f. Integration with Municipal Corporations Call Center & Municipal Corporations Services
g. Integration with DIAL 100
h. Integration with DIAL 108
i. Integration with Transport Management System (BCLL)
j. Integration with CCTV Surveillance (Police Deptt.)
k. Integration with Dynamic Market Place (Mayor Express)
l. Integration with Emergency Response and Disaster Mgmt.
m. Integration with Water Management System
n. Integration with Met Department (Local Weather Forecast)
o. Integration with Area Based Development (ABD) Services
    i. Utilities
    ii. Lighting
    iii. Metering
    iv. Surveillance
p. Integration with Crowdsourcing Data
q. Integration with Fire Brigade Control System
r. Integration with Solar Roof Top System
s. Any other services implemented in near future during the project period*

*These other services will be additional work and will be taken up as “Change request” following the process defined in Schedule 3 of this RFP. Change request will be given by each individual city based on their requirement.

MSI has to provide the network connectivity between all 10 city ICCC and cloud based common DC/DR and State level ICCC. MSI has to coordinate with, TUFIDCO and telecom service provider for setting up last mile connectivity.

5. MSI will be required to maintain the network backbone infrastructure for connectivity between the following individual City Command Center/Components and Cloud based Common Data Center and Data Recovery Center.

6. MSI shall be providing the network backbone infrastructure requirement for connectivity between the following Command Center / Components, State and City ICCC and Cloud based Common Data center and Data Recovery Center.

7. To ensure the easy accessibility of the application by users, MSI need to provide the redundant network connectivity as per the connectivity requirement mentioned below:

a. MSI will provide connectivity between various city ICCC and systems to be integrated with ICCC, point to point connectivity will also be provided by MSI.

b. MSI should provide the appropriate connectivity to meet the application data replication requirement between DC and DR to meet the required Recovery Point Objective (RPO). This should include connectivity between Data Center and City ICCC site and Cloud based Common Data Center and Data Recovery Center.

c. MSI will also provide internet connectivity at each city ICCC site.

d. MSI to provide primary and redundant (standby line) for internet connectivity at each ICCC site.

e. MSI to provide internal connectivity within each city ICCC site.

f. MSI to monitor the network connectivity (being provided by service provider) as per the service levels and highlight the non-compliance.

8. The MSI should provide a detailed network architecture of the proposed overall network system. The network so envisaged should be able to provide real time data streams to the DC and each city ICCC. All the components of the technical network architecture should be of industry best standard and assist MSI in ensuring that all the connectivity SLAs are adhered to during the operational phase.

9. The MSI shall prepare the overall network connectivity plan for this project. The plan shall comprise of deployment of required network equipment in the field to be connected over network, any clearances required from other government departments for setting up of the entire network. The network architecture proposed should be scalable and in adherence to network security standards. It is necessary that 100% of the proposed connectivity should be wired.

10. MSI shall ensure that bandwidth utilization should not cross 70% at any point of time. During the operations if bandwidth utilization reaches 70%, MSI will require to increase the Bandwidth without any additional cost to TUFIDCO.

11. The MSI through EMS should also provide network related reports including the below:

a. Link up/down ( real-time as well as periodic)

b. Link utilization in % ( real-time as well as periodic) (Link utilization should not be more than 70% in each case, barring acceptable occasional surges)

c. Router up/down ( real-time as well as periodic)

d. Top and Bottom N graphs showing the best and worst links in terms of availability (periodic)

e. Reports on threshold violations. Provisions for setting thresholds and getting alerts on threshold violations should be there in the system. (real-time as well as periodic)

f. Bandwidth utilization report for each link and utilization trends. The report should have provisions for displaying the minimum, maximum and average for each link. ( real-time as well as periodic)

g. The monitoring solution provides for application/port level traffic analysis with source and destination identifications

h. Report on jitters, latency due to network parameters, closely linked to reachability shall be available. ( real-time as well as periodic)

12. Router Statistics: CPU utilization and free memory reports of all the routers in the network should be available. Memory and CPU utilization reports will show maximum and minimum against a predefined threshold.

13. In case the Telecommunication guidelines of Government of India require the purchaser to place Purchase Order to the Service Provider for bandwidth, City SPV shall do so. However, MSI shall sign a contract with Telecom Service Provider(s) and ensure the performance. Each city based on pay per use shall make payments to the Service Provider directly.

14. The MSI shall be required to submit a detailed installation report post installation of all the equipment at approved locations. The report shall be utilized during the acceptance testing period of the project to verify the actual quantity of the equipment supplied and commissioned under the project.

#### 1.6.3.2 Preparation and implementation of the Information security policy, including policies on backup

The MSI shall prepare the Information Security Policy for the overall Project and the same would be reviewed and then finalized by TUFIDCO & its authorized committees. The Security policy needs to be submitted by the MSI within 1st quarter of the successful Final Acceptance Tests.

#### 1.6.3.3 Training and Capacity Building

1. The purpose of this section is to define the scope of work for training and capacity building to be implemented at various levels namely:

   a. Employees of each SPV of 10 Smart Cities
   b. Municipal Corporation’s employees of 10 Cities
   c. Stakeholder departments
   d. Command Center Operators of each city

2. The MSI’s scope of work also includes preparing the necessary documentation and aids required for successful delivery of such trainings.

3. The details provided in this section are indicative and due to the complex nature of the project the number of training sessions may increase. Over and above the team considered for performing the training as detailed in subsequent sections,

4. Further the MSI has to provide cost for additional and optional training sessions in its Financial proposal in case more training's are required. MSI has to conduct such additional training sessions on City SPV's request.

5. MSI will develop a training and capacity building strategy that will also include a detailed plan of implementation. MSI should have comprehensive hands on system training strategy and schedule for users doing Cloud based DC & DR and ICCC Operations.

6. MSI will get the Training and capacity building strategy including training material finalized with City SPV before starting the training programs.

7. MSI will prepare all the requisite audio/visual training aids that are required for successful completion of the training for all stakeholders. These include the following for all the stakeholders:

    a. Training manuals for City SPV employees / stakeholder departments such as Municipal Corporation, Police, and Electricity Board etc.

    b. Computer based training modules

    c. Video (recorded sessions) for ICCC operations, back end modules, business intelligence, dynamic reporting

    d. Presentations

    e. User manuals

    f. Operational and maintenance manuals for the ICCC modules

    g. Regular updates to the training aids prepared under this project

8. MSI must plan all the training and its material keeping defined and agreed SOPs of ICCC as prime focus.

9. MSI will maintain a copy of all the training material on the knowledge Portal and access will be provided to relevant stakeholders depending on their need and role. The access to training on the portal would be finalized with City SPV. MSI has to ensure the following points:

    a. For each training session, the MSI has to provide the relevant training material copies to all the attendees.

    b. The contents developed shall be the property of TUFIDCO / City SPV with all rights.

10. There are estimated 150 users who need to be trained. MSI may accordingly plan the training budget.

11. MSI has to ensure that the training sessions held are effective and that the attendees would be able to carry on with their work efficiently. For this purpose, it is necessary that the effectiveness of

training sessions is measured. The MSI will prepare a comprehensive feedback form that will capture necessary parameters on measuring effectiveness of the training sessions. This form will be discussed and finalized with City SPV.

12. After each training session, feedback will be sought from each of the attendees on either printed feedback forms or through a link available on the web portal. One member of the stakeholder group would be involved in the feedback process and he/she has to vet the feedback process. The feedback received would be reported to City SPV for each training session.

13. For each training session, the MSI will categorize the feedback on a scale of 1 to 10, where 10 will denote excellent and 1 will denote unsatisfactory.

14. The training session would be considered effective only after the cumulative score of the feedback (sum of all feedback divided by number of attendees) is more than 7.5.

#### 1.6.3.4 Helpdesk

a. MSI will be required to provide Help Desk cum Contact center in each city ICCC for following activities:
    - Technical and operational support of the system
    - Maintenance of the IT and Non-IT Infrastructure
    - Technical & Operational Manpower for smooth running of the system
    - This help desk will also provide support to do the effective incident management in case of any emergency or disaster.
    - The help desk solution should have achieved.

    In case of delay of responses or breach of SLAs in terms of resolution for any emergency, this help desk will play a critical role of getting services rendered effectively where ever needed.

## 1.6.4 Components for Common Cloud based Command and Control Applications

**This section to be read with Annexure 1 of this RFP.**

Common Cloud based Command and Control Center Application consists of some of the following components (not limited)

- Command Center Application
- EMS
- DBMS
- Document management System
- Knowledge Management System
- File Tracking System
- Workflow Management System
- Analytics
- Open Platform for Data
- GIS platform

- Disaster Management Solution

Expected number of user for such applications will be around 1000 for all cities. This user base will include officers of ULB, officers of City SPV and City ICCC operators.

#### 1.6.4.1 Open Platform for Data

The ICCC software solution should have provision for open data platform. The intent for creation of open platform for Data is to share the data with general public which is useful for citizen. The open platform for data should be able to share the APIs for development of useful application for public in general. Open platform should be implemented as the implementation guidelines issue by Govt. of India and it should adhere to the open data policy of Govt. of India.

#### 1.6.4.2 Document Management

a. System should support the storing of document (Image & Metadata)
b. Support for archiving a large number of file formats. The system should support all commonly used file formats as MSOffice, Acrobat, TIF, JPEG, GIF, BMP, etc.
c. Provision for an integrated scanning engine with capability for centralized and decentralized Scanning & Document Capturing. The scanning solution should directly upload documents in Document management system.
d. Association of the document with Workflow Management System
e. Movement of the document based on selected parameters
f. Provision to edit the document Metadata
g. Versioning of the document
h. Provision for marking comments
i. Archival of data on pre-defined parameters
j. Role based access to the documents
k. Final Decision by the Decision Authority
l. Should be platform independent and should support both Linux and Windows both with and without virtualization. It should support multiple databases i.e. MSSQL, Oracle and Postgre.
m. The inbuilt image viewer shall support comprehensive annotation features like highlighting, marking text, underlining putting sticky notes on documents, and support for text and image stamps etc.

#### 1.6.4.3 Workflow Management System

a. Movement of Proposals on various parameters
b. Facility to mark the application to pre-defined hierarchy
c. Inbox for officers (listing applications received)
d. FIFO principle for taking action on application
e. Creation of a Note Sheet for Scanned Documents
f. Alerts for delay in action
g. Compliance to workflow standards: BPMN, BPEL and WFMC

h. Shall support Inbuilt Graphical workflow designer for modelling complex Business Processes using drag and drop facilities.
i. Information/Alert to be sent to higher authority in case of delay in action by specific employee of the department
j. Pre-defined scrutiny for citizen applications
k. Display of all application data during scrutiny process
l. Check-list for rejection
m. Should have inbuilt Rule Engine for defining rules
n. Facility to mark the application to other officer
o. Facility to mark the application to other department for their NOC / Comments / Input
p. Final Decision by the Decision Authority
q. Shall provide graphical and tabular tools to create reports and view progress of each individual process.

#### 1.6.4.4 File Tracking System

a. Scanning & Marking the inward to the respective department.
b. Capturing of DAKs using inbuilt scanning solution.
c. Incorporation of separate hierarchy for RTI letter movements & Commissioner Office.
d. Capturing of Fresh applications & Appeals
e. Tracking of the Inward and outward correspondence
f. File Closure to be carried out as per the final decision of respective authorities.
g. DAK and File Management system should build using robust Enterprise Document Management and Workflow Management and should comply with the Manual of Office Procedure (MOP), published by the Department of Administrative Reforms and Public Grievances (DARPG).
h. Shall have an In-built Web based Text Editor with basic functionalities such as bold, alignment, font, color etc. for writing the notes.

#### 1.6.4.5 Knowledge Management Solution

Common Knowledge Management solution for all smart cities, to create their knowledge repositories.

**a) Archival of Knowledge Content**

1) Allow creation of a central knowledge repository of documents that can be accessed by all officials based on their roles and privileges.
2) Allow to add description with the uploading documents / knowledge content.
3) Should have a well-defined workflow that allows processes for knowledge creation, approval and archival for re-use.
4) Should allow multiple / bulk file upload
5) Should have folder wise categorization
6) Should allow to upload and archive documents of any format including tiff, jpeg, pdf, pdf/a, audio, video etc.

7) Should allow categorization of Knowledge into different categories like personnel, financial, legal etc.
8) Should allow multimedia content archiving / sharing.

**b) Knowledge Content Collaboration**

1) Should allow only authorized employees to locate, update and share documents
2) Should allow authorized users to post questions / answers.
3) Should provide an online discussion forum to hold conversation on posted topics.
4) Should allow documents to be stored and modified with proper versioning.
5) Should support Individual/group/section/office specific centralized information repository to store knowledge content.
6) Should allow collaborative working on the knowledge content.
7) Should keep a track of different document versions modified by different users
8) Should have an add-on feature of rating the content.
9) Should have capability to attach citations and synopsis with the respective knowledge content.
10) Should provide the capability to subscribe for the knowledge content, category, so that the users get notifications once any new document, content is getting uploaded for the respective category or knowledge source.
11) Should allow users to share the documents on Social media platforms such as Facebook, Twitter etc.
12) Should have online chat facilities, where users can initiate a discussion with concerned expert or group of users and can send messages, documents and interact on common platform.
13) Discussion forum should have an administrator who can add, edit and delete discussions post.
14) Should have functionality to define the To-Do list for the tasks to be done.

**c) Strong Searching Capabilities**

1) Provides facility for index based content search
2) Support content searching using content categories, sub categories, Title, author, File/Content types
3) Should allow to search for contents based on Keywords, Tags, From/To Date etc.
4) Supports automatic full text indexing for Text based search

**d) Notification & Messaging**

1) Should allow users to mail knowledge content to users / departmental officials.
2) Should have feature to send the notifications to a user about his/her content being approved / rejected.
3) Should have an intelligent feature to either email knowledge content on a specific date and time.
4) Should have a built in alert mechanism (Email and SMS) for subscribed documents.

**e) Architecture & Scalability**

1) Should be built using Enterprise Content Management framework
2) Should be COTS based solution and platform independent and support for all major operating systems such as Windows, Linux etc. on server side with or without virtualization.

3) Multi-tier architecture having web-based solution and support for clustering
4) Supports separate Document/Image server for better management of documents and store only metadata information in database.
5) Proven Scalability for thousands of users
6) Support for de-centralized/distributed architecture
7) Store billions of documents in repository

**f) Viewing & Annotations**

1) Support for viewing and annotating on image documents through inbuilt viewer through web and mobile devices
2) Inbuilt viewer for viewing scanned documents and facilitates zoom- in/zoom-out, zoom percentage and other image operations like Invert, rotate etc.
3) Support view of multipage document having capability to download and view document page by page
4) Support view & annotation of PDF/A format documents using inbuilt viewer (open ISO standard for long term archival of documents)
5) Provides facility of putting text and image annotations on scanned document.

**g) Reporting & Dashboards**

1) Should have dashboard and reporting capability for viewing the reports such as knowledge content added by users, number of documents per category, content pending to be approved etc.

**h) Compliance with Open Standards**

1) Should compliant to ODMA and WebDAV standards
2) Supports interoperability through CMIS compliance
3) Workflows of the proposed Knowledge Management System should compliant to open standards such as BPMN, BPEL, WFMC.

**i) Document Management Security**

1) Knowledge Management system should allow for multiple permission levels such as:
    - **At Folder level** – All rights (system, group, and user) are assigned at folder level.
    - **At system level** – Set global access rights at the overall system level.
    - **At the group level** – The **most efficient way** to manage security rights is defining the **access rights at group level** wherein users who are part of the specific groups will be able to perform operations accordingly.
    - **At the user level** – Set permissions for Individual users.

Apart from this, Knowledge Management System should also have various other key security features having support for:

- Defining multiple levels of access rights (Delete/ Edit/ View/ Print/ Copy or Download).
- Define system privileges like Create/Delete Users, Define indexes etc.
- Support for Digital certificate

- Facility to define password policy with extensive password validations like passwords must be of minimum 8 characters which shall be alphanumeric, locking of user-id after three un-successful attempts, password expiry, password history so that passwords are not same as previous passwords etc.
- Extensive Audit-trails at document, Folder and for highest levels for each action done by user with user name, date and time
- Encryption of documents and metadata

**j) Application Integration Capability**

1) Support for web services, Java based API, and URL-based integration
2) Integration based on standards such as XML
3) Active Directory/LDAP integration
4) Integration with Email Servers, MS Office application etc.

### 1.6.4.6 Data Analytics Capabilities

a. The ICCC software solutions should have inbuilt capability of data analytics/ business intelligence.
b. The Data Analytics/ BI Tool of software solution should work as single platform for analyzing data coming/input from all the IT components/initiative of all smart cities (City Specific or State Wide initiative).
c. The system should be able to generate report in the user defined manner.
d. There should be a provision for a dash board which may take input from various system like individual sensors of multiple IT components (SCADA sensor, Environment sensors etc.)
e. Apart from basic analytics system should also have provision to perform Predictive Analysis.
f. User should be able to choose any permutation and combinations of data fields to perform predictive analysis.
g. System should be able to predict the events, make scenarios which helps in decision making to city authorities.
h. The Data analytics/BI tool should have ability to analyze the useful information and sharing it with general public. For example in case of water supply effected areas and traffic situation awareness etc.
i. System should have capabilities to suggest best response options on the basis of current and historic data sets.
j. Solution should enable the department to monitor activities and operations relating to the citizen (Municipal) service being provided, feedback and grievances received
k. Solution should help department understand the level of responsiveness of the officers concerned in terms of their response to the grievances.
l. The solution should also contain abilities for forecasting and scenario analysis, this will help the department understand the trends of different concern areas.
m. Forward looking decision making – BI and analytics tool provide the predictive and forecasting capabilities which can help department in forward looking policy and decision making.
n. Analysis of citizen sentiment across topics as represented through news and social media
o. Identification of recently emerging and trending topics of interest

p. Providing analytical platform for identification of misclassified events reported by citizens and inadequacies in action taken versus relief requested
q. System shall provide an Enterprise Reporting and Visualization solution to author, manage, and deliver all types of highly formatted reports
r. The solution should have mining, analytical and querying capabilities, and should be able to interoperate with other DBMS.
s. The BI Platform should have the capability to schedule reports on the basis of a time calendar i.e. by hour, day, week, month, etc.
t. The BI Platform should have the capability to schedule reports on the basis of a trigger or an occurrence such as an email, database refresh, etc.
u. Solution should provide capability to :
    - Understand issues and concerns of citizens in a quick and effective manner
    - Monitor progress of grievances and quality of grievance redressal
    - Understand special / specific needs for different part of cities / subject areas affecting citizens (such as water, electricity etc.)

- Cloud based Platform as a Service or Software as a Service should be used to deliver enterprise grade operational intelligence and reporting.

| # | Specification | Bid Compliance (Yes/No) |
|---|---|---|
| 1. | The BI platform should provide integrated end user access ranging from interactive dashboards, ad hoc query, pixel-perfect reporting, Office integration, proactive alerting and mobile access, collaboration Scorecards, and embedded in business applications. | |
| 2. | BI platform should have an adhoc query and analysis environment that works against a logical view of information from multiple data sources in a pure Web environment. BI platform should provide capability combine data from multiple applications or databases in a single calculation For example it should be able to combine data from relational databases with non-relational data from Excel spreadsheets in a single calculation. | |
| 3. | BI Platform should provide capabilities to create KPIs to measure progress and performance over time and graphically communicate strategy & strategic dynamics using Strategy maps, Cause and Effect diagrams, and Custom views. Intuitive and dense visualizations specifically trellis charts, geographical maps, sparklines and waterfall charts must be available. | |
| 4. | BI Platform should provide capability to create reports that capture a series of snapshots of an BI Dashboard or report allowing the information to be viewed offline in presentation style. | |

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| 5. | BI Platform should provide alerting engine that captures and distributes notifications via multiple channels in response to pre-defined business events and/or data exceptions to speed exception based decision making. The alerting engine should have ability to invoke a workflow, web services, web content, BI content, java method etc. from the within the BI framework . When a condition is triggered, the user should be presented with a list of possible actions to take. | |
| 6. | BI should have capability of Microsoft Office integration that synchronizes information from BI to Microsoft Word, Excel, and PowerPoint for management presentations. | |
| 7. | BI should have the capability to search existing content based on full indexing of Dashboards, Analyses, Views, Prompts, KPIs, Scorecards, Formatted Reports Reports, Agents, Actions, Catalog, and Folders. The metadata should be indexed and searchable. This should go beyond just searching report names and titles, but, instead deeply interrogating every defined analysis to see the contained data elements, prompts and filters | |
| | Architecture | |
| 8. | The BI platform should supports clustering for high availability and scalability. The BI Platform should offer sophisticated Active-Active clustering with automatic failover that enables full utilization of compute resources, easy scale out to address dynamic performance demands, and on-line patching to minimize downtime during upgrade cycles | |
| 9. | BI platform should have the “content-aware” data federation capabilities, such as partitioning by source, partitioning by value range, and aggregate navigation; | |
| 10. | BI Platform should have the capability of queries reuse and caching both at the Web Server and within the Analytic Server layer to reduce database workload and network traffic. BI Platform should have the capability of supporting cluster aware caching. | |
| 11. | BI platform should provide capabilities such as session and query management, cancellation, statistics logging, monitoring | |
| 12. | BI Platform should support capability of maintaining user security internally, using standard protocols e.g. LDAP, Active Directory or OID. All data exchange must be SSL enabled | |
| 13. | BI Platform should generate optimized, native queries for each data source and should use the concept of function shipping to squeeze the most performance out of each relational or multidimensional source | |
| 14. | The BI Server should automatically perform multi-tiered, in-memory, disk-based, and cross-cluster caching, to enhance performance. | |

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| 15. | BI Platform should offer Multi-user development process that allow concurrent development and incremental deployment, to foster enterprise BI consolidation | |
| 16. | The BI Platform should provide a central management server that enables consistent diagnostics and troubleshooting, and easy configuration management of the distributed system topology over its complete lifecycle, including patching. | |
| | Dashboards and Adhoc Query | |
| 17. | Reporting and Adhoc Query should be available in form Web-based environment that is designed for users who want to create new analyses from scratch or modify and change existing analyses that appear on dashboard pages. BI should also provide feature of self-service where a user can upload his own excel sheet data and combine it with already published BI data and create his own dashboards with no help from IT | |
| 18. | Analysis & reporting layer should provide a single user interface for ad-hoc query, reporting & analysis against relational, OLAP and flat file data sources | |
| 19. | BI should provide capability for Dashboards to be personalized and automatically display data based on the user's identity or role. BI should provide the capability where in Measures, descriptive attributes, filters, sorting patterns, sub-totals, charts, and pivot table views can be added, deleted, or changed from within the dashboard, after a user makes all the changes, the new analysis can be saved and shared with a group of users. | |
| 20. | BI Platform should provide complete interactivity with dashboard content by selecting prompted values and filtering data; drilling on charts or tables to access detail; changing the sort order or sort direction of columns; maintaining context and moving to a different analysis by automatically passing constraints; or selecting columns to display. BI platform should provide capability to embed a corporate "portal", web page or image on the Internet/intranet, a Word document, or Excel workbook on the dashboard | |
| 21. | BI Platform should offer out-of-box integration with Geo-Spatial analysis | |
| 22. | Master-Detail linking should be provided | |
| 23. | The BI dashboards should provide support for real time collaboration | |
| | Enterprise Reporting | |
| 25. | BI Platform should provide a highly customized report format, layout, and output in order to create pixel-perfect reports and a scalable reporting server that generates and delivers canned reports from multiple data sources, in multiple document formats, via multiple delivery channels | |

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| 26. | BI platform should provide multiple delivery options for generated reports. it should be able to publish them to online folders via WebDAV; should be able to be attached to email for distribution; should be able to send Enterprise Print Servers; should be able to place them on a file server from which they can be FTPed. | |
| 27. | BI Platform should have native Job Scheduling feature | |
| 29. | BI Platform should provides integration with Enterprise Printing Servers and Enterprise Printers (that support IPP and LCUP protocols) for volume printing | |
| 30. | The Report Builder should generate multiple layouts, including HTML, PDF. It also should provide an interactive, on-line format for delivery over the Web | |
| | Scorecards | |
| 31. | The BI Platform should provide configuration of scorecards and KPI Builder which will allow users to build scorecards | |
| 32. | Breach of KPI becnhmarks should have the ability to trigger actions such as Email alerts, ERP workflows and Invoke Web Service | |
| 33. | BI platform should provide capability where in while viewing KPIs, Initiatives or Objectives business users can initiate discussion threads and attach related documents to collaborate with other users | |
| 34. | Scorecard should provide visualization effective in communicating strategy and causal relationships between, KPIs, corporate objectives and initiatives. Examples of these views include: KPI watch lists, Strategy trees, Strategy Maps, Cause and Effect Maps | |
| | Mobile | |
| 35. | Proposed tool should provide complete access to reports, dashboards, notifications through a native mobile application on mobile platforms like Android and Apple | |
| 36. | Should support catalog browsing and search over the mobile device. Catalog browsing and search makes it easy for the mobile user to locate and interact with relevant information | |
| 37. | Should provide platform self service application development for HTML5 compatible mobile applications which are agnostic to any mobile platform | |

### 1.6.4.7 Integration of GIS Platform

Each city may have its own GIS application for providing GIS MAP based services. The MSI should be able to integrate these GIS layers on user interface of command and control software application. Existing ArcGIS software available with urban local bodies should be reused / upgrade as needed. Procurement of GIS Software only if urban local bodies need additional modules and user licensing.

#### 1.6.4.8 Incident Management System

- Should support comprehensive reporting on event status in real time manually or automatically by a sensor/CCTV video feeds/Mobile app users.
- Should support for sudden critical events and linkage to standard operating procedures automatically without human intervention.
- Should support for multiple incidents with both segregated and/or overlapping management and response teams.
- Should support GIS map rendering of event and incident information.
- Should support plotting of area of impact using polynomial lines to divide the area into multiple zones on the GIS maps.
- Should support incorporation of resource database for mobilizing the resources for response.
- Should provide facility to capture critical information such as location, name, status, time of the incident and be modifiable in real time by multiple authors with role associated permissions (read, write). Incidents should be captured in standard formats to facilitate incident correlation and reporting.
- Should identify and track status of critical infrastructure / resources and provide a status overview of facilities and systems
- Should provide detailed reports and summary views to multiple users based on their roles.
- Should have a reference section option for providing posting, updating and disseminating plans, procedures, checklists and other related information.
- Provide User-defined forms as well as Standard Incident Command Forms for incident management. Should provide the capability to define forms or import predefined forms, using standard language like HTML. The forms shall be integrated with GIS such that entering a location in the form field shall result in the location display in GIS map.

#### 1.6.4.9 Disaster Management

MSI has to provide a separate module of Disaster Management as part of software solution. The Disaster Management module should be able to collect, gather and analyze the critical data of city from various components. The system should be able to create a strategic view or big picture of probable disaster. The system should be intelligent enough to make decisions that protect life and property. The system should disseminate such decisions to all concerned agencies and individuals. The critical data elements shall be decided in consultation with City SPV. The system should be

able to use predictive analysis which can finally reduce response time and improve SLAs. Disaster Management module should be able to communicate or to be integrated with National Emergency Operation Center (NEOC) of National Disaster Response Force (NDRF) based on defined SOPs. The Disaster Management system should be in compliance to applicable laws.

The Disaster management module should have interoperability between cities, here it refers that disaster management module of any city should be able to cater the disaster management operation of any of the other city.

Standard Operating Procedures (SoPs) must adhere with the Governance structure of City SPVs / ULBs and Municipal Corporations, as in case of any incident or disaster decision making ability lies with the authority.

### 1.6.5 Acceptance Testing

1. MSI shall submit a thorough Testing plan for implementation, go-live and upgrades for Common Command and Control Center Applications and city ICCC systems
2. Test plans will be reviewed and approved by TUFIDCO / City SPV.
3. MSI shall demonstrate the following mentioned acceptance testing plan prior to acceptance of the solution as well as during project operations phase, in respect of scalability and performance etc. The MSI may propose further detailed Acceptance plan which the city SPV for each city will review. Once the city SPV provides its approval, the Acceptance plan can be finalized.
4. In case required, parameters might be revised by city SPV in mutual agreement with bidder and the revised parameters shall be considered for acceptance criteria.
5. A comprehensive system should be set up that would have the capability to log & track the testing results, upload & maintain the test cases and log & track issues/bugs identified.
6. The following table depicts the details for the various kinds of testing envisaged for the project:

| Type of Testing | Responsibility | Scope of Work |
|---|---|---|
| **System Testing** | MSI | 1. MSI to perform System testing<br>2. MSI to prepare test plan and test cases and maintain it. TUFIDCO / City SPV may request the MSI to share the test cases and results<br>3. Should be performed through manual as well as automated methods<br>4. Automation testing tools to be provided by MSI. TUFIDCO / City |

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| | | SPV doesn't intend to own these tools. |
| **Integration Testing** | MSI | 1. MSI to perform Integration testing<br>2. MSI to prepare and share with TUFIDCO/city SPV the Integration test plans and test cases<br>3. MSI to perform Integration testing as per the approved plan<br>4. Integration testing to be performed through manual as well as automated methods<br>5. Automation testing tools to be provided by MSI. TUFIDCO / City SPV doesn't intend to own these tools |
| **Interoperability Testing** | MSI | 1. MSI will prepare interoperability traceability matrix with third party systems (existing legacy systems with ICCC) in consultation with TUFIDCO / City SPV and other relevant stakeholders (of external systems). Interoperability is an ability of one system to interact with another system. This matrix will cover all the use cases of system interaction and data movement.<br>2. MSI to perform Interoperability testing<br>3. MSI to prepare and share with TUFIDCO / City SPV the Interoperable test plans and test cases with scenarios<br>4. MSI to perform Interoperable testing as per the approved plan<br>5. In Interoperability testing all the functions / components will be tested of a particular third party |

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| | | system which is integrated with ICCC. |
| **Performance and load Testing** | • MSI<br>• TUFIDCO / Third Party Auditor ( to monitor the performance testing) | 1. MSI to do performance and load testing.<br>2. Various performance parameters such as transaction response time, throughput, and page loading time should be taken into account.<br>3. Load and stress testing of the ICCC System to be performed on business transaction volume<br>4. Test cases and test results to be shared with TUFIDCO / City SPV.<br>5. Performance testing to be carried out in the exact same architecture that would be set up for production.<br>6. MSI need to use performance and load testing tool for testing. TUFIDCO / City SPV doesn't intend to own these tools.<br>• TUFIDCO / City SPV if required, could involve third party auditors to monitor/validate the performance testing. Cost for such audits to be paid by TUFIDCO / City SPV. |
| **Security Testing (including Penetration and Vulnerability testing)** | • MSI<br>• TUFIDCO / Third Party Auditor ( to monitor the security testing) | 1. The solution should demonstrate the compliance with security requirements as mentioned in the RFP including but not limited to security controls in the application, at the network layer, network, data Center(s), security monitoring system deployed by the MSI<br>2. The solution shall pass vulnerability and penetration testing. The solution should pass web application security testing for the portal, mobile app and other |

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| | | systems and security configuration review of the infrastructure if applicable.<br>3. MSI should carry out security and vulnerability testing on the developed solution.<br>4. Security testing to be carried out in the exact same environment/architecture that would be set up for production.<br>5. Security test report and test cases should be shared with city SPV<br>6. Testing tools if required, to be provided by MSI. City SPV doesn't intend to own these tools<br>7. During O&M phase, penetration testing to be conducted on yearly basis and vulnerability assessment to be conducted on half-yearly basis.<br>TUFIDCO / City SPV will also involve third party auditors to perform the audit/review/monitor the security testing carried out by MSI. Cost for such auditors to be paid by city SPV. |
| **User Acceptance Testing** | • TUFIDCO / City SPV appointed third party auditor | 1. TUFIDCO / City SPV appointed third party auditor to perform User Acceptance Testing<br>2. MSI to prepare User Acceptance Testing test cases<br>3. UAT to be carried out in the exact same environment/architecture that would be set up for production<br>4. MSI should fix bugs and issues raised during UAT and get approval on the fixes from city SPV / third party auditor before production deployment<br>5. Changes in the application as an outcome of UAT shall not be |

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| | | considered as Change Request. MSI has to rectify the observations. |

Note:

a. MSI needs to provide the details of the testing strategy and approach including details of intended tools/environment to be used by MSI for testing in its technical proposal. TUFIDCO / City SPV does not intend to own the tools.

b. The MSI shall work in a manner to satisfy all the testing requirements and adhere to the testing strategy outlined. The MSI must ensure deployment of necessary resources and tools during the testing phases. The MSI shall perform the testing of the solution based on the approved test plan, document the results and shall fix the bugs found during the testing. It is the responsibility of MSI to ensure that the end product delivered by the MSI meets all the requirements specified in the RFP. The MSI shall take remedial action based on outcome of the tests.

c. The MSI shall arrange for environments and tools for testing and for training as envisaged. Post Go-Live; the production environment should not be used for testing and training purpose. If any production data is used for testing, it should be masked and it should be protected. Detailed process in this regard including security requirement should be provided by the MSI in its technical proposal. The process will be finalized with the selected bidder.

d. All the Third Party Auditors (TPA) as mentioned above will be appointed and paid by TUFIDCO / City SPV directly. All tools/environment required for testing shall be provided by the MSI.

e. STQC/Other agencies appointed by TUFIDCO / City SPV shall perform the role of TPA. MSI needs to engage with the TPA at the requirement formulation stage itself. This is important so that unnecessary re-work is avoided and the audit is completed in time. The audit needs to be completed before Go-Live. MSI needs to prepare and provide all requisite information/documents to third party auditor and ensure that there is no delay in overall schedule. The cost of rectification of non-compliances shall be borne by the MSI.

## 1.6.6 Components for Cloud based DC and DR

**To be read along with Annexure 1, 2 & 12 of this RFP**

### 1.6.6.1 Data Center Solution and Disaster Recovery (DC/DR)

TUFIDCO is looking for a Cloud Service Provider (CSP) for providing Cloud Services such as:

- Managed hosting (VM instances & Storage)
- Auto Scaling
- Network Connectivity

- PaaS ( Platform as a Service)
- DR as a Service
- Self Service provisioning Portal
- MIS, Reporting Services

The MSI shall be responsible for establishing/providing cloud based hosting for applications of all the 9 Cities.

#### 1.6.6.2 Disaster Recovery

Disaster Recovery as a Service will be provided for Platform as a Service and Software as a Service at no cost. The MSI's proposed CSP should provide an integrated SLA of 99.9 availability for database and other service components.

### 1.6.7 Operations and Maintenance

MSI will operate and maintain all the components of the ICCC for a project duration after Go-Live. During O&M phase, MSI shall ensure that service levels are monitored on continuous basis; service levels are met and are reported to city SPV. After Go-Live, if any system/sub-system/appliance that is deployed during the O&M phase must be added in the ICCC only after proper induction procedures are followed including hardening and security testing. MSI needs to implement suitable Performance Improvement Process (PIP) in the project. PIP program applies to all the processes of ICCC project. MSI need to submit its detailed approach for PIP in its technical proposal. Every process and procedure implemented in ICCC project must be reviewed and updated by MSI at least on annual basis from the Go-Live Date. All the manpower engaged for O&M support of the project should be citizens of India.

MSI will ensure that at no time shall any data of DC and ICCC be ported outside the geographical limits of the country. All the Cloud services by CSP should be offered from India Data Centers.

Some broad details of O&M activities are mentioned below:

#### *1.6.7.1 Helpdesk and Facilities Management Services*

The MSI shall be required to establish the helpdesk and provide facilities management services to support the city SPV and stakeholder department officials in performing their day-to-day functions related to this system.

The MSI shall setup a central helpdesk dedicated (i.e. on premise) for the Project, which shall be supported by individual smart city command centers, implemented and proposed to be setup under Smart City Programme of various cities. This helpdesk would be operational upon implementation of the Project. Providing helpdesk/support services from a shared facility of any other party/provider is not permitted.

Functional requirements of the helpdesk management system, fully integrated with the enterprise monitoring and network management system, are provided in **Annexure 2**. The system will be accessed by the stakeholder department officials for raising their incidents and logging calls for

support. The detailed service levels and response time, which the MSI is required to maintain for provisioning of the FMS services are described in the Service Level Agreement of this Tender.

MSI shall deploy Manpower during implementation and O&M phases at each city. The deployed resource shall report to City SPV's Project In-charge for Smart City Project and work closely with Program Management Office of the project.

#### *1.6.7.2 Applications Support and Maintenance*

Application support includes, but not limited to, production monitoring, troubleshooting and addressing the functionality, availability and performance issues, implementing the system change requests etc. The MSI shall keep the application software in good working order; perform changes and upgrades to applications as requested by the city SPV team. All tickets related to any issue/complaint/observation about the system shall be maintained in an ITIL compliant comprehensive ticketing solution. Key activities to be performed by MSI in the application support phase are as follows:

**a. Compliance to SLA**

MSI shall ensure compliance to SLAs as indicated in this RFP and any upgrades/major changes to the software shall be accordingly planned by MSI ensuring the SLA requirements are met at no additional cost to the city SPV.

**b. Annual Technology Support**

The MSI shall be responsible for arranging for annual technology support for the OEM products to each city SPV for each city ICCC provided by respective OEMs during the entire project duration.

**c. Application Software Maintenance**

i. MSI shall provide unlimited support through onsite team/telephone/Fax/E-mail/Video Conferencing/installation visit as required

ii. MSI shall address all the errors/bugs/gaps in the functionality in the solution implemented by the MSI (vis-à-vis the FRS, BRS and SRS signed off) at no additional cost during the O&M phase

iii. All patches and upgrades from OEMs shall be implemented by the MSI ensuring customization done in the solution as per the city SPV's requirements are applied. Technical upgrade of the installation to the new version, as and when required, shall be done by the MSI. Any version upgrade of the software / tool / appliance by MSI to be done after taking prior approval of city SPV and after submitting impact assessment of such upgrade.

iv. Any changes/upgrades to the software performed during the support phase shall subject to the comprehensive and integrated testing by the MSI to ensure that the changes implemented in the system meets the specified requirements and doesn't impact any

other function of the system. Release management for application software will also require city SPV approval. A detailed process in this regard will be finalized by MSI in consultation with city SPV/ TUFIDCO.

v. Issue log for the errors and bugs identified in the solution and any change done in the solution shall be maintained by the MSI and periodically submitted to the city SPV team.

vi. MSI, at least on a monthly basis, will inform city SPV about any new updates/upgrades available for all software components of the solution along with a detailed action report. In case of critical security patches/alerts, the MSI shall inform about the same immediately along with his recommendations. The report shall contain MSI's recommendations on update/upgrade, benefits, impact analysis etc. The MSI shall need to execute updates/upgrades though formal change management process and update all documentations and Knowledge databases etc. For updates and upgrades, MSI will carry it out free of cost by following defined process.

### d. Problem Identification and Resolution

i. Errors and bugs that persist for a long time, impact a wider range of users and is difficult to resolve becomes a problem. MSI shall identify and resolve all the application problems in the identified solution (e.g. system malfunctions, performance problems and data corruption etc.).

ii. Monthly report on problem identified and resolved would be submitted to city SPV team along with the recommended resolution.

### e. Change and Version Control

All planned or emergency changes to any component of the system shall be through the approved Change Management process. The MSI needs to follow all such processes (based on industry ITSM framework). For any change, MSI shall ensure:

i. Detailed impact analysis

ii. Change plan with Roll back plans

iii. Appropriate communication on change required has taken place

iv. Proper approvals have been received

v. Schedules have been adjusted to minimize impact on the production environment

vi. All associated documentations are updated post stabilization of the change

vii. Version control maintained for software changes

The MSI shall define the Software Change Management and Version control process. For any changes to the solution, MSI has to prepare detailed documentation including proposed changes, impact to the system in terms of functional outcomes/additional features added to the system etc. MSI shall ensure that software and hardware version control is done for entire duration of MSI's contract.

**f. Maintain configuration information**

MSI shall maintain version control and configuration information for application software and any system documentation.

**g. Training**

MSI shall provide training to city SPV personnel whenever there is any change in the functionality. Training plan has to be mutually decided with city SPV team.

**h. Maintain System documentation**

MSI shall maintain at least the following minimum documents with respect to the ICCC System:

i. High level design of whole system
ii. Low Level design for whole system / Module design level
iii. System requirements Specifications (SRS)
iv. Any other explanatory notes about system
v. Traceability matrix
vi. Compilation environment

MSI shall also ensure updation of documentation of software system ensuring that:

i. Source code is documented
ii. Functional specifications are documented
iii. Application documentation is updated to reflect on-going maintenance and enhancements including FRS and SRS, in accordance with the defined standards
iv. User manuals and training manuals are updated to reflect on-going changes/enhancements
v. Standard practices are adopted and followed in respect of version control and management.

i. All the project documents need to follow version control mechanism. MSI will be required to keep all project documentation updated and should ensure in case of any change, the project documents are updated and submitted to city SPV by the end of next quarter.

j. For application support MSI shall keep dedicated software support team to be based at MSI location that will single point of contact for resolution of all application related issues. This team will receive all the application related tickets/incidents and will resolve them. In its technical proposal MSI need to provide the proposed team structure of application support including number of team members proposed to be deployed along with roles and skills of each such member. Application support team shall be employees of MSI

k. Any software changes required due to problems/bugs in the developed software/application will not be considered under change control. The MSI will have to modify the software/application free of cost. This may lead to enhancements/customizations and the same needs to be implemented by the MSI at no extra cost.

l. Any additional changes required would follow the Change Control Procedure. City SPV may engage an independent agency to validate the estimates submitted by the MSI. The inputs of such an agency would be taken as the final estimate for efforts required. MSI to propose the cost of such changes in terms of man month rate basis and in terms of Function point/Work Breakdown Structure (WBS) basis in the proposal.

#### *1.6.7.3 ICT Infrastructure Support and Maintenance*

ICT infrastructure includes networking, security equipment, operating systems, database, enterprise management system, help desk system and other related ICT infra required for running and operating the envisaged system. MSI shall define, develop, implement and adhere to IT Service Management (ITSM) processes aligned to ITIL framework for all the IT Services defined and managed as part of this project.

#### *1.6.7.4 Technology Refresh*

Technology refresh refers to the adoption of newer technology to meet changing needs or to mitigate the risk of obsolescence of existing technology. State (on behalf of all City SPVs) intends to use IT as strategic enabler instead of just a backend support system. Hence it is imperative to keep provision for Technology refresh.

*Key Drivers for technology refresh:*

- Aging /obsolete technology
- Out-of-support technology
- Skill set shortage
- Compliance
- Cost reduction
- Standardization
- Performance Improvement
    - The proposed application cloud environment should provide flexibility to scale the environment vertically and horizontally:
    - Vertically: Upscale/downscale the solution to higher configuration Virtual Machines (i.e. VMs with different combinations of CPU and Memory)
    - Horizontally: Add more Virtual Machines of the same configuration to a load balanced pool.
    - It should be possible to scale the solution vertically/horizontally at any time, without prior notification to the cloud provider. It should be possible to automate this process of scaling up and down automatically.

#### *1.6.7.5 Warranty support*

a. MSI shall provide comprehensive and on-site warranty for complete project duration for the infrastructure deployed on the project. MSI need to have OEM support for these components and documentation in this regard need to be submitted to city SPV on annual basis.

b. MSI shall provide the comprehensive & onsite manufacturer's warranty in respect of proper design, quality and workmanship of all hardware, equipment, accessories etc. covered by the RFP. MSI must warrant all hardware, equipment, accessories, spare parts, software etc. procured and implemented as per this RFP against any manufacturing defects during the warranty period.

c. MSI shall provide the performance warranty in respect of performance of the installed hardware and software to meet the performance requirements and service levels in the RFP.

d. MSI is responsible for sizing and procuring the necessary hardware and software licenses as per the performance requirements provided in the RFP. During the warranty period MSI shall replace or augment or procure higher-level new equipment or additional licenses/hardware at no additional cost to the city SPV in case the procured hardware or software is not enough or is undersized to meet the service levels and the project requirements.

e. During the warranty period MSI shall maintain the systems and repair/replace at the installed site, at no charge to city SPV, all defective components that are brought to the MSI's notice.

f. The MSI shall carry out Preventive Maintenance (PM) of all hardware and testing for virus, if any, and should maintain proper records at each site for such PM. The PM should be carried out at least once in six months as per checklist and for components agreed with city SPV.

g. The MSI shall carry out Corrective Maintenance for maintenance/troubleshooting of supplied hardware/software and support infrastructure problem including network (active/passive) equipment, security and rectification of the same. The MSI shall also maintain complete documentation of problems, isolation, cause and rectification procedures for building knowledge base for the known problems in centralized repository, accessible to city SPV team as well.

h. MSI shall monitor warranties to check adherence to preventive and repair maintenance terms and conditions.

i. The MSI shall ensure that the warranty complies with the agreed technical standards, security requirements, operating procedures, and recovery procedures.

    i. MSI shall have to stock and provide adequate onsite and offsite spare parts and spare component to ensure that the uptime commitment as per SLA is met.

ii. Any component that is reported to be down on a given date should be either fully repaired or replaced by temporary substitute (of equivalent configuration) within the time frame indicated in the Service Level Agreement (SLA).

iii. The MSI shall introduce a comprehensive Assets Management process & appropriate tool to manage the entire lifecycle of every component of ICCC System.

### 1.6.7.6 *Maintenance of ICT Infrastructure of Cloud based DC & DRand ICCC*

#### a. Management of ICT Infrastructure

MSI need to deploy requisite mix of L1, L2 and L3 resources (on 24X7 basis) for management of entire ICCC System including ICT infrastructure deployed at Command Center. Employees can be of MSI or Consortium partner, and can be Indian or International employees of relevant experience. All the L1 and L2 resources proposed for the project need to be dedicated for the ICCC project. Any change in the team once deployed will require approval from city SPV. It is expected that the majority of resources have worked with MSI for at least preceding 1 year and have proven track record and reliability. Considering the criticality of the project, city SPV may ask for security verification (Police verification) of every resource deployed on the project and MSI need to comply the same before deployment of the resource at the project. At all times, the MSI need to maintain the details of resources deployed for the project to city SPV and keep the same updated. A detailed process in this regard will be finalized between city SPV and MSI. The MSI shall maintain an attendance register for the resources deployed Attendance details of the resources deployed also need to be shared with TUFIDCO on monthly basis. city SPV reserves the right to interview resources deployed for Operations and maintenance and assess the suitability of the resource for the role. In case a resource is not found suitable, MSI will change the resource on request of city SPV. MSI shall comply with this.

The scope of work for infrastructure and maintenance includes the following:

i. ICCC/DR operations to be in compliance with industry leading ITSM frameworks like ITIL, ISO 20000 & ISO 27001

ii. Ensure compliance to relevant SLA's

iii. 24x7 monitoring & management of availability & security of the infrastructure and assets

iv. Perform regular hardening, patch management, testing and installation of software updates issued by OEM/vendors from time to time after following agreed process

v. Ensure overall security – ensure installation and management of every security component at every layer including physical security

vi. Prepare documentation/policies required for certifications included in the scope of work

vii. Preventive maintenance plan for every quarter

viii. Performance tuning of system as required

ix. Design and maintain Policies and Standard Operating Procedures

x. User access management

xi. Other activities as defined/to meet the project objectives

xii. Updation of all Documentation.

During operations phase the MSI needs to submit proof of renewal of support for all IT infrastructure products and other system software's for whom it is mandated to have OEM support. This needs to be submitted on an annual basis and needs to be verified before release of 2nd quarter payment of each year.

**b. System Maintenance and Management**

i. MSI shall be responsible for tasks including but not limited to setting up servers, configuring and apportioning storage space, account management, performing periodic backup of data and automating reporting tasks, and executing hardware and software updates when necessary. It shall be noted that the activities performed by the MSI may also be reviewed by city SPV.

ii. MSI shall provision skilled and experienced manpower resources to administer and manage the entire system at the Data Center.

iii. On an ongoing basis, MSI shall be responsible for troubleshooting issues in the IT infrastructure solution to determine the areas where fixes are required and ensuring resolution of the same.

iv. MSI shall be responsible for identification, diagnosis and resolution of problem areas pertaining to the IT Infrastructure and maintaining the defined SLA levels.

v. MSI shall implement and maintain standard operating procedures for the maintenance of the IT infrastructure based on the policies formulated in discussion with city SPV and based on the industry best practices/frameworks. MSI shall also create and maintain adequate documentation/checklists for the same.

vi. MSI shall be responsible for managing the user names, roles and passwords of all the relevant subsystems, including, but not limited to servers, other devices, etc. MSI shall be required to set up the directory server. Logs relating to access of system by administrators shall also be kept and shall be made available to city SPV on need basis.

vii. MSI shall implement a password change mechanism in accordance with the security policy formulated in discussion with TUFIDCO and based on the industry best practices/frameworks like ISO 27001, ISO 20000 etc.

viii. The administrators shall also be required to have experience in latest technologies so as to provision the existing and applicable infrastructure on a requirement based scenario.

**c. System Administration**

i. 24*7*365 monitoring and management of the servers in the city ICCC.

ii. MSI shall also ensure proper configuration of server parameters and performance tuning on regular basis. MSI shall be the single point of accountability for all hardware maintenance and support the ICT infrastructure. It should be noted that the activities performed by the MSI may be reviewed by city SPV.

iii. MSI shall be responsible for operating system administration, including but not limited to management of users, processes, preventive maintenance and management of upgrades including updates, upgrades and patches to ensure that the system is properly updated.

iv. MSI shall also be responsible for installation and re-installation of the hardware(s) as well as the software(s) in the event of system crash/failures.

v. MSI shall also be responsible for proactive monitoring of the applications hosted

vi. MSI shall appoint system administrators to regularly monitor and maintain a log of the monitoring of servers to ensure their availability to city SPV at all times.

vii. city SPV shall undertake regular analysis of events and logs generated in all the sub systems including but not limited to servers, operating systems etc. The system administrators shall undertake actions in accordance with the results of the log analysis. The system administrators shall also ensure that the logs are backed up and truncated at regular intervals. MSI shall refer to CERT-In Guidelines so as to ensure their alignment with the practices followed.

viii. The system administrators shall adopt a defined process for change and configuration management in the areas including, but not limited to, changes in servers, operating system, applying patches, etc.

ix. The system administrators shall provide hardening of servers in line with the defined security policies. Validation of hardening configuration will be carried out quarterly and deviations must be tracked through SLA reporting

x. The system administrators shall provide integration and user support on all supported servers, data storage systems etc.

xi. The system administrators shall be required to trouble shoot problems with web services, application software, server relationship issues and overall aspects of a server environment like managing and monitoring server configuration, performance and activity of all servers.

xii. The system administrators should be responsible for documentation regarding configuration of all servers, IT Infrastructure etc.

xiii. The system administrators shall be responsible for managing the trouble tickets, diagnosis of the problems, reporting, managing escalation, and ensuring rectification of server problems as prescribed in Service Level Agreement.

xiv. The administrators will also be required to have experience in latest technologies so as to provision the existing and applicable infrastructure on a requirement based scenario.

**d. Storage Administration**

i. MSI shall be responsible for the management of the storage solution including, but not limited to, storage management policy, configuration and management of disk array, SAN fabric/switches, tape library, etc. It should be noted that the activities performed by the MSI may be reviewed by city SPV.

ii. MSI shall be responsible for storage management, including but not limited to management of space, SAN/NAS volumes, RAID configuration, LUN, zone, security, business continuity volumes, performance, etc.

iii. The storage administrator will be required to identify parameters including but not limited to key resources in the storage solution, interconnects between key resources in the storage solution, health of key resources, connectivity and access rights to storage volumes and the zones being enforced in the storage solution.

iv. The storage administrator will be required to create/delete, enable/disable zones in the storage solution.

v. The storage administrator will be required to create/delete/modify storage volumes in the storage solution.

vi. The storage administrator will be required to create/delete, enable/disable connectivity and access rights to storage volumes in the storage solution.

vii. To facilitate scalability of solution wherever required.

viii. The administrators will also be required to have experience in latest technologies such as virtualization and cloud computing so as to provision the existing and applicable infrastructure on a requirement based scenario.

### e. Database Administration

i. MSI shall be responsible for monitoring database activity and performance, changing the database logical structure to embody the requirements of new and changed programs.

ii. MSI shall be responsible to perform physical administrative functions such as reorganizing the database to improve performance.

iii. MSI shall be responsible for tuning of the database, ensuring the integrity of the data and configuring the data dictionary.

iv. MSI will follow guidelines issued by city SPV in this regard from time to time including access of data base by system administrators and guidelines relating to security of data base.

v. Database administration should follow the principle of segregation of duties to ensure no single DBA can update production tables/data singularly.

vi. In addition to restrictions on any direct change in Data by any administrator, the Databases shall have Auditing features enabled to capture all activities of administrators.

### f. Backup/Restore/Archival

i. MSI shall be responsible for implementation of backup & archival policies as finalized with city SPV. The MSI is responsible for getting acquainted with the storage policies of city SPV before installation and configuration. It should be noted that the activities performed by the MSI may be reviewed by city SPV.

ii. MSI shall be responsible for monitoring and enhancing the performance of scheduled backups, scheduled regular testing of backups and ensuring adherence to related retention policies.

iii. MSI shall be responsible for prompt execution of on-demand backups of volumes and files whenever required by city SPV or in case of upgrades and configuration changes to the system.

iv. MSI shall be responsible for real-time monitoring, log maintenance and reporting of backup status on a regular basis. MSI shall appoint administrators to ensure prompt problem resolution in case of failures in the backup processes.

v. MSI shall undertake media management tasks, including, but not limited to, tagging, cross-referencing, storing, logging, testing, and vaulting in fire proof cabinets (onsite and offsite as per the detailed process finalized by during project implementation phase).

vi. MSI shall also provide a 24 x 7 support for file and volume restoration requests at the Data Center(s).

**g. Network monitoring**

i. MSI shall provide services for management of network environment to maintain performance at optimum levels on a 24 x 7 basis. It should be noted that the activities performed by the MSI may be reviewed by city SPV.

ii. MSI shall be responsible for creating and modifying VLAN, assignment of ports to appropriate applications and segmentation of traffic.

iii. MSI shall also be responsible for break fix maintenance of the LAN cabling within DC/DR etc.

iv. MSI shall also provide network related support and will coordinate with connectivity service providers of TUFIDCO/other agencies who are terminating their network at the DC/DR for access of system.

**h. Security Management**

i. Regular hardening and patch management of components of the data center and ICCC system as agreed with city SPV/ TUFIDCO

ii. Performing security services on the components that are part of the city SPV environment as per security policy finalized with city SPV

iii. IT Security Administration – Manage and monitor safety of information/data

iv. Reporting security incidents and resolution of the same

v. Proactively monitor, manage, maintain & administer all security devices and update engine, signatures, and patterns as applicable.

vi. Managing and monitoring of anti-virus, anti-malware, phishing and malware for managed resources.

vii. Ensuring 100 percent antivirus coverage with patterns not old more than period agreed on any given system

viii. Reporting security incidents and co-ordinate resolution

ix. Monitoring centralized pattern distribution (live update) and scan for deficiencies

x. Maintaining secure domain policies

xi. Secured IPsec/SSL/TLS based virtual private network (VPN) management

xii. Performing firewall management and review of policies on at least quarterly basis during first year of O&M and then after at least on half-yearly basis

xiii. Resolution of calls for security notifications, system alerts, vulnerabilities in hardware/software and alerting city SPV as appropriate

xiv. Performing patch management using software distribution tool for all security applications including content management system, antivirus and VPN

xv. Providing root cause analysis for all defined problems including hacking attempts

xvi. Monthly reporting on security breaches and attempts plus the action taken to thwart the same and providing the same to city SPV

xvii. Maintaining documentation of security component details including architecture diagram, policies and configurations

xviii. Performing periodic review of security configurations for inconsistencies and redundancies against security policy

xix. Performing periodic review of security policy and suggest improvements

xx. Reviewing logs daily of significance such as abnormal traffic, unauthorized penetration attempts, any sign of potential vulnerability. Security alerts and responses. Proactive measures in the event a problem is detected

xxi. Policy management (firewall users, rules, hosts, access controls, daily adaptations)

xxii. Modifying security policy, routing table and protocols

xxiii. Performing zone management (DMZ)

xxiv. Sensitizing users to security issues through regular updates or alerts - periodic updates/Help city SPV issuance of mailers in this regard

xxv. Performing capacity management of security resources to meet business needs

xxvi. Rapidly resolving every incident/problem within mutually agreed timelines.

xxvii. Testing and implementation of patches and upgrades

xxviii. Network/device hardening procedure as per security guidelines from city SPV/ TUFIDCO

xxix. Implementing and maintaining security rules

xxx. Performing any other day-to-day administration and support activities

**i. Other Activities**

i. MSI shall ensure that it prepares configuration manual for OS, appliances, middleware, all tool, servers/devices and all equipment's and the same need to be submitted to city SPV, any changes in the configuration manual need to be approved by city SPV. Configuration manual to be updated periodically.

ii. MSI shall maintain data regarding entitlement for software upgrades, enhancements, refreshes, replacements and maintenance.

iii. If the Operating System or additional copies of Operating System are required to be installed/reinstalled/un-installed, the same should be done as part of O&M.

iv. MSI should carry out any requisite adjustments/changes in the configuration for implementing different versions of Application Software.

v. Updates/Upgrades/New releases/new versions: The MSI shall provide from time to time the Updates/Upgrades/new releases/new versions of the software and operating systems as required. The MSI should provide free upgrades, updates & patches of the software and tools to city SPV as and when released by OEM.

vi. MSI shall provide patches to the software as part of IT infrastructure, operating system, databases and other applications.

vii. Software License Management: The MSI shall provide for software license management and control. MSI shall maintain data regarding entitlement for software updates, enhancements, refreshes, replacements, and maintenance.

viii. Disaster Recovery management services

ix. All other activities required to meet the project requirements and service levels.

It is responsibility of the MSI to scale up the Operations & Maintenance (O&M) team as and when required to ensure smooth project execution throughout the project duration.

### *1.6.7.7 Compliance to SLA*

a. MSI shall ensure compliance to uptime and performance requirements of project solution as indicated in the SLA table of RFP and any upgrades/major changes to the ICCC System shall be accordingly planned by MSI for ensuring the SLA requirements.

b. MSI shall be responsible for measurement of the SLAs at the ICCC System level as well as at the user level with the help of the enterprise monitoring tool on a periodic basis.

c. Reports for SLA measurement must be produced city SPV officials as per the project requirements.

### 1.6.8 Project Implementation Timelines

T = Date of Signing of Contract

| | A. Common Cloud based DC and DR | |
|---|---|---|
| 1 | Inception Report | T+30 Days |
| 2 | High Level Architecture Diagram | T+45 Days |
| 3 | Readiness of Cloud based DC and DR to host city applications (can be without CCA supplication)for integration of applications | T+ 60 Days |
| 4 | FRS/SRS for CCC application for hosting on Cloud with all components | T+75 Days |
| 5 | Go Live – Common Command and Control Application ready with one city app integration. – for all Five Cities of Track I* | T+210 days |

*This is independent of the City ICCC Physical Infrastructure to be ready.

T1 = Date of Site Handover to MSI for physical setup of City ICCC

| | B. Physical ICCC Setup | |
|---|---|---|
| 1 | Implementation Roadmap | T1+30 Days |
| 2 | 3D Simulation of envisaged ICCC | T1+45 Days |
| 3 | Go – Live : Physical Setup of City ICCC | T1+120 Days |

T2 = Date for any service available for integration with Command Center Application

| | C. Integration of Individual Application | |
|---|---|---|
| 1 | SOPs and Use-Cases for operations in Command Center Application | T1+30 Days |
| 2 | Testing of Application Integration | T1+75 Days |
| 3 | Completion of Integration with UAT sign off | T1+90 Days |

| D. Operations & Maintenance |
|---|

| | | |
|---|---|---|
| 1 | Monthly Progress Report (to each city separately) | Every Month after Go-Live of command center application (as defined in table A of this section) |
| 2 | Quarterly Progress Report (to each city separately) | Every Quarter after Go-Live of command center application (as defined in table A of this section) |

### 1.6.9 Exit Management

a. This sets out the provisions, which will apply on expiry or termination of the Master Service Agreement, the Project Implementation, Operation and Management SLA.

b. In the case of termination of the Project Implementation and/or Operation and Management, the Parties shall agree at that time whether, and if so during what period, the provisions of this Schedule shall apply.

c. The Parties shall ensure that their respective associated entities carry out their respective obligations set out in this Exit Management Schedule.

d. The MSI shall provide the following documentation at the stage of exit management:
   i) SOPs for common cloud based DC and DR
   ii) License details of current cloud based DC and DR
   iii) License details of common applications hosted on common cloud based DC and DR
   iv) As-build drawing with marking of field devices, controllers and sensors
   v) As-implemented configurations
   vi) As-implemented architecture and topology diagrams
   vii) Completed UAT and FAT results
   viii) Standard operating procedures for administration of the installed devices.
   ix) Each Site specific user manual and standard operating procedures for end users
   x) Hardware-devices warranty details
   xi) License details

e. For common infrastructure required items will be handed over to TUFIDCO and for City ICCC to CITY SPV.
f. Common Command Center Application and other common application licenses may get transferred to TUFIDCO / City SPV, if they wish to do so by paying the residual price of transferring the license (as provided in the financial bid).
g. Complete Data, logs, views and analytics as stored / created in the various storage units of cloud service provider for this project will be required to move permanently to USB drives separately for each city. MSI will handover data of each city separately to each city SPV.
h. For CSP Exit Management Clause are defined separately in Annexure 2 Technical Specifications for cloud. In case of overall exit management both the clause are to be read together.

### 1.6.9.1 Cooperation and Provision of Information

During the exit management period:

a. The MSI will allow the city SPV or its nominated agency access to information reasonably required to define the then current mode of operation associated with the provision of the services to enable the TUFIDCO to assess the existing services being delivered

b. Promptly on reasonable request by the city SPV, the MSI shall provide access to and copies of all information held or controlled by them which they have prepared or maintained in accordance with this agreement relating to any material aspect of the services (whether provided by the MSI or sub-contractors appointed by the MSI). The city SPV shall be entitled to copy of all such information. Such information shall include details pertaining to the services rendered and other performance data. The MSI shall permit the TUFIDCO or its nominated agencies to have reasonable access to its employees and facilities, to understand the methods of delivery of the services employed by the MSI and to assist appropriate knowledge transfer.

### 1.6.9.2 Confidential Information, Security and Data

a. The MSI will promptly on the commencement of the exit management period supply to the TUFIDCO or its nominated agency the following:

   i. information relating to the current services rendered and customer and performance data relating to the performance of sub-contractors in relation to the services;

   ii. documentation relating to Intellectual Property Rights;

   iii. documentation relating to sub-contractors;

   iv. all current and updated data as is reasonably required for purposes of city SPV or its nominated agencies transitioning the services to its Replacement MSI in a readily available format nominated by the city SPV, its nominated agency;

   v. all other information (including but not limited to documents, records and agreements) relating to the services reasonably necessary to enable city SPV or its nominated agencies, or its Replacement MSI to carry out due diligence in order to transition the provision of the Services to city SPV or its nominated agencies, or its Replacement System integrator (as the case may be).

b. Before the expiry of the exit management period, the MSI shall deliver to the city SPV or its nominated agency all new or up-dated materials from the categories set out in Schedule above and shall not retain any copies thereof, except that the MSI shall be permitted to retain one copy of such materials for archival purposes only.

### 1.6.9.3 Employees

a. Promptly on reasonable request at any time during the exit management period, the MSI shall, subject to applicable laws, restraints and regulations (including in particular those relating to privacy) provide to the TUFIDCO or its nominated agency a list of all employees (with job titles) of the MSI dedicated to providing the services at the commencement of the exit management period.

b. Where any national, regional law or regulation relating to the mandatory or automatic transfer of the contracts of employment from the MSI to the TUFIDCO or its nominated agency, or a Replacement MSI ("Transfer Regulation") applies to any or all of the employees of the System integrator, then the Parties shall comply with their respective obligations under such Transfer Regulations.

c. To the extent that any Transfer Regulation does not apply to any employee of the MSI, department, or its Replacement MSI may make an offer of employment or contract for services to such employee of the MSI and the MSI shall not enforce or impose any contractual provision that would prevent any such employee from being hired by the TUFIDCO or any Replacement MSI.

### 1.6.9.4 Transfer of Certain Agreements

On request by the city SPV or its nominated agency the MSI shall effect such assignments, transfers, licenses and sub-licenses city SPV, or its Replacement MSI in relation to any equipment lease, maintenance or service provision agreement between MSI and third party lessors, vendors, and which are related to the services and reasonably necessary for the carrying out of replacement services by the city SPV or its nominated agency or its Replacement MSI.

### 1.6.9.5 General Obligations of the MSI

a. The MSI shall provide all such information as may reasonably be necessary to effect as seamless a handover as practicable in the circumstances to the city SPV or its nominated agency or its Replacement MSI and which the MSI has in its possession or control at any time during the exit management period.

b. For the purposes of this Schedule, anything in the possession or control of any MSI, associated entity, or sub-contractor is deemed to be in the possession or control of the MSI.

c. The MSI shall commit adequate resources to comply with its obligations under this Exit Management Schedule.

### 1.6.9.6 Exit Management Plan

a. The MSI shall provide the TUFIDCO or its nominated agency with a recommended exit management plan ("Exit Management Plan") which shall deal with at least the following aspects of exit management in relation to the MSA as a whole and in relation to the Project Implementation, and the Operation and Management SLA.

   i. A detailed program of the transfer process that could be used in conjunction with a Replacement MSI including details of the means to be used to ensure continuing provision of the services throughout the transfer process or until the cessation of the services and of the management structure to be used during the transfer;

   ii. plans for the communication with such of the MSI's sub-contractors, staff, suppliers, customers and any related third party as are necessary to avoid any material detrimental impact on the city SPV's operations as a result of undertaking the transfer;

   iii. (if applicable) proposed arrangements for the segregation of the MSI's networks from the networks employed by city SPV and identification of specific security tasks necessary at termination;

   iv. Plans for provision of contingent support to city SPV, and Replacement MSI for a reasonable period after transfer.

b. The MSI shall re-draft the Exit Management Plan annually thereafter to ensure that it is kept relevant and up to date.

c. Each Exit Management Plan shall be presented by the MSI to and approved by the city SPV or its nominated agencies.

d. The terms of payment as stated in the Terms of Payment Schedule include the costs of the MSI complying with its obligations under this Schedule.

e. In the event of termination or expiry of MSA, and Project Implementation, each Party shall comply with the Exit Management Plan.

f. During the exit management period, the MSI shall use its best efforts to deliver the services.

g. Payments during the Exit Management period shall be made in accordance with the Terms of Payment Schedule.

h. This Exit Management plan shall be furnished in writing to the city SPV or its nominated agencies within 90 days from the Effective Date of this Agreement.

## 1.7 Compliance to Standards & Certifications

1. For a large and complex set up such as the Integrated Command and Control Center (ICCC) System, it is imperative that the highest standards applicable are adhered to. In this context, the MSI will ensure that the entire ICCC solution is developed in compliance with the applicable standards.

2. During project duration, the MSI will ensure adherence to prescribed standards as provided below:

| Sl. No. | Component/Application/System | Prescribed Standard |
|---|---|---|
| 1. | Information Security | ISO 27001 |
| 2. | IT Infrastructure Management | ITIL specifications |
| 3. | Service Management | ISO 20000 specifications |
| 4. | Project Documentation | IEEE/ISO/CMMi (where applicable) specifications for documentation |
| 5 | Cloud Service Provider | As per the MeitY guidelines or preferred to be empaneled with MeitY |
| 6 | Integrated Command & Control Center | The ICCC should meet ISO 11064 Standards |

3. Apart from the above the MSI need to ensure compliance of the project with Government of India IT security guidelines including provisions of:

   a. The Information Technology Act, 2000" and amendments thereof and

   b. Guidelines and advisories for information security published by Cert-In/Meity (Government of India) issued till the date of publishing of tender notice. Periodic changes in these guidelines during project duration need to be complied with.

4. While writing the source code for application modules the MSI should ensure high-quality documentation standards to improve the readability of the software module. An illustrative list of comments that each module contained within the source file should be preceded by is outlined below:

   a. The name of the module

   b. The date when module was created

   c. A description of what the module does

   d. A list of the calling arguments, their types, and brief explanations of what they do

e. A list of required files and/or database tables needed by the module

f. Error codes/Exceptions

g. Operating System (OS) specific assumptions

h. A list of locally defined variables, their types, and how they are used

i. Modification history indicating who made modifications, when the modifications were made, and what was done.

5. Apart from the above MSI needs to follow appropriate coding standards and guidelines inclusive of but not limited to the following while writing the source code -

a. Proper and consistent indentation

b. Inline comments

c. Structured programming

d. Meaningful variable names

e. Appropriate spacing

f. Declaration of variable names

g. Meaningful error messages

**6. Quality Audits**

a. TUFIDCO or city SPV, at its discretion, may also engage independent auditors to audit any/some/all standards/processes. The MSI shall support all such audits as per calendar agreed in advance. The result of the audit shall be shared with the MSI who has to provide an effective action plan for mitigations of observations/non-compliances, if any.

# 2 Project Management and Governance

## 2.1 Project Management Office (PMO)

A Project Management office will be set up during the start of the project. The PMO will, at the minimum, include a designated full time Project Manager from MSI. It will also include key persons from other relevant stakeholders including members of city SPV and other officials/representatives by invitation. The operational aspects of the PMO need to be handled by the MSI including maintaining weekly statuses, minutes of the meetings, weekly/monthly/project plans, etc.

PMO will meet formally on a weekly basis covering, at a minimum, the following agenda items:

i. Project Progress
ii. Delays, if any – Reasons thereof and ways to make-up lost time
iii. Issues and concerns
iv. Performance and SLA compliance reports;
v. Unresolved and escalated issues;
vi. Project risks and their proposed mitigation plan
vii. Discussion on submitted deliverable
viii. Timelines and anticipated delay in deliverable if any
ix. Any other issues that either party wishes to add to the agenda.

During the development and implementation phase, there may be a need for more frequent meetings and the agenda would also include:

i. Module development status
ii. Testing results
iii. IT infrastructure procurement and deployment status
iv. Status of setting up/procuring of the Helpdesk, DC hosting
v. Any other issues that either party wishes to add to the agenda.

Bidder shall recommend PMO structure for the project implementation phase and operations and maintenance phase.

## 2.2 Steering Committee

The Steering Committee will consist of senior stakeholders from City SPVs, its nominated agencies and MSI. MSI will nominate its Project Head to be a part of the Project Steering Committee

The MSI shall participate in monthly Steering Committee meetings and update Steering Committee on Project progress, Risk parameters (if any), Resource deployment and plan, immediate tasks, and any obstacles in project. The Steering committee meeting will be a forum for seeking and getting approval for project decisions on major changes etc.

All relevant records of proceedings of Steering Committee should be maintained, updated, tracked and shared with the Steering Committee and Project Management Office by MSI.

During the development and implementation phase of the project, it is expected that there will be at least fortnightly Steering Committee meetings. During the O&M phase, the meetings will be held at least once a quarter.

Other than the planned meetings, in exceptional cases, TUFIDCO may call for a Steering Committee meeting with prior notice to the MSI.

### 2.3 Project Monitoring and Reporting

The MSI shall circulate written progress reports at agreed intervals to TUFIDCO, City SPV Authorities and other stakeholders. Project status report shall include Progress against the Project Management Plan, status of all risks and issues, exceptions and issues along with recommended resolution etc.

Other than the planned meetings, in exceptional cases, project status meeting may be called with prior notice to the Bidder. TUFIDCO and City SPV authorities reserves the right to ask the bidder for the project review reports other than the standard weekly review reports.

### 2.4 Risk and Issue management

The MSI shall develop a Risk Management Plan and shall identify, analyze and evaluate the project risks, and shall develop cost effective strategies and action plans to mitigate those risks.

The MSI shall carry out a Risk Assessment and document the Risk profile of City SPV based on the risk appetite and shall prepare and share the City SPV Enterprise Risk Register. The MSI shall develop an issues management procedure to identify, track, and resolve all issues confronting the project. The risk management plan and issue management procedure shall be done in consultation with City SPV.

The MSI shall monitor, report, and update the project risk profile. The risks should be discussed with City SPV and a mitigation plan be identified during the project review/status meetings. The Risk and Issue management should form an agenda for the Project Steering Committee meetings as and when required.

### 2.5 Staffing requirements

TUFIDCO has identified certain key positions that should be part of MSI's team during execution. MSI shall provide resource deployment schedule including these key positions and other team members as mentioned in RFP.

CVs of the key resources need to be submitted along with the proposal.

Please note that TUFIDCO shall require that all project related discussion should happen in TUFIDCO office. While the identified key personnel will operate out of TUFIDCO's office, other key members of the development/Data Center team may need to travel to TUFIDCO office for critical Project/Steering Committee meetings at their own expenses.

### 2.6 Governance procedures

MSI shall document the agreed structures in a procedures manual.

## 2.7 Planning and Scheduling

The MSI will prepare a detailed schedule and plan for the entire project covering all tasks and sub tasks required for successful execution of the project. The MSI has to get the plan approved from TUFIDCO at the start of the project and it should be updated every week to ensure tracking of the progress of the project.

The project plan should include the following:

1. The project break up into logical phases and sub-phases;
2. Activities making up the sub-phases and phases;
3. Components in each phase with milestones;
4. The milestone dates are decided by TUFIDCO in this RFP. MSI cannot change any of the milestone completion dates. MSI can only propose the internal task deadlines while keeping the overall end dates the same. MSI may suggest improvement in project dates without changing the end dates of each activity.
5. Key milestones and deliverables along with their dates including those related to delivery and installation of hardware and software;
6. Start date and end date for each activity;
7. The dependencies among activities;
8. Resources to be assigned to each activity;
9. Dependency on TUFIDCO

# 3. Change Management & Control

## 3.1 Change Orders / Alterations / Variations

a. The MSI agrees that the requirements given in the Bidding Documents are minimum requirements and are only indicative. The vendor would need to etch out the details at the time of preparing the design document prior to actual implementation. It shall be the responsibility of the MSI to meet all the requirements of technical specifications contained in the RFP and any upward revisions and/or additions of quantities, specifications sizes given in the Bidding Documents required to be made during execution of the works, shall not constitute a change order and shall be carried out without a change order and shall be carried out without any time and cost effect to Purchaser.

b. Further upward revisions and or additions required to make MSI's selected equipment and installation procedures to meet Bidding Documents requirements expressed and to make entire facilities safe, operable and as per specified codes and standards shall not constitute a change order and shall be carried out without any time and cost effect to Purchaser.

c. Any upward revision and/or additions consequent to errors, omissions, ambiguities, discrepancies in the Bidding Documents which the MSI had not brought out to the Purchaser's notice in his bid shall not constitute a change order and such upward revisions and/or addition shall be carried out by MSI without any time and cost effect to Purchaser.

## 3.2 Change Order

a. The Change Order will be initiated only in case (i) the Purchaser directs in writing the MSI to include any addition to the scope of work covered under this Contract or delete any part of the scope of the work under the Contract, (ii) MSI requests to delete any part of the work which will not adversely affect the operational capabilities of the facilities and if the deletions proposed are agreed to by the Purchaser and for which cost and time benefits shall be passed on to the Purchaser, (iii) the Purchaser directs in writing the MSI to incorporate changes or additions to the technical specifications already covered in the Contract.

b. Any changes required by the Purchaser over and above the minimum requirements given in the specifications and drawings etc. included in the Bidding Documents before giving its approval to detailed design or Engineering requirements for complying with technical specifications and changes required to ensure systems compatibility and reliability for safe operation (As per codes, standards and recommended practices referred in the Bidding Documents) and trouble free operation shall not be construed to be change in the Scope of work under the Contract.

c. Any change order as stated in Clause 2 a. comprising an alteration which involves change in the cost of the works (which sort of alteration is hereinafter called a "Variation") shall be the Subject of an amendment to the Contract by way of an

increase or decrease in the schedule of Contract Prices and adjustment of the implementation schedule if any.

d. If parties agree that the Contract does not contain applicable rates or that the said rates are inappropriate or the said rates are not precisely applicable to the variation in question, then the parties shall negotiate a revision of the Contract Price which shall represent the change in cost of the works caused by the Variations. Any change order shall be duly approved by the Purchaser in writing.

e. Within ten (10) working days of receiving the comments from the Purchaser or the drawings, specification, purchase requisitions and other documents submitted by the MSI for approval, the MSI shall respond in writing, which item(s) of the Comments is/are potential changes(s) in the Scope of work of the RFP document covered in the Contract and shall advise a date by which change order (if applicable) will be submitted to the Purchaser.

# Schedule 3 – General Conditions of Contract

## A. General Conditions of Contract (GCC)

### 1. Definition of Terms

Unless the context otherwise requires, capitalized terms used in this Agreement shall have the following meaning –

1.1. **"Authority":** Tamil Nadu Urban Finance & Infrastructure Development Corporation (TUFIDCO).

1.2. **"Acceptance of System":** The system including the hardware, software, solution or any deliverable shall be considered to have been accepted by designated authority, subsequent to its installation, rollout and deployment of trained manpower, when all the activities as defined in Scope of Work as laid down in the RFP have been successfully executed and completed by the MSI to the satisfaction of designated authority and the designated authority has indicated its acceptance by signing the Acceptance Certificate. Deliverable which are city specific like city ICCC and hardware/software/servers would be approved by city SPV authorities. Deliverables which are common to state will be reviewed and approved by TUFIDCO.

1.3. "**Acceptance Certificate**" - means that document issued by the designated authority signifying Acceptance of a hardware, software, solution, or any other deliverable pursuant to the successful completion of the acceptance test of the System.

1.4. **"Applicable Law(s)":** Any statute, law, ordinance, notification, rule, regulation, judgment, order, decree, bye-law, approval, directive, guideline, policy, requirement or other governmental restriction or any similar form of decision applicable to the relevant party and as may be in effect on the date of the execution of this Agreement and during the subsistence thereof, applicable to the Project.

1.5. **"Bidder"** shall mean organization/ consortium submitting the proposal in response to this RFP.

1.6. **"MSI**" or "**Lead Bidder**" means the bidder including the consortium who is selected by the designated authority at the end of this RFP process and shall be deemed to include the MSI's successors, representatives (approved by the designated authority), heirs, executors, administrators and permitted assigns, as the case may be, unless excluded by the terms of the contract. The word MSI when used in the pre-award period shall be synonymous with parties bidding against this RFP.

1.7. '**Confidential Information**' means all information including any information (whether in written, oral, electronic or other format) which relates to the technical, financial and business affairs, dealers, suppliers, products, developments, operations, processes, data, trade secrets, design rights, know-how, plans, budgets and personnel of designated authority which is disclosed to or otherwise learned by MSI in the course of or in connection with the Contract but does not include information which is available lawfully in the public domain

1.8. "**Contract**" or the "**Agreement**" means the Contract this agreement and all documents forming part of this agreement as mentioned herein

1.9. **"Contract Value"** means, the amount quoted by the MSI in its Financial bid. If the Contract Value is increased due to change request, increase in tax rates/tax laws etc. in accordance with the terms of this Agreement, then the Authority shall have the right to seek additional Performance Guarantee to such increased extent of Contract Value and the penalties/liquidated damages etc. getting affected by such increase would be calculated based on such increase from the effective date of such increase in the Contract Value. For purpose of this clause, the Contract Value shall be deemed to increase on every 20% increase in original Contract Value (quoted by the MSI in its Financial bid).

1.10. **"Commercial Off-The-Shelf (COTS)"** refers to software products that are ready-made and available for sale, lease, or license to the general public.

1.11. **"Document**" means any embodiment of any text or image however recorded and includes any data, text, images, sound, voice, codes, databases or any other electronic documents as per IT Act 2000.

1.12. **"Effective Date"** means the date on which this Contract is signed or LoI is issued by designated authority. If this Contract is executed in parts, then the date on which the last of such Contracts is executed shall be construed to be the Effective Date.

1.13. **"Goods"** means all of the equipment, sub-systems, hardware, software, products accessories, software and/or other material / items includes their user manuals, technical manuals, operating manuals, service mechanisms, policies and guidelines (such as security related, data migration related) and all its modifications which MSI is required to supply, install and maintain under the contract.

1.14. **"Integrated Command and Control Center"** means the integrated/centralized operation center to implement holistic and integrated solution for multiple (existing and future) IT initiative for the designated authority. The IT initiative may of any department for example whether it is safe city (CCTV surveillance) and DIAL 100 of police department, DIAL 108 of health department or network of Municipal Corporation. The end objective of establishing ICCC is to drive the actions by designated authority on behalf of all the departments for city operations.

1.15. **"Cloud Service Provider"** means an entity responsible to provide cloud based DC , DR and network services infrastructure business services and computing solutions.

1.16. **"Delivery of Goods"**- shall be deemed to have completed when the delivery of all the Goods under the proposed bill of material has reached the respective designated sites or locations wherein the delivery, installation, integration, management and maintenance services as specified under the Scope of Work are to be carried out for the purpose of this RFP / Contract and has been duly acknowledged by the designated authority's representative.

1.17. **"Intellectual Property Rights"** means any patent, copyright, trademark, trade name, service marks, brands, proprietary information whether arising before or after the execution of this Contract and the right to ownership and registration of these rights.

1.18. **"ISP"** means internet services provider

1.19. "**Intra-City Agreement**" means the agreement entered / to be entered into amongst the TUFIDCO and the smart cities specifying, inter alia, the governance of this Agreement amongst the smart city stakeholders.

1.20. **"Go- Live for City ICCC"** means commissioning and acceptance of ICCC at the cities mentioned in the RFP, installation and commencement of all smart city components, including training as per Scope of Work mentioned in RFP. Bidder should have the approval from the designated authority for user acceptance testing.

1.21. **"Go- Live for Cloud based DC & DR"** means commissioning and acceptance of common cloud based DC and DR with common command and control applications along with other common applications like EMS, KM, DBMS, Information & Cyber Security applications installed and commissioned, ready for integration with any city ICCC as per Scope of Work mentioned in RFP. Bidder should have the approval from the designated authority for user acceptance testing.

1.22. **"TUFIDCO"** means the Tamil Nadu Urban Finance & Infrastructure Development Corporation.

1.23. '**TUFIDCO's Representative / Project Coordinator**' means the person or the persons appointed by the designated authority from time to time to act on its behalf for overall coordination, supervision and project management.

1.24. "**Scope of Work**" means all Goods and Services, and any other deliverables as required to be provided by the MSI under the RFP.

1.25. **"MSI's Team"** means MSI who along with all of its Consortium Members who have to provide Goods & Services to the designated authority under the scope of this Contract. This definition shall also include any and/or all of the employees of MSI, Consortium Members, authorized service providers/ partners and representatives or other personnel employed or engaged either directly or indirectly by MSI for the purposes of this Contract.

1.26. **"SPV"** means special Purpose Vehicles designed and established in each of the 9 Cities to lead smart city project for respective city. They will be responsible for supervising monitoring and driving the implementation of command and control center and its integration with necessary services for respective cities.

1.27. '**Service Level(s)**' means the service level parameters and targets and other performance criteria which will apply to the Services and Deliverables as described in the RFP; 'SLA' or 'Service Level Agreement' means the service level agreement specified in the RFP;

1.28. '**Service Specifications'** means and includes detailed description, statements to technical data, performance characteristics, and standards (Indian as well as International) as applicable and as specified in the RFP and the Contract, as well as those specifications relating to industry standards and codes applicable to the performance of work, work performance quality and specifications affecting the work or any additional specifications required to be produced by the MSI to meet the design criteria.

1.29. '**System'** means integrated system/solution emerging out of all the Goods indicated in the Scope of Work and covered under the scope of each Purchase Order issued by the designated authority.

1.30. "**Purchase Order**' means the purchase order(s) issued from time to time by the designated authority to the MSI to provide Goods and Services as per the terms and conditions of this Contract.

1.31. "**Consortium**" means Lead Bidder, Consortium Partner 1 and Consortium Partner 2 entering into the Contract with the designated authority and includes their respective successors and assignees.

1.32. "**Replacement Service Provider**" means the organization replacing MSI in case of contract termination for any reasons

1.33. "**Sub-Contractor**" shall mean the entity named in the contract for any part of the work or any person to whom any part of the contract has been sublet with the consent in writing of the designated authority and the heirs, legal representatives, successors and assignees of such person.

1.34. **"Services"** means the work to be performed by the agency pursuant to the RFP and to the contract to be signed by the parties in pursuance of any specific assignment awarded by the designated authority. In addition to this, the definition would also include other related / ancillary services that may be required to execute the Scope of Work under the RFP.

1.35. '**Timelines'** means the project milestones for performance of the Scope of Work and delivery of the Services as described in the RFP;

## 1 Interpretation

1.1 In this Contract unless a contrary intention is evident:

a. the clause headings are for convenient reference only and do not form part of this Contract;

b. unless otherwise specified a reference to a clause number is a reference to all of its sub-clauses;

c. the word "include" or "including" shall be deemed to be followed by "without limitation" or "but not limited to" whether or not they are followed by such phrases;

d. unless otherwise specified a reference to a clause, sub-clause or section is a reference to a clause, sub-clause or section of this Contract including any amendments or modifications to the same from time to time;

e. a word in the singular includes the plural and a word in the plural includes the singular;

f. a word importing a gender includes any other gender;

g. a reference to a person includes a partnership and a body corporate;

h. a reference to legislation includes legislation repealing, replacing or amending that legislation;

i. Where a word or phrase is given a particular meaning it includes the appropriate grammatical forms of that word or phrase which have corresponding meanings.

## 2 Documents forming part of Agreement

2.1 The following documents shall be deemed to form and be read and constructed as part of the Contract viz.:

(a) The Contract;

(b) The RFP comprising of all volumes and any corrigenda, clarification thereto;

(c) The Proposal of the MSI as accepted by the designated authority along with any related documentation

(d) The designated authority's Letter of Award;

(e) The MSI's Acceptance of Letter of Award, if any;

(f) The tripartite agreement to be entered into between ISP, MSI and Authority for provision of bandwidth services, if any;

(g) The Corporate Non-disclosure agreement and any other document to be submitted by the MSI and appended to this Agreement.

(h) The Power of Attorney given by the seven Smart Cities to TUFIDCO; and

(i) The intra-city agreement.

## 3 Ambiguities within Agreement

In case of ambiguities or discrepancies within the Contract, the following principles shall apply:

i. As between the provisions of RFP and any Corrigendum issued thereafter, the provisions of the Corrigendum shall, to that extent only, prevail over the corresponding earlier provision of the RFP;

ii. As between the provisions of the Contract and the RFP and the Proposal, the Contract shall prevail; and

iii. As between any value written in numerals and that in words, the value in words shall prevail.

## 4 Conditions Precedent

The payment obligations of under the Contract shall take effect upon fulfillment of the following conditions precedent by MSI.

**a)** Furnishing by MSI, an unconditional and irrevocable Performance Bank Guarantee (PBG) (Annexure 7 (a) of this RFP) within 15 (fifteen) days after issuance of the Letter of Award and acceptable to the designated authority which would remain valid until 3 months from the expiry of the term of the contract..

**b)** All the members of the Consortium shall have executed a binding Consortium Contract / Agreement copy of which shall have been delivered to the designated authority without the commercials;

**c)** The designated authority reserves the right to waive any or all of the conditions specified in Clause 5 above in writing and no such waiver shall affect or impair any right, power or remedy that the designated authority may otherwise have.

## 5 Key Performance Measurements

**a.** Unless specified by the designated authority to the contrary, MSI shall deliver the Goods, perform the Services and carry out the Scope of Work in accordance with the terms of the Contract, Scope of Work and the Service Specifications as laid down under Section C (Service Level).

**b.** If the Goods and Service Specification includes more than one document, then unless the designated authority specifies to the contrary, the later in time shall prevail over a document of earlier date to the extent of any inconsistency.

c. The MSI shall commence the performance of its obligations under the Agreement from Effective Date and shall proceed to provide Goods and carry out the Services with diligence and expedition in accordance with any stipulation as to the time, manner, mode, and method of execution contained in this Agreement. The MSI shall be responsible for and shall ensure that all the Goods and Services are performed in accordance with the specifications and that the MSI's Team complies with such specifications and all other standards, terms and other stipulations/conditions set out hereunder.

d. The Goods supplied under this Agreement shall conform to the standards mentioned in the technical specifications given in the RFP, and, when no applicable standard is mentioned, to the authoritative standards, such standards shall be the latest issued by the concerned institution. Delivery of Goods shall be made by the MSI in accordance with the Agreement and the terms specified by the designated authority. In case if it is found that the Goods provided by MSI do not meet one/ more criteria, the MSI shall remain liable to provide a replacement for the same which meets all the required specifications and as per choice of MSI, at no additional cost to MSI.

## 6 Commencement and Progress

a. The MSI shall commence the performance of its obligations in a manner as specified in the Scope of Work, Service Level agreements and other provisions of the Contract from the Effective Date.

**b.** MSI shall proceed to carry out the activities / services with diligence and expedition in accordance with any stipulation as to the time, manner, mode, and method of execution contained in this Contract.

c. MSI shall be responsible for and shall ensure that all activities / services are performed in accordance with the Contract, Scope of Work and Service Specifications and that MSI's Team complies with such specifications and all other standards, terms and other stipulations/conditions set out hereunder.

**d.** MSI shall perform the activities / services and carry out its obligations under the Contract with due diligence, efficiency and economy, in accordance with generally accepted techniques and practices used in the industry and shall observe sound management, engineering and security practices. It shall employ appropriate advanced technology and

engineering practices and safe effective equipment, machinery, material and methods.MSI shall always act, in respect of any matter relating to this Contract, as faithful advisors to the designated authority and shall, at all times, support and safeguard the designated authority 's legitimate interests in any dealings with Third parties.

e. The Goods supplied under this Agreement shall confirm to the Standards mentioned in the technical specifications given in the RFP, and, when no applicable standard is mentioned, to the authoritative standards, such standard shall be the latest issued by the MSI to be proposed and approved by the designated authority in accordance with the Agreement and the terms specified by the designated authority in the Purchase Order.

## 7 Constitution of Consortium

a. For the purposes of fulfillment of its obligations as laid down under the Contract, where the designated authority deems fit and unless the contract requires otherwise, Prime Bidder shall be the sole point of interface for the designated authority and would be absolutely accountable for the performance of its own, the other member of Consortium and/or its Team's functions and obligations.

**b.** The Consortium member has agreed that MSI is the prime point of contact between the Consortium member and the designated authority and it shall be primarily responsible for the discharge and administration of all the obligations contained herein and, the designated authority, unless it deems necessary shall deal only with MSI.MSI along with all consortium members shall be jointly and severally y responsible for the Project execution

**c.** Without prejudice to the obligation of the Consortium member to adhere to and comply with the terms of this Contract, each Consortium member, shall, in addition to a binding Consortium Agreement, has executed and submitted a Power of Attorney in favor of MSI authorizing him to act for and on behalf of such member of the Consortium and do all acts as may be necessary for fulfillment of contractual obligations.

d. The MSI and each of the Consortium Members shall be bound by all undertakings and representations made by their authorized representative and any covenants stipulated hereunder with respect to the Contract, for and their behalf.

e. MSI shall submit the Consortium Agreement to be entered into between the Consortium Members for the designated authority's review without commercials. MSI shall not, except with the prior approval of the designated authority, have any provision in the consortium agreement or make any amendments to the said consortium agreement which affects the rights and/or obligations of MSI, OEM-ES and/or _____ under this Agreement or any amendment which is contrary to the provisions of this Agreement.

**f.** A notice of at least 3 months in advance is required to be given by the MSI to the designated authority if during the Term of the Contract the MSI desires to terminate any contract/arrangement relating to the performance of Services hereunder with any member of the Consortium. Where, during the Term of the Contract, MSI terminates any contract/arrangement or agreement relating to the performance of Services with any consortium member (subject to approval of the designated authority), MSI shall be

liable for any consequences resulting from such termination. MSI shall in such case ensure the smooth continuation of Services by providing a suitable replacement to the satisfaction of the designated authority at no additional charge and at the earliest opportunity.

## 8 MSI's Obligations

a. The obligations of the MSI described in this clause is in addition to, and not in derogation of, the obligations mentioned in the RFP and the two are to be read harmoniously. MSI's obligations shall include all the activities as specified by the designated authority in the Scope of Work and other sections of the RFP and Contract and changes thereof to enable designated authority to meet the objectives and operational requirements.

b. The MSI shall also be the sole point of contact for all matters relating to the RFP and Contract thereof.

**c.** It shall be MSI's responsibility to ensure the proper and successful implementation, performance and continued operation of the proposed solution in accordance with and in strict adherence to the terms of his the RFP and the Contract.

**d.** In addition to the aforementioned, MSI shall provide services to manage and maintain the said system and infrastructure as mentioned in the RFP.

**e.** The designated authority reserves the right to interview the personnel proposed by the MSI that shall be deployed as part of the project team. If found unsuitable, the designated authority may reject the deployment of the personnel. But ultimate responsibility of the project implementation shall lie with MSI.

f. The designated authority reserves the right to require changes in personnel which shall be communicated to MSI. MSI with the prior approval of the designated authority may make additions to the project team. MSI shall provide the designated authority with the resume of Key Personnel and provide such other information as the designated authority may reasonably require. The designated authority also reserves the right to interview the personnel and reject, if found unsuitable. In case of change in its team members, for any reason whatsoever, MSI shall also ensure that the exiting members are replaced with at least equally qualified and professionally competent members.

**g.** MSI shall ensure that none of the Key Personnel and manpower exit from the project during first 6 months of the beginning of the project. In such cases of exit, replacement has to be approved by the designated authority.

**h.** MSI should submit profiles of only those resources who shall be deployed on the Project. Any change of resource should be approved by the designated authority and compensated with equivalent or better resource. The designated authority may interview the resources suggested by MSI before their deployment on board. It does not apply in case of change requested by the designated authority.

**i.** In case of change in its team members, MSI shall ensure a reasonable amount of time overlap in activities to ensure proper knowledge transfer and handover / takeover of documents and other relevant materials between the outgoing and the new member.

**j.** MSI shall ensure that MSI's Team is competent, professional and possesses the requisite qualifications and experience appropriate to the task they are required to perform under this Contract. MSI shall ensure that the services are performed through the efforts of MSI's Team, in accordance with the terms hereof and to the satisfaction of the designated authority. Nothing in the Contract relieves MSI from its liabilities or obligations under the Contract to provide the Services in accordance with the designated authority's directions and requirements and as stated in this Contract and the Bid to the extent accepted by the designated authority and MSI shall be liable for any non-performance, non-compliance, breach or other loss and damage resulting either directly or indirectly by or on account of its Team.

**k.** MSI shall be fully responsible for deployment / installation / development/ laying of network fibre and integration of all the software and hardware components and resolve any problems / issues that may arise due to integration of components.

l. MSI shall ensure that the OEMs supply equipment/ components including associated accessories and software required and shall support MSI in the installation, commissioning, integration and maintenance of these components during the entire period of contract. MSI shall ensure that the COTS OEMs supply the software applications and shall support MSI in the installation / deployment, integration, roll-out and maintenance of these applications during the entire period of contract. It must clearly be understood by MSI that warranty and AMC of the system, products and services incorporated as part of system would commence from the day of Go-Live of system as a complete Smart city solutions including all the solutions proposed. MSI would be required to explicitly display that he/ they have a back to back arrangement for provisioning of warranty/ AMC support till the end of contract period with the relevant OEMs. The annual maintenance support shall include patches and updates the software, hardware components and other devices.

**m.** All the OEMs that Bidder proposes should have Dealer possession licenses.

n. The designated authority reserves the right to review the terms of the Warranty and Annual Maintenance agreements entered into between MSI and OEMs.

o. Shall ensure that none of the components and sub-components is declared end-of-sale or end-of-support by the respective OEM at the time of submission of bid. If the OEM declares any of the products/ solutions end-of-sale subsequently, the MSI shall ensure that the same is supported by the respective OEM for contract period.

**p.** If a product is de-supported by the OEM for any reason whatsoever, from the date of Acceptance of the System till the end of contract, MSI should replace the products/ solutions with an alternate that is acceptable to the designated authority at no additional cost to the designated authority and without causing any performance degradation.

q. Further, the MSI shall be obliged to ensure that all approvals, registrations, licenses, permits and rights which are, inter-alia, necessary for use of the Deliverables, goods, services, applications, services etc. provided by the MSI / Consortium / MSI's subcontractors under the Contract shall be acquired in the name of the designated authority and MSI shall have the non-exclusive, limited right to use such licenses till the Term on behalf of the designated authority solely for the purpose of execution of any of its obligations under the terms of the Contract. However, subsequent to the Term of this Contract, such approvals etc. shall endure to the exclusive benefit of the designated authority.

r. That the MSI shall procure all the necessary permissions and adequate approvals and licenses for **use** of various software and any copyrighted process/product for use of the copyright/process/products that the MSI has proposed to supply under the Contract free from all claims, titles, interests and liens thereon;

s. MSI shall ensure that the OEMs provide the support and assistance to MSI in case of any problems / issues arising due to integration of components supplied by him with any other **component**(s)/ product(s) under the purview of the overall solution. If the same is not resolved for any reason whatsoever, MSI shall replace the required component(s) with an equivalent or better substitute that is acceptable to designated authority without any additional cost to the designated authority and without impacting the performance of the solution in any manner whatsoever.

t. MSI shall ensure that the OEMs for hardware servers/equipment supply and/or install all type of updates, patches, fixes and/or bug fixes for the firmware or software from time to time at no additional cost to the designated authority.

u. MSI shall ensure that the OEMs for hardware servers/ equipment or Bidder's trained engineers conduct the preventive maintenance on a Quarterly basis and break-fix maintenance in accordance with the best practices followed in the industry.MSI shall ensure that the documentation and training services associated with the components shall be provided by the OEM partner or OEM's certified training partner without any additional cost to the designated authority.

v. The training has to be conducted using official OEM course curriculum mapped with the hardware / **Software** Product's to be implemented in the project.

w. MSI and their personnel/representative shall not alter / change / replace any hardware component proprietary to the designated authority and/or under warranty or AMC of third party without prior consent of the designated authority.

x. MSI shall provision the required critical spares/ components at the designated Datacenter Sites / office locations of the designated authority for meeting the uptime commitment of the components supplied by him.

y. MSI's representative(s) shall have all the powers requisite for the execution of Scope of Work and performance of services under the Contract. MSI's representative(s) shall liaise with the designated authority's Representative for the proper coordination and timely completion of the works and on any other matters pertaining to the works. MSI shall extend full co-operation to designated authority's Representative in the manner required by them for supervision/ inspection/ observation of the equipment/ goods/ material, procedures, performance, progress, reports and records pertaining to the works. He shall also have complete charge of MSI's personnel engaged in the performance of the works and to ensure compliance of rules, regulations and safety practice. He shall also cooperate with the other Service Providers/Vendors of the designated authority working at the designated authority's office locations & field locations and DC sites. Such Bidder's representative(s) shall be available to the designated authority Representatives at respective Datacenter during the execution of works.

z. MSI shall be responsible on an ongoing basis for coordination with other vendors and agencies of the designated authority and its nominated agency in order to resolve issues and oversee implementation of the same. MSI shall also be responsible for resolving conflicts between vendors in case of borderline integration issues.

aa. MSI shall set up a project office in each Smart City for City ICCC. The technical manpower deployed on the project should work from the same office. However, some resources may be required to work from the office assigned by designated authority during the contract period.

## 9 Access to Sites

**a.** Sites would include Command control center itself and different command and control center of projects which are to be integrated with ICCC like DIAL 100 and Safe City. Access will be provided to different command and control center only after approval of their respective authorities and as per access policy.

**b.** The designated authority's Representative upon receipt of request from MSI intimating commencement of activities at various locations shall give to MSI access to as much of the Sites, on a non-permanent basis, as may be necessary to enable MSI to commence and proceed with the installation of the works in accordance with the program of work subject to compliance by the MSI with any safety and security guidelines which may be provided by the designated authority and notified to the MSI in writing. Any reasonable proposal of MSI for access to Site to proceed with the installation of work in accordance with the program of work shall be considered for approval and shall not be unreasonably withheld by the designated authority. Such requests shall be made to the designated authority's Representative in writing at least 7 days prior to start of the work.

**c.** At the site locations, the designated authority's Representative shall give to MSI access to as much as may be necessary to enable MSI to commence and proceed with the installation of the works in accordance with the program of work or for performance of Facilities Management Services.

d. Access to locations, office equipment and services shall be made available to the MSI on an "as is, where is" basis by the designated authority as the case may be or its nominated agencies. The MSI agrees to ensure that its employees, agents and contractors/Sub-Contractors shall not use the location, services and equipment referred to in the RFP for the following purposes:

   i. For the transmission of any material which is defamatory, offensive or abusive or of an obscene or menacing character; or
   ii. In a manner which constitutes violation of any law or a violation or infringement of the rights of any person, firm or company (including but not limited to rights of copyright or confidentiality); or
   iii. For their own purpose or for conducting their own business or for providing services to any third party.

## 10 Start of Installation

**a.** Bidder shall co-ordinate with the designated authority and stakeholders for the complete setup of sites before commencement of installation of other areas as mentioned in Volume II document. MSI shall also co-ordinate regarding Network / Bandwidth connectivity in order to prepare the installation plan and detailed design / architectural design documents.

b. As per TRAI guidelines, resale of bandwidth connectivity is not allowed. In such a case tripartite agreement should be formed between designated authority, selected Bidder and Network Service Provider(s).Such tripartite agreement entered for provision of bandwidth services will form an integral part of the Contract. A draft of the tripartite agreement is attached.

c. The plan and design documents thus developed shall be submitted by MSI for written approval by the designated authority.

d. After obtaining the approval from the designated authority, MSI shall commence the installation.

## 11 Reporting Progress

**a.** MSI shall monitor progress of all the activities related to the execution of the Contract and shall submit to the designated authority, progress reports with reference to all related work, milestones and their progress during the contract period.

b. Formats for all above mentioned reports and their dissemination mechanism shall be discussed and finalized with the designated CITY SPV authority along with project plan.

The designated authority on mutual agreement between both parties may change the formats, periodicity and dissemination mechanism for such reports.

c. Periodic meetings shall be held between the representatives of the City SPV designated authority and MSI once in every 15 days during the implementation phase to discuss the progress of implementation. After the implementation phase is over, the meeting shall be held as an ongoing basis, as desired by designated City SPV authority, to discuss the performance of the contract.

d. MSI shall ensure that the respective solution teams involved in the execution of work are part of such meetings.

e. Several review committees involving representative of the designated authority and senior officials of MSI shall be formed for the purpose of this project. These committees shall meet at intervals, as decided by the designated City SPV authority later, to oversee the progress of the implementation.

**f.** All the Goods, Services and manpower to be provided / deployed by MSI under the Contract and the manner and speed of execution and maintenance of the work and services are to be conducted in a manner to the satisfaction of City SPV designated authority's Representative in accordance with the Contract.

**g.** Should the rate of progress of the works or any part of them at any time fall behind the stipulated time for completion or is found to be too slow to ensure completion of the works by the stipulated time, or is in deviation to Tender requirements/ standards, the City SPV / TUFIDCO designated authority's Representative shall so notify MSI in writing.

**h.** MSI shall reply to the written notice giving details of the measures it proposes to take to expedite the progress so as to complete the works by the prescribed time or to ensure compliance to RFP requirements. MSI shall not be entitled to any additional payment for taking such steps. If at any time it should appear to the designated authority or designated authority's Representative that the actual progress of work does not conform to the approved plan MSI shall produce at the request of the designated authority's Representative a revised plan showing the modification to the approved plan necessary to ensure completion of the works within the time for completion or steps initiated to ensure compliance to the stipulated requirements

**i.** The submission seeking approval by the designated authority or designated authority's Representative of such plan shall not relieve MSI of any of his duties or responsibilities under the Contract.

**j.** In case during execution of works, the progress falls behind schedule or does not meet the Tender requirements, MSI shall deploy extra manpower/ resources to make up the progress or to meet the RFP requirements. Plan for deployment of extra man power/ resources shall be submitted to the designated authority for its review and approval. All time and cost effect in this respect shall be borne, by MSI within the Contract Value.

k. The designated authority reserves the right to inspect and monitor/ assess the progress/ performance of the work / services at any time during the course of the Contract, after providing due notice to the MSI. The designated authority may demand and upon such demand being made, MSI shall provide documents, data, material or any other information pertaining to the Project which the designated authority may require, to enable it to assess the progress/ performance of the work / service under the Contract.

l. At any time during the course of the Contract, the designated authority shall also have the right to conduct, either itself or through another agency as it may deem fit, an audit to monitor the performance by MSI of its obligations/ functions in accordance with the standards committed to or required by the designated authority and MSI undertakes to cooperate with and provide to the designated authority / any other agency appointed by the designated authority, all documents and other details as may be required by them for this purpose. Such audit shall not include Bidder's books of accounts. Any deviations or contravention, identified as a result of such audit/assessment, would need to be rectified by the MSI failing which the designated authority may, without prejudice to any other rights that it may have issue a notice of default. Cost of acquisition of deliverables by the MSI and other Sub-Contractors is out of the purview of audit/inspections.

m. Without prejudice to the foregoing, the MSI shall allow access to the designated authority or its nominated agencies to all information which is in the possession or control of the MSI and which relates to the provision of the Services/Deliverables as set out in the Audit, Access and Reporting Schedule and which is reasonably required by the designated authority to comply with the terms of the Audit, Access and Reporting provision set out in this Contract.

n. Knowledge of Network Operations Center (NOC), Server Room, Command and Control Center, City Operation Center and areas of city kiosk centers

**o.** MSI shall be granted access to the command and control center of other IT project like DIAL 100, DIAL 108 and Safe City etc. for inspection by the designated authority before commencement of installation of integrated command and control center. The plan shall be drawn mutually at a later stage.

**p.** MSI shall be deemed to have knowledge of the cloud Data Centers, Server Room, Command and Control Center, its surroundings and information available in connection therewith and to have satisfied itself the form and nature thereof including, the data contained in the Bidding Documents, the physical and climatic conditions, the quantities and nature of the works and materials necessary for the completion of the works, the means of access, etc. and in general to have obtained itself all necessary information of all risks, contingencies and circumstances affecting his obligations and responsibilities therewith under the Contract and his ability to perform it. However, if during pre-installation survey / during delivery or installation, MSI detects physical conditions and/or obstructions affecting the work, MSI shall take all measures to overcome them.

## 12 Project Plan

**a.** Within 15 calendar days of Effective Date of the contract/ Issuance of LoI, MSI shall submit to the designated authority for its approval a detailed Project Plan with details of the project showing the sequence, procedure and method in which it proposes to carry out the works (one for each city to city SPV and one for the common components to TUFIDCO). The Plan so submitted by MSI shall conform to the requirements and timelines specified in the Contract. The designated authority and MSI shall discuss and agree upon the work procedures to be followed for effective execution of the works, which MSI intends to deploy and shall be clearly specified. The Project Plan shall include but not limited to project organization, communication structure, proposed staffing, roles and responsibilities, processes and tool sets to be used for quality assurance, security and confidentiality practices in accordance with industry best

practices, project plan and delivery schedule in accordance with the Contract. Approval by the designated authority's Representative of the Project Plan shall not relieve MSI of any of his duties or responsibilities under the Contract.

**b.** If MSI's work plans necessitate a disruption/ shutdown in designated authority's operation, the plan shall be mutually discussed and developed so as to keep such disruption/shutdown to the barest unavoidable minimum. Any time and cost arising due to failure of MSI to develop/adhere such a work plan shall be to his account.

## 13 Compliance with Applicable Law

**a.** MSI's Team shall comply with the provision of all laws including labour laws, rules, regulations and notifications issued there under from time to time. All safety and labour laws enforced by statutory agencies and by the designated authority shall be applicable in the performance of the Contract and Bidder's Team shall abide by these laws. The MSI shall take all measures necessary or proper to protect the personnel, work and facilities and shall observe all reasonable safety rules and instructions.

b. Access to the Data centers of other IT systems (DIAL 100, CM Helpline, safe city etc.) and its Server Room shall be strictly restricted. No access to any person except the essential members of MSI's Team who are authorized by the designated authority and are genuinely required for execution of work or for carrying out management/ maintenance shall be allowed entry. Even if allowed, access shall be restricted to the pertaining equipment of the designated authority only. MSI shall maintain a log of all activities carried out by each of its team personnel.

c. All such access should be logged in a loss free manner for permanent record with unique biometric identification of the staff to avoid misrepresentations or mistakes

d. Each Party to the Contract accepts that its individual conduct shall (to the extent applicable to its business like the MSI as an Information Technology service provider) at all times comply with all laws, rules and regulations of government and other bodies having jurisdiction over the area in which the Services are undertaken provided that changes in such laws, rules and regulations which result in a change to the Services shall be dealt with in accordance with the Change Management and Control set out in the RFP.

**e.** MSI shall take all measures necessary or proper to protect the personnel, work and facilities and shall observe all reasonable safety rules and instructions. MSI's Team shall adhere to all security requirement/ regulations of the designated authority during the execution of the work. Designated authority's employee also shall comply with safety procedures/ policy.

**f.** MSI shall report as soon as possible any evidence, which may indicate or is likely to lead to an abnormal or dangerous situation and shall take all necessary emergency control steps to avoid such abnormal situations.

## 14 Statutory Requirements

**a)** During the tenure of the Contract the MSI shall comply with all Applicable Laws and shall obtain and maintain all statutory and other approvals required for the performance of the Services under the Contract and nothing shall be done by MSI or his team including Consortium in contravention of any law, act and/ or rules/regulations, there under or any amendment thereof governing inter-alia customs, stowaways, foreign exchange etc. and shall keep designated authority indemnified in this regard.

## 15 Representations and Warranties

**a)** Representations and warranties of the MSI

The MSI hereby represents and warrants as of the date hereof, which representations and warranties shall remain in force during the Term and extension thereto, the following:

(i) it is duly organized and validly existing under the laws of India, and has full power and authority to execute and perform its obligations under this Contract and other agreement and to carry out the transactions contemplated hereby;

(ii) it is a competent provider of a variety of Information Technology and business process management services. It has taken all necessary corporate and other actions under laws applicable to its business to authorize the execution and delivery of this Contract and to validly exercise its rights and perform its obligations under this Contract;

(iii) That all conditions precedent under the Contract have been satisfied;

(iv) That the selected MSI along with its consortium members have the power and the authority that would be required to enter into this Contract and the requisite experience, the technical know-how and the financial wherewithal required to successfully execute the terms of this Contract and to provide services sought by the designated authority under this Contract;

(v) That the MSI and its team has the professional skills, personnel, infrastructure and resources/ authorizations that are necessary for providing all such services as are necessary to fulfil the scope of work stipulated in the tender and this Contract;

(vi) That the MSI shall ensure that all assets/ components including but not limited to equipment, software, licenses, processes, documents, etc. installed, developed, procured, deployed and created during the term of this Contract are duly maintained and suitably updated, upgraded, replaced with regard to contemporary requirements;

(vii) The MSI/ MSI's team shall use such assets of the designated authority, as the designated authority may permit for the sole purpose of execution of its obligations under the terms of the Bid, Tender or this Contract. The MSI shall however, have no claim to any right, title, lien or other interest in such property, and any possession of property for any duration whatsoever shall not create any right in equity or otherwise, merely by fact of such use or possession during or after the term thereof;

(viii) it has the financial standing and capacity to undertake the Project and obligations in accordance with the terms of this Contract;

(ix) in providing the Services, it shall spare no effort to prevent any disruption to designated authority 's normal business operations;

(x) this Contract has been duly executed by it and constitutes a legal, valid and binding obligation, enforceable against it in accordance with the terms hereof, and its obligations under this Contract shall be legally valid, binding and enforceable against it in accordance with the terms hereof;

(xi) the information furnished in the Proposal is to the best of its knowledge and belief, true and accurate in all respects as at the date of this Contract;

(xii) the execution, delivery and performance of this Contract shall not conflict with, result in the breach of, constitute a default by any of the terms of its Memorandum and Articles of Association or any Applicable Laws or any covenant, contract, Contract, arrangement, understanding, decree or order to which it is a party or by which it or any of its properties or assets is bound or affected;

(xiii) there are no material actions, suits, proceedings, or investigations pending or, to its knowledge, threatened against it at law or in equity before any court or before any other judicial, quasi-judicial or other authority, the outcome of which may result in the breach of this Contract or which individually or in the aggregate may result in any material impairment of its ability to perform any of its material obligations under this Contract;

(xiv) it has no knowledge of any violation or default with respect to any order, writ, injunction or decree of any court or any legally binding order of any Government Instrumentality which may result in any adverse effect on its ability to perform its obligations under this Contract and no fact or circumstance exists which may give rise to such proceedings that would adversely affect the performance of its obligations under this Contract;

(xv) it has complied with Applicable Laws in all material respects and has not been subject to any fines, penalties, injunctive relief or any other civil or criminal liabilities which in the aggregate have or may have an Adverse Effect on its ability to perform its obligations under this Contract;

(xvi) no representation or warranty by it contained herein or in any other document furnished by it to the designated authority or its nominated agencies in relation

to the any consents contains or shall contain any untrue or misleading statement of material fact or omits or shall omit to state a material fact necessary to make such representation or warranty not misleading;

(xvii) no sums, in cash or kind, have been paid or shall be paid, by it or on its behalf, to any person by way of fees, commission or otherwise for entering into this Contract or for influencing or attempting to influence any officer or employee of the designated authority or its nominated agencies in connection therewith;

(xviii) That the MSI shall procure all the necessary permissions and adequate approvals and licenses for use of various software and any copyrighted process/product for use of the copyright/process/products that the MSI has proposed to supply under this Contract free from all claims, titles, interests and liens thereon;

(xix) That the sub-contractor proposed and/or deployed by the MSI meets the technical and financial qualifications prescribed in the RFP; and

(xx) That the representations made by the MSI in its Proposal and in this Contract are and shall continue to remain true and fulfil all the requirements as are necessary for executing the obligations and responsibilities as laid down in the Contract and the RFP and unless the designated authority specifies to the contrary, the MSI shall be bound by all the terms of the Contract;

(xxi) That the MSI certifies that all registrations, recordings, filings and notarizations of the Contract and all payments of any tax or duty, including but not limited to stamp duty, registration charges or similar amounts which are required to be effected or made by the MSI which is necessary to ensure the legality, validity, enforceability or admissibility in evidence of the Contract have been made;

(xxii) That the MSI confirms that there has not and shall not occur any execution, amendment or modification of this contract without the prior written consent of the designated authority;

(xxiii) That the MSI owns or has good, legal or beneficial title, or other interest in, to the property, assets and revenues of the MSI on which it grants or purports to grant or create any interest pursuant to-the Contract, in each case free and clear-of any-encumbrance and further confirms that such Interests created or expressed to be created are valid and enforceable;

(xxiv) That the MSI-owns, has license to use or otherwise has the right to use, free of any pending or threatened liens or other security or other interests all Intellectual Property Rights, which are required or desirable for the project. In case of any infringement, designated authority is not responsible. Action will be taken as per the clauses defined in this RFP.

(xxv) That the MSI shall provide adequate and appropriate support and participation, on a continuing basis, in tuning/ upgrading all supplied hardware and software to meet the requirements of the applications;

b) **Representations and warranties of the** designated authority

The designated authority represents and warrants to the MSI that:

i. it has full power and authority to execute, deliver and perform its obligations under this Contract and to carry out the transactions contemplated herein and that it has taken all actions necessary to execute this Contract, exercise its rights and perform its obligations, under this Contract and carry out the transactions contemplated hereby;

ii. it has taken all necessary actions under Applicable Laws to authorize the execution, delivery and performance of this Contract and to validly exercise its rights and perform its obligations under this Contract;

iii. it has the financial standing and capacity to perform its obligations under the Contract;

iv. this Contract has been duly executed by it and constitutes a legal, valid and binding obligation enforceable against it in accordance with the terms hereof and its obligations under this Contract shall be legally valid, binding and enforceable against it in accordance with the terms thereof;

v. the execution, delivery and performance of this Contract shall not conflict with, result in the breach of, constitute a default under any of the Applicable Laws or any covenant, contract, Contract, arrangement, understanding, decree or order to which it is a party or by which it or any of its properties or assets is bound or affected;

vi. it has complied with Applicable Laws in all material respects.

**16 Obligations of the designated authority**

a. The obligations of the designated authority described in this clause is in addition to, and not in derogation of, the obligations mentioned in the RFP are to be read harmoniously. Without prejudice to any other undertakings or obligations of the designated authority under the Contract or the RFP, the designated authority shall perform the following:

b. The designated authority or his/her nominated representative shall act as the nodal point for implementation of the contract and for issuing necessary instructions, approvals, commissioning, Acceptance Certificate(s), payments etc. to MSI.

c. The designated authority shall ensure that timely approval is provided to MSI as and when required, which may include approval of project plans, implementation methodology, design documents, specifications, or any other document necessary in fulfillment of the contract.

d. The designated authority's Representative shall interface with MSI, to provide the required information, clarifications, and to resolve any issues as may arise during the execution of the Contract. Designated authority shall provide adequate cooperation in providing details, coordinating and obtaining of approvals from various governmental agencies, in cases, where the intervention of the designated authority is proper and necessary.

**e.** The designated authority may provide on Bidder's request, particulars/ information/ or documentation that may be required by MSI for proper planning and execution of work

and for providing Goods and Services covered under the contract and for which MSI may have to coordinate with respective vendors.

**f.** The designated authority shall provide to MSI only sitting space and basic infrastructure not including, stationery and other consumables at the designated authority's office locations.

**g.** The designated authority reserves the right to procure the hardware including devices on quarterly basis in first year based on actual deployment and AMC shall be applicable whenever the devices are procured and deployed till end of the contract.

**h. Site Not Ready**: The designated authority hereby agrees to make the project sites ready as per the agreed specifications, within the agreed timelines. The designated authority agrees that MSI shall not be in any manner liable for any delay arising out of designated authority's failure to make the site ready within the stipulated period.

i. TUFIDCO shall ensure that each smart city performs its scope of responsibility as mentioned in the responsibility matrix in this RFP.

## 17 Payments

1. Following table explains the category of payment and the paying authority

| | TUFIDCO | City SPVs / ULBs (including TUFIDCO) |
|---|---|---|
| CAPEX | • Initial setup of common components like Cloud based DC, DR and Command Center Application Platform | • Infrastructure for ICCC establishment at each City<br>• Software Licenses (Specific to City ICCC ; one time procurement like OS)<br>• One time charge of Integration of each Services (to be paid as it happens)<br>• One time establishment cost of Command Center Application (at the time of Go-Live) |
| OPEX | | • Cloud Services (Server, Storage and Networking Infrastructure)<br>• Cloud Services (Platform as a Service)<br>• Manpower for O&M<br>• O&M for IT and non IT Infrastructure for city ICCC |

2. Payments to MSI will be done on monthly basis, based on the activities completed in the particular month including for Cloud Service consumption on pay for use basis.
3. No Pro-rata payment will be done, payment for only activities completed will be done in the particular month at the end of each month.
4. The following steps will be followed:
    - 4.1 MSI will create separate monthly invoice for City ICCC work by 5th of the following month
    - 4.2 MSI will submit invoice to respective city along with monthly progress report and proof of the work delivered
    - 4.3 City SPV or its authorized personnel will approve / reject the invoice based on the performance of the MSI for the previous month
    - 4.4 After approvals from all the cities, MSI will receive payment for city specific components from CITY SPV only.
    - 4.5 City SPV or its authorized personal will review the submitted invoices and reports
    - 4.6 After all approvals, claims will be processed and payment will be made to MSI
    - 4.7 For Common components CAPEX (required for initial setup) part similar steps will be followed by TUFIDCO.

5. One time cost for common components like command center application, EMS, KM, etc implementation on cloud (If any). This component will be paid directly by TUFIDCO only. This will be paid in two portions:
    - 5.1 MSI will be paid 5% on the submission of all the relevant documentations as mentioned in RFP.
    - 5.2 MSI will be paid 55%, once the common platform is ready and available for integration with all the cities, along with ULB UAT test reports
    - 5.3 MSI will be paid 40%, once the common platform is SQTC certified and Go-Live of common platform.

6. One time cost for each service integration. This component will be paid by City SPV only. This cost should be broken and paid in 2 portions:
    - 6.1 MSI will be paid 10% of CAPEX on completion of Design Document for integration, SOPs for particular service and use-cases to be showcased after integration of one service.
    - 6.2 MSI will be paid left 90% of CAPEX on complete integration of each service, this includes showcasing of the approved use cases, SOPs running, Test Reports (as per RFP).

7. Infrastructure Component cost shall include all ICT Component (excluding Cloud Service) and Non ICT Components which are required for the establishment of ICCC. ICT Components like Hardware, AMC and Software licenses & support (for ICCC Situation Room), and Non ICT Components like all the expenses incurred for the civil work like electric work, etc., and all related Non ICT Components like furniture, fixtures, electric fittings, etc. This component will be paid by City SPV only. This will be paid in 3 portions for all components.

7.1 MSI will be paid 50% of particular Infrastructure component on delivery and Receipt at site and after Verification of such items by TUFIDCO/TUFIDCO authorized agency.

7.2 MSI will be paid 50% of particular Infrastructure component on Go – Live of particular City ICCC.

8. OPEX (Operation & Maintenance Cost) shall include of manpower, training, and required maintenance of ICCC setup (both ICT & non-ICT Components). OPEX cost shall also include cost of cloud subscription. This component will be paid by City SPV, on actual consumption of each city.

8.1 MSI will be paid Operation & Maintenance Cost during O&M Phase for 5 years on monthly basis after submission and approval of the relevant reports and documents for a particular city.

9. Bandwidth consumption will also be part of the OPEX, and are to be defined separately for each city. This component of the payment will be directly paid by the City SPV to ISP. As resale of bandwidth is not allowed. But separate invoice for the same has to be submitted on monthly basis.

**Note:**

1. MSI shall submit a separate monthly invoice to all CITY SPVs based on the success achieved so far. These 8 invoices will be – 1 for CAPEX of common command center to TUFIDCO and other applications setup and 7 for city specific containing details of both CAPEX and OPEX.
2. Monthly invoice will consists of the activities achieved in the respective month (as per clauses given above) and accordingly payments will be made to MSI.
3. Monthly invoice to be submitted will be exclusive of all taxes, taxes will be added and paid as per the norm defined by Government of India at the time of actual payment.
4. Each City will pay for its use and implementation.
5. Calculation for CAPEX items required for ICCC establishment – If MSI is able to procure any particular item in a specific month then MSI will receive 80% of the value quoted in financial bid for the particular item. (30% for procurement and 50% for installation). Left 20% will be received by MSI when the Go-Live for the City ICCC physical setup takes place. (As per clause 7 of this section). Similarly for other components percentages of payments are defined in the clauses given above.
6. Order for Infrastructure items including Hardware, COTS Software licenses and other system software etc. shall be placed by MSI only after receipt of written confirmation from City SPV in this regard.
7. All the milestone payments that are due to MSI after requisite approvals/acceptance as prescribed shall be made to MSI within 30 working days after receipt of valid invoice in this regard from the MSI, subject to correctness and validation of the invoice and no objections / observations by City SPV.
8. Unless otherwise mentioned in this RFP for any component, payment terms for additional work assigned through change management shall be defined in the change management order which will be, to the extent applicable, in line with payment terms defined in the above clauses.
9. Payments will be subject to deduction of taxes and liquidated damages etc.

## 18 Ownership and Intellectual Property Rights

a. The designated authority (or its nominated agency/respective smart city, as decided by the Authority) shall have a right in perpetuity to use all newly created Intellectual Property Rights which have been developed solely during execution of the Contract, including but not limited to all processes, products, specifications, reports and other documents which have been newly created and developed by MSI solely during the performance of Services and for the purposes of inter-alia use or sub-license of such Services under the Contract. MSI undertakes to disclose all such Intellectual Property Rights arising in performance of the Services to the designated authority, execute all such agreements/documents and obtain all permits and approvals that may be necessary in regard to the Intellectual Property Rights of the designated authority (or its nominated agency/respective smart city, as decided by the Authority).

b. All Commercially off the Shelf (COTS) products/ Open Source Solutions and related solutions and fixes provided pursuant to this Agreement shall be licensed according to the terms of the license agreement packaged with or otherwise applicable to such products. Such licenses shall be brought on behalf of and in the name of the Authority (or its nominated agency/respective smart city, as decided by the Authority) or mentioning the Authority (or its nominated agency/respective smart city, as decided by the Authority) as the end user of such licenses. MSI shall be responsible for arranging any licenses associated with products. “Product” means any computer code, web-based services, or materials comprising commercially released, pre-release or beta products (whether licensed for a fee or no charge) and any derivatives of the foregoing which are made available to the Authority for license which is published by product owner or its affiliates, or a third party. “Fixes” means product fixes that are either released generally (such as commercial product service packs) or that are provided to you when performing services (such as workarounds, patches, bug fixes, beta fixes and beta builds) and any derivatives of the foregoing. Unless otherwise specifically restricted by the Licensing Terms of the COTS products/ Open Source Solutions, all intellectual property rights in any development/enhancement/customization etc. done on the COTS products/ Open Source Solutions pursuant to this Agreement shall be owned by the Authority. Further, the MSI shall be obliged to ensure that all approvals, registrations, licenses, permits and rights which are, inter-alia, necessary for use of the Deliverables, goods, services, applications, services etc. provided by the MSI / Consortium / subcontractors under this Agreement shall be acquired in the name of the Authority (or its nominated agency/respective smart city, as decided by the Authority) and MSI shall have the non-exclusive, limited right to use such licenses till the Term on behalf of the Authority solely for the purpose of execution of any of its obligations under the terms of this Agreement. However, subsequent to the term of this Agreement, such approvals etc. shall endure to the exclusive benefit of the Authority (or its nominated agency/respective smart city, as decided by the Authority).

c. Pre-existing work: All intellectual property rights existing prior to the Effective Date of the Contract shall belong to the Party that owned such rights immediately prior to the Effective Date. Subject to the foregoing, the designated authority will also have rights to use and copy all intellectual property rights, process, specifications, reports and

other document, drawings, manuals provided or used by the MSI as part of the Scope of Works under the Contract for the purpose of the Contract on non-exclusive, non-transferable, perpetual, royalty-free license to use basis.

d. Third Party Products: If license agreements are necessary or appropriate between the MSI and third parties for purposes of enabling / enforcing/implementing the provisions hereinabove, the MSI shall enter into such agreements at its own sole cost, expense and risk and all such licenses etc. shall be bought in name of the designated authority unless otherwise directed in writing by the designated authority.

**e.** MSI shall not copy, reproduce, translate, adapt, vary, modify, disassemble, decompile or reverse engineer or otherwise deal with or cause to reduce the value of the Materials except as expressly authorized by the designated authority in writing

## 19 Taxes

**a.** MSI shall bear all personnel taxes levied or imposed on its personnel, or any other member of MSI's Team, etc. on account of payment received under the Contract. MSI shall bear all corporate taxes, levied or imposed on MSI on account of payments received by it from the designated authority for the work done under the Contract. The MSI shall bear all taxes and duties etc. levied or imposed on the MSI under the Contract including but not limited to Customs duty, Excise duty and all Income Tax levied under Indian Income Tax Act – 1961 or any amendment thereof up to the date for submission of final price bid, i.e., on account of payments received by him from the designated authority for work done under the Contract. The MSI shall also be responsible for having his Sub-Contractors under its Sub-Contract(s) to pay all applicable taxes on account of payment received by the Sub-Contractors from the MSI for works done under the Sub-contracts in relation to this Agreement and the designated authority will in no case bear any responsibility for such payment of taxes.

**b.** MSI agrees that he shall comply with the Indian Income Tax Act in force from time to time and pay Indian Income Tax, as may be imposed/ levied on them by the Indian Income Tax Authorities, for the payments received by them for the works under the Contract

**c.** MSIs shall fully familiarize themselves about the applicable domestic taxes (such as GST, income taxes, duties, fees, levies, etc.) on amounts payable by the designated authority under the Agreement.

d. Should MSI fail to submit returns/pay taxes in times as stipulated under applicable Indian/State Tax Laws and consequently any interest or penalty is imposed by the concerned authority, MSI shall pay the same. MSI shall indemnify the designated authority against any and all liabilities or claims arising out of this Contract for such taxes including interest and penalty by any such Tax Authority may assess or levy against the designated authority.

e. Payment agreed to be made by the designated authority to the MSI in accordance with the Proposal.

**f.** Supplies of materials from abroad are exempted from levy of Sales Tax/VAT on works/works Contract tax (Central or state). However, the Sales Tax/VAT on works (central or state) if levied on supplies made from indigenous vendors for the works shall be borne by MSI within the Contract Price. Service Tax/ Terminal Sales Tax/ Works Contract Tax, etc., if any applicable, shall be payable extra, at actuals by the designated authority in accordance with the conditions of the Contract and upon submission of proof of payment of such taxes.

**g.** The designated authority shall if so required by Applicable Laws in force, at the time of payment, deduct income tax payable by MSI at the rates in force, from the amount due to MSI and pay to the concerned tax authority directly.

h. Should the MSI and/or other Consortium members fail to submit returns/pay taxes in times as stipulated under the Indian Income Tax Act and consequently any interest or penalty is imposed by the Indian Income Tax authority, the MSI and/or other Consortium members, as the case may be shall pay the same. MSI and/or other Consortium members shall jointly and severally indemnify the designated authority against any and all liabilities or claims arising out of this Agreement for such taxes including interest and penalty any such Tax Authority may assess or levy against the designated authority /MSI and/or other Consortium members.

## 20 Indemnity

### 21.1 General Indemnity

Subject to Clause 21.2 below, the MSI (the "Indemnifying Party") undertakes to indemnify the designated authority and relevant individual smart cities and their nominated agencies (the "Indemnified Party") from and against all losses, claims, damages, compensation etc. on account of bodily injury, death or damage to tangible personal property arising in favour of any person, corporation or other entity (including the Indemnified Party) attributable to the Indemnifying Party's negligence, willful default, or lack of due care.

### 21.2 IPR Indemnity

If the Indemnified Party promptly notifies the Indemnifying Party in writing of a third party claim against the Indemnified Party that any Goods / Deliverables/ Services provided by the Indemnifying Party infringes a copyright, trade secret, patent or other intellectual property rights of any third party, the Indemnifying Party will defend such claim at its expense and will pay any costs or damages that may be finally awarded against the Indemnified Party. The Indemnifying Party will not indemnify the Indemnified Party, however, if the claim of infringement is caused by (a) The Indemnified Party’s misuse or modification of the Deliverables; (b) The Indemnified Party’s failure to use corrections or enhancements made available by the Indemnifying Party; (c) The Indemnified Party’s use of the Deliverables in combination with any product or information not owned or

developed or supplied by the Indemnifying Party. If any of the Deliverables is or likely to be held as infringing, the Indemnifying Party shall at its expense and option either (i) procure the right for the Indemnified Party to continue using it, (ii) replace it with a non-infringing equivalent, (iii) modify it to make it non-infringing.

### 21.3 Conditions for Indemnity

Without prejudice to the rights of the designated authority in respect of indemnification for any claim:

i. The designated authority shall notify the MSI upon receipt of any notice of claim setting out in reasonable particulars, the details of such notice of claim;

ii. Immediately upon receipt of notification of any claim from the designated authority, the MSI within a period of 5 days from date of receipt of such notice from the designated authority, notify the designated authority whether the MSI wish to assume the defense in relation to such claim (including settlement or resolution thereof). Thereafter, the MSI shall be entitled in consultation with the designated authority, and only to the extent such action does not in any manner compromise, prejudice or adversely affect the interests of the designated authority, to take such action as mutually agreed upon by MSI and the designated authority to avoid, dispute, deny, resist, appeal, compromise or consent such claim, within a period of 30 days from the date of receipt of such claim notification;

iii. Notwithstanding anything contained herein, the MSI and the designated authority agree and covenant that a notice by the designated authority to the MSI in relation to the claim as aforesaid shall amount to express acceptance and consent by the MSI to indemnify the designated authority for all losses in relation to such claim. Upon notice by the MSI, the designated authority shall reasonably co-operate with the MSI at the sole costs of the MSI, only to the extent the same does not in any manner compromise, prejudice or adversely affect the rights of the designated authority. The designated authority shall have the right, at its option, to participate in the defense of such claim;

If the MSI fails to take any action as per the above clause within the time period as specified therein, the designated authority shall have the right, in its absolute discretion, to take such action as it may deem necessary to avoid, dispute, deny, resist, appeal, compromise or contest or settle any claim (including without limitation, making claims or counterclaims against third parties). If the MSI does not assume control of the defense of such claims (as mentioned above), the entire defense, negotiation or settlement of such claim by the designated authority shall be deemed to have been consented to by, and shall be binding upon, MSI as fully as though the MSI alone had assumed the defense thereof and a judgment had been entered into by the MSI, for such claim in respect of the settlement or judgment.

## 22 Warranty

**22.1** The warranties and remedies provided in this Clause are in addition to, and not in derogation of, the warranties provided in the RFP and the two are to be read harmoniously.

**22.2** A comprehensive warranty applicable on goods/solutions supplied under the Contract by the respective OEMs and the warranties shall be passed on to the designated authority. The MSI shall be responsible for making any and all claims under the warranty on behalf of the designated authority. Generally the warranty for goods and solutions shall be for a period of two (2) years from the date of installation and commissioning of the respective hardware and solution. If the warranty period provided by the OEM is for more than two (2), then the same warranty period shall be passed on to the designated authority. The AMC / ATS shall commence from the date of expiry of the warranty period of the respective goods and solutions.

**22.3** Technical Support for Software applications shall be provided by the respective OEMs for the period of contract. The Technical Support should include all upgrades, updates and patches to the respective Software applications.

**22.4** The MSI warrants that the Goods supplied under the Contract are new, non-refurbished, unused and recently manufactured; shall not be nearing End of sale / End of support; and shall be supported by the MSI and respective OEM along with service and spares support to ensure its efficient and effective operation for the entire duration of the contract.

**22.5** The MSI warrants that the Goods supplied under the Contract shall be of the highest grade and quality and consisted with the established and generally accepted standards for materials of this type. The goods shall be in full conformity with the specifications and shall operate properly and safely. All recent design improvements in goods, unless provided otherwise in the Contract, shall also be made available.

**22.6** The MSI further warrants that the Goods supplied under the Contract shall be free from all encumbrances and defects/faults arising from design, material, manufacture or workmanship (except insofar as the design or material is required by the designated authority's Specifications) or from any act or omission of the MSI, that may develop under normal use of the supplied Goods in the conditions prevailing at the respective Datacenter / Server Room Sites.

**22.7** Warranty for Services – The MSI warrants that all services under the Contract will be performed with promptness and diligence and will be executed in a workmanlike and professional manner, in accordance with the practices and high professional standards used in well-managed operations performing services similar to the services under the Contract. The MSI represents that it shall use adequate numbers of qualified individuals with suitable training, education, experience and skill to perform the Services hereunder.

**22.8** The designated authority shall promptly notify the MSI in writing of any claims arising under this warranty.

**22.9** Upon receipt of such notice, the MSI shall, with all reasonable speed, repair or replace the defective goods or replace such goods with similar goods free from defect at MSI's own cost and risk. Any goods repaired or replaced by the MSI shall be delivered at the designated authority's premises without costs to the designated authority. Notwithstanding the foregoing, these are not the sole and exclusive remedies available to the designated authority in case of breach of any warranty and

are also not the sole and exclusive obligations on the MSI in case of breach of any warranty.

**22.10** If the MSI, having been notified, fails to remedy the defect(s) within a reasonable period, the designated authority may proceed to take such remedial action as may be necessary, at the MSI's risk and expense and without prejudice to any other rights which the designated authority may have against the MSI under the Contract.

**22.11** Any OEM specific warranty terms that do not conform to conditions under this Contract shall not be acceptable.

**22.12** The representations, warranties and covenants provided by the MSI under the Contract will not be affected by designated authority's modification of any portion of the software so long as the MSI can discharge its obligations despite such modifications, or following their removal by the designated authority

**22.13** Notwithstanding anything contained in the Contract, unless the designated authority has otherwise agreed in writing, the designated authority reserves the right to reject Goods which do not conform to the specifications provided in the RFP.

## 23 Term and Extension of the Contract

**23.1** The Contract period shall come into effect on …….i.e. from the date of signing of contract or Issuance of Letter of Intent, whichever is earlier((hereinafter the "Effective Date"), and shall remain valid for 60 Months of the all 7 city ICCC ("Term")

**23.2** If the delay occurs due to any Force Majeure event, a reasonable extension of time shall be granted by the designated authority.

**23.3** The designated authority shall reserve the sole right to grant any extension to the Term abovementioned and shall notify in writing to MSI, at least 3 (three) months before the expiration of the Term hereof, whether it shall grant MSI an extension of the Term. The decision to grant or refuse the extension shall be at the designated authority's discretion and such extension of the contract, if any, shall be as per terms agreed mutually between the designated authority and MSI.

**23.4** Where the designated authority is of the view that no further extension of the Term be granted to MSI, the designated authority shall notify MSI of its decision at least 3 (three) months prior to the expiry of the Term. Upon receipt of such notice, MSI shall continue to perform all its obligations hereunder, until such reasonable time beyond the Term of the Contract within which, the designated authority shall either appoint an alternative agency/MSI or create its own infrastructure to operate such Services as are provided under this Contract.

## 24 Dispute Resolution

**24.1** In case, a dispute is referred to arbitration, the arbitration shall be under the **Indian Arbitration and Conciliation Act, 1996** and any statutory modification or re-enactment thereof.

**24.2** If during the subsistence of this Contract or thereafter, any dispute between the Parties hereto arising out of or in connection with the validity, interpretation, implementation, material breach or any alleged material breach of any provision of this Contract or regarding any question, including as to whether the termination of this Contract by one Party hereto has been legitimate, the Parties hereto shall endeavor to settle such dispute amicably and/or by Conciliation to be governed by the Arbitration and Conciliation Act, 1996 or as may be agreed to between the Parties. The attempt to bring about an amicable settlement is considered to have failed as soon as one of the Parties hereto, after reasonable attempts; which attempt shall continue for not less than thirty (30) days, gives thirty (30) day notice to refer the dispute to arbitration to the other Party in writing.

**24.3** The Arbitration proceedings shall be governed by the Arbitration and Conciliation Act, 1996.

**24.4** The Arbitration proceedings shall be held in Tamil Nadu, India.

**24.5** The Arbitration proceeding shall be governed by the substantive laws of India.

**24.6** The proceedings of Arbitration shall be in Hindi/English language.

**24.7** Except as otherwise provided elsewhere in the contract if any dispute, difference, question or disagreement arises between the parties hereto or their respective representatives or assignees, at any time in connection with construction, meaning, operation, effect, interpretation or out of the contract or breach thereof the same shall be referred to a Tribunal of three (3) Arbitrators, constituted as per the terms of and under the (Indian) Arbitration and Conciliation Act, 1996. MD of MPUDC or the Commissioner of UADD will be the Arbitrator from TUFIDCO in this case. One arbitrator shall be appointed by MSI and the two arbitrators shall appoint a third arbitrator. .

**24.8** In case, a party fails to appoint an arbitrator within 30 days from the receipt of the request to do so by the other party or the two Arbitrators so appointed fail to agree on the appointment of third Arbitrator within 30 days from the date of their appointment upon request of a party, the Chief Justice of the Tamil Nadu High Court or any person or institution designated by him shall appoint the Arbitrator/Presiding Arbitrator upon request of one of the parties.

**24.9** Any letter, notice or other communications dispatched to MSI relating to either arbitration proceeding or otherwise whether through the post or through a representative on the address last notified to the designated authority by MSI shall be deemed to have been received by MSI although returned with the remarks, refused 'undelivered' where about not known or words to that effect or for any other reasons whatsoever

**24.10** If the Arbitrator so appointed dies, resigns, incapacitated or withdraws for any reason from the proceedings, it shall be lawful for the designated authority to appoint another person in his place in the same manner as aforesaid. Such person shall proceed with the reference from the stage where his predecessor had left if both parties consent for the same; otherwise, he shall proceed de novo.

**24.11** It is a term of the contract that the party invoking arbitration shall specify all disputes to be referred to arbitration at the time of invocation of arbitration and not thereafter.

**24.12** It is also a term of the contract that neither party to the contract shall be entitled for any interest on the amount of the award.

**24.13** The Arbitrator shall give reasoned award and the same shall be final, conclusive and binding on the parties.

## 25 . Conflict of interest

**25.1** MSI shall disclose to the designated authority in writing, all actual and potential conflicts of interest that exist, arise or may arise (either for MSI or MSI's Team) in the course of performing the Services as soon as practical after it becomes aware of that conflict.

## 26 Trademarks, Publicity

**26.1** Neither Party may use the trademarks of the other Party without the prior written consent of the other Party except that the MSI may, upon completion, use the Project as a reference for credential purpose. Except as required by law or the rules and regulations of each stock exchange upon which the securities of one of the Parties is listed, neither Party shall publish or permit to be published either alone or in conjunction with any other person any press release, information, article, photograph, illustration or any other material of whatever kind relating to this Agreement, the SLA or the business of the Parties without prior reference to and approval in writing from the other Party, such approval not to be unreasonably withheld or delayed provided however that the MSI may include the designated authority or its client lists for reference to third parties subject to the prior written consent of the designated authority not to be unreasonably withheld or delayed. Such approval shall apply to each specific case and relate only to that case.

## 27 Force Majeure

### 27.1 Definition of Force Majeure

The MSI or the designated authority, as the case may be, shall be entitled to suspend or excuse performance of its respective obligations under the Contract to the extent that such performance is impeded by an event of force majeure ('Force Majeure').

### 27.2 Force Majeure Events

A Force Majeure event means any event or circumstance or a combination of events and circumstances referred to in this Clause, which:

i. is beyond the reasonable control of the affected Party;

ii. such Party could not have prevented or reasonably overcome with the exercise of reasonable skill and care;

iii. does not result from the negligence of such Party or the failure of such Party to perform its obligations under the Contract;

iv. is of an incapacitating nature and prevents or causes a delay or impediment in performance; and

v. may be classified as all or any of the following events:

a) act of God like earthquake, flood, inundation, landslide, storm, tempest, hurricane, cyclone, lightning, thunder or volcanic eruption that directly and adversely affect the performance of services by the MSI under the Contract;
b) radioactive contamination or ionizing radiation or biological contamination (except as may be attributable to the MSI's use of radiation or radioactivity or biologically contaminating material) that directly and adversely affect the performance of services by the MSI under the Contract;
c) industry wide strikes, lockouts, boycotts, labour disruptions or any other industrial disturbances, as the case may be, not arising on account of the acts or omissions of the MSI and which directly and adversely affect the timely implementation and continued operation of the Project; or
d) an act of war (whether declared or undeclared), hostilities, invasion, armed conflict or act of foreign enemy, blockade, embargo, prolonged riot, insurrection, terrorist or military action, civil commotion or politically motivated sabotage, for a continuous period exceeding seven (7) days that directly and adversely affect the performance of services by the MSI under the Contract.

For the avoidance of doubt, it is expressly clarified that the failure on the part of the MSI under the Contract or the SLA to implement any disaster contingency planning and back-up and other data safeguards in accordance with the terms of the Contract or the SLA against natural disaster, fire, sabotage or other similar occurrence shall not be deemed to be a Force Majeure event. For the avoidance of doubt, it is further clarified that any negligence in performance of Services which directly causes any breach of security like hacking shall not be considered as arising due to forces of nature and shall not qualify under the definition of "Force Majeure". The MSI will be solely responsible to complete the risk assessment and ensure implementation of adequate security

hygiene, best practices, processes and technology to prevent any breach of security and any resulting liability therefrom (wherever applicable).

### 27.3 Notification procedure for Force Majeure

i. The affected Party shall notify the other Party of a Force Majeure event within seven (7) days of occurrence of such event. If the other Party disputes the claim for relief under Force Majeure it shall give the claiming Party written notice of such dispute within thirty (30) days of such notice. Such dispute shall be dealt with in accordance with the dispute resolution mechanism in the Agreement.

ii. Upon cessation of the situation which led the Party claiming Force Majeure, the claiming Party shall within seven (7) days thereof notify the other Party in writing of the cessation and the Parties shall as soon as practicable thereafter continue performance of all obligations under the Contract.

### 27.4 Allocation of costs arising out of Force Majeure

i. Upon the occurrence of any Force Majeure event prior to the Effective Date, the Parties shall bear their respective costs and no Party shall be required to pay to the other Party any costs thereof.

ii. Upon occurrence of a Force Majeure event after the Effective Date, the costs incurred and attributable to such event and directly relating to the Project ('Force Majeure Costs') shall be allocated and paid as follows:

a) Upon occurrence of an event mentioned in clause 28.2 (i), (ii), (iii) and (iv), the Parties shall bear their respective Force Majeure Costs and neither Party shall be required to pay to the other Party any costs thereof.
b) Save and except as expressly provided in this Clause, neither Party shall be liable in any manner whatsoever to the other Party in respect of any loss, damage, costs, expense, claims, demands and proceedings relating to or arising out of occurrence or existence of any Force Majeure event or exercise of any right pursuant hereof.

### 27.5 Consultation and duty to mitigate

Except as otherwise provided in this Clause, the affected Party shall, at its own cost, take all steps reasonably required to remedy and mitigate the effects of the Force Majeure event and restore its ability to perform its obligations under the Contract as soon as reasonably practicable. The Parties shall consult with each other to determine the reasonable measures to be implemented to minimize the losses of each Party resulting from the Force Majeure event. The affected Party shall keep the other Party informed of its efforts to remedy the effect of the Force Majeure event and shall make reasonable efforts to mitigate such event on a continuous basis and shall provide written notice of the resumption of performance hereunder.

## 28 Delivery

**28.1** MSI shall bear the cost for packing, transport, insurance, storage and delivery of all the goods for "Selection of Master System Integrator and Cloud Service Provider for Integrated Data Center for Smart Cities and City Integrated Command and Control Centers for the State of Tamil Nadu" at all locations identified by the designated authority for selected cities within Tamil Nadu.

**28.2** The Goods and manpower supplied under the Contract shall conform to the standards mentioned in the RFP, and, when no applicable standard is mentioned, to the authoritative standards; such standard shall be approved by the designated authority.

**28.3** MSI shall only procure the hardware and software after approvals from the designated Committee.

## 29 Insurance

**29.1** The Goods supplied under this Contract shall be comprehensively insured by MSI at his own cost, against any loss or damage, for the entire period of the contract. MSI shall submit to the designated authority, documentary evidence issued by the insurance company, indicating that such insurance has been taken.

**29.2** MSI shall bear all the statutory levies like customs, insurance, freight, etc. applicable on the goods and also the charges like transportation charges, octroi, etc. that may be applicable till the goods are delivered at the respective sites of installation shall also be borne by MSI.

**29.3** MSI shall take out and maintain at its own cost, on terms and conditions approved by the designated authority, insurance against the risks, and for the coverages, as specified below;

a. At the designated authority's request, shall provide evidence to the designated authority showing that such insurance has been taken out and maintained and that the current premiums therefor have been paid.

b. Employer's liability and workers' compensation insurance in respect of the Personnel of the Company, in accordance with the relevant provisions of the Applicable Law, as well as, with respect to such Personnel, any such life, health, accident, travel or other insurance as may be appropriate

## 30 Transfer of Ownership

**30.1** MSI must transfer all licenses / rights to use of the assets and goods procured for the purpose of the project to the designated authority or its nominated agency at the time of Acceptance of System. This includes all licenses, certificates, hardware, devices, equipment's etc. related to the system designed, developed, installed and maintained by MSI for each city ICCC. In case of Cloud based DC & DR and common cloud based DR only the data (both stored and generated), logs, and any other views

and analytics results will be transferred to city SPVs. Ownership of Goods that are part of this Agreement shall not pass to the designated authority unless and until the Goods is accepted in accordance with the conditions of the Contract and to the entire satisfaction of the designated authority and an acceptance notification is provided by the designated authority for to the MSI.

**30.2** Forthwith upon expiry or earlier termination of the Contract and at any other time on demand by the designated authority, MSI shall deliver to the designated authority all Documents provided by or originating from the designated authority and all Documents produced by or from or for MSI in the course of performing the Services, unless otherwise directed in writing by the designated authority at no additional cost. MSI shall not, without the prior written consent of the designated authority store, copy, distribute or retain any such Documents.

**30.3** The MSI shall execute such documents as may be required by the designated authority for documenting the transfer of title and ownership of Goods. Upon transfer of ownership of the Goods to the designated authority, the MSI shall treat such Goods as Assets as detailed above in this Agreement.

## 31 Exit Management Plan

**31.1** An Exit Management plan shall be furnished by MSI in writing to the designated authority within 90 days from the date of signing the Contract, which shall deal with at least the following aspects of exit management in relation to the contract as a whole and in relation to the Project Implementation, and Service Level monitoring.

i. A detailed program of the transfer process that could be used in conjunction with a Replacement Service Provider including details of the means to be used to ensure continuing provision of the services throughout the transfer process or until the cessation of the services and of the management structure to be used during the transfer;

ii. Plans for provision of contingent support to Project and Replacement Service Provider for a reasonable period after transfer.

iii. Exit Management plan in case of normal termination of Contract period

iv. Exit Management plan in case of any eventuality due to which Project is terminated before the contract period.

v. Exit Management plan in case of termination of MSI

vi. Exit Management Plan shall be presented by the MSI to and approved by the designated authority or its nominated agencies

**31.2** Exit Management plan at the minimum adhere to the following:

i. Three (3) months of the support to Replacement Service Provider post termination of the Contract

ii. Complete handover of the Planning documents, bill of materials, functional requirements specification, technical specifications of all equipment, change requests if any, reports, documents and other relevant items to the Replacement Service Provider/ Designated Authority

iii. Certificate of Acceptance from authorized representative of Replacement Service Provider issued to MSI on successful completion of handover and knowledge transfer

**31.3** In the event of termination or expiry of the contract, Project Implementation, or Service Level monitoring, both Bidder and the designated authority shall comply with the Exit Management Plan.

**31.4** During the exit management period, MSI shall use its best efforts to deliver the services.

## 32 Performance Security

**32.1** MSI shall furnish Performance Security to the designated authority at the time as indicated in the RFP which shall be equal to 10% of the Contract Value and shall be in the form of a **Bank Guarantee Bond** from a Nationalized / Scheduled Bank in the Performa given in Annexure of this RFP within 15 days after issuance of letter of intent (LOI) or Letter of Award (LoA) which would be valid up to a period of six months after the contract period.

**32.2** In the event of the MSI being unable to service the Contract for reasons attributable to the MSI, its Consortium members or any subcontractors, or any team members, the designated authority would invoke the PBG. Notwithstanding and without prejudice to any rights whatsoever of the designated authority under the Agreement in the matter, the proceeds of the PBG shall be payable to the Contract as compensation for any loss resulting from the failure of MSI, its Consortium members or any subcontractors, or any team members to perform/comply its obligations under the contract. The designated authority shall notify the MSI in writing of the exercise of its right to receive such compensation within 30 days, indicating the contractual obligation(s) for which the MSI is in default.

**32.3** The designated authority shall also be entitled to make recoveries from the MSI's bills, PBG, or from any other amount due to him, an equivalent value of any payment made to him due to inadvertence, error, collusion, misconstruction or misstatement.

**32.4** In case the Project is delayed beyond the Timelines as mentioned in RFP due to reasons attributable to MSI, its Consortium members or any subcontractors, or any team members, the PBG (any one or both, if not returned) shall be accordingly extended by the MSI till completion of Scope of Work as mentioned in RFP.

**32.5** Performance security shall be increased as mentioned in the definition section of this RFP.

**32.6** The performance security may be apportioned and liquidated as per the terms of the inter-city agreement.

## 33 Liquidated Damages

**33.1** If MSI fails to supply, install or maintain any or all of the goods as per the contract, within the time period(s) specified in the RFP and the Service Levels provided in the Contract, the designated authority without prejudice to its other rights and remedies under the Contract, deduct from the Contract price, as liquidated damages, as mentioned in the Service Level Agreements. In case the MSI is not solely liable for the breach of the Timelines or the Service Levels, amount of liquidated damages shall be deducted on proportionate / pro rata basis depending upon the MSI's extent of fault in such breach of the Timelines or the Service Levels. The designated authority shall have the right to determine such extent of fault and liquidated damages in consultation with the MSI and any other party it deems appropriate.

**33.2** The deduction shall not in any case exceed **the** upper limit cap mentioned for SLAs in the Service Level Agreement. If the liquidated damages cross the cap on liquidated damages as mentioned above, the designated authority shall have the right to terminate the Agreement for default and consequences for such termination as provided in this Agreement shall be applicable.

**33.3** The designated authority may without prejudice to its right to effect recovery by any other method, deduct the amount of liquidated damages from any money belonging to MSI in its hands (which includes the designated authority's right to claim such amount against MSI's Bank Guarantee) or which may become due to MSI. Any such recovery or liquidated damages shall not in any way relieve MSI from any of its obligations to complete the Work or from any other obligations and liabilities under the Contract.

**33.4** Delay not attributable to MSI shall be considered for exclusion for the purpose of computing liquidated damages.

**33.5** Payment of liquidated damages shall not be the sole and exclusive remedies available to the designated authority and the MSI shall not be relieved from any obligations by virtue of payment of such liquidated damages. Each of the Parties shall ensure that the range of the Services/Deliverables under the SLA shall not be varied, reduced or increased except with the prior written agreement between the designated authority and the MSI in accordance with the provisions of Change Control set out in the Contract.

### 33A. Risk Purchase

If the MSI fails or refuses to perform its obligations (or any part thereof) under this Agreement, or if the Agreement is terminated (in full or in part) by the Authority due to breach of any obligations of the MSP under this Agreement, the Authority reserves the right to procure the same or equivalent Goods / Services / Deliverables from alternative sources. Any incremental

cost borne by the Authority in procuring such Goods /Services/ Deliverables shall be borne by the MSI provided the liability of the MSI to pay such incremental cost shall be limited to the higher of (a) 100% of the value of the services/deliverables/obligations which the MSI has failed to perform/provide OR (b) 30% of the Contract Value. In the event the MSI has not been provided a notice / cure period for the relevant breach/default etc. under any other clause of this Agreement, the Authority shall give 30 days notice / cure period to MSI prior to invoking this clause. Any such incremental cost incurred in the procurement of the such Goods /Services/ Deliverables from alternative source will be recovered from the undisputed pending due and payable Payments / Bank Guarantee provided by the MSI under this Agreement and if such funds are not sufficient to recover the incremental cost, the same may be recovered, if necessary, by due legal process.

## 34 Limitation of Liability:

Limitation of Bidder's Liability towards the designated authority:

**34.1** Neither Party shall be liable to the other Party for any indirect or consequential loss or damage (including loss of revenue and profits) arising out of or relating to the Contract.

**34.2** The liability of the MSI (whether in contract, tort, negligence, strict liability in tort, by statute or otherwise) for any claim in any manner related to the Contract, including the work, deliverables or Goods and Services covered by the Agreement, shall be the payment of direct damages only which shall in no event in the aggregate exceed the Contract Value

**34.3** Notwithstanding anything contained in the foregoing, the liability cap and exclusion for the MSI given under this Clause shall not be applicable to the breach of indemnification obligations, confidential obligations and breach committed by MSI to the safety and security measures as provided in the Contract.

**34.4** Subject to the foregoing, the limitation of liability cap may be apportioned and applied as per the terms of the inter-city agreement.

## 35 Ownership and Retention of Documents

**35.1** The designated authority shall own the Documents, prepared by or for MSI arising out of or in connection with the Contract.

**35.2** Forthwith upon expiry or earlier termination of this Contract and at any other time on demand by the designated authority, MSI shall deliver to the designated authority all documents provided by or originating from the designated authority and all documents produced by or for MSI in the course of performing the Services, unless otherwise directed in writing by the designated authority at no additional cost. MSI shall not, without the prior written consent of the TUFIDCO store, copy, distribute or retain any such documents.

## 36 Information Security

**36.1** MSI shall not carry any written/printed document, layout diagrams, CD, hard disk, storage tapes, other storage devices or any other goods /material proprietary to the designated authority into / out of any location without written permission from the designated authority. The designated authority. The MSI's personnel shall follow the designated authority's Information Security policy. The MSI acknowledges that the designated authority's business data and other designated authority proprietary information or materials, whether developed by the designated authority or being used by the designated authority pursuant to a license agreement with a third party (the foregoing collectively referred to herein as "proprietary information") are confidential and proprietary to the designated authority; and the MSI agrees to use reasonable care to safeguard the proprietary information and to prevent the unauthorized use or disclosure thereof, which care shall not be less than that used by the MSI to protect its own proprietary information.

**36.2** MSI shall not destroy any unwanted documents, defective tapes/media present at any location on their own. All such documents, tapes/media shall be handed over to the designated authority.

**36.3** All documentation and media at any location shall be properly identified, labeled and numbered by MSI. MSI shall keep track of all such items and provide a summary report of these items to the designated authority whenever asked for.

**36.4** Access to designated authority's data and systems, Internet facility by MSI at any location shall be in accordance with the written permission by the designated authority. The designated authority shall allow MSI to use facility in a limited manner subject to availability. It is the responsibility of MSI to prepare and equip himself in order to meet the requirements.

**36.5** MSI must acknowledge that designated authority's business data and other designated authority proprietary information or materials, whether developed by the designated authority or being used by the designated authority pursuant to a license agreement with a third party (the foregoing collectively referred to herein as "proprietary information") are confidential and proprietary to designated authority; and MSI along with its team agrees to use reasonable care to safeguard the proprietary information and to prevent the unauthorized use or disclosure thereof, which care shall not be less than that used by MSI to protect its own proprietary information. MSI recognizes that the goodwill of designated authority depends, among other things, upon MSI keeping such proprietary information confidential and that unauthorized disclosure of the same by MSI or its team could damage the goodwill of designated authority, and that by reason of MSI's duties hereunder. MSI may come into possession of such proprietary information, even though MSI does not take any direct part in or furnish the services performed for the creation of said proprietary information and shall limit access thereto to employees with a need to such access to perform the

services required by this agreement. MSI shall use such information only for the purpose of performing the said services.

**36.6** MSI shall, upon termination of this agreement for any reason, or upon demand by designated authority, whichever is earliest, return any and all information provided to MSI by designated authority, including any copies or reproductions, both hardcopy and electronic.

**36.7** By virtue of the Contract, MSI team may have access to personal information of the designated authority and/or a third party. The designated authority has the sole ownership of and the right to use, all such data in perpetuity including any data or other information pertaining to the citizens that may be in the possession of MSI team in the course of performing the Services under the Contract

## 37 Records of contract documents

**37.1** MSI shall at all-time make and keep sufficient copies of the process manuals, operating procedures, specifications, Contract documents and any other documentation for him to fulfil his duties under the Contract.

**37.2** MSI shall keep on the Site at least three copies of each and every specification and Contract Document, in excess of his own requirement and those copies shall be available at all times for use by the designated authority's Representative and by any other person authorized by the designated authority's Representative.

## 38 Security and Safety

**38.1** The MSI shall comply with the technical requirements of the relevant security, safety and other requirements specified in the Information Technology Actor any other Applicable Law, IT Security Manual of the designated authority and the directions issued from time to time by the designated authority and follow the industry standards related to the security and safety, in so far as it applies to the provision of the Services.

**38.2** The Parties shall use reasonable endeavors to report forthwith in writing to each other all identified attempts (whether successful or not) by unauthorized persons (including unauthorized persons who are employees of any Party) either to gain access to or interfere with the designated authority as the case may be or any of their nominees data, facilities or the Confidential Information.

**38.3** MSI shall upon reasonable request by the designated authority, or its nominee(s) participate in regular meetings when safety and information technology security matters are reviewed.

**38.4** As per the provisions of the Contract, the MSI shall promptly report in writing to the designated authority or its nominated agencies, any act or omission which they are aware that could have an adverse effect on the proper conduct of safety and Information Technology security at the facilities of the designated authority as the case may be

## 39 Confidentiality

**39.1** The designated authority may allow the MSI to utilize highly Confidential Information including confidential public records and the MSI shall maintain the highest level of secrecy, confidentiality and privacy with regard to such Confidential Information. The MSI shall use its best efforts to protect the confidentiality, integrity and proprietary of the Confidential Information. No member of MSI's Team shall, without prior written consent from the designated authority, make any use of any Confidential and Proprietary Information given by the designated authority, except for purposes of performing the Contract. Each member of MSI's Team shall keep all the Confidential and Proprietary Information, provided by the- designated authority to them or their respective employees as confidential.

**39.2** Additionally, the MSI shall keep confidential all the details and information with regard to the Project, including systems, facilities, operations, management and maintenance of the systems/facilities. The MSI shall use the information only to execute the Project.

**39.3** The designated authority shall retain all rights to prevent, stop and if required take the necessary punitive action against the MSI regarding any forbidden disclosure. The designated authority reserves the right to adopt legal proceedings, civil or criminal, against the MSI in relation to a dispute arising out of breach of obligation by the MSI under this clause.

**39.4** The MSI shall execute a corporate non-disclosure agreement with designated authority in the format provided by the TUFIDCO and shall ensure that all its employees, agents and Sub-Contractors execute individual non-disclosure agreements, which have been duly approved by the designated authority with respect to this Project.

**39.5** The MSI may only disclose the Confidential Information in the following circumstances:

a) with the prior written consent of the designated authority;

b) to a member of the MSI's Team ("Authorized Person") provided the Authorized Person needs to know the Confidential Information for accomplishment of the Services and the Authorized Person has executed a confidentiality agreement with the designated authority prior to receiving such information (MSI and every other member of MSI's Team shall ensure that such Authorized Person to whom such information is disclosed are bound by the similar confidentiality obligations as applicable to each member of MSI's Team. Disclosure to any such Authorized Person shall be made in confidence on need to know basis i.e., so far as may be necessary for such Authorized Person for the purposes of-performance of the obligations of the Contract); and

c) If and to the extent that the MSI is compelled legally to disclose the Confidential Information.

**39.6** When the MSI is aware of any steps being taken or considered to compel legally the MSI or an Authorized Person to disclose the Confidential Information, it shall:

a. to the extent legally permitted, defer and limit the disclosure with a view to preserving the confidentiality of the Confidential Information as much as possible;

b. promptly notify the designated authority; and

c. do anything reasonably required by the designated authority to oppose or restrict that disclosure.

**39.7** The MSI shall notify the designated authority promptly if it is aware of any disclosure of the Confidential Information otherwise than as permitted by the Contract or with the authority of the designated authority.

**39.8** Any Confidential Information disclosed by MSI shall be treated as Confidential Information by the designated authority on the same terms and conditions above as applicable to the Confidential Information of the designated authority.

**39.9** All documentation and media at the respective Datacenter Sites shall be properly identified, labelled and numbered by the MSI. MSI shall keep track of all such items and provide a summary report of these items to the designated authority on a monthly basis.

**39.10** The obligations of confidentiality under the Contract shall remain in force for the Term of the Contract and shall survive for a period of three (3) years after expiry of the Term or earlier termination.

**39.11** Obligations under this clause shall not apply to any information which is: (a) previously known to the MSI at the time of disclosure without obligation of confidentiality, (b) independently developed by MSI and not derived from the Confidential Information supplied by the MSI or the participation of individuals who have had access to Confidential Information, (c) disclosed to MSI by a third party without an obligation of confidentiality, (d) in or subsequently comes into the public domain (other than as a result of a breach of the Contract); or (e) required to be disclosed by the MSI by law, regulation, court order or other legal process, provided, where legally permissible, MSI provides written notice to the designated authority prior to such disclosure and provide reasonable assistance to the designated authority in retaining the confidentiality of such information.

## 40 Events of Default by MSI

**40.1** The failure on the part of MSI to perform any of its obligations or comply with any of the terms of the Contract shall constitute an Event of Default on the part of MSI. The events of default are but not limited to:

**i.** MSI/ Bidder's Team has failed to perform the obligations under the Contract failed to execute the Scope of Work or provide Services under the Contract, or

**ii.** MSI/ Bidder's Team has failed to confirm / adhere to any of the key performance indicators as laid down in the RFP and in the Contract. The above mentioned failure on the part of MSI may be in terms of failure to adhere to performance, quality, timelines, specifications, requirements or any other criteria as defined by the designated authority;

**iii.** MSI has failed to remedy a defect or failure to perform its obligations in accordance with the specifications issued by the designated authority, despite being served with a default notice which laid down the specific deviance on the part of MSI/ MSI's Team to comply with any stipulations or standards as laid down by the designated authority; or

**iv.** MSI/ MSI's Team has failed to adhere to any amended direction, instruction, modification or clarification as issued by the designated authority during the Term of this Contract and which the designated authority deems proper and necessary for the execution of the Scope of Work under this Contract

**v.** MSI/ MSI's Team has failed to demonstrate or sustain any representation or warranty made by it in this Contract, with respect to any of the terms of its Bid, the RFP and this Contract

**vi.** There is a proceeding for bankruptcy, insolvency, winding up or there is an appointment of receiver, liquidator, assignee, or similar official against or in relation to MSI.

**vii.** MSI/ Bidder's Team has failed to comply with or is in breach or contravention of any Applicable Laws.

viii. Undue delay in achieving the agreed timelines for delivering the services under the Contract.

ix. Quality of Deliverables and services consistently not being to the satisfaction of the designated authority;

**40.2** Where there has been an occurrence of such defaults inter alia as stated above, the designated authority shall issue a notice of default to MSI, setting out specific defaults / deviances / omissions / non-compliances / non-performances and providing a notice of thirty (30) days to enable such defaulting party to remedy the default committed.

**40.3** Where despite the issuance of a default notice to MSI by the designated authority, SISI fails to remedy the default to the satisfaction of the designated authority, the designated authority may, where it deems fit, issue to the defaulting party another default notice or proceed to contract termination.

**40.4** Consequences for Events of Default

Where an Event of Default subsists or remains uncured, the designated authority shall be entitled to:

i. Impose any such obligations and conditions and issue any clarifications as may be necessary to, inter alia, ensure smooth continuation of the Services and the project which the MSI shall be obliged to comply with. The MSI shall in addition take all available steps to minimize loss resulting from such event of default..

ii. Suspend all payments to the MSI under the Agreement by written notice of suspension to the MSI provided that such notice of suspension shall (a) specify the nature of failure; and (b) request the MSI to remedy such failure within a specified period from the date of receipt of such notice of suspension by the MSI

iii. Where the designated authority deems it necessary, it shall have the right to require replacement of any of the Sub-Contractors with another suitable sub-contractor. The Sub-Contractor/ MSI shall in such case terminate forthwith all their agreements/contracts, other arrangements with such Sub-Contractor and find out the suitable replacement for such outgoing subcontractor with another Sub-Contractor to the satisfaction of the designated authority, who shall execute such contracts with the designated authority as the designated authority may require. Failure on the part of the MSI to find a suitable replacement and/or terminate all agreements/contracts with such member, shall amount to a breach of the terms hereof and the designated authority in addition to all other rights, have the right to claim damages and recover from the MSI all losses/ or other damages that may have resulted from such failure.

iv. Terminate the Contract in full or in part.

v. Retain such amounts from the payment due and payable by the designated authority to the MSI as may be required to offset any losses caused to the designated authority as a result of such event of default and the MSI shall compensate the designated authority for any such loss, damages or other costs, incurred by the designated authority in this regard. Nothing herein shall effect the continued obligation of the subcontractor / other members of its Team to perform all their obligations and responsibilities under the Contract in an identical manner as were being performed before the occurrence of the default.

vi. Invoke the Performance Bank Guarantee and other Guarantees furnished hereunder, enforce indemnity provisions, recover such other costs/losses and other amounts from the MSI which may have resulted from such default and pursue such other rights and/or remedies that may be available to the designated authority under law.

## 41 Termination

**41.1** The designated authority may, terminate this Contract in whole or in part by giving MSI a prior and written notice indicating its intention to terminate the Contract under the following circumstances:

**i.** Where the designated authority is of the opinion that there has been such Event of Default on the part of MSI / MSI's Team which would make it proper and necessary to terminate the Contract and may include failure on the part of MSI to respect any of its commitments with regard to any part of its obligations under its Bid, the RFP or under the Contract.

**ii.** Where it comes to the designated authority's attention that MSI (or MSI's Team) is in a position of actual conflict of interest with the interests of the designated authority, in relation to any of terms of MSI's Bid, the RFP or this Contract.

**iii.** Where MSI's ability to survive as an independent corporate entity is threatened or is lost owing to any reason whatsoever, including inter-alia the filing of any bankruptcy proceedings against MSI, any failure by MSI to pay any of its dues to its creditors, the institution of any winding up proceedings against MSI or the happening of any such events that are adverse to the commercial viability of MSI. In the event of the happening of any events of the above nature, the designated authority shall reserve the right to take any steps as are necessary, to ensure the effective transition of the sites pilot site to a successor agency, and to ensure business continuity

iv. The designated authority may terminate the Contract Agreement due to reason specified in clause 44;

v. The designated authority may terminate the Agreement if it comes to knowledge of the designated authority that the MSI or any of the MSI's personnel or the MSI's Sub-Contractors or such Sub-contractor's personnel have been involved in any fraudulent or corrupt practices or any other practice of similar nature.

**41.2** Termination for Insolvency: The designated authority may at any time terminate the Contract by giving written notice to MSI, without compensation to MSI, if MSI becomes bankrupt or otherwise insolvent, provided that such termination shall not prejudice or affect any right of action or remedy which has accrued or shall accrue thereafter to the designated authority.

**41.3** MSI may, subject to approval by the designated authority, terminate this Contract before the expiry of the Term by giving the designated authority a prior and written notice at least 3 months in advance indicating its intention to terminate the Contract.

## 42 Consequence of Termination

**42.1** In the event of termination of the Contract due to any cause whatsoever, whether consequent to the stipulated Term of the Contract or otherwise the designated authority shall be entitled to impose any such obligations and conditions and issue any clarifications as may be necessary to ensure an efficient transition and effective business continuity of the project which MSI shall be obliged to comply with and take all available steps to minimize loss resulting from that termination/breach, and further allow and provide all such assistance to the designated authority and/ or the successor

agency/ service provider, as may be required, to take over the obligations of MSI in relation to the execution/continued execution of the requirements of the Contract.

**42.2** Where the termination of the Contract is prior to its stipulated Term on account of a Default on the part of MSI or due to the fact that the survival of MSI as an independent corporate entity is threatened/has ceased, or for any other reason, whatsoever, the designated authority, through unilateral re-determination of the consideration payable to MSI, shall pay MSI for that part of the Services which have been authorized by the designated authority and satisfactorily performed by MSI up to the date of termination. Without prejudice to any other rights, the designated authority may retain such amounts from the payment due and payable by the designated authority to MSI as may be required to offset any losses caused to the designated authority as a result of any act/omissions of MSI. In case of any loss or damage due to default on the part of MSI in performing any of its obligations with regard to executing the Schedule of Requirements under the contract, MSI shall compensate the designated authority for any such loss, damages or other costs, incurred by the designated authority. Additionally, members of its team shall perform all its obligations and responsibilities under the Contract in an identical manner as were being performed before the collapse of MSI as described above in order to execute an effective transition and to maintain business continuity. All third parties shall continue to perform all/any functions as stipulated by the designated authority and as may be proper and necessary to execute the Schedule of Requirements under the Contract in terms of MSI's Bid, the Bid Document and the Contract

**42.3** Nothing herein shall restrict the right of the designated authority to invoke the Bank Guarantee and other Guarantees furnished hereunder and pursue such other rights and/or remedies that may be available to the designated authority under law.

**42.4** The termination hereof shall not affect any accrued right or liability of either Party nor affect the operation of the provisions of the Contract that are expressly or by implication intended to come into or continue in force on or after such termination.

**42.5** Any and all payments under this clause shall be payable only after the MSI has complied with and completed the transition and exit management as per the Exit Management Plan to the satisfaction of the designated authority. In case of expiry of the Agreement, the last due payment shall be payable to the MSI after the MSI has complied with and completed the transition and exit management as per the Exit Management Plan to the satisfaction of the designated authority.

## 44. Change Control Note (CCN)

44.1 This applies to and describes the procedure to be followed in the event of any proposed change to contract, site Implementation, and Service levels. Such change shall include, but shall not be limited to, changes in the scope of services provided by MSI and changes to the terms of payment.

44.2 Change requests in respect of the contract, the site implementation, or the Service levels shall emanate from the Parties' representative who shall be responsible for obtaining approval for the change and who shall act as its sponsor throughout the Change Control Process and shall complete Part A of the CCN (Annexure 13 of the RFP). CCNs shall be presented to the other Party's representative who shall acknowledge receipt by signature of the authorized representative of the City SPV Authority.

44.3 MSI and the Authority while preparing the CCN, shall consider the change in the context of whether the change is beyond the scope of Services including ancillary and concomitant services required The CCN shall be applicable for the items which are beyond the stated/implied scope of work as per the RFP document.

44.4 MSI shall assess the CCN and complete Part B of the CCN. In completing Part B of the CCN MSI/Lead Bidder shall provide as a minimum:

- a description of the change;
- a list of deliverables required for implementing the change;
- a timetable for implementation;
- an estimate of any proposed change; o any relevant acceptance criteria;
- an assessment of the value of the proposed change;
- Material evidence to prove that the proposed change is not already covered within the scope of the RFP, Agreement and Service Levels.

44.5 Prior to submission of the completed CCN to the City SPV or its nominated agencies, MSI shall undertake its own internal review of the proposal and obtain all necessary internal approvals. As a part of this internal review process, MSI shall consider the materiality of the proposed change in the context of the Agreement, the sites, Service levels affected by the change and the total effect that may arise from implementation of the change.

44.6 Each Party shall be responsible for its own costs incurred in the quotation, preparation of CCNs and in the completion of its obligations described in this process provided MSI meets the obligations as set in the CCN. In the event MSI is unable to meet the obligations as defined in the CCN then the cost of getting it done by third party shall be borne by MSI. Change requests and CCNs shall be reported monthly to each Party's representative who shall prioritize and review progress.

44.7 City SPV Authority after approving change request will submit the approved Change request to TUFIDCO for consideration of the payment in next payment cycle.

**44A. Miscellaneous**

**i) Assignment -** All terms and provisions of this Agreement shall be binding on and shall inure to the benefit of the Authority, smart cities mentioned in this Agreement, the MSI, the Consortium Member and their respective successors and permitted assigns. Except as otherwise expressly provided in this Agreement, the MSI and Consortium Member shall not be permitted to assign its rights and obligations under this Agreement to any third party. The Authority may assign or novate all or any part of this Agreement and Schedules/Annexures, and the MSI shall be a party to such novation, to any third party contracted to provide outsourced services to the Purchaser or any of its nominees.

**ii) Severability -** If any provision of this Agreement, or any part thereof, shall be found by any court or administrative body of competent jurisdiction to be illegal, invalid or unenforceable the illegality, invalidity or unenforceability of such provision or part provision shall not affect the other provisions of this Agreement or the remainder of the provisions in question which shall remain in full force and effect. The relevant Parties shall negotiate in good faith in order to agree to substitute for any illegal, invalid or unenforceable provision a valid and enforceable provision which achieves to the greatest extent possible the economic, legal and commercial objectives of the illegal, invalid or unenforceable provision or part provision.

iii) **Waiver -** No failure to exercise or enforce and no delay in exercising or enforcing on the part of either Party to this Agreement of any right, remedy or provision of this Agreement shall operate as a waiver of such right, remedy or provision in any future application nor shall any single or partial exercise or enforcement of any right, remedy or provision preclude any other or further exercise or enforcement of such right, remedy or provision or the exercise or enforcement of any other right, remedy or provision.

**iv) Amendment -** Any amendment to this Agreement shall be made by mutual written consent of the Parties. For avoidance of doubt, it is agreed that documents mentioned in clause 2 (h) and (i) of this GCC are made part of this Agreement only for purpose of information to MSI and except for TUFIDCO and smart cities, no other party shall have any right under the said POA and intra city agreement. The POA and the intra city agreement may be amended, varied, novated, assigned etc. by the parties to such POA and intra city agreement without seeking any consent from any other party and without informing any other party.

**v) Survival -** Any provision of this Agreement which imposes or intends to impose an obligation on any of the Parties after termination or expiration of this Agreement shall survive the termination or expiration of this Agreement. Such provisions include, without limitation, obligations related to confidentiality, indemnity, licenses, risk purchase and AMC/ ATS provided by the OEMs or the MSI.

vi) **Independent Contractor -** Nothing in this Agreement or the SLA shall be construed as establishing or implying any partnership or joint venture between the Parties to this Agreement or the SLA and, except as expressly stated in this Agreement or the SLA, nothing in this Agreement or the SLA shall be deemed to constitute any Parties as the agent of any other Party or authorizes either Party to: (a) Incur any expenses on behalf of the other Party; (b) Enter into any engagement or make any representation or warranty on behalf of the other Party;(c) Pledge the credit of or otherwise bind or oblige the other Party; or (d) Commit the other Party in any way whatsoever without in each case obtaining the other Party's prior written consent.

**45. Quotation**

**a.** MSI shall assess the CCN and complete Part B of the CCN. In completing

Part B of the CCN MSI/Lead Bidder shall provide as a minimum: o a description of the change;

- a list of deliverables required for implementing the change; o a timetable for implementation;
- an estimate of any proposed change; o any relevant acceptance criteria;
- an assessment of the value of the proposed change;
- Material evidence to prove that the proposed change is not already covered within the scope of the RFP, Agreement and Service Levels.

b. Cost for the change request in CCN will be included in the subsequent invoice of the next month.

**c.** Prior to submission of the completed CCN to the designated City SPV authority or its nominated agencies, MSI shall undertake its own internal review of the proposal and obtain all necessary internal approvals. As a part of this internal review process, MSI shall consider the materiality of the proposed change in the context of the Agreement, the sites, Service Levels affected by the change and the total effect that may arise from implementation of the change.

Each Party shall be responsible for its own costs incurred in the quotation, preparation of CCNs and in the completion of its obligations described in this process provided MSI meets the obligations as set in the CCN. In the event MSI is unable to meet the obligations as defined in the CCN then the cost of getting it done by third party shall be borne by MSI. Change requests and CCNs shall be reported monthly to each Party's representative who shall prioritize and review progress.

## B. SERVICE LEVELS

### 46. Purpose

46.1 The purpose is to define the levels of service provided by MSI to the designated authority for the duration of the contract. The benefits of this are:

46.1.1 Start a process that applies to the designated authority and MSI attention to some aspect of performance, only when that aspect drops below the threshold defined by the designated authority

46.1.2 Help the designated authority control the levels and performance of MSI's services

46.1.3 The Service Levels are between the TUFIDCO and MSI

### 47. Service Level Agreements & Targets

47.1 This section is agreed to by the designated authority and MSI as the key performance indicator for the project. This may be reviewed and revised according to the procedures detailed in Clause 45 SLA Change Control.

47.2 The following section reflects the measurements to be used to track and report system's performance on a regular basis. The targets shown in the following tables are for the period of contact.

47.3 The procedures in Clause 49 shall be used if there is a dispute between the designated authority and MSI on what the permanent targets should be.

## 48. General principles of Service Level Agreements

The Service Level agreements have been logically segregated in the following categories:

### 48.1 Liquidated Damages

The liquidated damages shall come into effect once the notification of Award has been issued by the designated authority. It would be mainly applicable on the implementation phase of the project.

### 48.2 Service Level Agreement

SLA would be applicable in operations and maintenance phase of the project. The penalties shall be applicable on Operations & Maintenance cost of the project calculated quarterly. Majorly SLAs would be applicable on 1) CSP, the cloud service provider for hosting data center and disaster recovery on cloud based platform and 2) each city ICCC through which all the service integrated in city.

## 49. Service Levels Agreement (SLA) and Monitoring

i. Service Level Agreement (SLA) shall become the part of contract between the designated authority and the Successful bidder. SLA defines the terms of the successful Bidder's responsibility in ensuring the timely delivery of the deliverables and the correctness of the same based on the agreed Performance Indicators as detailed in this section.

ii. The successful bidder must comply with Service Levels requirements to ensure adherence to project timelines, quality and availability of services, throughout the period of this contract i.e. during implementation phase and for a period of five (5) years. The successful bidder must supply appropriate software/hardware/ automated tools which can centrally collect performance data from the underline monitoring systems across all 9 Smart Cities

to measure and report the performance of SLA & penalty calculations. This tool should be platform agnostic..

iii. The Service Level parameters defined in Clause 42 shall be monitored on a periodic basis, as per the individual parameter requirements. MSI shall be responsible for providing appropriate web based online SLA measurement and monitoring tools for the same. MSI shall be expected to take immediate corrective action for any breach in SLA. In case issues are not rectified to the complete satisfaction of the designated authority, within a reasonable period of time defined in this RFP, then the TUFIDCO shall have the right to take appropriate penalizing actions, or termination of the contract.

iv. For purposes of the SLA, the definitions and terms as specified in the document along with the following terms shall have the meanings set forth below:

a) **"Total Time"** - Total number of hours in the quarter (or the concerned period) being considered for evaluation of SLA performance.

*b)* **"Uptime"** – Time period for which the specified services/ outcomes are available in the period being considered for evaluation of SLA. Formulae for calculation of Uptime: *Uptime (%) = {1-[(Downtime)/(Total time- scheduled maintenance time)]}*100*

c) **"Downtime"-** Time period for which the specified services/ components/ outcomes are not available in the concerned period, being considered for evaluation of SLA, which would exclude downtime owing to Force Majeure & Reasons beyond control of the successful bidder.

d) **"Scheduled Maintenance Time" -** Time period for which the specified services/ components with specified technical and service standards are not available due to scheduled maintenance activity. The successful bidder is required to take at least 10 days prior approval from the designated authority for any such activity. The scheduled maintenance should be carried out during non-peak hours (like post mid-night, and should not be for more than 4 hours. Such planned downtime would be granted max 4 times a year.

e) **"Incident" -** Any event / abnormalities in the service being rendered, that may lead to disruption in normal operations and services to the end user.

f) **"Response Time" -** Time elapsed from the moment an incident is reported in the Helpdesk over phone or by any applicable mode of communication, to the time when a resource is assigned for the resolution of the same.

g) **"Resolution Time" -** Time elapsed from the moment incident is reported to Helpdesk either in person or automatically through system, to the time by which the incident is resolved completely and services as promised are restored.

**50. Penalties**

- A maximum level of performance penalties is established and described in the section

- Performance Penalty for not meeting a measurement parameter for any two months in consecutive quarters shall result in twice the penalty percentage of that respective measurement parameter in the quarter for all the three months
- Maximum Penalty applicable for any quarter shall not exceed 10% of the 'applicable fees' for the respective month.
- Three consecutive quarterly deductions of 10 % of the applicable fee on account of any reasons shall be deemed to be an event of default and termination as per Clause 35 of this Section of RFP respectively and the consequences as provided in Clause 36 of this section of RFP shall follow.

- The payment to the agency shall be on monthly basis and the penalty shall also be calculated on monthly basis as per the SLAs stated in the RFP.

**51. Measurement of SLA**

The SLA metrics provided specifies performance parameters as baseline performance, lower performance and breach. All SLA calculations will be done on quarterly basis. The SLA also specifies the liquidated damages for lower performance and breach conditions.
Payment to the MSI is linked to the compliance with the SLA metrics. The matrix specifies three levels of performance, namely,

a. The MSI will get 100% of the Contracted value if all the baseline performance metrics are compiled and the cumulative credit points are 100.
b. The MSI will get lesser payment in case of the lower performance. (For e.g. if SLA point score is 80 then the MSI will get 20% less on the monthly payment – The formula calculating the deductions is "(100 – SLA Point Score)%")
c. If the performance of the Agency in respect of any parameter falls below the prescribed lower performance limit, debit points are imposed for the breach.

The credit (+) points earned during the quarter will be considered for computing penalty. The monthly payment shall be made after deducting the liquidated damages as mentioned above.

The aforementioned SLA parameters shall be measured as per the individual SLA parameter requirements and measurement methods, through appropriate SLA Measurement tools to be provided by the MSI and approved and audited by the designated authority or its appointed Consultant for accuracy and reliability.

TUFIDCO shall also have the right to conduct, either itself or through any other agency as it may deem fit, an audit / revision of the SLA parameters. The SLAs defined, shall be reviewed by the designated authority on an annual basis after consulting the MSI, Project Management Consultants and other experts. All the changes would be made by the designated authority after consultation with the MSI and might include some corrections to reduce undue relaxation in Service levels or some corrections to avoid unrealistic imposition of liquidated damages, which are noticed after project has gone live.

Total liquidated damages to be levied on the MSI shall be capped at 10% of the total contract value. However, the designated authority would have right to invoke termination of the contract in case the overall liquidated damages equals 10% of total contract value. Liquidated damages to be levied during Post Implementation period shall be capped at 10% of the OPEX value.

The designated authority would also have right to invoke termination of contract in case cumulative debit point (breach points) are above 30 in 2 consecutive quarters.

### 51.1 Pre Implementation SLA

Timely delivery of the Scope of Work

| Definition | Timely delivery of deliverables would comprise entire bill of material and the application systems, and as per successful UAT of the same. |
|---|---|
| **Service Level Requirement** | All the deliverables defined in the contract has to be submitted On-time on the date as mentioned in the contract with no delay. |
| **Measurement of Service Level Parameter** | To be measured in Number of weeks of delay from the timelines mentioned in the section “Project Timelines” |
| **Penalty for non-achievement of SLA Requirement** | Any delay in the delivery of the project deliverables (solely attributable to vendor) would attract a liquidated damage per week of 0.2% of the Total CAPEX of Request Order value per week for first 8 weeks and 0.3% per week for every subsequent week. If the liquidated damage reaches 10% of the total contract value, Authority may invoke termination clause. Liquidated damage will be computed on Total Capex value of contract/ Request order value of the particular phase |

### 51.2 SLA Matrix for Post Implementation SLAs (City ICCC)

| S. No. | Service Level Objective | Measurement Methodology / | Target/Service Level | Penalty (Indicative) |
|---|---|---|---|---|
| **Service Levels for CSP** | | | | |
| **Availability/Uptime** | | | | |
| 1. | Availability/Uptime of cloud services Resources for Production environment (VMs, Storage, OS, VLB, Security Components,) | Availability (as per the definition in the SLA) will be measured for each of the underlying components (e.g., VM, Storage, OS, VLB, Security Components) provisioned in the cloud. Measured with the help of SLA reports provided by CSP | Availability for each of the provisioned resources: >=99.5% | Default on any one or more of the provisioned resource will attract penalty as indicated below.<br><99.5% & >=99% ( 10% of the <<Periodic Payment>>)<br>< 99% (30% of the <<Periodic Payment>>) |

| | | | | |
|---|---|---|---|---|
| 2. | Availability of Critical Services (e.g., Register Support Request or Incident; Provisioning / De-Provisioning; User Activation / De- Activation; User Profile Management; Access Utilization Monitoring Reports) over User / Admin Portal and APIs (where applicable) | Availability (as per the definition in the SLA) will be measured for each of the critical services over both the User / Admin Portal and APIs (where applicable) | Availability for each of the critical services over both the User / Admin Portal and APIs (where applicable) >= 99.5% | Default on any one or more of the services on either of the portal or APIs will attract penalty as indicated below. <99.5% and >= 99% ( 10% of the <<Periodic Payment>>) <99% ( 20% of the <<Periodic Payment>>) |
| 3. | Availability of the network links at DC and DR (links at DC / DRC, DC-DRC link ) | Availability (as per the definition in the SLA) will be measured for each of the network links provisioned in the cloud. | Availability for each of the network links: >= 99.5% | Default on any one or more of the provisioned network links will attract penalty as indicated below. <99.5% & >=99% ( 10% of the <<Periodic Payment>>) < 99% (30% of the <<Periodic Payment>>) |
| 4. | Availability of Regular Reports (e.g., Audit, Certifications,) indicating the compliance to the Provisional Empanelment Requirements. | | 15 working days from the end of the quarter. If STQC issues a certificate based on the audit then this SLA is not required. | 5% of <<periodic Payment>> |
| 5. | Response Time | Average Time taken to acknowledge and respond, once a ticket/incident is logged through one of the agreed channels. This is calculated for all tickets/incidents reported within the reporting month. | 95% within 15minutes | <95% & >=90% ( 5% of the <<Periodic Payment>>) < 90% & >= 85% ( 7% of the <<Periodic Payment>>) < 85% & >= 80% ( 9% of the <<Periodic Payment>>) |

| | | | | |
|---|---|---|---|---|
| 6. | Time to Resolve - Severity 1 | Time taken to resolve the reported ticket/incident from the time of logging. | For Severity 1, 98% of the incidents should be resolved within 30 minutes of problem reporting | <98% & >=90% ( 5% of the <<Periodic Payment>>)<br>< 90% & >= 85% ( 10% of the <<Periodic Payment>>)<br>< 85% & >= 80% ( 20% of the <<Periodic Payment>>) |
| 7. | Time to Resolve - Severity 2,3 | Time taken to resolve the reported ticket/incident from the time of logging. | 95% of Severity 2 within 4 hours of problem reporting AND 95% of Severity 3 within 16 hours of problem reporting | <95% & >=90% ( 2% of the <<Periodic Payment>>)<br>< 90% & >= 85% ( 4% of the <<Periodic Payment>>)<br>< 85% & >= 80% ( 6% of the <<Periodic Payment>>) |
| **Service levels for MSP/MSI** | | | | |
| 8 | Recovery Time Objective (RTO)<br>(Applicable when taking Disaster Recovery as a Service from the Service Provider) | Measured during the regular planned or unplanned (outage) changeover from DC to DR or vice versa. | <<RTO <= 4 hours>> [Government Department / Agency to indicate based on the application requirements] | 10% of <<Periodic Payment>> per every additional 4 (four) hours of downtime |
| 9 | RPO<br>(Applicable when taking Disaster Recovery as a Service from the Service Provider) | Measured during the regular planned or unplanned (outage) changeover from DC to DR or vice versa. | <= 2 hours [Government Department / Agency to indicate based on the application requirements] | 10% of <<Periodic Payment>> per every additional 2 (two) hours of downtime |
| 10 | Availability of Root Cause Analysis (RCA) reports for Severity 1 & 2 | | Average within 5 Working days | 5% of <<periodic Payment>> |

***Note: The bidder should adhere to the MeiTy Guidelines for Service Level Agreement for procuring cloud services***

### 51.3 Service Level Agreement for Cloud Service Provider for cloud based common data center:

## Operational SLAs

1. The proposed cloud storage for all the production related applications should be on latest generation technology.

**Note:**

1. The Agency has to submit all the reports pertaining to SLA Review process within 2 weeks after the end of the month.
2. All the reports must be made available to City SPV, as and when the report is generated or as and when asked by the competent authority.
3. The down time will be calculated on monthly basis. Non-adherence to any of the services as mentioned below will lead to penalty as per the SLA clause and will be used to calculate downtime. The downtime calculated shall not include the following

    a. Negligence or other conduct of City SPV or its agents, including a failure or malfunction resulting from applications or services provided by City SPV or its vendors.
    b. Failure or malfunction of any equipment or services not provided by the Bidder.
4. The total deduction per month shall not exceed 10% of the total Monthly Payment value
5. Two consecutive monthly deductions amounting to more than 10% of the MPs on account of any reasons will be deemed to be an event of default and termination
6. It is the right of the TUFIDCO to bring/deploy any external resources / agencies at any time for SLA review
7. No Carry forward of any penalties of SLA calculations can be done from any of the preceding quarters
8. The Agency shall deploy sufficient manpower suitably qualified and experienced in shifts to meet the SLA. Agency shall appoint as many team members as deemed fit by them, to meet the time Schedule and SLA requirements.

### 51.3.1 General Instructions related to SLAs mentioned above

a. Theft cases by default would not be considered as "beyond the control of Bidder". However, certain cases, based on circumstances & certain locations, the designated authority /End user department may agree to qualify as "beyond the control of Bidder".
b. Power shut down would not be considered as "beyond the control of Bidder".
c. Damages due to Road Accident / Mishap shall be considered as "beyond the control of Bidder".
d. Deliberate damage to field devices: camera, Pole etc. would not be considered as "beyond the control of Bidder"
e. Bidder is advised to have stronger poles & proper housing to protect from such damages.
f. Bidder is also required to note that in case of SLAs not being made applicable for cases considered as "beyond the control of bidders", Bidder would still need to replace the component (if it is not functional as per SLA) within the SLA defined for Resolution of Critical Level / Medium Level / Low level issues. In case bidder doesn't adhere to the Issue Resolution SLA timelines, the original SLA shall be made applicable.

### 51.3.2 Security Breach SLA

**Note** – This SLA for Security Breach is applicable over and above the SLAs mentioned in above table.

| | |
|---|---|
| **Definition** | Security of the overall system is quite important and Successful Bidder shall be required to ensure no compromise is done on the same. Security Breach types considered for this SLA are<br>• Availability of any report / data to any other user than those authorized by the designated authority /End user department, and provided passwords<br>• Successful hacking of any active component on the network by any unauthorized user Or any other privacy rule is broken as per Govt. of India guidelines |
| **Service Level Requirement** | Security compliance of the system should be 100% |
| **Measurement of Level Service Para Meter** | Any reported security breach shall be logged into the SLA Management solution as a security breach |
| **Penalty for non-achievement of SLA Requirement** | For every security breach reported and proved, there shall be a penalty of 10% of the annual CSP billing- or lead to termination of contract |

### 51.3.3 Breach in supply of Technical Manpower

**Note** – This SLA for supply of Technical Manpower is applicable over and above the SLAs mentioned in the above table.

| | |
|---|---|
| **Definition** | Bidder is required to propose the CVs of the required technical manpower (as mentioned in Vol 2). It is vital that such manpower is available to the designated authority /End user department and performs to the expected |

<table>
<tr><td></td><td>levels. The current SLA breach shall specify penalty amount for non-availability of these man-power.</td></tr>
<tr><td>Service Level Requirement</td><td>Availability of the required man-power should be 100%. MSI to implement the biometric attendance system and share the attendance report of each person proposed as part of team on monthly basis with the designated authority.</td></tr>
<tr><td>Measurement of Service Level Parameter</td><td>Following instances would be considered as SLA non-compliances:<ul><li>Replacement of a profile by the Bidder (only one replacement per profile – with equal or higher qualification and experience – would be permitted per year)</li><li>Non-deployment of the profile for more than 1 month. Authority reserves the right to ask MSI to replace (with equal or higher qualification and experience) the profile if the performance / commitment are not up to the mark<br>Note: Replacement due to reasons not in control of MSI (like resignation of the resource, accident, etc.) would not be counted in the permissible 1 replacement.</li></ul></td></tr>
<tr><td>Penalty for non-achievement of SLA Requirement</td><td>For every SLA non-compliance reported and proved, there shall be a penalty as given below:
<table>
<tr><th>Team Member</th><th>Penalty</th></tr>
<tr><td>Project Manager</td><td><ul><li>Penalty of Rs 2,500 in 1st week of non-availability</li><li>Penalty of Rs. 5,000 in 2nd week of non-availability and thereafter</li></ul></td></tr>
<tr><td>For Technical Experts</td><td><ul><li>Penalty of Rs 2,500 per day of non-availability for 7 days</li><li>Penalty of Rs. 5,000 per day of non-availability after 7 days</li></ul></td></tr>
<tr><td>For all other team members</td><td><ul><li>Penalty of Rs 1,000 per day of non-availability</li></ul></td></tr>
</table></td></tr>
</table>

### 51.3.4 Explanation Notes for SLA Matrix

**A) Application Availability**

| | |
|---|---|
| **Definition** | Application availability refers to the total time when the Application is available to the users for performing all activities and tasks. |
| **Measurement of Service level Parameter** | [(Total Uptime of the Application in a quarter) / (Total Time in a quarter)]*100 |

**B) Issue Resolution**

| | |
|---|---|
| **Explanation** | Issue Resolution SLA shall monitor the time taken to resolve a complaint / query after it has been reported by the designated authority /End user department to the Successful Bidder. |
| **Service Level Requirement** | Different Issues/Queries shall be classified as in following three categories as defined above.<br>**Critical** : Issue that impacts more than one production services / is raised by higher management / is impacting high importance areas<br>**Medium**: Issue that doesn't impact more than one production services but has a potential to impact or may get escalated to top management if not resolved quickly<br>**Low**: Upgrades, shifting, preventive maintenance. Issues which don't have impact on services. |

**Reporting Procedures**

MSI representative shall prepare and distribute Service level performance reports in a mutually agreed format by the **5th working day of subsequent month**. The reports shall include **"actual versus target"** Service Level Performance, a variance analysis and discussion of appropriate issues or significant events. Performance reports shall be distributed to City SPV Authority or personnel as directed by the designated authority along with monthly invoice.

Also, MSI may be required to get the Service Level performance report audited by a third-party Auditor appointed by the designated authority.

**Issue Management Procedures**

**General**

This process provides an appropriate management structure for the orderly consideration and resolution of business and operational issues in the event that quick consensus is not reached between the designated authority and Bidder.

Implementing such a process at the beginning of the outsourcing engagement significantly improves the probability of successful issue resolution. It is expected that this pre-defined process shall only be used on an exception basis if issues are not resolved at lower management levels.

**Issue Management Process**

Either the designated authority or MSI may raise an issue by documenting the business or technical problem, which presents a reasonably objective summary of both points of view and identifies specific points of disagreement with possible solutions.

Any unresolved issues/disputes concerning the Project/Contract between the Parties shall first be referred in writing to the Project Manager for his consideration

and resolution. If the Project Manager is unable to resolve any issue/dispute within 5 days of reference to them, the Project Manager shall refer the matter to the Program Management Committee. If the Program Management Committee is unable to resolve the issues/disputes referred to them within 15 days the unresolved issue/dispute shall be referred to Steering Committee / high powered committee/Project Implementation Committee for resolution. The Steering Committee within 30 days of reference to them shall try to resolve the issue/dispute.

If the Steering Committee fails to resolve a dispute as per the above clause, the same shall be referred to arbitration. The arbitration proceedings shall be carried out as per the Arbitration procedures mentioned in Clause 18 of this section of RFP.

## 52. Service Level Change Control

### 52.1 General

It is acknowledged that this **Service levels may change as the designated authority's business needs of all smart cities within the state of MP will evolve over the course of the contract period**. As such, this document also defines the following management procedures:

a. A process for negotiating changes to the Service Levels

b. An issue management process for documenting and resolving particularly difficult issues.
c. The designated authority and Bidder management escalation process to be used in the event that an issue is not being resolved in a timely manner by the lowest possible level of management.

Any changes to the levels of service provided during the term of this Agreement shall be requested, documented and negotiated in good faith by both parties. Either party can request a change.

**52.2 Service Level Change Process:** The parties may amend Service Level by mutual agreement in accordance. Changes can be proposed by either party .Unresolved issues shall also be addressed. MSI's representative shall maintain and distribute current copies of the Service Level document as directed by the designated authority. Additional copies of the current Service Levels shall be available at all times to authorized parties.

**52.3 Version Control / Release Management:** All negotiated changes shall require changing the version control number. As appropriate, minor changes may be accumulated for periodic release or for release when a critical threshold of change has occurred.

# Schedule 4 – Annexures

## 1. Annexure 1 - Functional Requirements

Functional Requirements provided under are indicative, bidder carefully examine the requirements and may propose technical specification / design as per their solution to meet the objective of RFP.

Below are minimum functional requirements, to be considered for this project. Bidder is free to offer better product with more functionalities.

Further detailing of some of the technical and functional specifications are provided in annexure 12.

### 1.1 Cloud Service Specification

Standard protocols will be followed by CSP as per the Industry Standards and MeitY guidelines for the following:

- Compute
- Networking
- Storage – Block Storage
- Storage – Object Storage
- Storage – File Storage
- Relational Database
- Non-Relational Database
- Security and administration
- Deployment and Management
- Application Services
- Hybrid Integration

Few requirements are detailed as under for CSP providing services in this project. These are only indicative in nature.

#### i. Support

| # | Requirement | Description |
|---|---|---|
| 1. | Service Health Dashboard | Cloud provider should offer a dashboard that displays up-to-the-minute information on service availability across multiple regions. |
| 2. | 365 day service health dashboard and SLA history | Cloud provider should offer 365 days' worth of Service Health Dashboard (SHD) history. |

| | | |
|---|---|---|
| 3. | Service to compare resource usage to best practices | Cloud provider should offer a service acts like a customized cloud expert and helps provision resources by following best practices. |
| 4. | Monitoring Tools | Monitoring tools that will enable collection and tracking metrics, collection and monitoring log files, set alarms, and automatically react to changes in the provisioned resources. The monitoring tools should be able to monitor resources such as compute and other resources to gain system-wide visibility into resource utilization, application performance, and operational health. |
| 5. | Governance and Compliance | Able to define guidelines for provisioning and configuring cloud resources and then continuously monitor compliance with those guidelines. Ability to choose from a set of pre-built rules based on common best practices or custom rules (e.g., ensure Storage volumes are encrypted, Compute instances are properly tagged, and Elastic IP addresses (EIPs) are attached to instances) and continuously monitor configuration changes to the cloud resources and provides a new dashboard to track compliance status. |
| 6. | Audit Trail | Provide Audit Trail of the account activity to enable security analysis, resource change tracking, and compliance auditing |

### ii. Interoperability

The current cloud computing landscape consists of a diverse set of products and services that range from infrastructure services (IaaS), to specific software services (SaaS) to development and delivery platforms (PaaS), and many more. The variety of cloud services has led to proprietary architectures and technologies being used by vendors, increasing the risk of vendor lock-in for customers. While, at this stage the decision has been made to rely on a single CSPs for the current deployment, strategically the department needs to avoid the problem of lock-in, where they run the risk of being tied to a particular cloud service provider due to the difficulty and costs of switching to use equivalent cloud services from other providers. Incidents such as a cloud service providers shutting down operations or the discovery of significant security vulnerabilities in applications have highlighted this risk. Besides this, there are numerous instances wherein organizations have moved from one CSP to another CSP due to considerations like cost, better service and better security.

### iii. Exit Management

Smooth hand-over and Exit Management will be an important factor for public cloud environment as the weather new CSP needs to be on-boarded at the end of duration of the project or department decides to embark on a capacity building initiative and move the deployment on-prem etc , it is of paramount importance that appropriate architecture and technology controls are captured in the RFP so that it is easy for department to move their data to their place of choice.

These aspects become more important from a data standpoint as data is stateful and often served by independent datastores or databases. Data has mass: it takes time to move it where it is needed and resources to store it. Data has value: it is a protected asset for the government. Data has temperature: it has different degrees of accessibility at any point in time. All of these properties of data are dynamic, which makes comprehensive data management necessary.

Lack of comprehensive data management capabilities will create issues barriers to cloud interoperability and seamless exit management as incompatible data silos brings challenges, including:

- Inability to move data. After an organization's data is in a particular cloud, it is difficult or impossible to move it to a different one (whether another CSP or on-prem). It often requires complex migration process entailing significant downtime.

- Difficulty managing data consistently. Each environment has a different set of tools, APIs, and management software that make it difficult to apply consistent policies to data. Department administrator must learn how to use all of these tools and applications effectively.

- Limited choice. New technologies and services that do not integrate with existing environments are difficult to adopt. As a result, department is limited in its technology choices, affecting its ability to exploit the capabilities of existing and new environments and creating vendor lock-in

- Lack of control. Data is a critical asset for the department and it is steward of that data no matter where it is. Storing that data in a cloud where there is little visibility into how it is protected and governed can put department at risk.

The MEITY cloud guidelines also specifically lists these aspects of cloud interoperability and exit management as an important considerations. While, it does not details what technology controls a government department needs to define as the technology controls can be requirement specific , it recommends that respective government departments should details these technology controls as part of their procurement process.

**iv. Technical Controls**

1. The proposed solution must provide flexibility to move the application and its associated data from private cloud to a public cloud, across two different public cloud providers and from Public Cloud to Private Cloud. This movement can be required during exit management, capacity building purpose and to maintain data interoperability among various cloud service providers. This movement of data should be carried out over the network in an online fashion without requiring cumbersome and time consuming backup and recovery procedures. In order to ensure security and reduce the bandwidth required for this purpose, the data movement must be encrypted and should provide deduplication and compression. Any software/hardware required to meet this requirement should be provided as part of the proposed solution.
2. The proposed solution should allow flexibility to allow Primary Site to be hosted on a public or private cloud and its DR to be hosted on another public or private cloud. In order to ensure security and reduce the bandwidth required for this purpose, the data movement must be encrypted and should provide deduplication and compression. Any software/hardware required to meet this requirement should be provided as part of the proposed solution.
3. The proposed solution should provide flexibility to backup applications and data from public/private cloud to another public/private cloud. In order to ensure security and reduce the bandwidth required for this purpose, the data movement must be encrypted

and should provide deduplication and compression. Any software/hardware required to meet this requirement should be provided as part of the proposed solution.

4. The applications leveraging the cloud infrastructure should use non-proprietary protocols and APIs so that applications can be migrated from a private cloud to a public cloud , across two different public cloud providers and from Public Cloud to Private Cloud without any need to carry any customization. Any software/hardware required to meet this requirement should be provided as part of the proposed solution.

## 1.2 Functional Requirement of Command and Control Center

The MSI has to provide, deploy and configured an integrated operations and dashboard application that integrated various Smart City use cases on this platform.
Proposed Solution architecture should have combination of data normalization and City operation center software with below capabilities; data normalization software should support on-premise and cloud technology.

| S.NO. | Functionality Description | | Compliance (Yes/No) |
|---|---|---|---|
| 1. | Data Aggregation, Normalization and Access | It is envisaged that the city will implement multiple Smart City use cases over a period of time. The potential example Smart City use cases are-<br>• Smart Outdoor Lighting<br>• Smart Parking<br>• Smart Traffic Management<br>• Smart Energy Metering<br>• Smart Water Metering<br>• Public Safety and Safe City Operations<br>• Connected Public Transport<br>• Public Wi-Fi and Urban Service Delivery over Public Wi-Fi<br>• Kiosks for Citizen Information<br>• Citizen Interactive Kiosks for Urban Service Delivery<br>• Environmental Monitoring<br>• Smart Waste Management | |
| 2. | | The clause should be enhanced to address all the relevant interfaces on the platform to support for cellular and non-cellular network:<br>1) LoRA network support with Lora WAN, LoRA Network server with 853 to 868MHz,<br>2) 3GPP specs defined support for EC-GSM-IoT, Cat-M1, NB-IoT,<br>3) Wifi over 802.11 support,<br>4) IPv6 Support for all kinds of access network,<br>5) 2G/3G/4G eUICC SIM network support, | |

| S.NO. | Functionality Description | | Compliance (Yes/No) |
|---|---|---|---|
| | | 6) Global Connectivity platform support for multi-operator SIM cards profile for GSM based devices,<br>7) LWM2M compliance for Smart City platform is mandatory, etc.<br>The platform should also support the Connectivity Management in order to provide end to end solution:<br>• Change subscription (SIM) state: Activate, Deactivate, Pause, Terminate,<br>• eUICC ordering and Subscription profile ordering,<br>• eSIM Profile Download, Enable, Change, Delete<br>• Subscription Activate, Deactivate, Pause, Terminate,<br>• Query Subscription Status, Data consumed, # SMS sent/received, etc. | |
| 3. | | The platform should also allow the manufacturers of the sensors to develop integrations themselves using SDKs without affecting the northbound applications and existing integration The platform should have the ability and provision to write adaptors, which interface with the sensors or sensor management software | |
| 4. | | The platform should support distributed deployment of functions (workflows & policies) across city's network and compute infrastructure with centralized management and control | |
| 5. | GIS Map Support | System should support commonly used platform | |
| 6. | Location engine | a) Map services and geospatial coordinates: provides the geographical coordinates of specific facilities, roads, and city infrastructure assets.<br>b) Geospatial calculation: calculates distance between two, or more, locations on the map<br>c) Location-based tracking: locates and traces devices on the map | |
| 7. | Service management | a) Data brokerage, ID Management: Performs service management | |

| S.NO. | Functionality Description | | Compliance (Yes/No) |
|---|---|---|---|
| 8. | Developer Program tools | Sensor platform OEM should provide online Developer Program tools that help City to produce new applications, and/or use solution APIs to enhance or manage existing solution. | |
| 9. | Authentication, Authorization | Existing Active Directory based eGovernance Application Authentication should be integrated with Cloud based Platform as a Service – Authentication service. Moving forward only Cloud based authentication service should be used for ICCC for 9 cities, ICCC at State Level and for any new application in future. | |
| 10. | Data plan Functionalities | Live data and visual feed from diverse sensors connected to the platform | |
| 11. | API Repository / API Guide | Normalized APIs should be available for the listed domains (Parking, Outdoor Lighting, Traffic, Environment, Urban mobility etc.) to monitor, control sensor and/or actuators functionality to enable app developers to develop apps on the platform. For example Lighting APIs: Vendor agnostic APIs to control Lighting functionality. | |
| 12. | | Platform OEM should have published the normalized APIs in their website for the listed domains ((Parking, Outdoor Lighting, Traffic, Environment, Urban mobility etc.) to allow sensor vendors and app developers to develop their connectors / adaptors to the platform | |
| 13. | | Cross collaboration APIs: Enabling contextual information and correlation across domains and verticals (Multiple vendor and Multi-sensor in future) | |
| 14. | Platform upgrade and maintenance | The OEM should be able to securely access the platform remotely for platform updates / upgrades and maintenance for the given duration | |
| 15. | | Platform should be able to be deployed on a cloud for disaster recovery | |
| 16. | Platform functionality | API management and gateway: Provides secure API lifecycle, monitoring mechanism for available APIs | |
| 17. | | User and subscription management: Provides different tier of user categorization, authentication, authorization, and services based on the subscriptions | |

| S.NO. | Functionality Description | | Compliance (Yes/No) |
|---|---|---|---|
| 18. | | Application management: Provides role-based access view to applications | |
| 19. | | Enabling analytics: Time shifted and real-time data available for big data and analytics | |
| 20. | | The platform should also be able to bring in other e-governance data (SCADA systems) as i-frames in the command and control center dashboard | |
| 21. | | All of these data should be rendered / visualized on the command and control center dashboard. | |
| 22. | ICCC Operations | • The solution should be implemented and compliant to industry open standard commercial-off-the-shelf (COTS) applications that are customizable.<br>• The solution should have the capability to integrate with exiting GIS platform used by the ULBs of Tamil Nadu<br>• The solution shall integrate with GIS and map information to dynamically update the GIS maps to show status of resources.<br>• The solution shall also provide an integrated user interface for all the smart elements implemented<br>• The solution should provide operators and managers with a management dashboard that provides a real time status and is automatically updated when certain actions, incidents and resources have been assigned, pending, acknowledged, dispatched, implemented, and completed. The above attributes shall be color coded.<br>• The solution shall provide the “day to day operation”, “Common Operating Picture” and situational awareness to the center and participating agencies during these modes of operation<br>• It shall improve scalability for large and geographically distributed environments<br>• It shall provide complete view of sensors, facilities, e-governance/erp, video streams and alarms in an easy- | |

| S.NO. | Functionality Description | | Compliance (Yes/No) |
|---|---|---|---|
| | | to-use and intuitive GIS-enabled graphical interface with a powerful workflow and business logic engine<br>• It shall provide a uniform, coherent, user-friendly and standardized interface<br>• It shall provide possibility to connect to workstations and accessible via web browser<br>• The dashboard content and layout shall be configurable and information displayed on these dashboards shall be filtered by the role of the person viewing dashboard<br>• The solution should allow creation of hierarchy of incidents and be able to present the same in the form of a tree structure for analysis purposes<br>• The solution shall be available via a VPN as a web-based interface or a thin-client interface<br>• It shall be possible to combine the different views onto a single screen or a multi-monitor workstation<br>• The solution should maintain a comprehensive and easy to understand audit trail of read and write actions performed on the system<br>• The solution should provide ability to extract data in desired formats for publishing and interfacing purposes<br>• The solution should provide ability to attach documents and other artifacts to incidents and other entities<br>• The solution is required to issue, log, track, manage and report on all activities underway during these modes of operation:<br>• anticipation of incident<br>• incident or crisis<br>• recovery<br>• incident simulation | |
| 23. | Integration capabilities | This platform is expected to integrate various urban services devices at the street layer so that urban services applications can be | |

| S.NO. | Functionality Description | | Compliance (Yes/No) |
|---|---|---|---|
| | | developed on top of this platform independent of the technology that is used in the devices. | |
| 24. | | Integrate devices using their APIs in to this platform. For example, if the City wants to deploy Smart Parking solution, this platform should have the ability and provision to write adaptors which interface with the parking sensors or management software of the parking sensors to collect parking events, data and alerts and notifications from the devices and their software managers. | |
| 25. | | Platform should support on the fly deployment of Sensors. Platform shall have the ability to add / remove sensors including new vendor types without a need for shutdown. | |
| 26. | Edge Computing | • Provides standard edge appliance to connect industrial protocol devices, provides secure connection to cloud infrastructure, provides remote lifecycle management including software/firmware downloads and upgrades, provides remote management, self registration, and local administrative interface.<br>• Provides edge appliance to abstract downstream industrial protocols and upstream internet protocols.<br>• Edge appliance is provided in three form factors → Over the Pole, in street Cabinet and street appliances. Should be light weight with no moving parts and small in size. Should not need more than 1 Ghz of dual core CPU and 1 GB of memory to run with reasonable load.<br>• Edge appliance provides software modules to interact with control systems and SCADA systems.<br>• Smart City platform should be functionally complete on the edge, providing local processing of events, contextualization, transformation, analytics, decisions and controls. Business relevant events only passed to cloud.<br>• Provides runtime load of new functions on the edge from the cloud.<br>• Smart City platform should allow to set or change the behavior on the edge through policies, which could be defined through | |

| S.NO. | Functionality Description | | Compliance (Yes/No) |
|---|---|---|---|
| | | cloud instance of Smart City Platform.<br>• Edge provides inline actions with analytics in same time window as SCADA functions.<br>• Edge should learn the behavior as analyzing the data to create better decisions with time. Share the outcomes with the cloud to impact other edges.<br>• Provide centralized Device Management from sensor to cloud.<br>• Provide management tools to view, analyze, report on and modify the edge configurations.<br>• Edges and cloud instances of platform should create a logical cluster to distribute the workload dynamically between the nodes, if and when applicable. (Need to check, if too strong of the requirements)<br>• Edge software should not be dependent on sensors and devices or protocols. Same software blueprint should be deployed and running on all edges. Data and Configurations can be different from edge to edge. | |
| 27. | Resiliency | • This architecture provides the smart city use cases much needed resiliency while adapting cloud architecture<br>• Provides ways to define policies that make applications or things respond to external environments<br>• Schedule actions to happen at future time points<br>• The smart city platform should have integrations with the network layer to proactively monitor any incidents on the network for active troubleshooting and triaging<br>• The Smart city platform should be able to alert any incidents in the network proactively on command and control center<br>• The Smart City platform should have demonstrated integration to collaboration tools to bring multiple stake holders and responders to respond an emergency or an urban services event. | |

| S.NO. | Functionality Description | | Compliance (Yes/No) |
|---|---|---|---|
| 28. | API Based Open Platform | • Provides urban services' API(s) to develop operation applications for each of the Urban Services domains. For example, the lighting operator of the City should be able to develop a City Lighting management application based on the API(s) provided by the platform. This lighting application should also have the ability to access data from other domains like environment based on the access control configured in the system.<br>• The smart city platform should have API Management capabilities like API Security, API Metering, API Monetization<br>• The smart city platform is should be able to provide API access based on roles and access control policies defined for each user and the key issued to that user<br>• The vendor should have already documented different Urban Services APIs using which applications can be developed<br>• The vendor should be able to demonstrate existing applications that are developed using these urban services APIs | |
| 29. | | Enables the City and its partners to define a standard data model for each of the urban services domains (i.e. Parking, lighting, kiosks etc.…) | |
| 30. | | Enables City and/or its partners to write software adaptors based on the API(s) provided by device vendors and have the ability to control, monitor and collect the data from these street devices | |
| 31. | | Provides urban services API(s) to develop operation applications for each of the Urban Services domains. For example, the lighting operator of the City should be able to develop a City Lighting management application based on the API(s) provided by the platform. This lighting application should also have the ability to access data from other domains like environment based on the access control configured in the system. | |

| S.NO. | Functionality Description | | Compliance (Yes/No) |
|---|---|---|---|
| 32. | Trending Service | System should provide trends in graphical representation from data sources over a period of time. Trends should allow to monitor and analyze device performance over time. | |
| 33. | Policies and Events | System should allow policy creation to set of rules that control the behavior of infrastructure items. Each policy should a set of conditions that activate the behavior it provides. System should allow Default, Time-based, Event-based and Manual override polices creation. For example, an operator might enforce a "no parking zone" policy manually to facilitate road repairs. | |
| 34. | | System should provision to defines a set of conditions that can be used to trigger an event-based policy | |
| 35. | Notifications, Alerts and Alarms | System should generate Notification, Alert and Alarm messages that should be visible within the Dashboard and the Enforcement Officer Mobile App if required. | |
| 36. | | All system messages (notifications, alerts and alarms) should always visible from the Notifications view, which provides controls that operator can use to sort and filter the messages that it displays. | |
| 37. | | Systems should deliver message to a set of subscribers. The Notification service should support min two types of notification methods – Email notification and Short Messaging Service (SMS) notification. | |
| 38. | Users and roles | Users access performs various tasks, such as adding new locations, configuring new devices, managing adapters, and so on. However, not all users can perform all tasks. Each user should be associated with one or more roles and each role is assigned a certain set of permissions. | |
| 39. | | These roles and permissions define the tasks that a user can perform. Additionally, system should assign one or more locations to each role so that the user can perform tasks at the assigned locations only. | |
| 40. | | Roles and permissions define the tasks that a user can perform, such as adding users, viewing location details, exporting devices, | |

| S.NO. | Functionality Description | | Compliance (Yes/No) |
|---|---|---|---|
| | | generating reports, and so on. Each user should be associated with one or more roles and each role has an assigned set of permissions. | |
| 41. | | The platform should allow different roles to be created and assign those roles to different access control policies. | |
| 42. | | Since this platform is being used for managing Cities, the platform should also allow association of users and locations. For example, the platform should allow creation of locations in the system which correspond to various physical locations in the city and allow the admin to associate different users to different locations with the intent that each user can control only services for a location for which has been given access. | |
| 43. | | System should support LDAP to be used as an additional data store for user management and authentication. | |
| 44. | Service Catalog Management | The Service catalog management module should allow to categorize the externalized and non-externalized services into logical groups by creating the service catalogs. In addition, system should allow manage the service catalogs by adding, modifying, or deleting the catalog details. | |
| 45. | Reports | The platform should have capability to provide access to real time data and historical data from various connected devices for reporting and analytics. | |
| 46. | | System should allow dashboard to generate reports and have provision to add reports in favorites list | |
| 47. | Multi-tenancy | 1. Single instance of SMART CITY PLATFORM can be logically partitioned to host multiple tenants.<br>2. Each tenant should have respective administrator users.<br>3. Role based access control: Allows to provision users with specific roles to delegate monitoring and management of city resources based on regions | |

| S.NO. | Functionality Description | | Compliance (Yes/No) |
|---|---|---|---|
| | | (sub-boundaries in the tenant/City geography).<br>4. Each Tenant (City) can be further partitioned (zones/streets etc) with access to users for the respective zones/streets. | |
| 48. | Standard Operating Procedure | Command & Control Center should provide for authoring and invoking un-limited number of configurable and customizable standard operating procedures through graphical, easy to use tooling interface. | |
| 49. | | Standard Operating Procedures should be established, approved sets of actions considered to be the best practices for responding to a situation or carrying out an operation. | |
| 50. | | The users should be able to edit the SOP, including adding, editing, or deleting the activities. | |
| 51. | | The users should be able to also add comments to or stop the SOP (prior to completion). | |
| 52. | | There should be provision for automatically logging the actions, changes, and commentary for the SOP and its activities, so that an electronic record is available for after-action review. | |
| 53. | | The SOP Tool should have capability to define the following activity types:<br>• Manual Activity - An activity that is done manually by the owner and provide details in the description field.<br>• Automation Activity - An activity that initiates and tracks a particular work flow and select a predefined flow order from the list.<br>• If-Then-Else Activity - A conditional activity that allows branching based on specific criteria. Either enter or select values for Then and Else.<br>• Notification Activity - An activity that displays a notification window that contains an email template for the activity owner to complete, and then sends an email notification.<br>• SOP Activity - An activity that launches | |

| S.NO. | Functionality Description | | Compliance (Yes/No) |
|---|---|---|---|
| | | another standard operating procedure | |
| 54. | Collaboration | • The CCC platform should provide an ability to bring multiple stake holders on to a common voice conference call as a standard operating procedure in response configured events<br>• The stake holders can be on various types of devices like computer, smart phones, tablets or normal phones and in different geographical locations.<br>• The ICCC platform should have the capability to bring in multiple stake holders automatically into a common collaboration platform like persistent chat rooms and virtual meeting rooms in response to a SOP defined to handle a particular event.<br>• The operator should also have ability create these collaboration spaces like virtual meeting rooms or chat groups manually.<br>• The platform should allow the stakeholders to be notified of the creation of collaboration spaces using SMSs and announcements over PSTN telephone calls.<br>• The platform must allow configuration of the policy under which such collaboration spaces are created and stakeholders are invited and notified.<br>• The platform should allow stakeholders to share content relevant to the issue in the collaboration space. This content may include text, pictures, video, PDF/DOC/DOCX documents etc. and stakeholders should be able to view the content directly from the collaboration space.<br>• The platform should allow stakeholders to invoke a web conferencing session directly from the collaboration space. The web conferencing session should automatically include all stakeholders in the collaboration space. | |

| S.NO. | Functionality Description | | Compliance (Yes/No) |
|---|---|---|---|
| | | • The platform should allow stakeholders to participate in the web conferencing session using any means including smart phones, laptop computers, PSTN telephones, enterprise desk phones etc.<br>• The platform should allow smart city devices (cameras, lights, various sensors etc.) to be added to the collaboration spaces. It should also allow the stakeholders to acquire data from such devices and to control such devices directly from the collaboration space, subject to access privileges for each user and device.<br>• The platform should allow the stakeholders to access the collaboration spaces, participate in conversations, share content, create web conferences and control smart city devices from any endpoint (smart phones, laptops and other computers) and from any network location.<br>• The platform should allow the stakeholders to be notified of the creation of collaboration spaces using SMSs and announcements over PSTN telephone calls.<br>• The platform must allow configuration of the policy under which such collaboration spaces are created and stakeholders are invited and notified.<br>• The platform should allow stakeholders to invoke a web conferencing session directly from the collaboration space. The web conferencing session should automatically include all stakeholders in the collaboration space.<br>• The platform should allow stakeholders to participate in the web conferencing session using any means including smart phones, laptop computers, PSTN telephones, enterprise desk phones etc.<br>• The platform should allow the stakeholders to access the | |

| S.NO. | Functionality Description | | Compliance (Yes/No) |
|---|---|---|---|
| | | collaboration spaces, participate in conversations, share content, create web conferences and control smart city devices from any endpoint (smart phones, laptops and other computers) and from any network location. | |
| 55. | Enterprise resource planning (ERP) integration | System should allow integration of business process in ERP workflows like property tax collection etc. | |
| 56. | | System should allow ERP data visualization at city dashboard | |
| 57. | | The platform should have the capability to retrieve data directly from ERP systems. The APIs should be RESTful and return the data in JSON format. | |
| 58. | | The platform should also have the capability to read data directly from a set of databases (HBase, MongoDB, Oracle, Cassandra, MySQL, Impala). To connect to any of the databases information on how to connect should be provided. | |
| 59. | | System should be able to read data from flat CSV files. | |
| 60. | Analytics Engine | Analytics Engine should be an artificial intelligence-based smart city analytics platform module to maximize business value through advanced machine learning capabilities. The machine learning capabilities aid in automating policies that result in better asset and infrastructure management. | |
| 61. | | The solution should be flexible to integrate with other city and government software applications. | |
| 62. | | Analytics Engine module should have below intelligence capabilities;<br>a) Advanced Predictive Analytics should be part of the solution.<br>b) The solution should be flexible to integrate with other city and government software applications<br>c) The solution should be able to predict insights consuming data from city | |

| S.NO. | Functionality Description | | Compliance (Yes/No) |
|---|---|---|---|
| | | infrastructure viz., Traffic, Parking, Lighting etc.<br>d) The solution should have predictions with measurable accuracy of at least > 70%<br>e) The solution should be able to predict and integrate with Smart City solutions helping in driving operational policies creation.<br>f) The solution should be robust, secure and scalable.<br>g) The solution should have a visualization platform to view historic analytics | |
| 63. | | The application should enable the customers to discover, compare, and correlate data across heterogeneous data sources to unravel the patterns that are previously hidden. At a broader level, when you work with the application, system do the following tasks:<br>a) Connect to a variety of data sources<br>b) Analyze the result set<br>c) Visualize the results<br>d) Predict outcomes | |
| 64. | | Analytics Engine should support multiple Data Sources. Min below standard data sources should be supported from day 1 –<br>CSV, TSV, MS Excel , NoSQL, RDBMS | |
| 65. | | Analytics Engine should provide analysis of data from a selected data source(s).<br>Analysis enables to define arithmetic and aggregation operations that result in the desired output.<br>Analytics engine should provide capability to check analysis with multiple predictive algorithms | |
| 66. | Analytics Engine Visualizations | Analytics Engine should provide visualizations dashboard.<br>In the visualization workspace it should allow to change visual attributes of a graph.<br>User should not be allowed to alter the graph/visualization definition.<br>In the visualizations workspace, user should able to do the following operations: | |

| S.NO. | Functionality Description | | Compliance (Yes/No) |
|---|---|---|---|
| | | a) Change the graph/visualization type<br>b) Print the graph<br>c) Export the graph<br>d) Narrow down on the value ranges<br>e) Toggle the axis labels<br>f) Integrate with other 3rd party applications seamlessly | |
| 67. | Export Formats | System should allow export the analysis into min following formats:<br>g) XML/JSON<br>h) Excel<br>i) PDF<br>j) CSV | |
| 68. | Cloud Infrastructure Operations | **Hardened components:** The OS instances are hardened as per the latest CIS-CAT benchmarks with target of 80 % compliance. All actions are audit-logged. Hardened OS shall have only required applications, process and permissions. All components are hardened as per industry standards | |
| 69. | | **Infrastructure components security:** Platform should support user encrypted storage volumes. Restrict inbound access from public network only on secure ports via DMZ proxy instances. SSH access is restricted with secure keypair and from designated jump hosts alone. User management and authentication is tied to Corporate SSO. | |
| 70. | | **VM Infrastructure security:** Platform should have appropriate technical controls in place to prevent attacks that target virtual infrastructure | |
| 71. | Infrastructure as a Service support | System should provider should support following security features<br>• User encrypted storage volumes.<br>• Restrict inbound access from public network only on secure ports via DMZ proxy instances<br>• SSH access is restricted with secure keypair and from designated jumphosts alone.<br>• User management and authentication is tied to Corporate SSO.<br>• Platform should have appropriate | |

| S.NO. | Functionality Description | | Compliance (Yes/No) |
|---|---|---|---|
| | | technical controls in place to prevent attacks that target virtual infrastructure<br>• Platform should have appropriate controls in place to detect source code security defects, functionalities for any outsourced software development activities from suppliers, open source libraries | |
| 72. | API & Interface Security | • The access to data should be highly secure and efficient. | |
| 73. | | • Access to the platform API(s) should be secured using API keys. | |
| 74. | | • Software should support security standards: OAuth 2.0, HTTPS over SSL, and key management help protect the data across all domains. | |
| 75. | | • Should support security features built for many of its components by using HTTPS, TLS for all its public facing API implementations. For deployment where CCC Software API(s) exposed to application eco system, API Management, API security features and API Key management functions are required. | |
| 76. | Data Security & Integrity | • **Data Governance / RBAC:** Platform should support data governance & stewardship model, in which roles, responsibilities are clearly defined, assigned, implemented, documented and communicated<br>• **Data Governance/ Resilient hosting:** Platform should have capability to restrict the storage of customer data to specific countries or geographic locations with resilient hosting options<br>• **Data Protection / Production Data integrity:** Platform should support procedure in place to ensure production data shall not be replicated or used in non-production environment<br>• **Data Protection / Data at rest:** Platform should support encryption for tenent data at rest (on disk/storage) | |

| S.NO. | Functionality Description | | Compliance (Yes/No) |
|---|---|---|---|
| | | • **Data Retention:** Platform should have capabilities to enforce tenent data retention policies<br>• **Data recover & restore:** Platform should have capability to recover and restore data for a specific customer in the case of a failure or data loss.<br>• **Data disclosure & privacy :** Platform should disclose data attributes, elements collected from source . All the attributes should be disclosed & appraised to data owner. With appropriate approval from City authority, Platform should have ability to encrypt sensitive data element at rest. | |
| 77. | Release Operations | **Critical production assets:** Platform vendor should maintain complete inventory of critical production assets. Asset could be defined as source code, documents, binaries, configuration data, scripts, supplier agreements, SW Licenses | |
| 78. | | **Patch Management:** Platform should have capabilities to patch vulnerabilities across VM infrastructure, applications and systems | |
| 79. | | **Patch timeline / notifications:** Platform vendor should provide risk-based systems patching time frames to tenants based on request | |
| 80. | | **Secure SDLC:** Platform should support automated source code analysis tool to detect security anomalies / defects in code prior to production | |
| 81. | Business Operations | **Audit & logging:** Platform should support centralized logging & auditing framework. Physical and logical user access to audit logs restricted to authorized personnel only. | |
| 82. | | **Critical production assets:** Platform vendor should maintain complete inventory of critical production assets. Asset could be defined as source code, documents, binaries, configuration data, scripts, supplier agreements, SW Licenses | |
| 83. | Field Responder | Provide integrated Mobile Application for Android and Windows for capturing real-time | |

| S.NO. | Functionality Description | | Compliance (Yes/No) |
|---|---|---|---|
| | Mobile Apps | information from the field response team using Mobile- Standard Operating Procedure. | |
| 84. | High Availability | As per SLA defined in the RFP. | |
| 85. | | Platform shall have no single point of failure. Software & hardware fault shall not result total system failure. | |
| 86. | | All failure must report relevant error messages to the user | |
| 87. | | Platform vendor shall provide supporting infrastructure, appropriate tools to measure & monitor system availability and automated notification for system failure and unavailability | |
| 88. | | System response Time<br>Measured as the elapsed time between the moments a user initiates a process using input device to last display of first screen (First Screen means the first user accessing information regarding some application/ sensor).<br>• System response time should not exceed 3 seconds for 2 concurrent users (accessing similar information regarding some application / sensors on command center application)<br>• System response time for any web services shall not exceed 3 seconds for 60 concurrent users | |
| 89. | Logging | Platform should have logging frame with following functionalities<br>• Logs shall readable in ASCII plaintext or UTF-8 format or any similar standard or format.<br>• All logs shall be timestamped<br>• Log events shall capture user activities, applications, system & network messages<br>• Centralized & secure log repositories to all log events<br>• System logging shall be provided for all successful and unsuccessful login attempts and for all super user activities<br>• Platform should implement mechanisms to trigger alerts and | |

| S.NO. | Functionality Description | | Compliance (Yes/No) |
|---|---|---|---|
| | | facilitate users to analyze and review logs efficiently<br>• All critical logs are secured and sent to archive<br>• Centralized logging shall be configurable to report for exceptions and generate reports based on desired filters<br>• Logging framework shall be integrated with SIEM framework<br>• Any anomalies shall be promptly identified & investigated through SIEM(Security Incident Management Framework)<br>• Appropriate controls shall be put in place to ensure outage of the central log repository does not result in any loss of logs<br>• The central syslog shall be able to normalize logs from wide variety of platforms / components to Common Event Format (CEF) to ease of use for monitoring and analysis and support logical data segregation so that the different user groups can only view their own managed equipment logs<br>• Central syslog system shall have sufficient disk storage to keep the logs for 1 year to facilitate incident response investigation<br>• Logging should have following retrieval time<br>o Timeline : Log Duration<br>o 6 Hrs : 0 – 30 days<br>o 1 day : 30 – 90 days<br>o 5 days : Older than 90 days | |
| 90. | Performance Monitoring Tool | Performance monitoring tool shall include following functionalities<br>• Identify infra and/or application components between the user and backend servers that is causing the problems<br>• Providing key performance indicators<br>• Identify the inter-dependencies between application & infra components | |

| S.NO. | Functionality Description | | Compliance (Yes/No) |
|---|---|---|---|
| | | • Able to provide network/ system node causing the problem<br>• Provide email, SMS and/or mobile alert mechanism if performances falls below predefined thresholds<br>• Performance monitoring shall not adversely affect the performance of the platform<br><br>Additional information is provided in following sections. | |
| 91. | Platform Environment | • Platform provider shall have 3 environments<br>1. Development environment<br>2. QA environment<br>3. Production environment<br>• All 3 environments shall be physically / logically separated<br>• All should have same system & application software versions | |
| 92. | Platform Software | • Platform provider shall provide complete information on all platform software deployed indicating clearly the software versions, quantity of licenses, functions, type of license ( one time or annual recurring)<br>• Platform provider shall transfer all licenses with maintenance service supports to authority<br>• There shall be no use of freeware, shareware and proprietary software | |

### b. Key Design Considerations

Key design considerations taken into account are as follows –

- Designed for 24x7 online availability of application.
- Scalable solution on open protocols
- No propriety devices/ applications
- API based architecture for Integration with other web applications and Mobile applications

The key guiding principles considered for building the integrated Smart Governance solution are the following:

- **Transformational nature of Smart City applications** - Instead of imitating paper process in electronic form, applications should look to fully embrace mobile adoption, digital signature, online authentication, etc. to transform the processes completely and offer wider choice and no/low touch point for residents to interact directly. It is critical that project design are aligned to larger trends and designed for next decade rather than past.
- **Continuous adoption of rapidly evolving Technology** - Technology evolves too fast and Government projects similar to Smart City with its long procurement cycles do not align naturally to adapt to this trend. Also, any changes to existing implementations require contract changes, new RFP (Request for Proposal), etc. Hence the entire system would be built to be open (standards, open API, plug-n-play capabilities like virtual environments ,creating sandbox), components coupled loosely to allow changes in sub-system level without affecting other parts, architected to work completely within a heterogeneous compute, storage, and multi-vendor environment. Simulated services environment can help agencies to save cost, Infrastructure and time in testing multiple application integrations.
- **Selection of best solution at best rate as and when required** - Large integrated systems of Smart City operations should be designed to get best cost and performance advantages of natural technology curve (constant increase of speed and decrease of cost) and still aligned to open procurement practices of the Government. For this to happen, architecture should be open and vendor neutral, use commodity hardware, and designed for horizontal scale. This allows buying of commodity compute, storage, etc. only when needed at best price.
- **Distributed Access and Multi-channel service delivery -**With high penetration of mobile devices and very large percentage of internet usage using mobile devices, it is imperative that the Smart City applications provide multiple channels of service delivery to its stakeholders. An important consideration is that the access devices and their screen capabilities (including browser variations) are numerous and constantly evolve. Hence, it is imperative to design the system such that the ecosystem of Smart City-integrated mobile apps also evolves.
- **Security and privacy of data** - Security and privacy of data within the integrated Smart City system will be foundational keeping in view of the sensitivity of data and critical nature of the infrastructure envisioned to be built for Smart City operations. Security and privacy of data should be fundamental in design of the system without sacrificing utility of the system. When creating a system of this scale, it is imperative that handling of the sensitivity and criticality of data are not afterthoughts, but designed into the strategy of the system from day one.
- **Provision of a Sustainable, Scalable Solution-** The motive of the technological enhancements to provide a system that would be sustainable for the next few years. The expectation is that the system should sustain at least 10 years from GO-Live. The solution would be done keeping in mind the scalability of the system. The simplified procurement processes and ease of compliance is expected to lead to huge growth in contract's base. Every component of TUFIDCO system needs to scale horizontally to very large volume of data.

The Application Software will have the capability to scale up to tomorrow's requirements like given below:

- Managing the entire Property Life Cycle (Data Collaboration between various govt. departmental systems)
- Maintaining Information on Citizen Life Cycle (Right from Birth to Marriage, Health, Education, Driving License, Interactions with TUFIDCO)
- **API Approach-** TUFIDCO has decided to adopt Open API as the guiding paradigm to achieve the above goals. Though TUFIDCO system would develop a portal but that would not be the only way for interacting with the TUFIDCO system as the stakeholders via his choice of third party applications, which will provide all user interfaces and convenience via desktop, mobile, other interfaces, will be able to interact with the TUFIDCO system. These applications will connect with the TUFIDCO system via secure TUFIDCO system APIs. This architectural approach has been taken as the UI based integration through a ubiquitous web portal requires manual interaction and does not fit most consumption scenarios. The following benefits are envisaged from API based integration,
    - Consumption across technologies and platforms(mobile, tablets, desktops, etc.) based on the individual requirements
    - Automated upload and download of data
    - Ability to adapt to changing taxation and other business rules and end user usage models
    - Integration with customer software (GIS, Accounting systems).
    - Simulated services environment can help agencies to save cost, Infrastructure and time in testing multiple application integrations.
    - Open APIs should have a security and management layer for all interfaces.
- **Business Rule Driven Approach-**All configurations including policy decisions, business parameters, rules, etc. shall be captured in a central place within the system. The system shall provide facility to the decision makers to add new or edit/delete existing policies or make changes with appropriate permission control and audit trace. Managing these in a central repository ensures only once source of truth is used across many application servers and reduces issues of inconsistent application behaviour. Decoupling of the business parameters/rules/master data from the rest of the solution architecture and making them configurable allows for a great deal of flexibility.
- **Data Distribution Service-**As a future roadmap it is envisaged that the functionalities provided by the TUFIDCO Smart City system should be available as services that could be offered to other stakeholders on request. Keeping this in mind the system shall be able to provide data on subscription-publication basis. The organization of the information exchange between modules is fundamental to publish-subscribe (PS) systems. The PS model connects anonymous information producers (publishers) with information consumers (subscribers). The overall distributed application (the PS system) is composed of processes. The goal of the DDS architecture is to facilitate efficient distribution of data in a distributed system. Participant using DDS can ‘read’ or ‘write’ data efficiently and naturally with a typed interface. Underneath, the DDS middleware will distribute the data so that each reading participant can access the ‘most current’ values.

### c. Guiding Architecture Principle

The IT architecture principles defined in this section are the underlying general rules and guidelines that will drive the subsequent development, use and maintenance of architectural standards, frameworks and future state target architecture.

TUFIDCO system will be built on the following core principles:

#### i. Platform Approach

It is critical that a platform based approach is taken for any large scale application development, to ensure adequate focus and resources on issues related to scalability, security and data management. Building an application platform with reusable components or frameworks across the application suite provides a mechanism to abstract all necessary common features into a single layer. Hence the system is envisaged as a faceless system with 100% API driven architecture at the core of it. Smart City portal will be one such application on top of these APIs, rather than being fused into the platform as a monolithic system.

Open APIs designed to be used form the core design mechanism to ensure openness, multi-user ecosystem, specific vendor/system independence, and most importantly providing tax payers and other ecosystem players with choice of using innovative applications on various devices (mobile, tablet, etc.) that are built on top of these APIs.

#### ii. Openness

Adoption of open API, open standards and wherever prudent open source products are of paramount importance for the system. This will ensure the system to be lightweight, scalable and secure. Openness comes from use of open standards and creating vendor neutral APIs and interfaces for all components. All the APIs will be stateless. Data access must be always through APIs, no application will access data directly from the storage layer or data access layer. For every internal data access also (access between various modules) there will be APIs and no direct access will be there. System shall use open standards and protocols like BPMN, BPEL, OWASP, WSDL, SOAP, etc.

#### iii. Data as an enterprise asset

Information is a high value asset to be leveraged across the organization to improve performance and decision making. Accurate information would ensure effective decision making and improved performance effective and careful data management is of high importance and top priority should be placed on ensuring where data resides, that its accuracy can be relied upon, and it can obtained when and where needed.

#### iv. Performance

A System using the leading technologies of the domain should be proposed in the solution ensuring the highest levels of performance. It will also ensure that the performance of various modules should be independent of each other to enhance the overall performance and also in case of disaster, performance of one module should not impact the performance other modules.
The solution should be designed in a manner that the following can be achieved:

- Modular design to distribute the appropriate system functions on web and app server
- Increase in-memory Operations (use static operations)
- Reduce number of I/O operations and N/w calls using selective caching
- Dedicated schemas for each function making them independent and avoiding delays due to other function accessing the same schema.
- Solution should provide measurable and acceptable performance requirements for users, for different connectivity bandwidths.
- The solution should provide optimal and high performance Portal Solution satisfying response time for slow Internet connections and different browsers.

**v. Scalability**

The component in the architecture will be capable of being scaled up to more user requests or handling more no. of input resources in various modules. Even inclusion of additional application functionalities can be catered to by upgrading the software editions with minimal effort.

The design of the system to consider future proofing the systems for volume handling requirements

- The application functions to be divided logically and developed as Modular solution.
- The system should be able to scale horizontally & vertically.
- ***User Base -*** Must support One Thousand users (knowledge workers) with projected growth of 10 %/year. Concurrent users at peak time may be assumed to be at least 10% of the user base. The design of the Solution should be scalable to handle increasing number of users.
- ***Data Volume-*** Ability to support 20 % projected volume growth in content post system implementation & content migration.
- ***Functionality –*** Ability to extend functionality of the solution without significant impact to the existing functional components and infrastructure.
- **Loose coupling through layered modular design and messaging** - The architecture would promote modular design and layered approach with clear division of responsibility and separation of concerns at the data storage, service and integration layer in order to achieve desired interoperability without any affinity to platforms, programming languages and network technologies. The architecture has to be scalable, maintainable and flexible for modular expansion as more citizen and business services are provided through the Smart City system. Each of the logical layers would be loosely coupled with its adjacent layers
- **Data partitioning and parallel processing** - Smart City system functionality naturally lends itself for massive parallel and distributed system. For linear scaling, it is essential that entire system is architected to work in parallel within and across machines with appropriate data and system partitioning. Choice of appropriate data sources such as RDBMS, Hadoop, NoSQL data stores, distributed file systems; etc. must be made to ensure there is absolutely no “bottleneck” in the entire system including at the database and system level to scale linearly using commodity hardware.

**vi. No Vendor lock-in and Replace-ability**

Specific OEM products may only be used when necessary to achieve scale, performance and reliability. Every such OEM component/service/product/framework/MSI pre-existing product or work must be wrapped in a vendor neutral API so that at any time the OEM product can be replaced without affecting rest of the system. In addition, there must be at least 2 independent OEM products available using same standard before it can be used to ensure system is not locked in to single vendor implementation.

**vii. Security**

The security services will cover the user profile management, authentication and authorization aspects of security control. This service run across all the layers since service components from different layers will interact with the security components. All public contents should be made available to all users without authentication. The service will authenticate users and allows access to other features of the envisaged application for which the user is entitled to.
The system should be designed to provide the appropriate security levels commiserate with the domain of operation. Also the system will ensure data confidentiality and data integrity.
The application system should have the following

- A secure solution should be provided at the hardware infrastructure level, software level, and access level.
- Authentication, Authorization & Access Control: 3 factors (User ID & Password, Biometric, and Digital Signature) security mechanisms should be implemented to enable secure login and authorized access to portal information and services.
- Encryption Confidentiality of sensitive information and data of users and portal information should be ensured.
- Appropriate mechanisms, protocols, and algorithms necessary to protect sensitive and confirmation data and information both during communication and storage should be implemented.
- Data security policies and standards to be developed and adopted across the Smart City departments and systems
- In order to adequately provide access to secured information, security needs must be identified and developed at the data level. Database design must consider and incorporate data integrity requirements.
- Role based access for all the stake holders envisaged to access and use the system
- Appropriate authentication mechanism adhering to industry good practice of Password Policies etc.
- Ability to adopt other authentication mechanism such as Electronic Signature Certificates
- Authorization validity to be ensured for the users providing the Data to the system. Data should be accepted only from the entity authorized
- Data should be visible only to the authorized entity
- Audit trails and Audit logging mechanism to be built in the system to ensure that user action can be established and can investigated if any can be aided(e.g. Logging of IP Address etc.)
- Data alterations etc. through unauthorized channel should be prevented.

- Industry good practice for coding of application so as to ensure sustenance to the Application Vulnerability Assessment

System must implement various measures to achieve this including mechanisms to ensure security of procurement data, spanning from strong end-to-end encryption of sensitive data, use of strong PKI national standards encryption, use of HSM (Hardware Security Module) appliances, physical security, access control, network security, stringent audit mechanism, 24x7 monitoring, and measures such as data partitioning and data encryption.

Activities such as anti-spoofing (no one should be able to masquerade for inappropriate access), anti-sniffing (no one should be able get data and interpret it), anti-tampering (no one should be able to put/change data which was not meant to be put/changed) should be taken care for data in transit, as well as data at rest, from internal and external threats.

**viii. User Interface**

The architecture and application solutions to be designed should promote simplicity and ease of use to the end users while still meeting business requirements. It should provide a simpler and more cost-effective solution. Reduces development time and makes the solution easier to maintain when changes in requirements occur.

This will be accomplished by the implementation of rich User Interfaces along with its integration with the DMS, Relational Data Store, Messaging and other external applications.

- Efficient and layout design are the key considerations that enhance usability which should be factored in while designing the application. Standard and consistent usability criteria must be defined. An intuitive, user friendly, well-articulated navigation method for the applications greatly enhances the usability of the application.
- Effective information dissemination
- Enhanced functionalities including personalized delivery of content, collaboration and enriching GUI features
- The load time for all web page user interfaces must satisfy both the following response time targets on 1 mbps connection:
    - 3 sec for welcome page
    - 5 sec for static pages
    - 10 sec for dynamic pages
- Ability to perform a simple search within 10 seconds on 1 mbps connectivity and a complex search (combining four terms) within 15 seconds regardless of the storage capacity or number of files and records on the system.
- Mobile Application Platform
    - Applications and services including all appropriate channels such as SMS/USSD/IVRS and development of corresponding mobile applications to the applications and services leveraging the Mobile Service Delivery Gateway (MSDG) and Mobile App Store.
    - Application platform should support the following smart phone mobile OS (Android 4.0 and above, iOS 4, 5 and above, Windows Phone OS 8.0 and above, Mobile Web App)

- Support the target packaging components like (Mobile Website, Hybrid App, Native App, Web App and Application Development, Eclipse tooling platforms)
- Support the ability to write code once and deploy on multiple mobile operating systems
- Support integration with native device API
- Support utilization of all native device features
- Support development of applications in a common programing language
- Support integration with mobile vendor SDKs for app development and testing
- Support HTML5, CSS3, JS features for smartphone devices
- Support common protocol adapters for connection to back office systems (i.e. HTTP, HTTPS, SOAP, XML for format)
- Support JSON to XML or provide XHTML message transformations
- Support multi-lingual and language internalization
- Support encrypted messaging between server and client components

**ix. Reliability**

This is a very crucial system and data are of high sensitivity, the data transfer and data management should be reliable to keep the confidence of the stakeholders. The system should have appropriate measures to ensure processing reliability for the data received or accessed through the application.

It may be necessary to mainly ensure the following

- Prevent processing of duplicate incoming files/data
- Unauthorized alteration to the Data uploaded in the system should be prevented
- Ensure minimum data loss(expected zero data loss)

**x. Manageability**

It is essential that the application architecture handles different failures properly; be it a hardware failure, network outage, or software crashes. The system must be resilient to failures and have the ability to restart, and make human intervention minimal.

All layers of the system such as application, infrastructure must be managed through automation and proactive alerting rather than using 100’s of people manually managing.

The entire application must be architected in such a way that every component of the system is monitored in a non-intrusive fashion (without affecting the performance or functionality of that component) and business metrics are published in a near real-time fashion. This allows data center operators to be alerted proactively in the event of system issues and highlight these issues on a Network Operations Center (NoC) at a granular level. The solution should be envisaged to utilize various tools and technologies for management and monitoring services. There should be management and monitoring tools to maintain the SLAs.

### xi. Availability

The solution design and deployment architecture will ensure that the application can be deployed in a centralized environment offering system High Availability and failover.

The solution should meet the following availability requirements

- Load Balanced across two or more Web Server avoiding single point of failure
- Deployment of multiple application instances should be possible
- Distributed or load balanced implementation of application to ensure that availability of services is not compromised at any failure instance.
- Network, DC, DR should be available 99.99 % time.

### xii. SLA driven solution

Data from connected smart devices to be readily available (real-time), aggregated, classified and stored, so as not to delay the business processes of monitoring and decision making, and will enable appropriate timely sharing across the Smart City organization.

Readily available and consumed device data will facilitate timely access of analytics reports at every level and department of the Smart City and provide timely analysis of data as well as monitoring of KPIs through SLAs resulting in effective service delivery and improved decision making.

### xiii. Reconstruction of truth

System should not allow database/system administrators to make any changes to data. It should ensure that the data and file (data at rest) that is kept in the systems has tamper resistance capacity and source of truth (original data of invoices and final returns) could be used to reconstruct derived data such as ledgers and system generated returns. System should be able to detect any data tampering through matching of hash value and should be able to reconstruct the truth.

- Services/solutions should be flexible and extensible to respond to, accommodate and adapt to changing business needs and unanticipated requirements easily. Consolidate and simplify technology applications wherever possible to minimize complexity. Ongoing application, database and server consolidation may be required.
- Software should use meta-data to configure itself (using declarations rather than coding).
- Avoid proprietary solutions and technologies if possible. Consider adhering to latest industry best practices and technical standards.
- The infrastructure should support an environment that allows applications to start small, grow quickly, and operate inexpensively. An adaptable infrastructure provides the capability to add to the current infrastructure with minimum inconvenience to the user.
- The IT architecture should be designed to support the overall SLA requirements around scalability, availability and performance.

- Each application should be performance tested to identify performance issues. The potential performance bottlenecks need to be identified and cost-effective paths for performance improvements should be provided for these identified problem areas.
- The system infrastructure should be architected considering failover requirements and should ensure that a single server or network link failure does not bring down the entire system.
- The system should be reliable handling every request and yield a response. It should handle error and exception conditions effectively

### d. Integration Architecture

This section recommends the proposed integration architecture aligning with the overarching architectural principles.

The following are the integration specifications for the various integration scenarios -

**Real-time integration**

The need for a Service Oriented Architecture (SOA) and API Governance architecture is felt that will facilitate in defining an enterprise integration platform. An SOA and API Lifecycle Management platform will help in data exchange across applications in real-time mode (both synchronous and asynchronous), promote loose coupling with ease of maintenance and change, facilitate rapid composition of complex services, achieve scalability through modularity, and improved business visibility and help secure API based business critical transaction.

SOA /API is an architectural style that allows the integration of heterogeneous applications & users into flexible and lightweight architecture. Discrete business functions contained in enterprise applications could be organized as layers of interoperable, standards-based shared "services" that can be combined, reused, discovered and leveraged by other applications and processes. The proposed integration architecture is depicted below. All real-time data integration across the enterprise applications will be through middleware based enterprise integration platform.

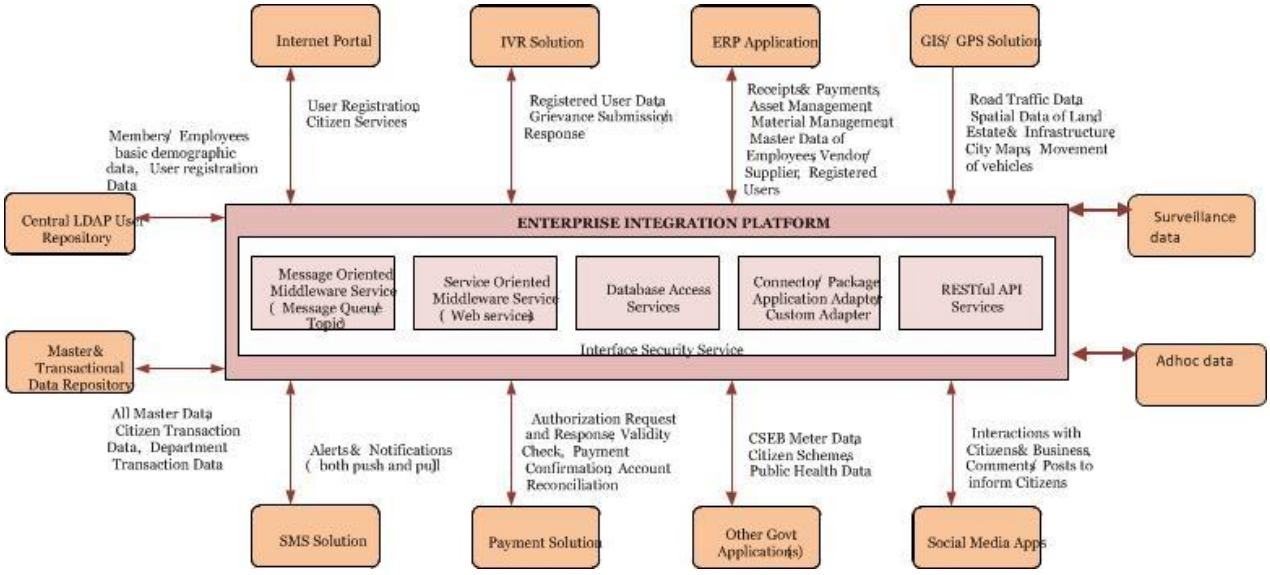


***Figure 1: Integration Framework***

The following are the various integration modes and techniques that could be leveraged -

- SOAP / REST web service based interfacing technique will be leveraged as the real-time point to point synchronous integration mode with external or third party systems. The following integration points could be considered for SOAP web service based interfacing -
    - Payment gateway of the authorized banks to enable authorized users make financial transactions for the Smart City services availed by them. This should support a unified interface to integrate with all Payment Service Providers using web services over secured protocols.
    - Should protects against threats and OWASP vulnerabilities and controls access with Single Sign-On and identity management, providing end-to-end security for apps, mobile, and IoT.
    - Solution should be able to protect against cross-site scripting (XSS), injection attacks ( Xpath SQL , XQuery etc. ) and DoS attacks.
    - SMS application, acting as the SMS Gateway, will make use of Java Communication APIs for SMS communication to GSM network using the GSM modem, which can be both event-driven as well as time-driven. The API will be exposed to initiate the broadcasting or alert notification.
    - Social Media Apps and NoSQL data stores to exchange photos, videos and message feeds, based on interactions with Citizens and Business as well as comments/posts to inform stakeholders
    - IVR/Customer Support solution with ERP and Transactional Data Repository to exchange citizen and business demographic, registration and payment data as well as transactional data related to citizen services and municipal operations.
    - GIS/GPS solution with traffic management, surveillance and land & estate management applications to capture the data pertaining to location traces left by GPS-enabled smartphones and Wi-Fi network logins, road traffic condition, movement of vehicles and spatial data of land, estate and Smart City infrastructure.
- Message based interfacing technique will be leveraged for real-time asynchronous integration mode. The following integration points could be considered for message based interfacing -
    - Central LDAP with ERP to synchronize member and employee user registration data
    - Payment solution and ERP to exchange payment data for tracking of beneficiary's payment transactions against different services (citizen, workers, transporter, vendor), master data (employee, vendor/supplier, location, facilities, price table)
    - Employee attendance data with ERP (HR Module) to capture data pertaining to employee location and attendance
    - Departmental applications with ERP (Asset Management module) to exchange data for procurement and maintenance of any assets or infrastructure items for each department.
    - Municipal operations application with ERP (Material Management module) to capture materials related transaction and inventory data for public works

  - Other government applications with Smart City application to exchange data for government procurement, public health schemes, welfare schemes, citizen health and BEB meters.

- RESTful API service based interfacing technique will be leveraged for the following integration areas-
  - Access and use of various services provided by the different departments for citizens and business community will be done through a RESTful, stateless API layer.
  - Access and use of various internal functions related to operations and administration of Smart City for departmental and employees will be done through a RESTful, stateless API layer
- Data integration in batch mode will be through ETL. The following integration points could be considered for ETL based data integration -
  - Initial data migration to cleanse, validate and load the data extracted from source systems into target tables
  - Data load from all the individual transactional systems like ERP, Grievance Redressal to central enterprise data warehouse solution for aggregation, mining, dashboard reporting and analytics.

Process Integration layer of the solution will automate complex business processes or provide unified access to information that is scattered across many systems. Process Integration will provide a clean separation between the definition of the process in the process model, the execution of the process in the process manager, and the implementation of the individual functions in the applications. This separation will allow the application functions to be reused in many different processes.

An enterprise service bus (ESB) is a software architecture model used for designing and implementing the interaction and communication between mutually interacting software applications in Service Oriented Architecture. As software architecture model for distributed computing it is a variant of the more general client server software architecture model and promotes strictly asynchronous message oriented design for communication and interaction between applications. Its primary use is in Enterprise Application Integration of heterogeneous and complex landscapes. Following are the requirement for an ESB system:

- The solution should support static/deterministic routing, content-based routing, rules-based routing, and policy-based routing, as applicable in various business cases.
- The solution should have capabilities to receive input message in heterogeneous formats from various different systems, interpret those messages, process and transform those messages to generate output and feed them to various different clients as per formats applicable.
  - The solution should have features to communicate across different services, process them and expose as single aggregate service to facilitate business functionality
  - ESB should support SOA standards such as XML, XSLT, BPEL, web services standards and messaging standards.
  - ESB should support all industry standards interfaces for interoperability between different systems
  - ESB should support the following integration security standards:

- Authentication
- Authorization
- Encryption
- Secure Conversation
- Non-repudiation
- XML Firewalls
- Security standards support
- WS-Security 1.1
- WS-Trust 1.3
- WS-Secure Conversations 1.3
- WS-Basic Security Profile

- The solution should support routing to all internal & external systems.
- The solution should have comprehensive auditing capabilities to support any internal or external audits.
- The solution should provide configurable logging feature for supporting error handling.
- The solution should include feature of service registry for managing all services.
- The solution should support Business Activity Monitoring. One should be able to do a real time analysis of the data flowing within the ESB. One should be also able to monitor Key Performance Indicators.
- The solution should be able to interoperate and connect with applications deployed on a number of platforms including, AIX, HP-UX, Sun Solaris, Windows, Linux etc.
- The solution should support a whole suite of adapters such as Data Handler for XML, Exchange, Lotus Domino, industry standard packaged solutions etc.
- The solution should support various messaging patterns e.g. synchronous, asynchronous, pub/sub, multicast, etc.
- The solution should support SQL access to relational databases. Integration capabilities with NoSQL databases would be also advised.
- The proposed ESB should support Time Control and Notification for messaging
- The ESB should have an capabilities of Routing, Enrichment, Update, Transformation Processing
- The ESB should support for Message Expiry configuration

There are four integration gateways envisaged as part of the solution design. The key requirements with respect to each of these are mentioned below:

**SMS Gateway:** SMS services are envisaged to be made available as part of the solution design. The service provider may integrate the solution with MSDG, and use the services available through it, or deploy its own SMS Gateway services at no extra charge , but it is a mandatory requirement that all the SMS based services (alerts and notifications) should be available as part of the solution. Following are some of the key requirements for the SMS services through the solution:

- Should contain required details/information and targeted to the applicant or designated officers of tax departments and other stakeholders and users as per prevailing TRAI norms
- Facilitate access through access codes for different types of services
- Support automated alerts that allows to set up triggers that will automatically send out reminders
- Provide provision for International SMS
- Provide provision to receive messages directly from users
- Provide provision for personalized priority messages
- Resend the SMS in case of failure of the message
- Provide messaging templates

**Payment Gateway:** The solution is envisaged to have integration with payment gateways, to enable authorized Users make financial transactions, as per rights and privileges provided to him/her. The service provider is required to make the provisions for integration with such third party gateways and provide payment services, as per requirement of the smart city. Some of the key features of payment gateway are mentioned below:

- Should support secure integration with Payment Service Providers
- Should support a unified interface to integrate with all Payment Service Providers
- Should support integration with Payment Service Providers using web services and over HTTP/S protocol
- Should manage messages exchange between UI and payment service providers
- Should support beneficiary's payment transactions tracking against various services
- Should support bank accounts reconciliation
- Should provide logs for all transactions performed through the Payment Gateway for future financial dispute resolution that might arise between entities and either beneficiaries or Payment Service Providers
- Should maintain and keep transactions logs for time period required and specified by the financial regulations followed in country
- Should support redundant Payment Discovery
- Should submit Periodic Reconciliation Report to government entities
- Should support transaction reports to monitor and track payments
- Should support real-time online credit card authorization for merchants
- Should support compliance with emerging trends and multiple payment options such debit card, credit card, cash cards and other payment gateways
- Should provide fraud screening features
- Should support browser based remote administration
- Should support multicurrency processing and settlement directly to merchant account
- Should support processing of one-time or recurring transactions using tokenization
- Should support real time integration with SMS and emails

**IVR Services:** IVR services are envisaged as part of Call Center facility, which will be integrated with the solution, to provide information and services to the people who would contact the Call Center: Some of the key features of the IVR services are mentioned below:

- Should provide multi-lingual content support
- Should facilitate access through access codes for different types of services
- Should support Web Service Integration

- Should support Dual Tone Multi Frequency (DTMF) using telephone touchpad - in-band and out-of-band
- Should support for Voice Extensible Markup Language (VoiceXML)
- Should support speech recognition that interprets spoken words as texts (Advanced Speech Recognition).
- Should support playing of pre-recorded sounds
- Should support redirection to human assistance, as per defined rules
- Should be able to generate Data Records – (CDRs) and have exporting capabilities to other systems
- Should provide provision for voice mailbox and voice recognition

There are multiple ways of integration of the solution with other systems is envisaged. These may be through Web Services, Message Queuing, File based or API based. The integration and data sharing mechanism may be either in Batch Mode or Needs basis (synchronous or asynchronous). Some of the key requirements of the interface/integration are mentioned below:

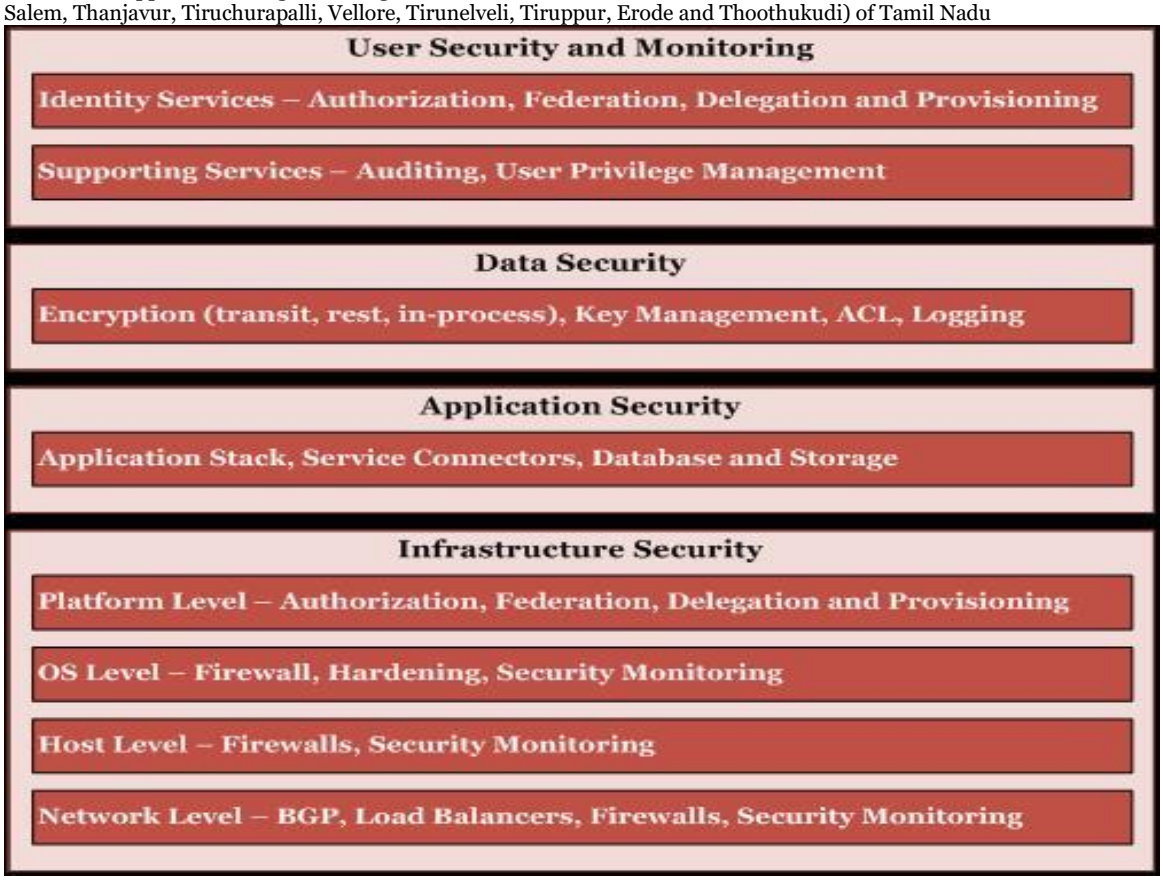
  - Interface Definition
  - Interface Owner
  - Interface Type
  - Interface Format
  - Frequency
  - Source System
  - API/Service/Store Procedure
  - Entitlement Service
  - Consuming System
  - Interface Layout (or) Schema

- Should have provision for exceptional scenarios
- Should have syntax details such as data type, length, mandatory/option, default values, range values etc.
- Error code should be defined for every validation or business rule
- Inputs and outputs should be defined
- Should be backward compatible to earlier datasets
- Data exchange should provide transactional assurance
- Response time and performance characteristics should be defined for data exchange
- The failover scenarios should be identified

**e. Data exchange should be auditable**

Data exchange should abide by all laws on privacy and data protection Security Architecture

This section recommends the proposed security architecture aligning with the overarching architectural principles. The basic tenets of Smart City security architecture are the design controls that protect confidentiality, integrity and availability of information and services for all the stakeholders. A diagrammatic representation of the security framework for the envisaged Smart City system is provided below.




Some of the key security principles are explained below.

**MSI must comply with the Cyber Security Model framework circulated vide Ministry of Urban Development's OM No. K-15016/61/2016-SC-I dated 20th May 2016 and another guidelines issued by MoUHA**

### i. User Security and Monitoring

***Authentication & Authorization***

A strong authentication mechanism should be considered to protect unauthorized access to the Smart City applications. Consider use of at least two of the following forms of authentication mechanism:

- Something you know, such as a password, PIN etc
- Something you have, such as a smart card, hardware / software security token etc
- Something you are, such as a fingerprint, a retinal scan, or other biometric methods

***Levels of Authentication***

Based on the security requirements the following levels of authentication should be evaluated.

- For applications handling sensitive data it is recommended that in the least one factor authentication key in the form of a password is essential. Strong password complexity rules should be enforced to ensure confidentiality and integrity of the data
- For applications handling highly sensitive data it is recommended that two factor authentication mechanisms should be considered. The first line of defence is the password

conforming to the password complexity rules'. Along with the password next user has to provide a one-time password which varies for each session. One time passwords are valid for each session and it is not vulnerable to dictionary, phishing, interception and lots of other attacks. A counter synchronized One-Time Password (OTP) solution could be used for this purpose.

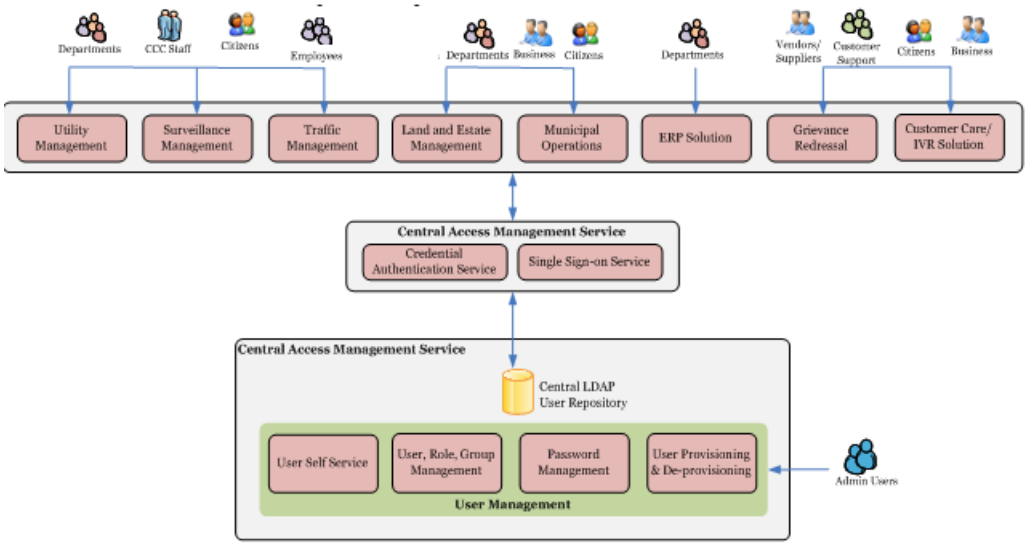
- The solution should not store user passwords, hash of passwords and any pre-shared secret. It should only be a copy of the user credential, which should reside only with the user.

### *Centralized Identity and Access Management Model*

It is recommended to adopt an enterprise level centralized authentication model that is secured and ensures that user has a single credential to access the all the services.

In this model there will a centralized authentication services with provision for centralized user registration and user credential store. A centralized user repository (directory services) for the storage of user credentials will also store the authorization information for the user which will be used in different application.

The proposed centralized Identity and Access Management solution is depicted below –




### *Central Access Management Service*

This service will provide the central authentication service for the users/groups created by verification of the user credentials against the central LDAP user repository. When a user tries to login to any centralized application e.g. single window portal, departmental sub-systems or ERP solution, the user credentials will be validated through the central authentication service.

Single Sign-On service will centrally maintain user session thus preventing user from multiple login when trying to access multiple applications.

### *Central Identity Management Service*

This service will handle user life cycle management and governance that will enable all smart cities to manage the lifespan of the user account from its initial stage of provisioning to the end stage of de-provisioning. Typically user provisioning and de-provisioning is workflow driven that will require approval. The Solution should cover user role discovery and entitlement. Similarly, it should be capable of integrating with privileged user account.

User management service will cover user administrative functionalities like creation, propagation and maintenance of user identity and privileges.

Self Service feature will allow end users (e.g. members) to maintain their user identity account including self-password reset which will significantly reduce helpdesk/admin effort to handle password reset requests.

The central user repository will store the user identity data and deliver it to other services (e.g. central authentication service) for credential verification. Adherence to LDAP v3 standard has been the dominant standard for central user repository

Enforce a robust and strong password policies that will allow users to change/reset password with password expiry and account lockout features, define and implement complex password rules and session timeout policies.

**Authorization**

Authorization of system users should be enforced by access controls. It is recommended to develop access control lists. Consider the following approach for developing access control list -

- Establish groups of users based on similar functions and similar access privilege.
- Identify the owner of each group
- Establish the degree of access to be provided to each group

**ii. Data Security**

***Traditional Structured Enterprise Data***

MSI should protect Integrated Smart City System information against unauthorized access, denial of service, and both intentional and accidental modification. Data security, audit controls and integrity must be ensured across the data life cycle management from creation, accessed, viewed, updated and when deleted (or inactivated). This provides a proactive way to build defences against possible security vulnerabilities and threats, allowing errors to be corrected and system misuse to be minimized.

The implications for adhering to an effective data security and integrity guideline related to the Smart City System are the following –

- Data security policies and standards to be developed and adopted across Smart City applications of all the cities and stakeholders
- Data security controls to be put in place to restrict access to enterprise data based on roles and access privileges. Data audit logs should be maintained for audit trail purposes. Security controls will be able to be reviewed or audited through some qualitative or

quantitative means for traceability and to ensure that risk is being maintained at acceptable levels.

- In order to adequately provide access to secured information, security needs must be identified and developed at the data level, not the application level. Database design must consider and incorporate data integrity requirements.
- Procedures for data sharing need to be established. Data integrity during data synchronization needs to be ensured across the enterprise.
- *Audit Capabilities:* The system provides for a system-wide audit control mechanism that works in conjunction with the RDBMS.
- *Maintaining Date/Time Stamp and User Id:* Every transaction, with a date and time and User ID, is captured. The system allows generating various audit reports for verification.
- *Access Log:* should have extensive inbuilt security and access control mechanisms. Based on this, the system keeps track of the various functions accessed by any users.

***Secure Big Data Environment***

As the Integrated Smart City System will be capturing observation, interaction and monitoring data from various devices (like sensors, scanners, detectors, meters and cameras) and systems (like GIS, social media) on a real-time basis and processing them, it is imperative that the data repository will have the following characteristics - ability to handle large amounts of data, distributed redundant data storage, parallel task processing, extremely fast data insertion, extensible, centralized management and orchestration. This would necessitate considering the corresponding security concerns and countermeasures from a big data perspective.

It is essential to adhere to the following requirements for designing the big data security controls of Smart City system:

- No compromise with the basic functionality of the cluster
- Provision for scalability in line with the cluster
- No compromise with the essential big data characteristics
- Dealing with the security threat to big data environments or data stored within the cluster (refer the table below)

The key security concerns that must be addressed during design process are provided in the table below:

| Technical Area | Security Concern | Description |
|---|---|---|
| Architecture | Distributed nodes to enable massive parallel computation | Difficulty in verifying security consistency across a highly distributed cluster of possibly heterogeneous platforms |
| Architecture | Replication into multiple copies and movement of big data to ensure redundancy and resiliency | Missing the centralized data security model where a single copy of data is wrapped in various protections until it is used for processing |
| Architecture | No built in security within big data stacks except service-level authorization and web proxy capabilities | Big data systems are built on the web services model with very few facilities to counter common web threats and hence vulnerable to well-known attacks |

| Technical Area | Security Concern | Description |
|---|---|---|
| Operation | No built in encryption method to protect data, copied from the cluster and at rest | Provision for encryption of data at rest to guard against attempts to access data outside established application interfaces is not present with most NoSQL variants. Moreover any external encryption tool selected needs to have adequate horizontal scalability and transparency to work with big data. |
| Operation | Lack of built-in facility to provide separation of duties between different administrators across the nodes | Each node in a big data system has at least one administrator with full access to its data. So any direct unwanted access to data files or data node processes can be addressed through a combination of access controls, separation of duties and encryption technologies, which are not available out-of-the-box for big data system. |
| Operation | Introduction of a corrupted node or service into a big data cluster through cloning of a node or exact replica of a client app or service | Big data system like Hadoop uses Kerberos to authenticate users and add-on services to the cluster. But a corrupt client can be inserted onto the network using credentials extracted from virtual image files or snapshots. |
| Operation | No built-in monitoring to detect misuse or block malicious queries | All the available external monitoring tools review data and user requests only at the API layer of the big data system |

The implications for taking into consideration the above security concerns for a big data environment and the related requirements of security controls for the Smart City System are the following -

- Kerberos, already built in the Hadoop infrastructure, has to be set up for validating inter-service communication, helping to keep corrupt nodes and application out of the big data cluster, protecting web control access and making administrative functions harder to compromise.
- File layer encryption needs to be established for consistent protection from credentialed user access and multi-key support across different platforms regardless of OS/platform/storage type, while ensuring that this encryption is transparent to both Hadoop and calling applications and scales out as the cluster grows.
- Key management service needs to be leveraged through dedicated FIPS certified Key Management appliances to distribute keys and certificates, and manage different keys for each group, application and user in order to prevent access of encryption keys to an attacker.
- Validation process for patches, application configuration, machine images, certificates and Hadoop stack must be in place prior to deployment in a multi-node environment.
- Audit Capabilities: The system provides for a system-wide audit control mechanism that works in conjunction with the big data environment.
- Secure Communication: SSL/TLS implementation technique needs to be used for secure communication between two nodes or between a node and an application.
- Logging: Collection and management of event data through logging within the big data cluster has to be ensured in order to keep the records of activity for detecting attacks, diagnosing failures or investigating unusual behaviour.

Additionally for any service based on cloud environment, there are three main security challenges namely multi-tenancy, divided responsibility and dynamic environment. In this context, one of the key concerns for the customers would be protection of sensitive/confidential/personal data through access control, encryption, integrity and origin verification.

In cloud environments, the amount of data at rest, in transit and in use is considerably larger than in traditional networks. So the following technologies should be considered to discover and remedy security vulnerabilities related to integrity protection of data to be used by the IT systems of Smart City. They can be used separately or can complement each other in achieving desired outcome.

- Symmetric cryptography: It utilizes the same shared key to encrypt plain text message from the sender and decrypt cipher text for the recipient, and thus is relatively faster in processing large volume of data.
- Public key infrastructure (PKI): It utilizes public-private key pairs to verify the integrity of data.
- Keyless Signing Infrastructure (KSI): It utilizes data hashes and hash trees for generating and publishing a root hash for the data to be integrity protected. It then verifies the data integrity using signature tokens that enable data verification using the previously published root.

KSI technology does not rely on a single key that could be breached and no key is needed to verify if data matches the root hash. Hence it provides greater efficiency in the context of big data.

**Audit Trail & Audit Log**

Audit trails or audit logs should be maintained. Log information is critical in identifying and tracking threats and compromises to the environment.

There are a number of devices and software that should be logged which include hardware & software based firewalls, web servers, authentication servers, central/domain controllers, database servers, mail servers, file servers, routers, DHCP servers etc.

It is essential to decide what activities and events should be logged. The events which ideally should be captured include

- Create, read, update and delete of confidential information;
- User authentication and authorization activities in the system, granting, modification or revoking of user access rights;
- Network or service configuration changes;
- Application process start up, shutdown or restart, abort, failure or abnormal terminations, failure of network services;
- Detection of suspicious activities such as from Intrusion Detection and Prevention system, anti-virus, anti-spyware systems etc.

**iii. Application Security**

- Smart City system must comply with the Application Security Plan and security guidelines of Government of India as applicable

- Secure coding guidelines should be followed. Secure coding guidelines should include controls against SQL injection, command injection, input validation, cross site scripting, directory traversal, buffer overflows, resource exhaustion attacks etc. OWASP Top 10 standard should be mapped in the secure coding guidelines to cover all major vulnerabilities.
- Validation checks should be incorporated into the application to detect any corruption of information through processing errors or deliberate acts.
- Data output from an application should be validated to ensure that the processing of stored information is correct and appropriate to the circumstances
- Should implement secure error handling practices in the application
- Smart City system should have Role based access, encryption of user credentials. Application level security should be provided through leading practices and standards including the following:
    - Prevent SQL Injection Vulnerabilities for attack on database
    - Prevent XSS Vulnerabilities to extract user name password (Escape All Untrusted Data in HTML Contexts and Use Positive Input Validation)
    - Secure Authentication and Session Management control functionality shall be provided through a Centralize Authentication and Session Management Controls and Protect Session IDs from XSS
    - Prevent Security Misconfiguration Vulnerabilities (Automated scanners shall be used for detecting missing patches, misconfigurations, use of default accounts, unnecessary services, etc. maintain Audits for updates
    - Prevent Insecure Cryptographic Storage Vulnerabilities (by encrypt off-site backups, ensure proper key storage and management to protect keys and passwords, using a strong algorithm)
    - Prevent Failure to Restrict URL Access Vulnerabilities (By providing authentication and authorization for each sensitive page, use role-based authentication and authorization and make authentication and authorization policies configurable
    - Prevent Insufficient Transport Layer Protection Vulnerabilities (enable SSL for all sensitive pages, set the secure flag on all sensitive cookies and secure backend connections
    - Prevent Id Redirects and Forwards Vulnerabilities
    - For effective prevention of SQL injection vulnerabilities, MSI should have monitoring feature of database activity on the network and should have reporting mechanism to restrict or allow the traffic based on defined policies.

**iv. Infrastructure Security**

The following focused initiatives to discover and remedy security vulnerabilities of the IT systems of Smart City should be considered to proactively prevent percolation of any threat vectors -

- Deploy anti-virus software to all workstations and servers to reduce the likelihood of security threats;
- Deploy perimeter security technologies e.g. enterprise firewalls to reduce the likelihood of any security threat;
- Deploy web content filtering solutions to prevent threats from compromised websites to help identify and block potentially risky web pages;

- Install enterprise-level e-mail anti-security software to reduce vulnerability to phishing and other e-mail security spams. This would check both incoming and outgoing messages to ensure that spam messages are not being transmitted if a system becomes compromised.
- Perform periodic scanning of the network to identify system level vulnerabilities
- Establish processes for viewing logs and alerts which are critical to identify and track threats and compromises to the environment. The granularity and level of logging must be configured to meet the security management requirements.
- Deploy technology to actively monitor and manage perimeter and internal information security.
- Deploy Dedicated Network Intrusion Prevention System.
- In case of cloud deployment, cloud services can be disrupted by DDoS attacks or misconfiguration errors which have the potential to cascade across the cloud and disrupt the network, systems and storage hosting the cloud application.
- Deploy security automation techniques like automatic provisioning of firewall policies, privileged accounts, DNS, application identity etc.
- The security solution should support application layer (Layer-7) security & user control platform which should be able to identify & prevent known & unknown threats (in realtime basis) covering the related in-scope applications running on the network as per the scope of RFP. The proposed solution should therefore integrate the user's identity repository (across all entities) to enforce authorized access to the related in-scope applications.
- The security platform should be capable of providing firewall, application control, IPS, Anti-Virus, Anti-malware, content filtering and Anti-bot , URL filtering, DoS prevention functionality in a single appliance and the solution be 360 degree defense security system at the perimeter level, midlevel as well as at the end point level to achieve the complete network security These three layers should ideally talk to each other and integrate to common source of updates

***Physical Security of ICCC Premises***

- MSI will be required to do the physical security arrangements for the ICCC premises during contract period.

- MSI will be required to manage the access cards and access control for ICCC premises during contract period.

- MSI will be required to provide security guards at the ICCC premises during contract period.

- Physical security arrangements should be 24*7, as the operations of ICCC is conceived to be 24*7.

***Network Security for Smart Devices***

The core principles of security for any smart device network rest on the three most important data security concerns of confidentiality, integrity and authentication. Hence the security for smart device networks should primarily focus on the protection of the data itself and network connections between the nodes. From a network perspective, following are to be considered for designing the smart devices network -

- Protection of fair access to communication channels (i.e. media access control)
- Concealing of physical location of the nodes
- Defence against malicious resource consumption, denial of service, node capturing and node injection
- Provision for secure routing to guard the network from the effects of bad nodes
- Protection of the mobile code

Smart devices have a triple role in most networks - data collectors, processors and traffic forwarders for other devices in the network. The typical attacks for which countermeasures are to be defined and implemented are: Radio Jamming, Nodes Reporting Wrong Data, Data Aggregation Attacks and Battery Attacks.

The following guidelines need to be considered for security enhancement of smart devices and their networks:

- Use of IP-based network for smart devices
- Use of Link Layer Security for password-based access control and encryption
- Protection of smart devices nodes behind a firewall for carrying out SSL-based application data transfer and mechanism to avoid distributed DoS attacks
- Public-key-based authentication of individual devices to the network and provisioning them for secure communications
- Conformance of the security solution to the standards of IETF, IEC and IEEE to ensure maximum security and interoperability, with support for the following commonly used protocols at a minimum - IPSec/IKE, SSH and SSL/TLS

### f. Software Development Lifecycle

**Continuous Build and Deployment**

The Ten Smart Cities of Tamil Nadu should be highly modular and parallel development should be carried out for faster execution using industry's best Software Development Lifecycle practices. All application modules within the same technology platform should follow a standardized build and deployment process.

At its core, Continuous Delivery is all about releasing high-quality software to the market faster and with less effort—a simple goal, but one that requires new thinking around the people, processes and technologies driving your application delivery efforts.

It is a mandatory to create, update and maintain all relevant documentation throughout the contract duration. Also it should be ensured that a bug tracking toll is maintained for proper tracking of all bugs fixes as per various tests conducted on the application.

The solution should be able to produce synthetic data. To generate synthetic data, the solution should be able to understand the underlying data model and generate data that follows the existing data model and constraints

The solution should provide an interface for user to raise data requests and dynamically receive the test data

The solution should be capable of producing obfuscated data that logically makes sense and is usable for testing. i.e. data produced must remain meaningful at several levels and retain the context, retain the same type and format, and context of data

The solution should support masking and synthetic data generation for multiple RDBMS and file formats such as XML, CSV, Excel

The solution should have Data Profiling capability to check the data at the source and identify its characteristics and attributes

The solution should allow user to populate reference and seed tables with their own data.

The solution should maintain evidence/logs of obfuscation routines for audit purposes and evidence in case of data- the ability to version and audit rule set - audit the obfuscation process itself

The solution should provide data bulking capabilities to rapidly produce high volume of data sets

The solution should be able to retain the total and average values of a masked column of, either closely or precisely

The solution should provide an interface for user to raise data requests and dynamically receive the test data

### g. Quality Assurance & Audit

A thorough quality check is proposed for the Ten Smart Cities system and its modules, as per standard Software Development Life Cycle (SDLC). MSI is expected to lay down a robust Quality Assurance program for testing of the developed application for its functionality, performance and security before putting in production environment. The program must include an overall plan for testing and acceptance of system, in which specific methods and steps should be clearly indicated and approved by TUFIDCO. MSI is required to incorporate all suggestions / feedback provided after the elaborate testing of the system, within a pre-defined, mutually agreed timeline. MSI must undertake the following:

- The solution should create on its own, Virtual Services through Recording of pre-production message traffic, WSDLs, PCAP, sample messages and from scratch
- The solution should be able to associate multiple responses with a single request, such as used in messaging-based service interfaces
- The solution should Automatically provide "meta" or default transaction responses for un-recorded data
- The solution should Normalize request/response data to XML for easy editing
- The solution should have the ability to save recording sessions for subsequent re-use
- The solution should be able extract inbound request arguments for lookup or computation
- The solution should be able to use Excel lookup values and database lookup values to dynamically populate Virtual Service outbound response(s)
- The solution should be able to model logical constructs and conditions(if-then-else, do while etc)
- The solution should have Ability to add dynamic behaviour

- The solution should allow virtual services to have realistic response times based on recordings and modeling. It should allow user to apply adjustable think time scale % across response times
- The solution should be able to deploy Virtual Services directly from graphical modelling environment.
- The solution should allow user to configure threading for scalability, performance and concurrent capacity handling.
- The solution should support transport protocols for standards-based services (HTTP/S, JMS, CICS, DRDA, CTG, MQ, TCP, Java)
- The solution should provide web based dashboard for managing the virtual services, track virtual service metrics, transactions and inspection of virtual service logs
- The solution should provide graphical modelling and wizard based user interface.
- The solution should provide integration mechanisms for ALM products (Continuous Integration, Source Control, Test Management, etc…)
- The solution should allow execution of virtual services in pass-through mode and dynamic mode.

- .

**i. Automated Testing**

MSI is expected to perform automated testing with following features:

- Should support multi-layer test scenarios with a single solution.
- Should support and execute testing on GUI and UI-Less (standard Web Services, non-SOAP Web Services, such as REST, etc.) Components.
- Should allow version control of tests and test assets providing ability to compare versions and identify changes.
- Should allow centralized storage and management of tests and test assets including external resources used by tests.
- Should have an IDE environment for QA engineers which should be configurable.
- Should provide local system monitoring to test and validate performance issues including memory leakage, CPU overload and network overload to determine if specific business scenarios exceed desired performance thresholds.
- Should provide Auto-documentation while creating of automated tests.
- Should generate reports that can diagnose defects and can be exported to (PDF, XML , Html) (mandatory) and doc (optional) formats.
- Report with summary data, pie charts and statistics for both the current and previous runs needs to be provided.
- Should enable thorough validation of applications through a full complement of checkpoints such as GUI object, database, XML, XPath, etc.
- Should provide Unicode support for multilingual application testing.
- Should be able to record the test Execution into a video file for viewing later.
- Should provide facility to parameterize tests to generate/assign test case output values automatically during runtime.

**ii. Performance and Load Testing**

MSI is expected to implement performance and load testing with following features:

- Testing workload profiles and test scenarios based on the various functional requirements should be defined. Application as well as system resource utilization parameters that need to be monitored and captured for each run also needs to be defined.
- MSI should perform the load testing of Smart City systems for multiple workload profiles, multiple scenarios, and user loads to handle the envisaged users of the system.
- Different activities before load testing i.e. identification of work load profiles, scenarios, information capturing report formats, creation of testing scripts, infrastructure detailing and workload profile should be prepared before the start of actual load testing exercise.
- Solution parameters needs to be tuned based on the analysis of the load testing reports. The tuning process could be iterative until the issues are closed. Multiple load runs needs to be executed for users to simulate different scenarios, such as peak load (year end, quarter end, etc.), load generation within the LAN, Load generation across WAN or mobile network simulator while introducing configurable latency/jitter/packet loss etc.
- Should eliminate manual data manipulation and enable ease of creating data-driven tests.
- Should provide capability to emulate true concurrent transactions.
- Should identify root cause of performance issues at application or code level. Include code performance analysis to quickly pinpoint component-level bottlenecks: Slowest classes and methods, most frequently called methods, most costly (aggregate time spent for each method), response time variance etc.
- Should allow selection of different network bandwidth such as analog modems, ISDN, DSL, or custom bandwidth.
- Should correlate response times and system performance metrics to provide quick insights in to root cause of performance issues.
- Reports on following parameters (but not limited to) such as transaction response time, transaction per second (Passed), user interface rendering time, transaction per second (Failed), web transaction breakdown graphs, hits per second, throughput, HTTP responses per Second, pages downloaded per second, system infrastructure performance metrics etc.
- Should provide End-to-End system performance analysis based on defined SLAs. Should monitor resource utilization including memory leakage, CPU overload and network overload. Should have the ability to split end-to-end response time for Network & Server(s) and provide drill-down capability to identify and isolate bottlenecks.

### iii. Audits & Inspections

MSI is expected to perform the following activities for overall ICCC Audits & Inspections organized by TUFIDCO or its authorized agency:

- Should provide necessary information at the time of such activities
- Should provide necessary environment and access to the authorized personal for conducting such activities
- Should provide necessary evidences for Audits (if asked by the auditor / inspector) at the time of such activities.

## 1.3 Integration Platform and Edge Computing

As per Smart City proposals and plans of various smart cities, there are plans to implement multiple smart initiatives across cities. All these initiatives / applications can be with multiple technologies and will be required to be integrated with ICCC applications over time to come. In order to do so, we require a robust integration layer which will help in seamless integration of various applications with City Command Center Application.

This integration platform may be part of the Command Center Application suite or as a separate layer.

Following are a few key features required for this layer:

| | |
|---|---|
| 1 | Integration platform should support adapters base framework mechanism to enable efficient integration |
| 2 | Integration platform should have built in caching technologies to enable Service Result Caching will dramatic improvement in performance and high availability through cached service results. |
| 3 | Should provide integration debugger to enable set break points, change variables while debugging, view payloads (XML/non-XML) |
| 4 | Integration Platform from Orchestration perspective - Should support standard like BPEL 2.0 and similar latest standards to provide additional support to command control application platform. |
| 5 | Platform should provide Encrypt inbound and Decrypt outbound data based on sensitivity of the data |

This integration layer

- Should support API based integration with multiple applications hosted on various technologies
- Should support various GIS based platforms
- Should support sensor / device level integration

Integration are required for only identified data points of various application. These data points will be defined in consultation with City SPVs at the time of integration of any specific application.

This Integration layer will also help in defining the type of data to be stored on the cloud, also the data will be pulled from any application based on user query or requirement. MSI will be required to define such data sets at the time of integration.

Edge computing is envisaged for managing the applications at local level as well as define the type of data to be stored in Cache, local storage and cloud.

Edge computing will also help in local Analytics at City level and is able to do basic in line Edge based analytics at City level to enable emergency response and also function as a layer which may work independently with basic data and limited functionality. In eventuality of break of services from cloud due to things like link failure and store data for 24 hours.

Edge computing device may be required for integration layer at each city ICCC.

Some of the City specific Integration requirements are provided in the annexures.

### 1.4 DBMS for Command Center Application

Database platform would be very high transactional database platform, the database platform would be required for analytics and predictions.

The database platform must be scalable, highly available, secure and robust. Also able to store and process various data types.

| | |
|---|---|
| 1 | The database platform should provide dynamic scalability, so as additional resources (i.e. nodes) can be added horizontally in the database cluster without any downtime. |
| 2 | Database should provide row level security based on the user. |
| 3 | Database provide transparent to application data encryption capabilities at the tables, columns, storage levels and should able to encrypt backups and the information over the network. |
| 4 | For database tier should blocks unauthorized SQL traffic before it reaches the database transactions. Also Should the system should prevents from sql injections, sql bypass and provide a secured layer for multiple databases. Able to provide Policy based auditing, sql analysis accurately where to substitute, entry in log, generate an alert, allow or block. |
| 5 | For data security, database should provide access (of transactions tables) through the application only. It should restrict system users, DBA or any privileged user accessing the operational/transactional information through SQL Language / tools like Toad etc., using direct connection. |
| 6 | For data archival and data management database should support partitioning at table level on various criteria like list, range, and composite and dynamic periodic partitioning. |

### 1.5 EMS (Enterprise Monitoring System)

The Monitoring system should be able to provide automated consolidated SLA reports for all the SLAs as mentioned in this RFP including real time status of various service levels achieved. The report to be available through a centralised web access / dash board the access for this to be given to specified users (minimum 10 users) of City SPV.

- MSI will implement dedicated EMS solution to meet the SLA monitoring and other requirements as mentioned in the RFP. The implemented EMS solution to help TUFIDCO in data driven decision making. In case the MSI uses any OEM product(s), the implementation should be as per best practices of the OEM. City SPV may engage STQC/other independent auditors for validating the deployment of EMS facilities as per

RFP requirements, specially their capabilities for measuring and reporting SLAs & KPIs as defined in RFP. The entire EMS implementation shall be certified by the MSI also for its correctness, adequacy to meet RFP requirements and measurement of SLAs & KPIs etc. Helpdesk System

- Application Performance Management

Proposed EMS Solution shall be based on industry standard best practice framework such as ITIL etc.

### 1.5.1 **SLA & Contract management System**

The SLA & Contract Management solution should enable the City SPVs to capture all the System based SLAs defined in this Tender and then calculate monthly (or for any duration) penalty automatically. Measuring service performance requires incorporation of a wide variety of data sources of the ICCC project. The SLA solution should support the collection data from various sources in order to calculate Uptime / Performance / Security SLAs. Various features required in this component to EMS are -

- It must be a centralized monitoring solution for all IT assets (including servers, network equipment etc.)
- The solution must have integrated dashboard providing view of non performing components / issues with related to service on any active components
- The solution must follow governance, compliance and content validations to improve standardisation of service level contracts
- Application should be pre-configured so as to allow the users to generate timely reports on the SLAs on various parameters.
- The solution must support Service Level Agreements & Lifecycle Management including Version Control, Status Control, Effectively and audit Trail to ensure accountability for the project.
- The solution must have the ability to define and calculate key performance indicators from an End to End Business Service delivery perspective related to ICCC Project under discussion.
- The solution should support requirements of the auditors requiring technical audit of the whole system which MSI should allow the auditors to access the system.
- The solution most have an integrated dashboard, view of Contract Parties & current SLA delivery levels and view of Services & current SLA performance
- The solution should support SLA Alerts escalation and approval process.

- Solution should support effective root-cause analysis, support capabilities for investigating the root causes of failed service levels and must make it possible to find the underlying events that cause the service level contract to fail.

- Accept Data from a variety of formats.

- Support for Defining and Calculating service Credit and Penalty based on clauses in SLAs.

### 1.5.2 **Reporting**

- Ability to generate reports on penalty and credit due, to check on non-compliance of SLAs for the Cloud based DC & DR and each city ICCC.

- Monetary penalties to be levied for non-compliance of SLA, thus the system must provide Service Level Performance Report over time, contract, service and more.

- The solution should provide historical and concurrent service level reports for the surveillance project in order to ensure accountability of the service provider's performance

- Automatic Report creation, execution and Scheduling, must support variety of export formats including Microsoft Word, CSV, Adobe PDF etc.

- The solution must support Templates for report generation, Report Filtering and Consolidation and Context sensitive Drill-down on specific report data to drive standardisation and governance of the Cloud based DC & DR and each city ICCC

- The solution must support security for drill-down capabilities in dashboard reports ensuring visibility for only relevant personnel of the Cloud based DC & DR and each city ICCC.

- Support real-time reports (like at-a-glance status) as well as historical analysis reports (like Trend, Capacity planning reports etc.)

    - Resource utilisation exceeding or below customer-defined limits

    - Resource utilisation exceeding or below predefined threshold limits

An indicative List of SLAs that need to be measured centrally by SLA contract management system are given in the Tender Document. These SLAs must be represented using appropriate customisable reports to ensure overall service delivery.

- The ICCC should allow users to define benchmarks against performance parameters. Performance reports shall have the option to generate reports with or without benchmark comparison.

- The ICCC should provide facility to trigger a corrective action workflow and define the stakeholders for the same.

### 1.5.3 City ICCC Helpdesk System

- The proposed helpdesk solution must provide flexibility of logging, viewing, updating and closing incident manually via web interface for issues related to the project.
- Helpdesk system should provide incident management, problem management templates along with helpdesk SLA system for tracking SLA's pertaining to incident resolution time for priority / non-priority incidents.
- The proposed helpdesk solution must have a built-in workflow engine to define escalations or tasks to be carried out after issues or change order are logged pertaining to project.
- Centralized Helpdesk System should have integration with Network/Server Monitoring Systems so that the Helpdesk Operators can to associate alarms with Service Desk tickets to help surveillance operators that for what particular alarms corresponding helpdesk tickets got logged.
- Network admin should be able to manually create tickets through Fault Management GUI.
- System should also automatically create tickets based on alarm type

System should provide a link to directly launch a Service Desk view of a particular ticket created by alarm from within the Network Operation console.

MSI is required to access and plan the location of help desk in MP. Single help desk will have dedicated agents for each city as per manpower requirements defined in this RFP.

Centralized helpdesk for DC and DR is defined in cloud specifications.

### 1.5.4 Application Performance Management

- The proposed solution must provide a module for secure administrator control, monitor and record privileged sessions including RDP, SSH, Telnet, HTTP/HTTPS, AS400, Mainframe, etc. in single module.
- The security module must be able to prevent leap frog attempts, session continuous recording & no ideal session time out.
- The proposed module must offer in various forms: appliance-based, virtual appliance based.
- The proposed module must allow defining roles or groups for user management. Roles should be customizable and pre-defined in system.
- The proposed module should be able to support text searching for SSH sessions.

- The proposed module should provide the capability to manage EMS application credential together with access control and password management all within a single hardened platform.

### 1.5.5 User Experience Monitoring

- The proposed solution should measure the end users' experiences based on transactions without the need to install agents on user desktops.
- Solution shall work based on the passive listening of the network traffic to and from the Web servers, and analyzes the transactions without affecting the performance or availability of the IT infrastructure in any way.
- The proposed system must be able to detect user impacting defects and anomalies and reports them in real-time:
  - Slow Response Time
  - Fast Response time
  - Low Throughput
  - Partial Response
  - Missing component within transaction
- The proposed solution should be capable of identifying the problem domain (browser, network or application) thereby it should monitor the browser side metrics and provide reports in real time for:
  - DOM Construction Time (ms)
  - Page Load Time (ms)
  - Previous page unload time (ms)
  - Browser Render Time (ms) –
  - Page Roundtrip Time (ms) -
  - Responses Per Interval (browser activity)
- The proposed system must be able to pro-actively determine exactly which real users were impacted by transaction defects, their location and status.
- The proposed system must be able to provide the ability to create user groups based on application criteria or location and link user ids to user names and user groups.
- The proposed system must be able to provide user usage analysis and show how user's success rate, average time and transaction count has changed over a specific period of time such as current week versus previous week.
- The proposed system must be able to provide the ability to detect and alert when users experience HTTP error codes such as 404 errors or errors coming from the web application.
- The proposed system must be able to provide root-cause probability graphs for performance problems showing the most probable root-cause area within application infrastructure.
- The proposed system must allow for following SLA monitoring at:
  - Transactional level
  - Business Process level
  - User and User group level
- Solution shall be able to monitor customer transaction by end-user name, and thus able to understand exactly which customers were impacted, their location, type of browser used etc.

- Solution must be able to provide the ability to create user groups based on location/geographic area.
- Solution must have ability to create user groups based on URL string, cookie value, XML attribute, IP Addresses or HTTP header
- Solution must be able to extract data from Http request header and body to assist in identifying transactions or extract user, session and other parameters.

### 1.5.6 **Application Fault Diagnostics**

- The proposed solution must simplify complex app topologies through task–relevant views based on attributes such as location, business unit, application component etc.
- The proposed solution must speed up the process of triage by showing the impact of change, thus enabling to easily locate where performance problems originate.
- The proposed solution must provide the timeline view which enables to examine the relationship map and dashboard for historic time frames and roll back time to the point when application first started experiencing symptoms.
- The proposed solution must help to quickly recognize problems and intuitively understand the most critical and recurrent problems.
- The proposed solution should provide the flexibility of collecting deep-dive diagnostics data for the transactions that matter for triage as opposed to collecting deep-dive data for every transaction.
- The proposed solution should detect performance hotspots in the applications.
- The proposed solution should have the mechanism for automatic entry point detection that allows quick monitoring and triage Java applications without manual configuration.
- The proposed solution must provide browser web timings for dynamic web pages in structured frameworks, such as AJAX and AngularJS.
- The proposed solution must provide metric aggregation by browser type.
- The proposed solution must provide integration into APM transaction traces with a breakdown of framework calls to an application.
- The proposed solution should provide installation through the APM Java agent servlet tracer for easy deployment.
- The proposed solution should provide Browser Response Time Metrics such as Page Load, AJAX, JavaScript Function.
- The proposed solution should monitor the performance of HTTP requests made by the Java applications, such as REST, using:
    - Java URLConnection
    - Apache HTTPClient
    - Spring HTTPClient
- The proposed solution must monitor and report on the methods and URLs used by REST applications and correlate REST client and REST server transactions, as well as show these interactions into the triage map.
- The proposed solution must support SSO-SAML method for secure and standard means of APM authentication which communicates with external services to authenticate a user when logging in.
- The proposed solution must provide tight integration with Mobile Analytics solution to provide end-to-end business transaction monitoring from mobile-through-middleware-to-mainframe.

- The proposed solution should provide the capability to manage the agent's configuration via a central hub thereby eliminating the administrative overhead to manage the Agents in a manual, decentralized manner. It should provide user-friendly dashboard to enable users to access an inventory of thousands of agents across multiple APM clusters in one view so that they can more quickly generate diagnostic reports and diagnose agent configuration problems.
- The proposed solution must determine if the root cause of performance issues is inside the monitored application, in connected back-end systems or at the network layer from a single console view.
- The proposed solution must proactively monitor 100%of real user transactions; detect failed transactions; gather evidence necessary for triage and diagnosis of problems that affect user experiences and prevent completion of critical business processes.
- The proposed solution must provide deeper end-to-end transaction visibility by monitoring at a transactional level and without deploying any software at end user desktop.
- The proposed solution must provide a single view that shows entire end-to-end real user transaction and breaks down times spent within the application components, SQL statements, backend systems and external 3rd party systems.
- The proposed solution must be able to provide root-cause probability graphs for performance problems showing the most probable root-cause area within application infrastructure.
- The proposed solution must support any combination of operating platforms that support JDKs higher than 1.7 or .NET v4.5 with a single methodology.
- The proposed solution must provide real-time performance metrics for leading application servers including IBM WebSphere, BEA WebLogic, and all respective JVMs (or .NET v4.5 and above on Windows).
- The proposed solution must be able to detect production Memory Leaks from mishandled Java Collections and Sets and isolate exact component creating leaking Collection or Set (or .NET Memory Leaks within the CLR).
- The proposed solution must have ability to report on non-java or non-.NET measurements (i.e. CPU-Utilization, Disk Space, processes etc.) to the same management console in order to correlate with application metric Data.
- As a means of detecting poorly performing SQL, the solution must be able to proactively record all SQL calls, and report on the slow performing ones. The SQL measurements must be made from within the monitored application – not using an external database agent.
- The proposed solution must tie SQL statements to components involved, i.e. SQL queries should be able to get correlated to the Java components calling them. This should be clearly visible by showing the transaction call stack ("Blame stack").
- The proposed solution must monitor performance of all stored procedures being executed from within the Java/.NET application.
- The proposed solution must have integrated ability to store historical performance data without requiring external database to be configured for any length of time.
- The proposed solution must provide ability to monitor performance of applications up to the method level of execution (Java/.Net method) 24x7 in production environments with negligible impact on monitored application.

- The proposed solution must provide ability to monitor performance of Java/.Net methods based on simple parameters (Strings, Numbers) passed to the methods 24x7 in production environments with negligible impact on monitored application
- The proposed solution must not necessitate any changes to application source code.
- The proposed solution must provide for dynamic instrumentation of application code, i.e. enhance be able out of the box monitoring with extra monitoring definitions without having to restart application.
- The proposed solution must include auto-base lining concept, learning about the application over time and report automatically report any anomalies.
- The proposed solution must monitor individual web service and performance transaction debugging for web services.
- The proposed solution must monitor web services across multiple processes (cross JVM tracing)
- The proposed solution must provide ability to monitor performance of PHP based applications up to the method level of execution 24x7 in production environments with negligible impact on monitored application.
- The PHP Agent must have the below features:
  - Automatic Frontend Detection and Monitoring
  - Deep Transaction Trace Visibility
  - Custom Instrumentation of the Frontend Marker, BlamePoint Tracer and Backend Marker
- The proposed solution should provide the capability to automatically collect transaction traces when a problem occurs, so that there is no need to re-create the issue. It should further provide stall snapshots with deep call stack visibility that shows actionable information and trigger traces based upon customized criteria, errors and stalls
- The proposed solution should have the provision to support Java 8.
- The proposed solution must provide support for Node.JS
- The proposed solution must provide support for MongoDB apart from other popular databases like Oracle, SQL Server etc.

### 1.6 Additional System Security Requirements

Below given specifications are indicative, MSI may propose a different solution meeting the functional and SLA requirements of this RFP

| **Web Single Sign On** | |
|---|---|
| 1 | System Architecture |
| 1.1 | The Web Single Sign-On & Access Management Security Server shall be a multi-tier implementation |
| 1.2 | The Access Management Security Server shall provide key security decision-making operations. It should be high-performance server, providing load balancing, failover, and caching for superior reliability and speed. |
| 1.3 | The Access Management Security Server shall provide shared services: authentication, authorization, administration, health-monitoring and auditing. |

| | |
|---|---|
| 1.4 | It is essential that the solution can be extended to support web services security and identity federation |
| 1.5 | The solution shall support reverse proxy environments, in line with good security practice and performance. |
| 1.6 | The solution shall support IPv6 interface. |
| 1.7 | In the event when SSO becomes unavailable, Solution should allow applications to revert to its own login mechanism without any code change. |
| | |
| **Authentication** | |
| 2.1 | The solution shall provide out-of-the-box integration to the following directories for authentication |
| | a. Active Directory |
| | b. LDAP Directory |
| | c. ODBC DB |
| | d. RADIUS Server |
| 2.2 | The solution shall have the ability to provide connection to multiple user stores for single server implementation with many web application servers. |
| 2.3 | The solution shall support strong (two-factor) authentication technologies at least with the following: |
| | a. Smart Card |
| | b. Dynamic/One Time Password |
| | c. Biometric devices |
| | d. Two-Factor Token |
| | e. Digital Certificates |
| 2.4 | All sign-on attempts shall be logged. |
| 2.5 | After a site-specified number of failed sign-on attempts, the system shall ensure all future primary sign-on attempts be unconditionally rejected. |
| 2.6 | The solution shall have the provision to support customized authentication mechanisms. The solution shall provide an Authentication API in Java, which can be used to develop plug-in authentication modules to the policy server. This API can be used to define new authentication schemes as well as custom implementations of known authentication schemes. |
| 2.7 | The solution shall offer a credential collector that accepts additional authentication fields. This will better the alignment of the solution with the business organization of the client. |
| 2.8 | The solution shall offer a parameterized authentication scheme, accepting additional authentication fields provided by the credential collector, or any runtime configuration options. |
| 2.9 | The solution shall offer HTML form authentication over SSL. This form will be capable of client-side scripting. |
| 2.10 | The system must support |
| | a. Force change password first logon |
| | b. Change password when user need |
| | c. Password expiration |

| | |
|---|---|
| | d. Maximum and minimum length of password |
| | e. Disable user account when 3 consecutive failures to perform logon |
| | f. Restricted password (Directory word, similar to user id) |
| 2.11 | The solution shall support protection or assurance levels. Each authentication method shall be associated with a particular level, ranging from 1 (lowest priority) to 1000 (highest priority). When a user accesses a resource, the authentication method priority is compared with the authentication method priority level that was used to authenticate the user. If the level of the current method is higher than the level used to authenticate the user, then the user must re-authenticate using the new resource's associated method. If the user has already been authenticated at a higher level, no re-authentication is required. |
| 2.12 | The solution shall enable users to select the type of authentication credentials necessary to access protected resources. This can be used to solve a use case where the user is given a choice of different credentials to obtain different levels of access. |
| 2.13 | The solution shall support Integrated Windows Authentication (IWA). The solution shall be able leverage IWA to secure protected web resources by processing user credentials obtained by the Microsoft IWA infrastructure. |
| | |
| **Integration** | |
| 4.1 | The solution shall provide integration to provisioning products from the same vendor. |
| 4.2 | The solution shall support integration to various security repositories (eg. Active Directory, LDAP, Database, etc) to achieve Single Sign-On. |
| 4.3 | The solution client shall have a web interface for administration. |
| 4.4 | The solution shall provide tight integration to leading web servers via open standard specifications. |
| 4.5 | The solution shall offer a Java application programming interface. This interface will expose mechanisms for authentication and authorization. |
| 4.6 | The solution shall offer directory access to user attributes. These attributes will be available via the application programming interface, independent of directory architecture and type. |
| 4.7 | The solution should protect home-grown and/or third-party applications. |
| 4.8 | The solution should provide single sign-on to cloud-based applications via open standards (eg.; SAML) |
| | |
| **Robustness** | |
| 5.1 | The solution shall provide reliability, availability and scalability to achieve high levels of performance. |
| 5.2 | The solution shall have tools for performance testing. |
| 5.3 | The solution shall provide fail-over and high availability features for the server components to any potential failure and prevent user logging in the target applications. |

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| 5.4 | The solution shall provide dynamic load balancing allowing higher levels of processing loads to get allocated to faster servers within the cluster. More effective load balancing increases maximum system throughput because the requests get served by the policy server that can provide the fastest response at any given time. |
| 5.5 | The solution should support automatic failover with 2 or more servers in a cluster for high redundancy. When the number of available servers in cluster falls below the criteria, the requests will be automatically sent to another cluster without interrupting service. |
| 5.6 | The solution shall provide several caches that can be configured to maintain copies of recently accessed data (for example, user authorizations and sessions) to improve system performance. |
| 5.7 | The solution should meet the most demanding enterprise requirements through dynamic load balancing, fully tunable caching, replication, and automatic failover. |
| | |
| **Encryption and Information Protection** | |
| 6.1 | The communication protocol between the workstation and the web access management server shall be secured. All internal and external communications should be encrypted. |
| 6.2 | The data stream between the Agent (application & web server agent) and the web access management server shall be secured. |
| 6.3 | The solution shall have the capability to provide an end-to-end protection mechanism. |
| 6.4 | The encryption keys shall be managed by the system and shall be protected. |
| 6.5 | Encryption keys shall be rolled over automatically and all key management can be scheduled and automated. |
| 6.6 | The solution shall support both encryption and digital signing for the communication between the Identity Provider and Service Provider sites. |
| | |
| **Authorization and Access Control** | |
| 7.1 | The solution shall provide a flexible access control features to authorize users by resource, time, IP address and subnet. It shall support the use of wildcards while in the definition of authorization policies for resources, for example, defining a rule for all URL resources. |
| 7.2 | The solution shall provide the facility to explicitly deny access to a web resource. |
| 7.3 | The solution should allow the administrator to configure a rule to fire based on specific authentication or authorization events. For example, when an authorization fails, a rule can be triggered that redirects the user to customized web page informing the user of the authorization failure. |
| 7.4 | The solution shall allow the definition of sophisticated and powerful security policies. It shall allow data from a variety of sources, such as web pages, directories, or databases, to be dynamically included in the authorization decision in real time. Sources of data include static |

| | |
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| | variables, user attributes, request context variables, HTTP POST variables or web services variables. |
| 7.5 | The solution shall allow the administrator to configure an active rule, which authorizes users based on dynamic data obtained from external business logic. The solution shall be able to invoke a function in a supplied shared library. |
| 7.6 | The solution shall support idle timeout. The solution shall allow administrators to set an idle session timeout. With this setting, the solution shall force users to re-authenticate if they exceed [X] minutes of inactivity. Idle timeouts are not global, but rather can be set on a resource by resource basis. In addition, administrators shall be able to enforce specific maximum idle timeout by individual and/or groups via http header variables. |
| 7.7 | The support session timeout features. The solution shall allow administrators to set a maximum session time limit. With this setting, the solution will force users to re-authenticate if they exceed a specified length of session based on the time that the users are authenticated. Session timeouts are not global, rather can be set on a resource by resource basis. In addition, administrators shall be able to enforce specific maximum idle timeout by individual and/or groups via http header variables. |
| | |

# 1. Annexure 2-Technical Specifications (Integrated Command and Control Center (ICCC)

Below given Technical Specification provided under are indicative for ICCC and its local server room. Bidder are required to carefully examine the requirements and may propose technical specification / design as per their solution to meet the objective of RFP.

MSI needs do its due diligence and finalize Bill of Material (BoM) for each city at the time of implementation. This finalized BoM should be submitted by MSI to city SPV for approval. This approved BoM will become the base document for future payments to MSI.

MSI will be required to do the installation as per the approved BoM.

MSI will be required to submit design documents (as defined in earlier sections of the RFP) to City SPV for approval based on the approved BoM.

Further detailing of some of the technical and functional specifications are provided in annexure 12.

## 1.1 Multi-Function Laser Printer

| # | Parameter | Minimum Specifications |
|---|---|---|
| 1. | Technology | Laser |
| 2. | Monthly duty cycle/RMPV (pages) | 200,000/5K-20K |
| 3. | Print speed – simplex (A4) | Up to 41 ppm |
| 4. | Scan speed – Black/Color simplex | Up to 50/30 ipm |
| 5. | Scan speed – Black/Color duplex | Up to19/14 ipm |
| 6. | Scan-to destinations | Email, Network folder, USB |
| 7. | Processor (MHz) | 600 |
| 8. | Memory (MB) | 1,024 |
| 9. | Hard disk drive (HDD)/Capacity (GB) | Yes/240 |
| 10. | Connectivity | 2 Hi-Speed USB 2.0; 1 Gigabit Ethernet 10/100/1000T network |
| 11. | Print resolution – Max/Best print quality (dpi) | Up to 1200x1200 |
| 12. | Input capacity – Std/Max (sheets) | 600/4,600 |
| 13. | Output size – Min/ Max (mm) | 76.2 x127/312x469.9 |
| 14. | Automatic duplex | Yes |
| 15. | Energy Efficiency | BEE or Energy Star certified |
| 16. | Control panel display | 20 m touchscreen |

**2.2 Laser Printer**

| # | Parameter | Minimum Specifications |
|---|---|---|
| 1. | Print speed black (normal, A4) | Up to 25 ppm |
| 2. | Print quality black (best): | Up to 1200 x 1200 dpi |
| 3. | Print technology : | Monochrome Laser |
| 4. | Duty cycle (monthly, A4) | Up to 15,000 pages |
| 5. | Recommended monthly page | volume 250 to 2000 |
| 6. | Standard memory: | Minimum 128 MB |
| 7. | Processor speed: | Minimum 700 MHz |
| 8. | Paper handling standard/input | Up to 250-sheet input tray |
| 9. | Paper handling standard/output | Up to 150-sheet output bin |
| 10. | Media sizes supported | A4, A5, A6, B5, postcard |
| 11. | Media types supported | Paper, transparencies, postcards, envelopes, labels |
| 12. | Standard connectivity | Hi-Speed USB 2.0 port with USB data cable, Ethernet with RJ45 connectivity |
| 13. | Duplex printing | Automatic (standard) |
| 14. | Compatible operating systems | Microsoft Windows 7 Professional(64bit), Windows 8 Pro(64 bit), Windows 8.1, Windows 10, Server 2008 R2, Server 2012 R2, MAC OS 9.0, MAC OS X, Linux |
| 15. | Power requirements: | Input voltage 220 to 240 VAC (+/- 10%), 50 Hz (+/- 2 Hz); |
| 16. | Power consumption during printing | Less than 500W |
| 17. | Energy Efficiency | BEE or Energy Star certified |
| 18. | Front operating Panel | Graphical LCD display |

**h. Video Wall**

The minimal specifications of video wall cubes are as below -

- Video wall: 55" inches LED, The native resolution of each LED should be 1920 X 1080 pixels (Full HD) and should offer min 16.7 million colors.
- The contrast shall be 1500:1 or higher.
- The Aspect Ratio of each of projection module should be 16:9.
- The screen should have front accessibility and adjustable low inter screen gap < 1 mm to give seamless viewing experience.
- Video Wall Controller:
    - Should be based on server architecture, operating system should be windows 7 or higher, 64 bit
    - RAM 16GB, HDD 500 GB, Dual redundant power supply,
    - 24 DP/ DVI outputs to the cube
    - 6 DVI Input , Dual LAN
    - 19 Inch rack mountable
    - Capable to display image from UNIX, LINUX system
    - Software should be provided to manage video wall content

### i. Workstations (Desktop Computer)

| # | Parameter | Minimum Specifications |
|---|---|---|
| 1. | Processor | Latest generation 64bit X86 Quad core processor(3Ghz) or better |
| 2. | Chipset | Latest series 64bit Chipset |
| 3. | Motherboard | OEM Motherboard |
| 4. | RAM | Minimum 8 GB DDR3 Memory @ 1600 Mhz. Slots should be free for future upgrade |
| 5. | Graphics card | Minimum Graphics card with 2 GB video memory (non-shared) |
| 6. | HDD | 2 TB SATA-3 Hard drive @7200 rpm |
| 7. | Media Drive | NO CD / DVD Drive |
| 8. | Network interface | 10/100/1000 Mbps autosensing on board integrated RJ-45 Ethernet port. |
| 9. | Audio | Line/Mic IN, Line-out/Spr Out (3.5 mm) |
| 10. | Ports | Minimum 6 USB ports (out of that 2 in front) |
| 11. | Keyboard | 104 keys minimum OEM keyboard |
| 12. | Mouse | 2 button optical scroll mouse (USB) |
| 13. | Monitor | Min. 22" (*or 21.5"*) TFT LED monitor, Minimum 1920 x1080 resolution, 5 ms or better response time, TCO 05 (or higher) certified<br>For Command Control Centers : 2 LED Monitors *attached to the same workstation (multi monitor)* |
| 14. | Certification | Energy star 5.0/BEE star certified |
| 15. | Operating System | 64 bit pre-loaded OS with recovery disc |
| 16. | Security | BIOS controlled electro-mechanical internal chassis lock for the system. |
| 17. | Antivirus feature | Advanced antivirus, antispyware, desktop firewall, intrusion prevention (comprising of a single, deployable agent) which can be managed by a central server. (Support, updates, patches and errata for the entire contract/ project period) |
| 18. | Power supply | SMPS;- Power supply should be 90% efficient with EPEAT Gold certification for the system. |

### j. IP PABX System

| # | Description | Parameter |
|---|---|---|
| 1. | Technology | PCM-TDM , IP, Non-blocking |

| # | Description | Parameter |
|---|---|---|
| 2. | Interface | Should support all telecom interfaces in Indian Telecom Service provider offerings |
| 3. | Type of Interface | ISDN interface for digital, basic interface for Analog lines |
| 4. | No. of lines - ,ISDN PRI lines & Analog / Digital Extensions | 1 PRI from BSNL, 32 Extensions ( IP / Analog / Digital ) |
| 5. | Type of Extension Support | Analog , Digital and IP |
| 6. | Expansion of Extensions | Multiples of 8 / 16 |
| 7. | Run Distance | Not less than 800 mtrs. on 0.5mm dia. Cable |
| 8. | Max. Loop resistance for analog trunk lines Extensions | 2500 ohms including telephone |
| 9. | Requirement at the time of supply | 01 ISDN PRI, 24 Analog Ports & 8 Digital extension ports.. Expected to handle at least 30 external lines. |
| 10. | Contact center Expansion available (Max. capacity) | It must support at least 16 Call center Agents |
| 11. | Max. loop resistance for analog trunk lines | 1200 ohms at –48 Volts DC |
| 12. | Other | • ISDN supplementary services for Digital phone<br>• Support for digital trunk lines<br>• Working on 230v AC mains and DC voltage<br>• Support for ACD call center with CTI and advanced call routing |
| 13. | Design of EPABX System | Modular with universal slots, wall mountable |
| 14. | Conferencing | 5 party conferencing to be provided (to be configurable dynamically) |
| 15. | Digital / IP Extension telephone instrument with programmable one touch keys | |

### k. Civil Work, Safety Instrumentation and Furniture (at ICCC)

The entire control room environment has to be designed as per ISO 11064 (International Norms to Design the Control Center). It should be state-of-art and the design should conform to provisions under ISO 14001 and OHSAS 18001, HFE and ISO 9241, covering various aspects of Command Center (wall paneling/partition & ceiling).
SAFETY: It must be safe and the designing components should not PROVOKE FIRE. So, ASTM E84 (Standard Test Method for Surface Burning Characteristics of Building Materials) certified materials to be used for wall cladding, flooring, paneling, partitions and ceilings. Safety of User & control room equipment safety is a high concern area therefore ceiling, paneling, partition and desk must be seismically tested and qualified. The test must be carried out by authorized government agency.
The test must be carried out by authorized government agency and certificate to be submitted along with the bid.

### a. False Ceiling

"The ceiling used must be ASTM E84 class A certified for surface spread of flame and smoke generation and ROHS certified (Restriction of Hazardous Substance like Nickle, Cadmium etc.). Zero / minimum maintenance is the basic requirement, thus wood, painted Gypsum, Fabric etc. are not acceptable. Designer Acoustic Metal False Ceiling: Factory made acoustic modular metal false ceiling of powder coated panels. Panels shall be designed to achieve shape and design as per the design consultant. The ceiling shall be designed to enhance visual feel, with provision for easy installation and maintenance, integrated lighting and scope for integration of building services like HVAC and fire detection/ fighting system.

**Design:**

- The ceiling panels shall be made up of powder coated metal panels to achieve strength. These planks shall be bend through CNC & laser Cut to achieve perfect accuracy.
- Structure shall be made from heavy duty powder coated modular steel frame (minimum sheet thickness 1 to 1.6mm). It shall be securely grouted from roof with help of anchor fastener and GI self-threaded rods. It shall be formed with the help of slotted rolled sections (stiffener) with help of M6 cage nut and bolts.
- Light fitting & AC Diffuser can be defined as per the LUX requirement.
- Surface Finish:
    - For Panels: Powder coated GI sheet. (sheet thickness: 0.6mm with powder coating:)
    - For Structure: Powder coated sheet. (sheet thickness: 1.0mm to 1.6mm with powder coating)
- The metal sheet shall have possibility of being formed mechanically per the specific needs of the project. The powder coating shall be able to undergo stretching up to 100% and therefor follow (adhere to) bend with the steel in all its deformation.

- In some parts of the control room; fire rated acoustical fleece to be pasted on the perforated metal ceiling planks to achieve better acoustic levels. Metal modular false ceiling is having Sound absorption coefficient (NRC) value 0.30 per IS:8225-1987, ISO: 354-1985 and ASTM 423-90.

**Material Testing/Certification:**

- Powder coating
  - Adhesion test: EN ISO 2409 (2 mm)
  - Impact resistance test: ASTM D 2794 (5/9' ball)
  - flexibility test: EN ISO 1519
  - Salt spry test: 600 hrs.
  - Resistance to humid atmosphere test: DIN 50017.

**ILLUMINATION**

- A detailed Lux level report to be submitted considering ISO 11064:6 (norms for Environmental requirements for control centers).
- Design factors must consider influences such as comfort, health, safety, efficiency and effectiveness of all people through architectural design, control room lighting and lighting therapy.
- Illumination levels on the work surface where paperwork is undertaken should be maintained at a level of 200lx to 750 lx with an upper limit of 500lx where VDUs are used; this can be a combination of ambient and task lighting.
- Diming should be provided with a lower limit of maintained 200lx on the work surface at all times.
- For working areas where mainly paperwork is undertaken an illumination level of 500 lx should be maintained.

**b. Furniture and Fixture**

- PHYSICAL STRUCTURE:
  - Ergonomically designed desk to ensure 24x7 desking solution with sufficient knee space (min 450mm) and foot space (min 600 mm).
- WORKING SURFACE
  - The Console Top / working surface should be made of minimum 25 mm thick MDF with High Pressure Laminate finish. The laminate shall be fire retardant, Insulated, Water Proof, Scratch resistant and high hardness. The Table Top should be able to mount three 27 Inches Display monitors for each work station.
    - Working surfaces must be NEMA LD3 Norms with moulded ergonomic Urethane waterfall edge with minimum 50-60mm thickness for operator's wrist comfort.
- CONSOLE DESIGN

- Consoles must be of modular design, facilitating future equipment retrofits and full reconfigurations without requiring any major modification to the structure or exterior elements

- EQUIPMENT MOUNTING
  - The workstation shall be able to house computer equipment's, Ethernet Points, Power Distribution Unit.
- FRAME MATERIAL
  - Made of heavy duty Aluminum. The Extrusions shall be duly powder coated with 40+ micron over all surfaces. Console should be Seismic Zone- 4 tested.
- CERTIFICATES & SUBMITALS
  - BIFMA X5.5, FSC Certified manufacturer, OHSAS 18001, RoHS on console (from UL/Intertek), Greenguard Certified.
  - Consoles to be qualified for Seismic Zone 4 (or better).
  - Test certification for ASTM E84 from UL; for the surface burning characteristics of products and materials. Test must refer the actual assembled components for wood-core panels including core, laminates, edging.
  - Raw-material supplier data alone is not acceptable.
- PROVEN TRACK RECORD
  - The desk manufacturer or supplier Should have supplied Minimum One desk with BIFMA X5.5 (all parameters) certified desk having scratch resistant table top with Moulded PU nosing to any one Government/PSU (through system integrator or end user) in past three years.
  - For desk, agency to produce minimum one installation with similar specifications.

**c. Partitions (wherever required as per approved drawing)**

- Partitions must be modular in nature.
  - Straight Metal Partition–
- All the properties and material of construction shall be like straight Metal paneling but the partition shall have metal tiles on either side of the frame.
  - Curvilinear Metal Partition:-
- All the properties and material of construction shall be like Metal paneling/partition but the front tiles shall be having perfect curve to meet the aesthetical requirement of the Control room and shall allow easy installation of the LVS/Screens on it.
- SAFETY
  - From fire and safety point of view; the metal partitions must be ASTM E84 class A certified for surface spread of flame and smoke generation and ROHS Certified (Restriction of Hazardous Substance like Nickle, Cadmium etc.)
- GLASS PARTITION
  - Full glass wall partitions will be made of 12mm Toughened laminated glass with frame-less structure. The glass partition shall be supported by 200-600mm high Modular metal partition (having the same finish as that of wall cladding) from the floor. Proper structure shall be made to ensure the fixing of glass from RCC slab above false ceiling and flooring.

- Straight and vertical structural members shall not be visible. Safety film shall be applied on the glass to avoid shattering. Glass shall be fitted on anodized extrusion with tool less technology and having a provision for replacing glass with perforated sheet/acoustic tile by removing the glass.

- NOTE: - The nature of installation should be replaceable, expandable and flexible to cater the future expansion/technical up-gradation.

- Air Flow
  - Design to ensure proper flow and throw of air in the control room. This requirement is mandatory to create perfect temperature and enough air movement to stay awake and comfortable. Design must comply ISO 11064:6.
- All desired certificates to be obtained from UL or Intertek or any Indian Government owned Research / Testing Institute

**d. Painting**

- WALL PANELING
  - Panel should comprise of hexagonal perforations for making the cladding and partitions acoustically sound. Min 20% panels shall be perforated or as required in the control room to achieve the desired acoustic levels. .
  - Materials having adverse impact on the environment and nature shall not be accepted. Zero / minimum maintenance is the basic requirement, thus wood, painted Gypsum, etc are not acceptable.
- Material Specification for Paneling
  - Factory made removable type self inter lockable metal panels of Preformed textured Hot dip galvanized strips and sheets of low carbon steel coated on one side with rigid polyvinylchloride (PVC) film and on the other side a coating based on cross linkable polyester resins (sheet thickness 0.6mm & PVC Coating 0.15mm). Make shall comprise of specially designed combination of perforated and non-perforated panels through CNC laser Cutting, bending & punching. Panel shall be of 0.75mm thick galvanized metal of approved color. Panels shall be designed to achieve shape and design as per the design consultant. Panels shall be fixed using hook fitting on structure. Overall system thickness for paneling shall be 70mm to 85mm and for partition shall be 85mm to 110mm.
    - As per design panel shall comprise of hexagonal perforation for making paneling and partitions acoustically sound. Acoustic grade fire retardant fabric (min 1.5mm thick) will be fixed at some parts of the control room.
    - Panel shall be design in such a manner that it takes care of undulation of civil walls and gives perfect flat surface finish and compile easy service & maintenance procedure.
- DESIGN

- The cladding panels shall be made up of combination of two sheets locked and riveted together and polystyrene shall be used as infill to achieve strength and acoustics. The front tile (PVC pre-coated metal sheet) shall be perorated/ non-perforated as per the design requirement and the back tile (Powder coated 0.6mm GI sheet) shall be designed in such a manner that it fits on the back portion of the front tile. Once the tiles are fitted together then these will be manually riveted. These tiles shall be bend through CNC, machine punched & laser Cut to achieve perfect accuracy.
- Structure Shall be made from heavy duty powder coated modular steel frame (minimum sheet thickness 1 to 1.6mm) and shall allow uninterrupted flow of wires/cable/tubes of max. dia. 25mm.
- Structure Shall be securely grouted from wall, roof and floor. It shall be made up of 1-1.6mm thick vertical Slotted rolled C sections (Upright) and horizontal rolled 'C' connectors. Grid of desired dimension shall be formed by Vertical and horizontal sections having 50mm pitch.

- Surface Finish:
  - For Panels:
    - Front Panel: PVC pre-coated GI sheet (sheet thickness: 0.6mm and PVC coating: 0.15mm)
    - Back Cover: Powder coated GI sheet. (sheet thickness: 0.6mm with powder coating:)
  - For Structure:
    - Powder coated sheet. (sheet thickness: 1.0mm to 1.6mm with powder coating)
- The metal sheet shall have possibility of being formed mechanically per the specific needs of the project.
- Panel shall provide better thermal, electrical insulation as compared to normal GI panels. It shall be non-reflective/glare free and be eligible for food contact.
- Material Selection:
  - Available Width- 300mm to 1200mm (in multiples of 150mm).
  - Available Height- 150mm to 750mm (in multiples of 150mm).
  - Thickness- 10mm to 15mm for perforated tiles with acoustic fleece without back cover
  - 25mm to 30mm for non-perforated tiles with back covers
  - PVC pre-coated sheet:
    - Fire rating and Low flame spread: EN ISO 11925-2, EN 13823 and ASTM E-84
    - Food grade: EU10/2011
  - Core material (compressed polystyrene): Acoustic test: 9301/ ISO: 140/ASTM 413, ASTM C 578.
- Powder coating
  - Adhesion test: EN ISO 2409 (2 mm)
  - Impact resistance test: ASTM D 2794 (5/9' ball)
  - Flexibility test: EN ISO 1519
  - Salt spray test: 600 hrs.
  - Resistance to humid atmosphere test: DIN 50017.

- ACOUSTICS
    - The ambient noise level in the control room must not exceed 45 dB(A) during the length of the working day also it should not be less than 30dB.
    - The auditory alarms Alarm signals should be at least 10 dB(A) over the background noise of the control room in order to be audible; and less than 15 dB higher than the background to avoid startling staff and affecting speech communication (ISO 7731:1986).
    - Sound transmission class (STC) value of 35dB for Wall Paneling & Partition (according to IS: 9901 (Part III) – 1981, DIN 52210 Part IV- 1984, ISO:140(Part III) -1995.
    - Metal modular perforated plank false ceiling have Sound absorption coefficient (NRC) value 0.60 per IS:8225-1987.
    - Acoustic flooring (shall reduce impact sound by 14dB (ISO 717-2)). It shall be twin layer linoleum built up from 2 mm acoustic and a 2 mm Corkment backing. Flooring shall be decorative type of approved shade, pattern, texture and design and of approved manufacturer. Dimensions shall be as per the final approved design and site requirement.

- EXECUTION
    - ACP, wood & laminate, gypsum, fabric shall be deemed unacceptable for vertical cladding and ceiling surfaces.
    - Vendor to demonstrate one portion at wall paneling & ceiling at their premises before dismantling & shipping to site. In short, a FAT (Factory acceptance test) to be carried out at vendors works for ceiling & paneling.
    - At site, any type of cutting, chipping, Gluing, screwing etc. shall not be acceptable.
    - All desired certificates to be obtained from UL or Intertek or any Indian Government owned Research / Testing Institute

- General Requirement for Command Center Manufacturer
    - Certificate for ISO 9001-2015 quality certification and proof of quality system implementation in Manufacturing processes for at least 5 years.
    - To prove supplier's seriousness in the business; Printed Catalogues to be furnished.
    - Ergonomic compliance report for Command and control room layout as per international ISO ergonomic norms to be submitted along with the bid.
    - The bidder to produce following documents from the Command and control room interior Manufacturer or supplier along with the bid: -
    - Minimum 5 installation of Command control rooms/ NOC areas with appreciation letters for the turnkey scope including but not limited to ceiling, flooring, illumination and wall cladding from reputed companies to be submitted along with the bid. These packages should have been executed on or before Bid release date.
    - Copy of Test certification for ASTM E84 (from UL) for the surface burning characteristics of wall paneling tiles and ceiling tiles to be submitted along with the bid. This is mandatory requirement from Fire safety point of view.
    - Raw-material supplier data alone is not acceptable.**"**

### e. Steel Conduit

- All sections of conduit and relevant boxes shall be properly cleaned and glued using appropriate epoxy resin glue and the proper connecting pieces, like conduit fittings such as Mild Steel and should be so installed that they can remain accessible for existing cable or the installing of the additional cables.
- No conduit less than 20mm external diameter shall be used. Conduit runs shall be so arranged that the cables connected to separate main circuits shall be enclosed in separate conduits, and that all lead and return wire of each circuit shall be run to the same circuit.
- All conduits shall be smooth in bore, true in size and all ends where conduits are cut shall be carefully made true and all sharp edges trimmed. All joints between lengths of conduit or between conduit and fittings boxes shall be pushed firmly together and glued properly.
- All electrical wiring should be done as per CPWD specifications.

- The chase in the wall required in the recessed conduit system shall be neatly made and shall be of angle dimensions to permit the conduit to be fixed in the manner desired. Conduit in chase shall be hold by steel hooks of approved design of 60cm center the chases shall be filled up neatly after erection of conduit and brought to the original finish of the wall with cement concrete mixture 1:3:6 using 6mm thick stone aggregate and course sand.

### f. Wiring

- PVC insulated copper conductor cable shall be used for sub circuit runs from the distribution boards to the points and shall be pulled into conduits. They shall be stranded copper conductors with thermoplastic insulation of 650 / 1100 volts grade. Color code for wiring shall be followed.
- Looping system of wring shall be used, wires shall not be jointed. No reduction of strands is permitted at terminations.
- Wherever wiring is run through trunking or raceways, the wires emerging from individual distributions shall be bunched together with cable straps at required regular intervals. Identification ferrules indication the circuit and D.B. number shall be used for sub main, sub circuit wiring the ferrules shall be provided at both end of each sub main and sub-circuit.
- Where, single phase circuits are supplied from a three phase and a neutral distribution board, no conduit shall contain wiring fed from more than one phase in any one room in the premises, where all or part of the electrical load consists of lights, fans and/or other single phase current consuming devices, all shall be connected to the same phase of the supply.
- Circuits fed from distinct sources of supply or from different distribution boards or M.C.B.s shall not be bunched in one conduit. In large areas and other situations where the load is divided between two or three phases, no two single-phase switches connected to difference phase shall be mounted within two meters of each other.
- All splicing shall be done by means of terminal blocks or connectors and no twisting connection between conductors shall be allowed.

- Metal clad sockets shall be of die cast non-corroding zinc alloy and deeply recessed contact tubes. Visible scraping type earth terminal shall be provided. Socket shall have push on protective cap.
- All power sockets shall be piano type with associate's switch of same capacity. Switch and socket shall be enclosed in a M. S. sheet steel enclosure with the operating knob projecting. Entire assembly shall be suitable for wall mounting with Bakelite be connected on the live wire and neutrals of each circuit shall be continuous everywhere having no fuse or switch installed in the line excepting at the main panels and boards. Each power plug shall be connected to each separate and individual circuit unless specified otherwise. The power wiring shall be kept separate and distinct from lighting and fan wiring. Switch and socket for light and power shall be separate units and not combined one.
- Balancing of circuits in three phases installed shall be arranged before installation is taken up. Unless otherwise specified not more than ten light points shall be grouped on one circuit and the load per circuit shall not exceed 1000 watts.

**g. Earthing**

- All electrical components are to be earthen by connecting two earth tapes from the frame of the component ring and will be connected via several earth electrodes. The cable arm will be earthen through the cable glands. Earthling shall be in conformity with provision of rules 32, 61, 62, 67 & 68 of Indian Electricity rules 1956 and as per IS-3043. The entire applicable IT infrastructure in the Control Rooms shall be earthed.

- Earthing should be done for the entire power system and provisioning should be there to earth UPS systems, Power distribution units, and AC units etc. so as to avoid a ground differential. State shall provide the necessary space required to prepare the earthing pits.
- All metallic objects on the premises that are likely to be energized by electric currents should be effectively grounded.
- The connection to the earth or the electrode system should have sufficient low resistance in the range of 0 to 25 ohm to ensure prompt operation of respective protective devices in event of a ground fault, to provide the required safety from an electric shock to personnel & protect the equipment from voltage gradients which are likely to damage the equipment.
- Recommended levels for equipment grounding conductors should have very low impedance level less than 0.25 ohm.
- In case of a UPS and Transformer equipment, the Earth resistance shall be automatically measured on an online basis at a pre-configured interval and corrective action should be initiated based on the observation. The automatic Earthing measurements should be available on the UPS panel itself
- There should be enough space between data and power cabling and there should not be any cross wiring of the two, in order to avoid any interference, or corruption of data.
- The earth connections shall be properly made.
- A complete copper mesh earthing grid needs to be installed for the server farm area, every rack need to be connected to this earthing grid. A separate earthing pit needs to be in place for this copper mesh.

- Provide separate earthing pits for servers, UPS & generators as per the standards.
- Expectation is to have maintenance free chemical earthing.

### h. Cable Work

- Cable ducts should be of such dimension that the cables laid in it do not touch one another. If found necessary the cable shall be fixed with clamps on the walls of the duct. Cables shall be laid on the walls/on the trays as required using suitable clamping/ fixing arrangement as required. Cables shall be neatly arranged on the trays in such manner that a criss-crossing is avoided and final take off to switch gear is easily facilitated.
- All cables will be identified close to their termination point by cable number as per circuit schedule. Cable numbers will be punched on 2mm thick aluminum strips and securely fastened to the. In case of control cables all covers shall be identified by their wire numbers by means of PVC ferrules. For trip circuit identification additional red ferrules are to be used only in the switch gear / control panels, cables shall be supported so as to prevent appreciable sagging. In general distance between supports shall not be greater than 600mm for horizontal run and 750mm for vertical run.
- Each section of the rising mains shall be provided with suitable wall straps so that same the can be mounted on the wall.
- Whenever the rising mains pass through the floor they shall be provided with a built-in fire proof barrier so that this barrier restricts the spread of fire through the rising mains from one section to the other adjacent section.
- Neoprene rubber gaskets shall be provided between the covers and channel to satisfy the operating conditions imposed by temperature weathering, durability etc.
- Necessary earthling arrangement shall be made alongside the rising mains enclosure by Mean of a GI strip of adequate size bolted to each section and shall be earthed at both ends. The rising mains enclosure shall be bolted type.
- The space between data and power cabling should be as per standards and there should not be any criss-cross wiring of the two, in order to avoid any interference, or corruption of data.

### i. Fire Detection and alarm System

- Fire can have disastrous consequences and affect operations of a Control Room. It is required that there is early-detection of fire for effective functioning of the Control Room.

#### i. System Description

- The Fire alarm system shall be an automatic 1 ton (e.g. 8) zone single loop addressable fire detection and alarm system, utilizing conventional detection and alarm sounders.
- Detection shall be by means of automatic heat and smoke detectors located throughout the Control Room (ceiling, false floor and other appropriate areas where fire can take place) with break glass units on escape routes and exits.

#### ii. Control and Indicating Component

- The control panel shall be a microprocessor based single loop addressable unit, designed and manufactured to the requirements of EN54 Part 2 for the control and indicating component and EN54 Part 4 for the internal power supply.
- All controls of the system shall be via the control panel only.
- The system status shall be made available via panel mounted LEDs and a backlit 8 line x 40-character alphanumeric liquid crystal display.
- All system controls and programming will be accessed via an alphanumeric keypad. The control panel will incorporate form fill menu driven fields for data entry and retrieval.
- The system will include a detection verification feature. The user shall have the option to action a time response to a fire condition. This time shall be programmable up to 10 minutes to allow for investigation of the fire condition before activating alarm outputs. The operation of a manual call point shall override any verify command.

**iii. Manual Controls**

- Start sounders
- Silence sounders
- Reset system
- Cancel fault buzzer
- Display test
- Delay sounder operation
- Verify fire condition
- Disable loop

**iv. Smoke detectors:**

Smoke detectors shall be of the optical or ionisation type. Devices shall be compatible with the CIE conforming to the requirements of EN54 Part 7 and be LPCB approved. The detectors shall have twin LEDs to indicate the device has operated and shall fit a common addressable base.

**v. Heat detectors**

- Heat detectors shall be of the fixed temperature (58° C) or rate of temperature rise type with a fixed temperature operating point.
- Devices shall be compatible with the CIE conforming to the requirements of EN54 Part 5 and be LPCB approved.
- The detectors shall have a single LED to indicate the device has operated and shall fit a common addressable base.

**vi. Addressable detector bases**

- All bases shall be compatible with the type of detector heads fitted and the control system component used. Each base shall comprise all necessary electronics including a short circuit isolator.

- The device shall be automatically addressed by the CIE on power up of the loop without the need of the insertion of a pre-programmed EPROM or setting of DIL switches.
- Detector bases shall fit onto an industry standard conduit box.

**vii. Audible Alarms**

- Electronic sounders shall be coloured red with adjustable sound outputs and at least 3 sound signals. The sounders should be suitable for operation with a 24V DC supply providing a sound output of at least 100dBA at 1 meter and 75 dBA min, for a bed head or sounder base type device. The sounder frequency shall be in the range of 500Hz to 1000Hz.

**viii. Commissioning**

- The fire detection and alarm system will be programmable and configurable via an alpha numeric keypad on the control panel.

**ix. High Sensitivity Smoke Detection System**

- General – The HSSD system shall provide an early warning of fire in its incipient stage, analyse the risk and provide alarm and actions appropriate to the risk. The system shall include, but not be limited to, a Display Control Panel, Detector Assembly and the properly designed sampling pipe network. The system component shall be supplied by the manufacturer or by its authorized distributor.

**x. Regulatory Requirements**

- National Electrical Code (NEC)
- Factory Mutual
- Local Authority having Jurisdiction

### j. Water leak detection System

- Water leak detection System should be designed to protect the Air-conditioned premises and to alert the personnel about the leak in the AC systems. The system should be capable of interfacing to Water leak detection sensors, condensation sensors & I/O modules.
- Events should be clearly reported on LCD/LED display with full English language description of the nature of the fault in the panel. The successful bidder should make detailed working drawings and coordinate them with other agencies at site. Water Leak Detection systems should be integrated with BAS.

#### i. EQUIPMENT

The Water leak detection system should comprise of Tape Sensors, Water Leak detection modules, Condensation detectors, I/O modules and sounders all connected to a Control Panel.

#### ii. CONTROL PANEL

- The control panel should be computerized 4/8/12 zone multiplex controller with a facility to add on dialer and speech processor. The system should be programmed, armed or disarmed through a control key pad. The control key pad should have a 16 character LCD display for viewing various events. The code to arm or disarm the system should be changed only by entering a master code.
- The system should have 4/8/12 zones and all the detectors should be connected through a 2 core cable. Each area of the premises should be divided into specific zones such that any zone should be isolated by the user if required.
- The entire system should be backed up by a maintenance free rechargeable battery to take care of system's power requirements whenever power fails.
- The system should be totally tamper proof and should activate an alarm if the control panel is opened, the sensors tampered with or if the system cables are cut even in the disarmed state.
- The system should log 500 events and optionally printer should be connected for generating reports.
- The Detectors, I/O Modules, Remote Keypads and other Devices should be connected to a system on a single 2/4/6 Core Cable Bus to avoid individual cabling of zones.
- The system should have a Buffer memory of minimum 250 events and log each event with exact date and time.
- The controller should have a Serial Port for connecting to a computer.
- The controller should work on 220/240V AC power supply and it should also have a built in battery backup.
- The memory inside the controller should be backed up by a lithium battery. The controller should work effectively over a temperature range of -10 Deg. C to + 55 Deg. C. and 0 to 90% of Humidity.

#### iii. WATER LEAK DETECTION SENSOR

Water Leak Detection sensors should be able to mount in DIN rails, inside AHU's, power distribution units or other equipment where localized leak detection is required. The detectors should be resistant to oxidation and erosion. The detector should have relay output for connection to the controller. LED alarm indication should also be provided. The detectors should operate in AC or DC supply.

**iv. TAPE SENSORS**

Tape sensors are used to detect water leaks usually under floors. Tape sensors for use with water leak detectors should be covered with plastic netting to prevent short circuits when used in metal trays or conduits, and enables the tape to be folded at right angles to allow easy routing.

**v. HOOTER / SOUNDER**

The hooter / sounder should give audible alarm when any sensor operates. It should be complete with electronic oscillations, magnetic coil (sound coil) and accessories ready for mounting (fixing). The sound output from the Hooter should not be less than 85 decibels at the source point.

**k. Access Control System**

The Access Control System shall be deployed with the objective of allowing entry and exit to and from the premises to authorized personnel only. The system deployed shall be based on Biometric Technology. An access control system consisting of a central PC, intelligent controllers, power supplies and all associated accessories is required to make a fully operational on line access control system. Access control shall be provided for doors. These doors shall be provided with electric locks, and shall operate on fail-safe principle. The lock shall remain unlocked in the event of a fire alarm or in the event of a power failure. The fire alarm supplier shall make potential free contacts available for releasing the locks in a fire condition especially for staircase and main doors. Entry to the restricted area shall be by showing a proximity card near the reader and exit shall be using a push button installed in the secure area. The system shall monitor the status of the doors through magnetic reed contacts. The system should be designed and implemented to provide following functionality:

- Controlled Entries to defined access points
- Controlled exits from defined access points
- Controlled entries and exits for visitors
- Configurable system for user defined access policy for each access point
- Record, report and archive each and every activity (permission granted and / or rejected) for each access point.
- User defined reporting and log formats
- Fail safe operation in case of no-power condition and abnormal condition such as fire, theft, intrusion, loss of access control, etc.
- Day, Date, Time and duration based access rights should be user configurable for each access point and for each user.
- One user can have different policy / access rights for different access points.

**l. Rodent Repellent system:**

The entry of Rodents and other unwanted pests shall be controlled using non-chemical, non-toxic devices. Ultrasonic pest repellents shall be provided in the false flooring and ceiling to repel the pests without killing them. However periodic pest control using Chemical spray can be done once in 3 months as a contingency measure to effectively fight the pest menace.

- Configuration : Master console with necessary transducer
- Operating Frequency : Above 20 KHz (Variable)
- Sound Output : 50 dB to 110 dB (at 1 meter)
- Power output : 800 mW per transducer
- Power consumption : 15 W approximately
- Power Supply : 230 V AC 50 Hz
- Mounting : Wall / Table Mounting

**m. Instruction about Civil Work**

a. Building design must be in accordance with international standards.
b. MSI has to provide the Building Design Parameters which are essential for building
   State of the Art Building of ICCC
   i. Layout Design
   ii. Cabling
c. Layout
   i. Type of cable (Fire resistant etc.)
d. Ducting
e. MSI should define the standard of on building construction.
f. It is expected that design of CCC building is demonstrated through 3D video.
g. MSI should recommend the international standards and suggest what specific requirement of building design are required for building a state of the art Integrated Command and Control Center.
h. Building design must be futuristic, using 3D modelling, which can be refined and revise the final view of the actual ICCC.
i. The ICCC physical building design should also be modular and able to accommodate other Municipal Corporations systems within ICCC premises.
j. MSI will be required to get approval on engineering drawings of ICCC from TUFIDCO.
k. During the review of design documents, TUFIDCO may suggest some changes or provide feedback on design parameters. MSI will be required to incorporate such inputs.
l. TUFIDCO may authorize any third party do to review of design documents.
m. After final approval of TUFIDCO on design documents, building work will be initiated by TUFIDCO.

### l. Online Uninterrupted Power Supply (UPS) System

Supply, install, test and commissioning of two numbers of true online, double conversion, high efficiency, and high power factor Uninterruptible Power Systems (UPS) rated at 2 x 20 KVA with battery backup support for 60 minutes on full load. The backup batteries should be supplied with the necessary arrangements to mount externally. The UPS shall be connected in LBS (Load bus

Synchronization Mode) and should have the capability to add 20KVA Modules which can go up to 80Kva on each side i.e. 4X 20KVA and 4X20 KVA in LBS Mode. Every 2Modules of 20KVA can have a Common Battery Bank. Load to get power feed from two independent 2 x 20 KVA UPS systems to ensure redundancy. For single Power Source ACOS to be considered. Each UPS Input

Shall have TVSS (Transient Voltage Surge Suppressor) as per the rating desired for each Location. TVSS and UPS shall be from same OEM.

Specification / features of the each UPS system are as follows :

- Widest input range. -
- Double conversion and IGBT technology. -
- Full IGBT Rectifier / Battery charger -
- IGBT based Inverter -
- Batteries to support 60minutes combined full load backup.
- Facility for remote viewing
- Easy to expand in a cost effective way

20 KVA UPS other Technical Specification:

| **OUTPUT PARAMETERS** | |
|---|---|
| Capacity | 20kVA/18kW (0-30deg C) / 16.2kW (30-35 deg C) / 14.4kW (35-40 deg C) |
| Power Factor | 0.9 at 30Deg C |
| Configuration | 3- ph, 3-wire,N +PE / 1 phase, L-N +PE |
| | |
| Voltage Regulation | (+/- 1%) |
| Voltage THD | <=2% - Linear load <=5% - Nonlinear load |
| Frequency | 50/ 60Hz |
| | |
| Frequency Regulation (synchronized with bypass) | (+/- 2 Hz) |
| Slew Rate | 0.2Hz/s |
| Crest Factor | 3:1 max. |
| | |
| Recovery time | 60 millisecond |
| Over load capacity | < 105% - continuous; 105-125% - < 5 min; 125-150%-<1min >150% - < 200ms (after overload shifted to bypass) |
| AC-AC Efficiency | >93% up to 94% |
| Transfer time - Mains to battery | 0 millisecond |
| Transfer time - Inverter to bypass - Synchronization mode | 1 millisecond |
| Parallel Redundancy | N+N |
| | |
| INPUT PARAMETERS | |
| Configuration | 3- ph, 3-wire,N +PE |

| | |
|---|---|
| Nominal Voltage | 380/400/415V |
| Input Voltage range | 3 Phase 228Vac-478Vac |
| Frequency | 50/60 Hz |
| Frequency range- Hz | 40 to 70 Hzat full load |
| Power Factor | >0.99 at full load |
| BYPASS | |
| Voltage Range | +15% -20% |
| Frequency | 50/ 60Hz |
| Frequency Range | +/-20% |
| BATTERY PARAMETERS | |
| Type | SMF |

**m. DG Set**

| # | Item | Minimum Specifications |
|---|---|---|
| 1 | General Specifications | • Auto Starting DG Set mounted on a common base frame with AVM (Anti-Vibration) pads, residential silencer with exhaust piping, complete conforming to ISO 8528 specifications and CPCB certified for emissions.<br>• KVA rating as per the requirement to provide the supply for ICCC |
| 2 | Engine | Radiator cooled, multi cylinder, 1500 RPM diesel engine, with electronic/manual governor and electrical starting arrangement complete with battery, conforming to BS 5514/ ISO 3046/ IS 10002 |
| 3 | Fuel | High Speed Diesel (HSD) |
| 5 | Alternator | Self-exciting, self-regulating type alternator rated at 0.8 PF or better, 415 Volts, 3 Phase, 4 wires, 50 cycles/sec, 1500 RPM, conforming to IS 4722/ BS 5000, Windings of 100% Copper, class H insulation, Protection as per IP 23. |
| 6 | AMF (Auto Main Failure) Panel | AMF Panel fitted inside the enclosure, with the following:<br>It should have the following meters/indicators<br>• Incoming and outgoing voltage<br>• Current in all phases<br>• Frequency<br>• KVA and power factor<br>• Time indication for hours/minutes of operation<br>• Fuel Level in fuel tank, low fuel indication<br>• Emergency Stop button<br>• Auto/Manual/Test selector switch<br>• MCCB/Circuit breaker for short-circuit and overload protection<br>• Control Fuses<br>• Earth Terminal |

| | | |
|---|---|---|
| | | • Any other switch, instrument, relay etc. essential for Automatic functioning of DG set with AMF panel |
| 7 | Acoustic Enclosure | • The DG set shall be provided with acoustic enclosure / canopy to reduce the sound level and to house the entire DG set (Engine & Alternator set) assembly outside (open-air).<br>• The enclosure must be weather resistant powder coated, with insulation designed to meet latest MOEF/CPCB norms for DG sets, capable to withstand climate. The enclosure must have ventilation system, doors for easy access for maintenance, secure locking arrangement, complete and |
| 8 | Fuel Tank Capacity | It should be sufficient and suitable for containing fuel for minimum 12 hours continuous operation, Complete with level indicator, fuel inlet and outlet, air vent, drain plug, inlet arrangement for direct filling and set of fuel hoses for inlet and return. |

### n. Internet Router

| # | Minimum Specifications |
|---|---|
| 1. | Chassis should have a minimum 16 x 1 SFP or more ports populated with Multi-mode 1G SR transceivers from day 1. In addition, it must have an additional 4 x 10G SFP+ ports populated with Multimode 10G SR transceivers. |
| 2. | There should not be any single point of failure in the Router. All the main components like Supervisor / CPU module, management module, power supplies and fans etc should be in redundant configuration. It should have distributed forwarding and there should not be any performance degradation in case of any switching/routing engine failure. |
| 3. | It must have minimum two or more vacant interface payload slots (after populating all the required above interfaces). |
| 4. | Must have minimum of 40 Gbps or more per interface slot throughput with all the above asked redundancy. |
| 5 | All the interfaces / line-cards should be non-blocking and wire-speed for 64 bytes of packet size and have distributed forwarding architecture. |
| 6 | Must have minimum 1M IPv4 Routes, 200K IPv6 Routes, 32K IPv6 Multicast routes, 1M MAC Address and 4K active VLAN's . |
| 7 | Chassis must support 40G and 100G interface line cards from day 1 |
| 8 | Must have minimum IPv6 Static routes, OSPFv3, PIM Sparse / Dense mode (SM /DM), Policy-based routing (PBR), Virtual routing and forwarding (VRF), BGP, BFD, MPLS and Netflow/Jflow/Sflow. |
| 9 | It is preferred that Router & transceiver should be from same OEM. |

### o. Integrated Building management system

| # | Description |
|---|---|
| 1. | A. The MSI shall supply, install and commission BAS, Access control and Physical security system for ICCC Building Office. MSI has to also provide all necessary hardware and all |

operating and applications software necessary to perform the control sequences of operation as called for in this specification

B. The MSI shall Supply, install and commission a complete Building Automation System (BAS) including all necessary hardware and all operating and applications software necessary to perform the control sequences of operation as called for in this specification. All components of the system –, application controllers, unitary controllers, etc. shall communicate using the BACnet protocol, as defined by ASHRAE Standard 135-2007, or EIA standard 709.1, the LonTalk™ protocol, or Modbus protocol. At a minimum, provide controls for the following:

1. Air handling units
2. Return air fans
3. Exhaust and supply fans
4. Chilled water system including pumps, chillers, and cooling towers
5. Boilers including hot water pumps
6. Computer room air handling units
7. Refrigerant leak detection system
8. Smoke evacuation sequence of AHUs and return fans including smoke control dampers and fire command override panel.
9. Finned tube radiation control
10. Variable volume and constant volume box control including interlocks with finned tube radiation.
11. Cabinet unit heater controls
12. Monitoring points for packaged equipment such as emergency generators,
13. Power wiring to DDC devices, smoke control dampers and BAS panels except as otherwise specified.

**i. Access Control System**

- Access Controller Ethernet Based
  - The Access Controller's should be designed for both critical government & private sector security applications.
  - Below input & output modules should be onboard with the Controllers.
    - Universal Inputs : 12
    - Reader Inputs : 8
    - Tamper Input : 1
    - Digital Lock Output : 4
  - The Access Controller's should be designed to support both entry & egress readers while supplying +5 or +12 VDC to each reader.
  - The controller should support the data transfer rates upto 100 Mbps and should have IPSec/IKE encryption and authentication. Encryption (up to 192-bit) and authentication may be enabled for communication to and from workstations and controllers. Controller should utilizes Internet Protocol Security (IPSec) and Internet Key Exchange (IKE) for its encryption to assure tamperproof communications over the Ethernet.
  - The Controller should be perfect for large systems. A controller servicing up to 8 areas can hold 480,000 personnel records. With such a large local

storage capacity, access decisions can be made swiftly without waiting for validation by a remote server.

- Controller should have inbuilt 32 MB of flash memory and 128 MB of DDR SDRAM. The flash memory is used to preserve 12 MB of application and run-time data. The dynamic RAM is partitioned for dedicated functions: a full 12 MB for applications, 48 MB for personnel records and 8 MB for the operating system. The unused memory should be available for future enhancements. Personnel record data should be preserved using onboard batteries that can hold the data for at least 7 days without the use of an external UPS. If the controller has its application stored in flash and power loss lasts longer than what the battery can supply for RAM, the controller will send a message to Cyber Station and request that the personnel records automatically be reloaded when the power returns.
- The reader inputs should be powered by a dedicated processor allowing the controllers to support current and future devices for advanced applications. The hardware should be ready to support 260-bit encrypted data messages from the reader.
- It is important for controller to be able to contain potential threats when they are detected. The Controller should respond to Area Lockdown commands set from Access control software providing a quick method of sealing off areas. A simple click of a graphic or an automatic program response is all that is needed to disable card readers and exit requests in any given area. First responder personnel can still gain access to the area if their record is marked with “executive privilege”.
- The Controller should be able to adapt access rights to a change in condition or “threat” levels. Each personnel record should be assigned a clearance level for each area to which they have access. When the condition is more severe than the person’s clearance level then access is automatically denied. The Condition Level may be set manually through workstation or automatically through a program. A program can even be used to monitor national threat levels and adjust Condition Levels accordingly.
- Each controller should support the use of two expansion modules plus an Display unit. The expansion module is used for expanding the controller for special or access to doors. Modules can also be used to provide a cost effective entry reader only solution.
- The Access controller should support up to 32 Infinet nodes. The RS-485 programmable port can be set to support a wired or wireless Infinet field bus.
- The Controllers should be ready to support a wide range of card formats. Ideal for retrofits, The Controller lets you preserve existing cards by accepting standard formats (Weigand, ABA, HID Corporate-1000, CardKey) as well as custom formats (Custom Weigand, Custom ABA). The Controller should support formats up to 260-bits making the controllers ready for government installations that must meet HSPD-12 and FIPS 201 standards.
- SNMP (Simple Network Messaging Protocol) messages may be sent to network monitoring software to inform IT managers as to the health and presence of the access controller on the corporate network. The Access Controller should also support the SNMP alarming option.

| Parameters | Specifications |
|---|---|

| | |
|---|---|
| **Controller** | Microprocessor Based with 8 Readers 12 Inputs, 4 DO , 10/100 bT |
| **Memory** | DDR SDRAM: 128 MB Flash: 32 MB |
| **Power** | 24 VAC , 50/60 Hz<br>12-28 VDC auto-sensing , 50/60 Hz |
| **Power Consumption** | 90 VA (AC)<br>50 W (DC) |
| **Real time Clock** | Battery backed by an Internal Battery |
| **Operation Environment** | 0-50 * C<br>10-90% RH (Non-Condensing) |
| **Enclosure** | UL open class, flammability rating of UL94-5V, IP 10 |
| **Mounting** | Wall mount using fasteners. |
| **Internal Battery** | NiMH , 3.6 VDC, 800 mAh |
| **Battery Backup** | Minimum 7 days DDR SDRAM and real-time clock |
| **Ethernet LAN Interface** | 10/100 Ethernet; ethernet cable with RJ-45 connector. |
| **Serial Comm. Inteface** | One RS-485 programmable port, software configurable for Infinet, wireless adapter, RoamIO2 or third-party system. |
| **Input Voltage Range** | 0-5.115 volts DC |
| **Input Impedance** | 10K ohm to 5.120V or 5M ohm with pull-up resistor disabled |
| **Input Resolution** | 5.0 mV |
| **Input Accuracy** | ±15mV (±0.56°C from -23°C to +66°C or ±1°F from -10°F to +150°F) |
| **Alarm Inputs** | 12 |
| **Card Reader/Keypad Inputs** | 8, Each input can be connected to a card reader, dedicated keypad, or reader/keypad combination. |
| **Card Reader Type** | Wiegand, ABA, or CardKey (jumper selectable) |
| **Max Number of Bits/Card** | Up to 260 bits/card |
| **Card Reader Power** | +5 VDC @ 120 mA or +12 VDC @ 180 mA (jumper selectable) |
| **Door Outputs** | 4 Nos. Form C relays with a manual override switch |
| **Output Rating** | 24 VAC/30 VDC @ 3 A |
| **Overrides** | 3-position manual override switch on each output for manual control of relay. LED override status indicator. |
| **Status Indicator LEDs** | CPU Active, Trasmit & Receive Data , Status of Ethernet activity & link etc. |
| **Dip Switches** | Universal inputs, 10 K ohm pull-up disable/enable |
| **Listing & Certifications** | FCC , ICES, CE, C-Tick, WEEE, UL/CUL , UL. |

- **Input/output Expansion Module:** Up to two I/O modules and an xP-Display may be connected to a controller.

| Parameters | Specifications |
|---|---|
| **Operating Environment** | 32°–120°F (0–49°C), 10–95% RH (non-condensing) |
| **Communications Interface** | Through built-in Expansion Port on controller |
| **Status Indicator LEDs** | CPU Module is Active |

| | |
|---|---|
| **Switches** | RESET |
| **Listing** | CE,UL & FCC |

### ii. Smart card/Biometric fingerprint reader

| Parameters | Specifications |
|---|---|
| **Read Range** | Card Up to 4" (10.2 cm)<br>Key/Tag Up to 1.25" (3.2 cm) |
| **Mounting** | Mounting plate attaches to US/EU/ Asian back box, 52-60 mm Screw hole spacing (vertical or horizontal). LCD/Keypad reader Housing latches onto mounting plate; fingerprint module secured to reader with a screw. |
| **Power Supply** | 9-12 VDC, Linear supply |
| **Operating Temperature** | 32º F to 113º F (0º C to 45º C) |
| **Operating Humidity** | 5% to 95% relative humidity non-condensing |
| **Transmit Frequency** | 13.56 Mhz |
| **Cable Distance** | Wiegand/Clock-and-Data Interface: 500 ft (150 m) (22AWG), RS232: 50 ft (15 m), RS485: 4000 ft (1220 m), USB: 16 ft (4 m), UART: 1 ft (0.30 m). |
| **Card Compatibility** | iCLASS 15693 & 14443B - read-only on 16k bit (2k Byte), 32k bit (4k Byte); HID Application iCLASS 15693 & 14443B - read/write (RWKLB575 only) on 16k bit (2k Byte), 32k bit (4k Byte); Application Space |
| **Certifications** | UL,CE,FCC, C-Tick. |
| **Housing Material** | UL94 Polycarbonate |
| **Resolution** | 500 dpi, 256-bit gray scale, 18 x 22 mm sensor area |
| **Timing** | Card read < 0.5 sec<br>Fingerprint capture < 2 sec, typical 1 sec<br>Verification of captured finger < 1 sec |
| **False Accept/Reject Rate** | FAR < 0.01%, FRR < 0.01% |

### iii. Electromagnetic Lock (LED with Lamp Indicator)

| Parameters | Specifications |
|---|---|
| **Magnet Size** | 250 x 42 x 26 mm |
| **Armature Size** | 180 x 38 x 11 mm |
| **Holding Force** | Up to 600 lbs |
| **Current Drain** | 480 mA+/- 10% / 12 VDC |
| **Temperature** | (-10 to 55 ) * C (14 to 131) * F |
| **Weight** | 2.0 Kg |

### iv. Fixed Dome Cameras for Indoor Surveillance

| # | Parameter | Minimum Specifications |
|---|---|---|
| 1. | Video Compression | H.264 |
| 2. | Video Resolution | 1920x1080 |
| 3. | Frame rate | 25 fps in all resolutions |

| # | Parameter | Minimum Specifications |
|---|---|---|
| 4. | Image Sensor | 1/4" / 1/3" Progressive Scan CMOS |
| 5. | Lens Type | Varifocal, C/CS Mount, IR Correction |
| 6. | Lens | Fixed IRIS 2.8-10mm, F1.7, 10x digital zoom |
| 7. | Minimum Illumination | 0.9 lux |
| 8. | Image settings | Compression, colour, brightness, sharpness, contrast, white balance, exposure control, backlight compensation, rotation |
| 9. | Protocol | HTTP, HTTPS, FTP, SMTP, RTSP, RTP, TCP, UDP, RTCP, DHCP, UPnP, QoS, IPV4, IPV6 |
| 10. | Security | Password Protection, IP Address filtering, User Access Log |
| 11. | Operating conditions | 0 to 50°C |
| 12. | Casing | Tamper Resistant casing for Indoor Environment |

## 3. Annexure 3 – Template for Pre-Bid Queries

| Request for Clarification | | | |
|---|---|---|---|
| Name and Address of the Organization submitting request | | | |
| Name and Position of Person submitting request | | | |
| Contact Details of the Organization / Authorized Representative | | | |
| Tel:<br>Mobile:<br>Fax:<br>Email: | | | |
| **Sr. No** | **RFP Document Reference (Section No., Page No.)** | **Content of the RFP requiring clarification** | **Clarification Sought** |
| | Pre-Qualification | | |
| | A | | |
| | Technical Evaluation | | |
| | | | |
| | | | |
| | Legal / Contract Conditions | | |
| | | | |
| | SLA | | |
| | | | |
| | Technical Specifications | | |
| | | | |
| | Bills of Material | | |
| | | | |

| | | | |
|---|---|---|---|
| | Functional Specifications | | |
| | | | |
| | Technical Specifications | | |
| | | | |
| I | O Others | | |
| | | | |

# 4. Annexure 4 – Formats for Submission of the Pre- Qualification Bid

## a. Pre-qualification bid checklist

| # | Check List Items | Compliance (Yes or No) | Page No. and Section No. in Bid |
|---|---|---|---|
| 1 | RFP Document fees | | |
| 2 | Earnest Money Deposit | | |
| 3 | Pre-Qualification Covering letter | | |
| 4 | Consortium Agreement, if applicable as per Annexure 9 | | |
| 5 | ● Copy of Certification of Incorporation/Registration Certificate<br>● PAN card<br>● VAT registration | | |
| 6 | Audited financial statements for the last three financial years (FY 2014-15, 2015-16 and 2016-17) and Certificate from the Statutory Auditor | | |
| 7 | Declaration of non-blacklisting | | |
| 8 | Power of attorney for Lead Bidder of Consortium | | |
| 9 | Project Citations and Self-certifications, as Applicable | | |
| 10 | Total Responsibility Certificate | | |
| 11 | Valid Certification (as required) | | |

### b. Pre-Qualification Bid Covering Letter

Date: dd / mm / yyyy

To,

[ ]

Sub: **Request for Proposal for Master System Integrator to Design, Develop, Implement and Maintain the Common Cloud Based DC and DR, Citizen Application and E-Governance Application along with Integrated Command and Control Center (ICCC) for ten smart cities (Coimbatore, Madurai, Salem, Thanjavur, Tiruchirapalli, Vellore, Tirunelveli, Tiruppur, Erode and Thoothukudi) of Tamil Nadu**

Ref: RFP No. **<<…..>> dated << …..>>**

Dear Sir,

With reference to your "**Request for Proposal for Master System Integrator to Design, Develop, Implement and Maintain the Common Cloud Based DC and DR, Citizen Application and E-Governance Application along with Integrated Command and Control Center (ICCC) for ten smart cities (Coimbatore, Madurai, Salem, Thanjavur, Tiruchirapalli, Vellore, Tirunelveli, Tiruppur, Erode and Thoothukudi) of Tamil Nadu"** we hereby submit our Prequalification bid, Technical Bid and Financial Bid for the same.

We hereby declare that:

a. We hereby acknowledge that the TUFIDCO will evaluate the proposal submitted as per the evaluation Criteria set forth in this RFP.

b. We have submitted EMD of 1% of our bid value as part Bid Pre-Qualifications

c. We hereby declare that all information and details furnished by us in the Bid are true and correct, and all documents accompanying such application are true copies of their respective originals.

d. We agree to abide by our offer for a period of 180 days from the date of opening of pre-qualification bid prescribed by **TUFIDCO** and that we shall remain bound by a communication of acceptance within that time.
e. We have carefully read and understood the terms and conditions of the RFP and the conditions of the contract applicable to the RFP. We do hereby undertake to provision as per these terms and conditions.
f. In the event of acceptance of our bid, we do hereby undertake:

   i. To supply the products and commence services as stipulated in the RFP document

   ii. To undertake the project services for entire contract period from the date of signing of the contract as mentioned in the RFP document.

iii. We affirm that the prices quoted are inclusive of design, development, delivery, installation, commissioning, training, providing facility management and handholding support, and inclusive of all out of pocket expenses, discounts etc.

g. We do hereby undertake, that, until a formal contract is prepared and executed, this bid, together with your written acceptance thereof and notification of award of contract, shall constitute a binding contract between us.

h. We understand that the **TUFIDCO** may cancel the bidding process at any time and that **TUFIDCO** is not bound to accept any bid that it may receive without incurring any liability towards the bidder.

i. We fully understand and agree to comply that on verification, if any of the information provided in our bid is found to be misleading the selection process, we are liable to be dismissed from the selection process or termination of the contract during the project, if selected to do so

In case of any clarifications please contact _____ email at _____

Thanking you,

Yours sincerely,

(Signature of the Lead bidder)

Printed Name

Designation

**Seal**

Date:

Place:
Business Address:

**c. Company profile - Brief company profile (required for both bidder and consortium member)**

| # | Particular | Description or Details |
|---|---|---|
| 1 | Name of Bidder | |
| 2 | Legal status of Bidder (company, Pvt. Ltd., LLP etc.) | |
| 3 | Main business of the Bidder | |
| 4 | Registered office address | |
| 5 | Incorporation date and number | |
| 6 | Service Tax number | |
| 7 | GST number | |
| 8 | PAN details | |
| 9 | Primary Contact Person (Name, Designation, address, mobile number, fax, email) | |
| 10 | Secondary Contact Person (Name, Designation, address, mobile number, fax, email) | |
| 11 | EMD details | |
| 12 | Role in Consortium (if applicable) | Brief scope of work in the consortium |

B. **Certificate of Incorporation (required for both bidder and consortium member)**

**C. Financial Turnover**

The financial turnover of the company is provided as follows:

| | 2014-15 | 2015-16 | 2016-17 |
|---|---|---|---|
| Annual Turnover | | | |

Certificate from the Chartered Accountant. The said certificate also need to be counter signed by authorized signatory of the bidder.

**D. Certifications (required for both bidder and consortium member)**

**d. Provide copy of valid certifications as required in Pre-Qualification criteria as on release date of the RFP. Declaration of Non-Blacklisting**

*(To be provided on the Company letter head)*

**Declaration for Lead Bidder:**

Place

Date

To,

[ ]

Subject: Self Declaration of not been blacklisted in response to the Request for Proposal for selection of "**Request for Proposal for Master System Integrator to Design, Develop, Implement and Maintain the Common Cloud Based DC and DR, Citizen Application and E-Governance Application along with Integrated Command and Control Center (ICCC) for ten smart cities (Coimbatore, Madurai, Salem, Thanjavur, Tiruchirapalli, Vellore, Tirunelveli, Tiruppur, Erode and Thoothukudi) of Tamil Nadu"**

Ref: RFP No. **<<…..>> dated << …..>>**

Dear Sir,

We confirm that our company or firm, _____,is currently not blacklisted in any manner whatsoever by any of the State or UT and or Central Government / PSUs in India on any ground including but not limited to indulgence in corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice.

(Signature of the Lead Bidder)

Printed Name

Designation

**Seal**

Date:

Place:

Business Address:

### e. Declaration for Consortium Member:

*(To be provided on the Company letter head)*

{Place}

{Date}

To,

[ ]

Subject: Self Declaration of not been blacklisted in response "**Request for Proposal for Master System Integrator to Design, Develop, Implement and Maintain the Common Cloud Based DC and DR, Citizen Application and E-Governance Application along with Integrated Command and Control Center (ICCC) for ten smart cities (Coimbatore, Madurai, Salem, Thanjavur, Tiruchirapalli, Vellore, Tirunelveli, Tiruppur, Erode and Thoothukudi) of Tamil Nadu**
Ref: RFP No. **<<…..>> dated << …..>>**

Dear Sir,

We confirm that our company or firm, _____,is currently not blacklisted in any manner whatsoever by any of the State or UT and or Central Government in India on any ground including but not limited to indulgence in corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice.

(Signature of the Consortium Member)

Printed Name

Designation

**Seal** Date:

Place: Business Address:

### f. Total Responsibility Certificate

*(To be provided on the Company letter head)*

This is to certify that we undertake the total responsibility for the defect free operation of the proposed solutions as per the requirement of the RFP for the duration mentioned in all the volumes of the RFP.

(Authorized Signatory)

Signature:

Name:

Designation:

Address:

Seal:

Date:

### g. Technology Declaration Certificate

*(To be provided on the Company letter head)*

This is to certify that we <Lead bidder name> along with <consortium partner names (if applicable) will be deploying following OEMs / Service Providers and using their product to fulfill the requirement of the application:

Common Command Center Application Platform: _____

Common Stack of Applications (EMS, KM, DBMS, Integration Layer, Cyber & Information Security applications, etc. as per RFP and the solution proposed in the technical proposal):

1. <name of vendor / OEM / service provider> for <name of the product>
2. <name of vendor / OEM / service provider> for <name of the product>
3. <name of vendor / OEM / service provider> for <name of the product>
4. <name of vendor / OEM / service provider> for <name of the product>

.

.

n. <name of vendor / OEM / service provider> for <name of the product>

Common Cloud Service Provider (Sub Contractor or Consortium Member): _____

ICCC Specific IT Hardware Requirements (Networking Infra, Operators Desktops, Video Walls, other systems, etc. as per RFP and the solution proposed in the technical proposal)

1. <name of vendor / OEM / service provider> for <name of the product>
2. <name of vendor / OEM / service provider> for <name of the product>
3. <name of vendor / OEM / service provider> for <name of the product>
4. <name of vendor / OEM / service provider> for <name of the product>

.

.

n. <name of vendor / OEM / service provider> for <name of the product>

ICCC Specific IT Software Requirements (as per RFP and the solution proposed in the technical proposal)

1. <name of vendor / OEM / service provider> for <name of the product>
2. <name of vendor / OEM / service provider> for <name of the product>
3. <name of vendor / OEM / service provider> for <name of the product>
4. <name of vendor / OEM / service provider> for <name of the product>

.

.

n. <name of vendor / OEM / service provider> for <name of the product>

(Authorized Signatory)

Signature:

Name:

Designation:

Address:

Seal:

Date:

### h. Self-certificate for Project execution experience (In Bidding Entity's Letter Head)

This is to certify that < Name of the Bidding entity > has been awarded with < Name of the Project > as detailed under:

| | |
|---|---|
| Name of the Project | |
| Client's Name, Contact No and Complete address, | |
| Contract Value for the bidder (in INR) | |
| Current Status of the project | |
| Activities Completed by bidding entity as on bid submission date | |
| Value of work completed for which payment has been received from the client | |
| Date of Start | |
| Date of Completion | |

(Authorized Signatory)

Signature:

Name:

Designation:

Bidding entity's name

Address:

Seal:

Date:

# 5. Annexure 5 – Formats for Submission of the Technical Bid

## a. Technical Bid Check-List

| # | Checklist Item | Compliance (Yes/No) | Page No. and Section No. in the Bid |
|---|---|---|---|
| 1 | Technical Bid Letter | | |
| 2 | Credential summary | | |
| 3 | Project Citations and Self-certifications, as applicable | | |
| 4 | Detailed proposed solution | | |
| 5 | Project plan and manpower plan | | |
| 6 | Proposed CVs | | |
| 7 | Compliance to Requirement (Technical / Functional Specifications) | | |
| 8 | Proposed Bill of Material | | |
| 9 | Manufacturers'/Producers' Authorization Form Anti-Collusion certificate | | |
| 10 | Non-disclosure agreement | | |
| 11 | Manufacturers'/Producers' Authorization Form (one for each OEM) | | |

Technical Bid Covering Letter

Date: dd/mm/yyyy

To,

[ ]

Subject: Request for Proposal for Master System Integrator to Design, Develop, Implement and Maintain the Common Cloud Based DC and DR, Citizen Application and E-Governance Application along with Integrated Command and Control Center (ICCC) for ten smart cities (Coimbatore, Madurai, Salem, Thanjavur, Tiruchirapalli, Vellore, Tirunelveli, Tiruppur, Erode and Thoothukudi) of Tamil Nadu

Ref: RFP No. **<<…..>> dated << …..>>**

Dear Sir,

I (in case of single bidder) or We, <<name of the undersigned Bidder and consortium members>>, having read and examined in detail all the bidding documents in respect of "Request for Proposal for Master System Integrator to Design, Develop, Implement and Maintain the Common Cloud Based DC and DR, Citizen Application and E-Governance Application along with Integrated Command and Control Center (ICCC) for ten smart cities (Coimbatore, Madurai, Salem, Thanjavur, Tiruchirapalli, Vellore, Tirunelveli, Tiruppur, and Thoothukudi, Erode) of Tamil Nadu" do hereby propose to provide our services as specified in the bid submitted by us.

It is hereby confirmed that I / We are entitled to act on behalf of our company / corporation / firm / organization and empowered to sign this document as well as such other documents, which may be required in this connection.

We declare that all the services shall be performed strictly in accordance with the RFP documents.

We confirm that the information contained in this response or any part thereof, including its exhibits, and other documents and instruments delivered or to be delivered to TUFIDCO,, Government of [State] is true, accurate, verifiable and complete. This response includes all information necessary to ensure that the statements therein do not in whole or in part mislead the department in its evaluation process. We also confirm that we shall not attract conflict of interest in principle.

We hereby declare that in case the contract is awarded to us, we shall submit the contract Performance bank guarantee in the form prescribed at Annexure 5 (a) of Section 9 of the RFP Volume I.

We hereby declare that our bid is made in good faith, without collusion or fraud and the information contained in the bid is true and correct to the best of our knowledge and belief.

We understand that our bid is binding on us and that you are not bound to accept a Bid you receive. This bid is valid for 180 days after opening of technical bid. We shall extend the validity of the bid if required by Purchaser.

Thanking you,

Yours sincerely,

(Signature of the Lead Bidder)

Printed Name

Designation

**Seal**

Date:

Place:

Business Address:

### b. Credential Summary

| Sl # | Project Name | Client Name | Client Type | Project Value (in INR) | Project Components | Documentary evidence provided (Yes or No) | Project Status (Completed or Ongoing or Withheld) |
|---|---|---|---|---|---|---|---|
| 1 | | | | | | | |
| 2 | | | | | | | |
| 3 | | | | | | | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| 6 | | | | | | | |
| 7 | | | | | | | |

- *Client type – Indicate whether the client is Government or PSU or Private*
- *Project Components – Indicate the major project components like setting up of NOC, Wide Area Network, city/ public Wi-Fi, application development for security surveillance, command and control center, Maintenance, Hardware procurement and deployment, DC setup and maintenance, Facility management services, provisioning manpower, IT support and maintenance*
- *Documentary evidence provided – Indicate the documentary evidence provided with the detailed project credential like work order or purchase order or completion certificate or letter of appointment*
- *Project Status – Completed (date of project completion) or Ongoing (project start date)*

### c. Bidder's Experience - Client Citations

Prime Bidder or Consortium member is requested to furnish the credentials in the following format for both Pre-qualification and Technical criterion. All credentials should be followed by relevant documentary proof.

| **General Information** | |
|---|---|
| Name of the project | |
| Client for which the project was executed | |
| Name and contact details of the client | |
| **Project Details** | |
| Description of the project | |
| Scope of services | |
| Technologies used | |
| Relevance to the current project | |
| Outcomes of the project | |
| **Other Details** | |
| Total cost of the project | |
| Total cost of the services provided by the respondent | |
| Duration of the project (no. of months, start date, completion date, current status) | |
| **Other Relevant Information** | |
| Letter from the client to indicate the successful completion of the projects (if any) | |
| Copy of Work Order/Agreement | |

*N.B - If the project is ongoing, bidder must clearly specify which of the stages/phases/milestones are completed and which are ongoing and at what stage of completion and produce a self-certificate as per the format provided in Section 6.7.*

### d. Overview of Proposed Solution

#### i. Structure of Proposed Solution

Bidders are required to provide a detailed approach & methodology to execute the entire project. Bidders are advised to comply with the below provided headers/Approach components while detailing out their solution.

| Sl. No. | Item |
|---|---|
| 1. | **Understanding of requirement and Implementation approach**<br><br>· Understanding of requirements<br>· Work Plan & its adequacy |
| 2. | **Robustness and quality**<br><br>· End to end integrated solution proposed<br>· Hardware deployment and integration approach encompassing all solutions<br>· Timelines and modalities for implementation in a time bound manner<br>· Project implementation approach or strategy and operations and maintenance plan including comprehensiveness of fall-back strategy and planning during rollout<br>· Any other area relevant to the scope of work and other requirements of the Project |
| 3. | **Assessment of Manpower deployment, Training and Handholding plan**<br><br>· Deployment strategy of Manpower<br>· Contingency management<br>· Mobilization of existing resources and additional resources as required<br>· Training and handholding strategy (must include training of Operators before Go-Live and during implementation phase) |

Bidders may refer to technical evaluation framework while finalizing the content of the technical proposal.

### ii. Project Plan

A **Detailed Project Plan** covering break-up of each phase into the key activities, along with the start and end dates must be provided as per format given below.

**Activity-wise Timelines**

| Sl. No. | Item of Activity | Month wise Program | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | ... |
| | Project Plan | | | | | | |
| 1 | Activity 1 | | | | | | |
| 1.1 | Sub-Activity 1 | | | | | | |
| 1.2 | Sub-Activity 2 | | | | | | |
| 2 | | | | | | | |
| 2.1 | | | | | | | |
| 2.2 | | | | | | | |
| 3 | | | | | | | |
| 3.1 | | | | | | | |
| 4 | | | | | | | |

*Note: The above activity chart is just for the purpose of illustration. Bidders are requested to provide detailed activity & phase wise timelines for executing the project with details of deliverables & milestones as per their bid.*

### iii. Manpower Plan

**I. Till Go-Live (Implementation)**

| Sl No. | Manpower | Months | | | | Total |
|---|---|---|---|---|---|---|
| | | Month 1 | Month 2 | …….. | Month N | |
| 1. | Program Manager | | | | | Onsite / Offsite Support |
| 2. | Citizen Service/Municipal Domain expert | | | | | Onsite / Offsite Support |
| 3. | Water SCADA or Electrical SCADA expert | | | | | Onsite / Offsite Support |
| 4. | GIS expert | | | | | Onsite / Offsite Support |
| 5. | Project Manager-Infrastructure | | | | | Onsite / Offsite Support |
| 6. | ICT Security Expert | | | | | Onsite / Offsite Support |
| 7. | Command and Control Center management Expert | | | | | Onsite / Offsite Support |
| 8. | Mobile App development Expert | | | | | Onsite / Offsite Support |

Above plan is required to be prepared separately for each city. Experts may be shared between various cities

**II. After Go-Live (Operation & Maintenance for 5 Years)**

Following manpower has to be deployed for all the cities at their respective city ICCC.

| # | Type of Resource | Minimum Quantity | Minimum Deployment during Operation and Maintenance phase |
|---|---|---|---|
| 1. | Programme Manager | 1 | 100% |
| **2.** | Solution Architect | 1 | Onsite Support to Project team on need basis |
| **3.** | Project Manager-Software | 1 | 100% |
| **4.** | Project Manager – Infrastructure | 1 | Onsite Support to Project team on need basis |
| **5.** | Database Architect/DBA/ Data Scientist | 1 | Onsite Support to Project team on need basis |
| **6.** | Cloud DC / DR Expert | 1 | Onsite Support to Project team on need basis |
| **7.** | ICT Security Expert | 1 | Onsite Support to Project team on need basis |
| **8.** | Command Center Expert | 1 | 100% |
| **9.** | GIS expert | 1 | Onsite Support to Project team on need basis |
| **10.** | Command Center Operators (24*7 – 11 in each shift) | 33 | 100% (1 in each shift) |

### e. Details of Resources proposed

Summary of Resources proposed

| SL No. | Name of Staff | Proposed Role | Qualification | Certification | Experience | Area of Expertise | Position Assigned | Time committed for the engagement |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Compliance to Requirement (Technical / Functional Specifications)

*The bidder should provide compliance to the requirement specifications (both technical and functional) specified in the Section 4 of the Volume II of this RFP. The same should be reproduced here, and compliance against each requirement line item should be marked.*

### f. Manufacturers'/Producers' Authorization Form

*(This form has to be provided by the OEMs of the hardware and software solutions proposed. This letter should be on the letterhead of the manufacturer and should be signed by a person competent and having the power of attorney to bind the manufacturer.)*

Date:

To,

The Chief Managing Director
Tamil Nadu Urban Finance & Infrastructure Development Corporation (TUFIDCO)

490, Anna Salai, Nandanam, Chennai-35

Subject: Manufacturer's Authorization Form

Ref: RFP No. <<…..>> dated << …..>>

Dear Sir,

We_____ (Name of the OEM) who are established and reputable manufacturers of _____ (List of Goods) having factories or product development centers at the locations _____ or as per list attached, do hereby authorize. _____ (Name and address of the Bidder) to bid, negotiate and conclude the contract with you against RFP No. _____Dated _____for the above goods manufactured or developed by us.

We hereby extend, our warranty for the hardware goods supplied by the bidder and or maintenance or support services for software products against this invitation for bid by _____ (Name of the Bidder) as per requirements of this RFP.

Thanking you,

Yours faithfully,

(Signature)

For and on behalf of: _____ (Name of the OEM)

Authorised Signatory

Name:

Designation:

Place:

Date:

Anti-Collusion Certificate*[Certificate should be provided by Lead Bidder and on letter head]*

**Anti-Collusion Certificate**

We hereby certify and confirm that in the preparation and submission of our Bid for **Request for Proposal for Master System Integrator to Design, Develop, Implement and Maintain the Common Cloud Based DC and DR, Citizen Application and E-Governance Application along with Integrated Command and Control Center (ICCC) for ten smart cities (Coimbatore, Madurai, Salem, Thanjavur, Tiruchirapalli, Vellore, Tirunelveli, Tiruppur, Erode and Thoothukudi) of Tamil Nadu,** against the RFP issued by Purchaser, We have not acted in concert or in collusion with any other Bidder or other person(s) and also not done any act, deed or thing, which is or could be regarded as anti-competitive. We further confirm that we have not offered nor will offer any illegal gratification in cash or kind to any person or organization in connection with the instant bid.

(Signature of the Lead Bidder)

Printed Name

Designation

**Seal**

Date:

Place:

Business Address:

## 6. Annexure 6 – Formats for Submission of the Financial Bid

**For the Financial Bid format refer to the Excel file**

| Sl # | Commercial | Comments / Assumptions for Units (if any) | Per unit price (INR) | Track - Capex | | Year 1 O&M | | O&M Year 2 | | O&M Year 3 | | O&M Year 4 | | O&M Year 5 | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| | | | | Quantities | Cost 3 = 2*1 | Quantities | Cost 5 = 4*1 | Quantities | Cost 7 = 6*1 | Quantities | Cost 9 = 8*1 | Quantities | Cost 11 = 10*1 | Quantities | Cost 13 = 12*1 | 14 = 3+5+7+9+11+13 |
| | | | | | | | | | | | | | | | | |
| **0** | **Initial IT set up per city for Common Platform** | | | | | | | | | | | | | | | |
| **a** | **Initial set up per city- Implementation, configuration and activation, (One time cost for any number of cities)** | One time setup cost for Common applications on common cloud platform (like command Center Application, EMS, KM, DBMS | | 1 | 0 | | | | | | | | | | | 0 |
| **b** | **Citizen Mobile Application with integration in CCC** | Citizen Mobile application will be specific to city requirements therefore Indiviual city will have its own interface on a common app developed | | 10 | 0 | | | | | | | | | | | 0 |
| **c** | **Upgrade of existing ULB GIS platform** | Existing ESRI / ArcGIS software available with urban local bodies should be reused / upgrade as needed. Procurement of GIS Software only if urban local bodies need additional modules and user licensing | | 10 | 0 | | | | | | | | | | | |
| **d** | **Enhancement and addition of required Modules in Existing E-Governance** | Enhancement and addition of required modules in E-governance application | | 1 | 0 | | | | | | | | | | | 0 |
| | **Sub - Total of 0** | **0 = a +b+c+d** | | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | 0 |
| | | | | | | | | | | | | | | | | |
| **1** | **Initial IT set up per city (including Head Quarter ICCC at Tufidco)** | | | | | | | | | | | | | | | |
| a | Video Wall (LED Technology 4 x 2 Modules of 55" each) | 1 per city | | 11 | 0 | | | | | | | | | | | 0 |
| b | Operator Terminal (Workstations) (along with desired software system like OS, Office, Antivirus etc.) | 8 per city | | 88 | 0 | | | | | | | | | | | 0 |
| c | Office Desktop (along with desired software system like OS, Office, Antivirus etc.) | 1 per city | | 11 | 0 | | | | | | | | | | | 0 |
| d | LAN Cabling | Required LAN cabling cost per city with assumption of minimum area as 3000 sq. feet of ICCC | | 11 | 0 | | | | | | | | | | | 0 |
| e | LAN Switches (along with desired software system like OS, DB, etc.) | 1 per city | | 11 | 0 | | | | | | | | | | | 0 |
| f | IP Phones | 10 per city | | 110 | 0 | | | | | | | | | | | 0 |
| g | Multi Function Laser Printer | 1 per city | | 11 | 0 | | | | | | | | | | | 0 |
| h | Fixed Dome Cameras | 10 per city (1 at Entry, 1 at Exit, 4 in ICCC room, 2 in Situtation room, 2 in common asile) | | 110 | 0 | | | | | | | | | | | 0 |
| i | Fire Alarm System | 1 per city ICCC | | 11 | 0 | | | | | | | | | | | 0 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| j | Public Address System | 1 per city ICCC | | 11 | 0 | | | | | | | | | | | 0 |
| k | Access Control System (RFID / Proximity based, for all staff) | 1 per city ICCC | | 11 | 0 | | | | | | | | | | | 0 |
| l | IP PABX | 1 per city | | 11 | 0 | | | | | | | | | | | 0 |
| m | Internet Router/Switch | 1 per city | | 11 | 0 | | | | | | | | | | | 0 |
| | | | | | | | | | | | | | | | | 0 |
| | **Sub - Total of 1** | **1 = a+b+c+d+e+f+g+h+i+j+k+l+** | | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | 0 |
| | | | | | | | | | | | | | | | | |
| 2 | **Initial Non IT Setup for city ICCC (including Head Quarter ICCC at Tufidco)** | | | | | | | | | | | | | | | |
| a | Civil Work (Structure of building shall be provided by the City SPV, finishing which includes wiring, ducting, false ceiling, false flooring, etc. will be the responsibility of MSI) | Cost of required work for 4000 sq. feet | | 11 | 0 | | | | | | | | | | | 0 |
| b | Wiring and Earthing | Cost of required work for 4000 sq. feet | | 11 | 0 | | | | | | | | | | | 0 |
| c | UPS / SMPS Unit | 2 units per city - Cost of required supply | | 22 | 0 | | | | | | | | | | | 0 |
| d | Power Backup / DG Set | 1 units per city - Cost of required supply | | 11 | 0 | | | | | | | | | | | 0 |
| e | Ergonomic Chairs (for operators , meeting rooms, office staff etc.) | 15 per city | | 165 | 0 | | | | | | | | | | | 0 |
| f | Operator Table | 10 per city | | 110 | 0 | | | | | | | | | | | 0 |
| g | HVAC | Cost of required work for 4000 sq. feet | | 11 | 0 | | | | | | | | | | | 0 |
| h | Lighting | Cost of required work for 4000 sq. feet | | 11 | 0 | | | | | | | | | | | 0 |
| i | Conference Room Tables | 1 per city | | 11 | 0 | | | | | | | | | | | 0 |
| j | Situation Room Setup (non IT) | 1 per city | | 11 | 0 | | | | | | | | | | | 0 |
| k | Training of City SPV / ULB Staff | 1 unit = 15 trainee per city (includes complete costing of training the staff as per RFP requirements) | | 11 | 0 | | | | | | | | | | | 0 |
| | **Sub - Total of 2** | **2 = a +b+c+d+e+f+g+h+i+j+k** | | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | 0 |
| | | | | | | | | | | | | | | | | |
| **3** | **New Application integration in to the platform (per sensor vendor- to be charged once only if same sensor vendor is in multiple cities), Staging environment for a new application integration (Ref Sl # 100 of Functional Requirement of Command and Control Centre provided in Functional Specification provided in annexures of this RFP)** | **Only for 10 Cities** | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| a | Video Surveillance for Citizen Safety and Security | | | 10 | 0 | | | | | | | | | | | 0 |
| b | Integrated Enterprise Geographical Information System (GIS) | | | 10 | 0 | | | | | | | | | | | 0 |
| c | Smart Parking Management and Guidance | | | 10 | 0 | | | | | | | | | | | 0 |
| d | Smart and Integrated City Lighting | | | 10 | 0 | | | | | | | | | | | 0 |
| e | Citizen Kiosks for Information and Govt. services | | | 10 | 0 | | | | | | | | | | | 0 |
| f | Integrated Solid Waste Management | | | 10 | 0 | | | | | | | | | | | 0 |
| g | Intelligent Transport Management System | | | 10 | 0 | | | | | | | | | | | 0 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| h | Intelligent Water Supply Management System | | | 10 | 0 | | | | | | | | | | | 0 |
| i | Integration of Municipal Corporation Call Centre | | | 10 | 0 | | | | | | | | | | | 0 |
| j | Integration of Standard Municipal Corporation Services | | | 10 | 0 | | | | | | | | | | | 0 |
| k | Integration with City Specific mobile / web Application | | | 10 | 0 | | | | | | | | | | | 0 |
| l | Integration with Public Bike Sharing System / Application | | | 10 | 0 | | | | | | | | | | | 0 |
| m | Integration with Smart Pole System | | | 10 | 0 | | | | | | | | | | | 0 |
| n | Integration with Vehicle Tracking System | | | 10 | 0 | | | | | | | | | | | 0 |
| p | Integration with Integrated Solid Waste Management System | | | 10 | 0 | | | | | | | | | | | 0 |
| o | Integration with Transport Management System (BRTS) | | | 10 | 0 | | | | | | | | | | | 0 |
| q | Integration with Traffic Management System | | | 10 | 0 | | | | | | | | | | | 0 |
| r | Integration with DIAL 100 | | | 10 | 0 | | | | | | | | | | | 0 |
| s | Integration with DIAL 108 & Jannani Express | | | 10 | 0 | | | | | | | | | | | 0 |
| t | Integration with City Water SCADA System | | | 10 | 0 | | | | | | | | | | | 0 |
| u | Integration with Emergency Response and Disaster Mgmt. | | | 10 | 0 | | | | | | | | | | | 0 |
| v | Integration with Met Department (Local Weather Forecast) | | | 10 | 0 | | | | | | | | | | | 0 |
| w | Integration with Area Based Development (ABD) Services: i. Utilities ii. Lighting iii. Metering iv. Surveillance | | | 10 | 0 | | | | | | | | | | | 0 |
| x | Integration with Fire Brigade Control System | | | 10 | 0 | | | | | | | | | | | 0 |
| y | Integration with Solar Roof Top Project | | | 10 | 0 | | | | | | | | | | | 0 |
| | **Sub - Total of 3** | **3 = a +b+c+d+e+f+g+h+i+j+k+l+m+n+o+p+q+r+s+t+u+v+w+x+y** | | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | 0 |
| | | | | | | | | | | | | | | | | |
| **4** | **O&M Cost for ICT Setup (including Head Quarter ICCC at Tufidco)** | **This is cost for operations and comprehensive maintenance** | | | | | | | | | | | | | | |
| **a** | **Initial set up per city- Implementation, configuration and activation,** | Cost of one edge device per city, Refer to Edge architecture definition- Sl # 29 of Functional Requirement of Command and Control Centre provided in Functional Specification provided in annexures of this RFP | | | | 11 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 0 |
| b | Video Wall (LED Technology 4 x 2 Modules of 55" each) | 1 per city | | | | 11 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 0 |
| c | Operator Terminal (Workstations) (along with desired software system like OS, Office, Antivirus etc.) | 8 per city | | | | 88 | 0 | 80 | 0 | 80 | 0 | 80 | 0 | 80 | 0 | 0 |
| d | Office Desktop (along with desired software system like OS, Office, Antivirus etc.) | 1 per city | | | | 11 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 0 |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| e | LAN Cabling | Required LAN cabling cost per city with assumption of minimum area as 3000 sq. feet of ICCC | | | | 11 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 0 | |
| f | LAN Switches (along with desired software system like OS, DB, etc.) | 1 per city | | | | 11 | | 10 | | 10 | | 10 | | 10 | | | |
| g | IP PABX | 1 per city | | | | 11 | | 10 | | 10 | | 10 | | 10 | | | |
| h | IP Phones | 9 per city | | | | 99 | | 90 | | 90 | | 90 | | 90 | | | |
| i | Multi Function Laser Printer | 1 per city | | | | 11 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 0 | |
| j | Fixed Dome Cameras | 10 per city (1 at Entry, 1 at Exit, 4 in ICCC room, 2 in Situtation room, 2 in common asile) | | | | 99 | 0 | 90 | 0 | 90 | 0 | 90 | 0 | 90 | 0 | 0 | |
| k | Fire Alarm System | 1 per city ICCC | | | | 11 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 0 | |
| l | Public Address System | 1 per city ICCC | | | | 11 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 0 | |
| m | Access Control System (RFID / Proximity based, for all staff) | 1 per city ICCC | | | | 11 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 0 | |
| n | Internet router/Switch | 1 per city | | | | 11 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 0 | |
| o | Situation Room Setup | Unit includes all the IT infrastructure as per RFP | | | | 11 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 0 | |
| | **Sub - Total of 4** | **4 = a+b+c+d+e+f+g+h+i+j+k+l+m+n+o** | | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | 0 | |
| | | | | | | | | | | | | | | | | | |
| 5 | **O&M cost for Initial Non IT Setup for city ICCC (including Head Quarter ICCC at Tufidco)** | **This is cost for operations and comprehensive maintenance** | | | | | | | | | | | | | | | |
| a | Civil Work (Structure of building shall be provided by the City SPV, finishing which includes wiring, ducting, false ceiling, false flooring, etc. will be the responsibility of MSI) | Cost of required work for 4000 sq. feet | | | | 11 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 0 | |
| b | Wiring and Earthing | Cost of required work for 4000 sq. feet | | | | 11 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 0 | |
| c | UPS / SMPS Unit | 2 units per city - Cost of required supply | | | | 22 | 0 | 20 | 0 | 20 | 0 | 20 | 0 | 20 | 0 | 0 | |
| d | Power Backup / DG Set with fuel / Raw Power | 1 units per city - Cost of required supply | | | | 11 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 0 | |
| e | Ergonomic Chairs (for operators , meeting rooms, office staffetc.) | 15 per city | | | | 165 | 0 | 150 | 0 | 150 | 0 | 150 | 0 | 150 | 0 | 0 | |
| f | Operator Table | 9 per city | | | | 99 | 0 | 90 | 0 | 90 | 0 | 90 | 0 | 90 | 0 | 0 | |
| g | HVAC | Cost of required work for 4000 sq. feet | | | | 11 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 0 | |
| h | Lighting | Cost of required work for4000 sq. feet | | | | 11 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 0 | |
| i | Conference Room Tables | 1 per city | | | | 11 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 0 | |
| j | Situation Room Setup (non IT) | Unit includes all the non IT infrastructure | | | | 11 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 0 | |
| k | Networking Services | Includes Bandwidth Provisioning & Internet Connectivity | | | | 11 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 0 | |
| l | Refresher Training of City SPV / ULB Staff | 1 unit = 15 trainee per city per year (includes complete costing of training the staff as per RFP requirements) | | | | 11 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 0 | |
| | **Sub - Total of 5** | **5 = a +b+c+d+e+f+g+h+i+j+k+l** | | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | 0 | |
| | | | | | | | | | | | | | | | | | |
| **6** | **License cost per sensor (per Video and non-Video sensors Including (applicable only when sensor level integration is required to be done)** | **This is cost for operations and comprehensive maintenance Only for 9 Cities** | | | | | | | | | | | | | | | |
| | This includes support cost that includes 24X7 call support, etc. | | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | This is cost of cloud operation (monitoring and management) for the platform (ref Sl # 98, 99 of Functional Requirement of Command and Control Centre provided in Functional Specification provided in annexures of this RFP) | | | | | | | | | | | | | | | |
| a | Video Surveillance for Citizen Safety and Security | Number of nodes provided are indicative and cumulative in nature | | | | 500 | 0 | 1000 | 0 | 1000 | 0 | 1000 | 0 | 1000 | 0 | 0 |
| b | Integrated Enterprise Geographical Information System (GIS) | | | | | 1000 | 0 | 1500 | 0 | 2500 | 0 | 3500 | 0 | 3500 | 0 | 0 |
| c | Smart Parking Management and Guidance | | | | | 1500 | 0 | 2500 | 0 | 3500 | 0 | 3500 | 0 | 3500 | 0 | 0 |
| d | Smart and Integrated City Lighting | | | | | 1500 | 0 | 2500 | 0 | 3500 | 0 | 3500 | 0 | 3500 | 0 | 0 |
| e | Citizen Kiosks for Information and Govt. services | | | | | 1500 | 0 | 2500 | 0 | 3500 | 0 | 3500 | 0 | 3500 | 0 | 0 |
| f | Integrated Solid Waste Management | | | | | 1500 | 0 | 2500 | 0 | 3500 | 0 | 3500 | 0 | 3500 | 0 | 0 |
| g | Intelligent Transport Management System | | | | | 1500 | 0 | 2500 | 0 | 3500 | 0 | 3500 | 0 | 3500 | 0 | 0 |
| h | Intelligent Water Supply Management System | | | | | 1500 | 0 | 2500 | 0 | 3500 | 0 | 3500 | 0 | 3500 | 0 | 0 |
| | **Sub - Total of 6** | **6 = a +b+c+d+e+f+g+h** | | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | 0 |
| | | | | | | | | | | | | | | | | |
| **7** | **Cost for number of client / user licenses for City Operations center platform (applicable only when sensor level integration is required to be done)** | **1 license per 200 sensor licenses (total of line 6 / 200) This is cost for operations and comprehensive maintenance (Only for 10 Cities)** | | | | | | **88** | | **123** | | **123** | | **123** | | **0** |
| | | | | | | | | | | | | | | | | |
| **8** | **Project Resources** | | | | | | | | | | | | | | | |
| a | Program Manager (Common for complete Project) | man year cost (man month rate *12) | | | | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | **0** |
| b | Citizen Service/Municipal Domain expert (Common for complete Project) | man year cost (man month rate *12) | | | | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | **0** |
| c | Cloud PaaS Expert (Common for complete Project) | Availability / Incident | | | | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | **0** |
| d | Command and Control Centre management Expert (Common for complete Project) | man year cost (man month rate *12) | | | | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | **0** |
| e | Database Architect/DBA/ Data Scientist (Common for complete Project) | Availability / Incident | | | | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | **0** |
| f | API Management Expert (Common for complete Project) | Availability / Incident | | | | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | **0** |
| g | GIS expert (Common for complete Project) | Availability / Incident | | | | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | **0** |
| h | ITMS Expert (Common for complete Project) | Availability / Incident | | | | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | **0** |
| i | Mobile App development Expert (Common for complete Project) | Availability / Incident | | | | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | **0** |
| j | Project Manager-Infrastructure (Common for complete Project) | Availability / Incident | | | | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | **0** |
| k | Project Manager-Software (Common for complete Project) | Availability / Incident | | | | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | **0** |
| l | ICT Security Expert (Common for complete Project) | Availability / Incident | | | | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | **0** |
| m | ICT Infrastructure Expert (Common for complete Project) | Availability / Incident | | | | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | **0** |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| n | Solution Architect (Common for complete Project) | Availability / Incident | | | | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | **0** |
| o | Surveillance Expert (Common for complete Project) | Availability / Incident | | | | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | **0** |
| p | Water SCADA or Electrical SCADA expert (Common for complete Project) | Availability / Incident | | | | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | **0** |
| q | Support Executives for City ICCC (24*7 – 1 in each shift with 8 hrs shift) (to be deployed only in 10 cities) | man year cost (man month rate *12) | | | | 33 | 0 | 30 | 0 | 30 | 0 | 30 | 0 | 30 | 0 | **0** |
| | **Sub - Total of 8** | **8= a +b+c+d+e+f+g+h+i+j+k+l+m+n+o+p+q** | | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | **0** |
| | | | | | | | | | | | | | | | | |
| **9** | **O&M for Common Cloud Operations and Command Center Application Platform** | **This is cost for operations and comprehensive maintenance** | | | | | | | | | | | | | | |
| a | Cloud Operations DC | Consumption for hosting common applications, audit related services, testing, etc. | | | | 10 | 0 | 9 | 0 | 9 | 0 | 9 | 0 | 9 | 0 | **0** |
| b | Citizen Mobile Application | per City | | | | 10 | 0 | 9 | 0 | 9 | 0 | 9 | 0 | 9 | 0 | **0** |
| c | GIS service Platform | per City | | | | 10 | 0 | 9 | 0 | 9 | 0 | 9 | 0 | 9 | 0 | **0** |
| d | E-Governance application | E-Governance application for all the ULBs of Tamil Nadu | | | | 10 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | **0** |
| e | Common Command Center Application | Common applications on common cloud platform (like command Center Application, EMS, KM, DBMS, Privilege Access Management System, Identity Access Management System, Information,etc, as per RFP) including regular upgrades / updates, tests, as per RFP) | | | | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | **0** |
| | **Sub - Total of 9** | **9 = a +b+c+d+e** | | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | **0** |
| | | | | | | | | | | | | | | | | |
| **10** | **Year wise Total** | | | | **₹ 0.00** | | **₹ 0.00** | | **₹ 0.00** | | **₹ 0.00** | | **₹ 0.00** | | **₹ 0.00** | **₹ 0.00** |
| **11** | **Total Project value** | ₹ 0.00 | | **Total Project CAPEX** | | ₹ 0.00 | **Total Project O&M** | | **₹ 0.00** | | | | | | | |
| **12** | **Total Net Present Value of the O&M period of project (@ 10%)** | **₹ 0.00** | | | | | | | | | | | | | | |

| | |
|---|---|
| **Bid Value for Evalutation (Total CAPEX + NPV of O&M)** | **₹ 0.00** |

*N.B –*
*The price quoted in the format given above will be used for evaluation purposes and will be treated as total envisaged value of the project. However the payment will be done on the basis of actual completion of the respective items in a particular month.*

*PBG will be required to be created by the appointed MSI based on the total value of the project (CAPEX + O&M) as shown in the financial bid.*

*Above given Financial Bid has 2 parts OPEX and O&M (for 5 years)*

*Bidder must ensure that all amounts to be quoted in INR.*

*Unit priced for Manpower cost is per annum, and at the time of monthly payment – payment will be done as per man month rate which is equal to Manpower rate per annum divided by 12.*

*Assumptions of Units are provided in the financial bid table.*

*Value coated as total price must contain all the components required for the successful implementation of the project. Nothing extra will be paid by the authority beyond the value coated in the above form, until there is change request is approved by Authority.*

*Telephone (landline), Electricity and Water consumption bills will be initially paid by MSI, then reimbursed by City SPV along with invoice of following month.*

*Taxes as applicable at the time of invoicing shall be considered. Any changes (upward or downward) in the taxes/duties shall be accordingly revised at the time of actual payments and paid. Service Tax & Cess will be paid by TUFIDCO as per the norms defined by Government of India at the time of actual payment.*

*Bidder is requested to check final figure in all the totals of the sheets. TUFIDCO is not responsible for errors in the financial bid document.*

## 7. Annexure 7 (a) – Performance Bank Guarantee

Ref: _____ Date _____

Bank Guarantee No. _____

<Name>

<Designation>

<Addre
ss>
<Phone
Nos.>
<Fax
Nos.>
<Email
id>

Whereas, <<name of the supplier and address>> (hereinafter called "the System Integrator") has undertaken, in pursuance of contract no. <Insert Contract No.> dated. <Date> to provide Implementation services for <<name of the assignment>> to [TUFIDCO] (hereinafter called "the Purchaser")

And whereas it has been stipulated by in the said contract that the bidder shall furnish you with a bank guarantee by a recognized bank for the sum specified therein as security for compliance with its obligations in accordance with the contract;

And whereas we, <Name of Bank> a banking company incorporated and having its head/registered office at <Address of Registered Office> and having one of its office at <Address of Local Office> have agreed to give the supplier such a bank guarantee.

Now, therefore, we hereby affirm that we are guarantors and responsible to you, on behalf of the supplier, up to a total of Rs.<Insert Value> (Rupees <Insert Value in Words> only) and we undertake to pay you, upon your first written demand declaring the supplier to be in default under the contract and without cavil or argument, any sum or sums within the limits of Rs. <Insert Value> (Rupees <Insert Value in Words> only)

as aforesaid, without your needing to prove or to show grounds or reasons for your demand or the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the bidder before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the contract to be performed there under or of any of the contract documents which may be made between you and the System Integrator shall in any way release us from any liability under this guarantee and we hereby waive notice of any such change, addition or modification.

This Guarantee shall be valid until <<Insert Date>>)

Notwithstanding anything contained herein:

I. Our liability under this bank guarantee shall not exceed Rs. <Insert Value> (Rupees <Insert Value in Words> only).

II. This bank guarantee shall be valid up to <Insert Expiry Date>)

III. It is condition of our liability for payment of the guaranteed amount or any part thereof arising under this bank guarantee that we receive a valid written claim or demand for payment under this bank guarantee on or before <Insert Expiry Date>) failing which our liability under the guarantee will automatically cease.

Date _____

Place _____ Signature _____

Witness _____ Printed name _____

**(Bank's common seal**

## 8. Annexure 7 (b) – Bank Guarantee for Earnest Money Deposit

To,

<Name>

<Designation>

<Address>

<Phone Nos.>

<Fax Nos.>

<Email id>

Whereas <<Name of the bidder>> (hereinafter called 'the System Integrator') has submitted the bid for Submission of RFP <<RFP Number>> dated <<Date>> for <<Name of the assignment>> (hereinafter called "the Bid") to <<Purchaser>> .

Know all Men by these presents that we <<… >> having our office at <<Address>> (hereinafter called "the Bank") are bound unto the << Purchaser >> (hereinafter called "the Purchaser") in the sum of Rs. <<Amount in figures>> (Rupees <<Amount in words>> only) for which payment well and truly to be made to the said Purchaser, the Bank binds itself, its successors and assigns by these presents. Sealed with the Common Seal of the said Bank this <<Date>>.

The conditions of this obligation are:

1. If the Bidder having its bid withdrawn during the period of bid validity specified by the Bidder on the Bid Form; or
2. If the Bidder, having been notified of the acceptance of its bid by the Purchaser during the period of validity of bid

(a) Withdraws his participation from the bid during the period of validity of bid document; or

(b) Fails or refuses to participate in the subsequent Tender process after having been short listed;

We undertake to pay to the Purchaser up to the above amount upon receipt of its first written demand, without the Purchaser having to substantiate its demand, provided that in its demand the Purchaser will note that the amount claimed by it is due to it owing to the occurrence of one or both of the two conditions, specifying the occurred condition or conditions.

This guarantee will remain in force up to <<insert date>> and including <<extra time over and above mandated in the RFP>> from the last date of submission and any demand in respect thereof should reach the Bank not later than the above date.

NOTHWITHSTANDING ANYTHING CONTAINED HEREIN:

I. Our liability under this Bank Guarantee shall not exceed Rs. <<Amount in figures>> (Rupees

<<Amount in words>> only)
II. This Bank Guarantee shall be valid up to <<*insert date*>>)

III. It is condition of our liability for payment of the guaranteed amount or any part thereof arising under this Bank Guarantee that we receive a valid written claim or demand for payment under this Bank Guarantee on or before <<insert date>>) failing which our liability under the guarantee will automatically cease.

(Authorized Signatory of the Bank)

Seal:

Date:

## 9. Annexure 8 - Non-Disclosure Agreement

WHEREAS, we the undersigned Bidder, _____, having our principal place of business or registered office at _____, are desirous of bidding for RFP No. <<>> dated <<DD-MM-2017>> "**Request for Proposal for Master System Integrator to Design, Develop, Implement and Maintain the Common Cloud Based DC and DR, Citizen Application and E-Governance Application along with Integrated Command and Control Center (ICCC) for ten smart cities (Coimbatore, Madurai, Salem, Thanjavur, Tiruchirapalli, Vellore, Tirunelveli, Tiruppur, Erode and Thoothukudi) of Tamil Nadu** " (hereinafter called the said 'RFP') to the "[TUFIDCO]", hereinafter referred to as 'Purchaser'

and,

WHEREAS, the Bidder is aware and confirms that the Purchaser's business or operations, information, application or software, hardware, business data, architecture schematics, designs, storage media and other information or documents made available by the Purchaser in the RFP documents during the bidding process and thereafter, or otherwise (confidential information for short) is privileged and strictly confidential and or or proprietary to the Purchaser,

NOW THEREFORE, in consideration of disclosure of confidential information, and in order to ensure the Purchaser's grant to the Bidder of specific access to Purchaser's confidential information, property, information systems, network, databases and other data, the Bidder agrees to all of the following conditions.

It is hereby agreed as under:

1. The confidential information to be disclosed by the Purchaser under this Agreement ("Confidential Information") shall include without limitation, any and all information in written, representational, electronic, verbal or other form relating directly or indirectly to processes, methodologies, algorithms, risk matrices, thresholds, parameters, reports, deliverables, work products, specifications, architecture, project information, security or zoning strategies & policies, related computer programs, systems, trend analysis, risk plans, strategies and information communicated or obtained through meetings, documents, correspondence or

inspection of tangible items, facilities or inspection at any site to which access is permitted by the Purchaser.

2. Confidential Information does not include information which:

   a. the Bidder knew or had in its possession, prior to disclosure, without limitation on its confidentiality;

   b. information in the public domain as a matter of law;

   c. is obtained by the Bidder from a third party without any obligation of confidentiality;

   d. the Bidder is required to disclose by order of a competent court or regulatory authority;

   e. is released from confidentiality with the written consent of the Purchaser.

The Bidder shall have the burden of proving hereinabove are applicable to the information in the possession of the Bidder.

3. The Bidder agrees to hold in trust any Confidential Information received by the Bidder, as part of the Tendering process or otherwise, and the Bidder shall maintain strict confidentiality in respect of such Confidential Information, and in no event a degree of confidentiality less than the Bidder uses to protect its own confidential and proprietary information. The Bidder also agrees:

   a. to maintain and use the Confidential Information only for the purposes of bidding for this RFP and thereafter only as expressly permitted herein;

   b. to only make copies as specifically authorized by the prior written consent of the Purchaser and with the same confidential or proprietary notices as may be printed or displayed on the original;
   c. to restrict access and disclosure of Confidential Information to their employees, agents, consortium members and representatives strictly on a "need to know" basis, to maintain confidentiality of the Confidential Information disclosed to them in accordance with this clause; and

   d. to treat Confidential Information as confidential unless and until Purchaser expressly notifies the Bidder of release of its obligations in relation to the said Confidential Information.

4. Notwithstanding the foregoing, the Bidder acknowledges that the nature of activities to be performed as part of the Tendering process or thereafter may require the Bidder's personnel to be present on premises of the Purchaser or may require the Bidder's personnel to have access to software, hardware, computer networks, databases, documents and storage media of the Purchaser while on or off premises of the Purchaser. It is understood that it would be impractical for the Purchaser to monitor all information made available to the Bidder's personnel under such circumstances and to provide notice to the Bidder of the confidentiality of all such information.

   Therefore, the Bidder shall disclose or allow access to the Confidential Information only to those personnel of the Bidder who need to know it for the proper performance of their duties in relation to this project, and then only to the extent reasonably necessary. The Bidder will take appropriate steps to ensure that all personnel to whom access to the Confidential Information is given are aware of the Bidder's confidentiality obligation. Further, the Bidder shall procure that all personnel of the Bidder are bound by confidentiality obligation in relation to all proprietary and Confidential Information received by them which is no less onerous than the confidentiality obligation under this agreement.

5. The Bidder shall establish and maintain appropriate security measures to provide for the safe custody of the Confidential Information and to prevent unauthorised access to it.

6. The Bidder agrees that upon termination or expiry of this Agreement or at any time during its currency, at the request of the Purchaser, the Bidder shall promptly deliver to the Purchaser the Confidential Information and copies thereof in its possession or under its direct or indirect control, and shall destroy all memoranda, notes and other writings prepared by the Bidder or its Affiliates or directors, officers, employees or advisors based on the Confidential Information and promptly certify such destruction.

7. Confidential Information shall at all times remain the sole and exclusive property of the Purchaser. Upon completion of the Tendering process and or or termination of the contract or at any time during its currency, at the request of the Purchaser, the Bidder shall promptly deliver to the Purchaser the Confidential Information and copies thereof in its possession or under its direct or indirect control, and shall destroy all memoranda, notes and other writings prepared by the Bidder or its Affiliates or directors, officers, employees or advisors based on the Confidential Information within a period of sixty days from the date of receipt of notice, or

destroyed, if incapable of return. The destruction shall be witnessed and so recorded, in writing, by an authorized representative of the Purchaser. Without prejudice to the above the Bidder shall promptly certify to the Purchaser, due and complete destruction and return. Nothing contained herein shall in any manner impair rights of the Purchaser in respect of the Confidential Information.

8. In the event that the Bidder hereto becomes legally compelled to disclose any Confidential Information, the Bidder shall give sufficient notice and render best effort assistance to the Purchaser to enable the Purchaser to prevent or minimize to the extent possible, such disclosure. Bidder shall not disclose to a third party any Confidential Information or the contents of this RFP without the prior written consent of the Purchaser. The obligations of this Clause shall be satisfied by handling Confidential Information with the same degree of care, which the Bidder applies to its own similar Confidential Information but in no event less than reasonable care.

**For and on behalf of:**

(BIDDER)

| | |
|---|---|
| Authorised Signatory | Office Seal: |
| Name: | Place: |
| Designation: | Date : |

# 10. Annexure 9 - Consortium Agreement

**DRAFT MEMORANDUM OF UNDERSTANDING EXECUTED BY MEMBERS OF THE**

**CONSORTIUM. The Agreement to be valid for a minimum period of 6 Years or till the end of the Contract Period, whichever is later.**

*[On Non-judicial stamp paper of INR 100 duly attested by notary public]*

This Memorandum of Understanding (MoU) entered into this day of [Date] [Month] 2015 at [Place] among _____ _____ (hereinafter referred to as "_____") and having office at [Address], India, as Party of the First Part and _____ _____ (hereinafter referred as "_____") and having office at [Address], as Party of the Second Part and _____ _____

(hereinafter referred as "____") and having office at [Address], as Party of the Third Part.

The parties are individually referred to as Party and collectively as Parties.

WHEREAS DIT, Govt. of [state] has issued a Request for Proposal dated [Date] (RFP) from the Applicants interested in **Request for Proposal for Master System Integrator to Design, Develop, Implement and Maintain the Common Cloud Based DC and DR, Citizen Application and E-Governance Application along with Integrated Command and Control Center (ICCC) for ten smart cities (Coimbatore, Madurai, Salem, Thanjavur, Tiruchirapalli, Vellore, Tirunelveli, Tiruppur, Erode and Thoothukudi) of Tamil Nadu**

AND WHEREAS the Parties have had discussions for formation of a Consortium for bidding for the said Project and have reached an understanding on the following points with respect to the Parties' rights and obligations towards each other and their working relationship.

AS MUTUAL UNDERSTANDING OF THE PARTIES, IT IS HEREBY AGREED AND

DECLARED AS FOLLOWS:

i. The purpose of this Agreement is to define the principles of collaboration among the Parties to:

Submit a response jointly to Bid for the "**Request for Proposal for Master System Integrator to Design, Develop, Implement and Maintain the Common Cloud Based DC and DR, Citizen Application and E-Governance Application along with Integrated Command and Control Center (ICCC) for ten smart cities (Coimbatore, Madurai, Salem, Thanjavur, Tiruchirapalli, Vellore, Tirunelveli, Tiruppur Erode and Thoothukudi) of Tamil Nadu "** as a Consortium.

a. Sign Contract in case of award.

b. Provide and perform the supplies and services which would be ordered by the Purchaser pursuant to the Contract.

This Agreement shall not be construed as establishing or giving effect to any legal entity such as, but not limited to, a company, a partnership, etc. It shall relate solely towards the Purchaser for "**Request for Proposal for Master System Integrator to Design, Develop, Implement and Maintain the Common Cloud Based DC and DR, Citizen Application and E-Governance Application along with Integrated Command and Control Center (ICCC) for ten smart cities (Coimbatore, Madurai, Salem, Thanjavur, Tiruchirapalli, Vellore, Tirunelveli, Tiruppur, Erode and Thoothukudi) of Tamil Nadu"** for and related execution works to be performed pursuant to the Contract and shall not extend to any other activities.

iii. The Parties shall be jointly and severally responsible and bound towards the Purchaser for the performance of the works in accordance with the terms and conditions of the BID document, and Contract.

iv. ---------- (Name of Party) shall act as Lead Partner of the Consortium. As such, it shall act as the coordinator of the Party's combined activities and shall carry out the following functions:

a. To ensure the technical, commercial and administrative co-ordination of the work package

b. To lead the contract negotiations of the work package with the Purchaser.

c. The Lead partner is authorized to receive instructions and incur liabilities for and on behalf of all Parties.

d. In case of an award, act as channel of communication between the Purchaser and the Parties to execute the Contract

v. That the Parties shall carry out all responsibilities as Developer in terms of the Project Agreement.

vi. That the broad roles and the responsibilities of each Party at each stage of the Bidding shall be as below:

Party A: _____

Party B: _____

Party C: _____

vii. That the broad roles and the responsibilities of each Party at each stage of the Project Execution shall be as below:

Party A: _____

Party B: _____

Party C: _____

viii. That the Parties affirm that they shall implement the Project in good faith and shall take all necessary steps to see the Project through expeditiously.

ix. That this MoU shall be governed in accordance with the laws of India and courts in [state] shall have exclusive jurisdiction to adjudicate disputes arising from the terms herein.

In witness whereof the Parties affirm that the information provided is accurate and true and have caused this MoU duly executed on the date and year above mentioned.

(Party of the first part) (Party of the second part) (Party of the third part)

Witness:

i. _____ ____

ii. _____ _____

## 11. Annexure 10 - Format for Power of Attorney to Authorize Signatory

POWER OF ATTORNEY

*[To be executed on non-judicial stamp paper of the appropriate value in accordance with relevant Stamp Act. The stamp paper to be in the name of the company who is issuing the power of attorney.]*

We, M/s._____ (name of the firm or company with address of the registered office) hereby constitute, appoint and authorise Mr. or Ms._____ (Name and residential address) who is presently employed with us and holding the position of _____, as our Attorney to do in our name and our behalf all or any of the acts, deeds or things necessary or incidental to our RFP for the Project _____ (name of the Project), including signing and submission of the RFP response, participating in the meetings, responding to queries, submission of information or documents and generally to represent us in all the dealings with Client or any other Government Agency or any person, in connection with the works until culmination of the process of bidding till the Project Agreement is entered into with _____ (Client) and thereafter till the expiry of the Project Agreement.

We hereby agree to ratify all acts, deeds and things lawfully done by our said Attorney pursuant to this power of attorney and that all acts, deeds and things done by our aforesaid Attorney shall and shall always be deemed to have been done by us.

(Add in the case of a Consortium)

Our firm is a Member or Lead bidder of the Consortium of _____, _____ and

_____.

Dated this the _____ day of _____ 2015

(Signature and Name of authorized signatory)

_____

(Signature and Name in block letters of all the remaining partners of the firm Signatory for the Company)

Seal of firm Company

Witness 1: Witness 2:

*Notes:*

a. *To be executed by all the members individually.*

b. *The Mode of execution of the power of attorney should be in accordance with the procedure, if any laid down by the applicable law and the charter documents of the executant(s) and when it is so required the same should be under common seal affixed in accordance with the required procedure.*

## 12. Annexure 11 - Format for Power of Attorney for Lead bidder of Consortium

*[To be executed on non-judicial stamp paper of the appropriate value in accordance with relevant Stamp Act. The stamp paper to be in the name of the company who is issuing the power of attorney]*

Whereas _____ has invited RFP response for _____ (Name of the Project)

Whereas, the Members of the Consortium comprising of M/s._____, M/s._____, M/s._____ and M/s._____ (the respective names and addresses of the registered offices to be given) are interested in bidding for the Project and implementing the same in accordance with the terms and conditions contained in the RFP Documents.

Whereas, it is necessary for the members of the Consortium to designate one of them as the lead member with all necessary power and authority to do, for and on behalf of the Consortium, all acts, deeds and things as may be necessary in connection with the Consortium's RFP response for the Project.

NOW THIS POWER OF ATTORNEY WITNESSETH THAT

We, M/s._____ and M/s _____ and M/s_____ hereby designate M/s. _____

being one of the members of the Consortium, as the lead member of the Consortium, to do on behalf of the Consortium, all or any of the acts, deeds or things necessary or incidental to the Consortium's RFP response for the Project, including submission of the RFP response, participating in meetings, responding to queries, submission of information or documents and generally to represent the Consortium in all its dealings with Client or any other Government Agency or any person, in connection with the Project until culmination of the process of bidding till the Project Agreement is entered into with Client and thereafter till the expiry of the Project Agreement.

We hereby agree to ratify all acts, deeds and things lawfully done by our said Attorney pursuant to this power of attorney and that all acts, deeds and things done by our

aforesaid Attorney shall and shall always be deemed to have been done by us or Consortium.

Dated this the _____ day of _____ 2017

_____

(signature)

_____

(Name in Block Letter of Executant) *[seal of Company]*

Witness 1 Witness 2

*Notes:*

*To be executed by all the members individually, in case of a Consortium.*

*The Mode of execution of the power of attorney should be in accordance with the procedure, if any laid down by the applicable law and the charter documents of the executant(s) and when it is so required the same should be under common seal affixed in accordance with the required procedure.*

# 13. Annexure 12: Common guidelines/ comments regarding the compliance of equipment/ systems

1. The specifications mentioned for various IT / Non-IT components are indicative requirements and should be treated for benchmarking purpose only. Bidders are required to undertake their own requirement analysis and may propose higher specifications that are better suited to the requirements.

2. Any manufacturer and product name mentioned in the Tender should not be treated as a recommendation of the manufacturer / product.

3. None of the IT / Non-IT equipment's proposed by the Bidder should be End of Life product. It is essential that the technical proposal is accompanied by the OEM certificate in the format given in Section 5.11 (Form 10) of Volume I of this Tender, where-in the OEM will certify that the product is not end of life & shall support for at least 7 years from the date of Bid Submission.

4. Technical Bid should be accompanied by OEM's product brochure / datasheet. Bidders should provide complete make, model, part numbers and sub-part numbers for all equipment/software quoted, in the Technical Bid.

5. Bidder should ensure that only one make and model is proposed for one component in Technical Bid for example all workstations must belong to a single OEM and must be of the same model etc.

6. Bidders should ensure complete warranty and support for all equipment from OEMs. All the back-to-back service agreements should be submitted along with the Technical Bid.

7. All equipment, parts should be original and new.

8. The user interface of the system should be a user friendly Graphical User Interface (GUI).

9. Critical core components of the system should not have any requirements to have proprietary platforms and should conform to open standards.

10. For custom made modules, industry standards and norms should be adhered to for coding during application development to make debugging and maintenance easier. Object oriented programming methodology must be followed to facilitate sharing, componentizing and multiple-use of standard code. Before hosting the application, it shall be subjected to application security audit (by any of the CERTIN

empanelled vendors) to ensure that the application is free from any vulnerability; and approved by the TUFIDCO.

11. All the Clients Machines / Servers shall support static assigned IP addresses or shall obtain IP addresses from a DNS/DHCP server.

12. The Successful Bidder should also propose the specifications of any additional hardware/Non IT infrastructure, if required for the system.

13. The design consideration of the system is given in this volume. The Successful Bidder must provide the architecture of the solution it is proposing.

14. MSI is required to ensure that there is no choking point / bottleneck anywhere in the system (end-to-end) and enforce performance and adherence to SLAs. SLA reports must be submitted as specified in the Bid without fail.

15. All the hardware and software supplied should be from the reputed Original Equipment Manufacturers (OEMs) and approved by TUFIDCO.

16. All licenses should be in the name of the TUFIDCO and should be Perpetual.

17. The proposed solution of MSI should meet the minimum specification requirements for respective component, bidder need to size the solution components to meet the project requirement. In case any of the system / appliance could not meet the performance requirement during the implementation testing or operations phase, MSI will be responsible to change the same with equivalent/better product without any additional cost to TUFIDCO.

18. All components to be maintained in redundancy with Active - Active / Active-Passive Clustering based on the SLA requirements, architecture and performance. Bidder need to provide the compliance with respect to each clause and clear reference-able document, highlighting how the stated requirement is being met. All components should be sized to meet the required performance and SLA level when one of the redundant devices is down.

19. The proposed solution should be optimized for power, rack space, bandwidth while ensuring high availability and no single point of failure across the architecture.

20. The proposed systems and IT Infrastructure components like servers, storage, network etc. should be of enterprise class and must be current as per OEMs latest offering, in line with advancements of technology in these domains. Bidder need to provide the published benchmarks for the stated systems along with the sizing assessment sheet being certified by the OEM for the stated systems. All the components should be able to handle expected loads and provision the desired transaction times and throughputs.

21. The proposed systems and IT infrastructures components like servers, storage, network devices and software systems should be latest as per current technology trends and it should be upgradable. It is MSI's responsibility to proactively take care of system obsolescence planning. The systems should not become obsolescent before 5 years (of O&M). For proposed hardware and software systems, support from OEMs should be available for at-least 5 years (of O&M). Failing which it will be MSI's responsibility to provide support free of cost for initial 5 years of O&M.

22. Servers should be based on x86 platform in high density form factor to ensure optimal power and space usage. However, bidder may suggest rack form factor for any specific server usage, stating clearly the benefits being derived without compromising on the power and cooling factors.

23. The database layer should utilize the database servers for consolidating the database requirements. The architecture should have horizontal scalability. Benefits/additional security, reliability, availability features at the server level architecture would be given due consideration during evaluation

24. Redundancies/teaming should be maintained at different interconnecting fabrics so as to avoid any single point of failure / performance bottleneck

25. Networking equipment should be capable of processing IPV4 & IPV6 traffic. Security features that are delivered shall be IP v 6 ready.

26. All devices should be IPv4 and IPv6 ready from day-1. MSI shall deploy IPv4 and IPV6 dual stack supported network from day-1. The proposed solution and all appliances should meet this requirement. The MSI shall also be responsible for security adherence on both IPv4 and IPv6.

27. Bidder should utilize virtualization technology to optimise the solution and provide benefits for the overall Cost of ownership and ease of maintenance.

28. Proposed environment at DC should support set up and operations of multiple OEMs / brands of servers and storage without having any compatibility issue.

29. In future if TUFIDCO plans to monetize the project, MSI should not have any objection. Rather it will be expected by the MSI to provide full support to TUFIDCO.

30. If TUFIDCO decides to retain the command center operators (some or all or none) provided by MSI after the project tenure, MSI will not have any objection.

# 14. Annexure 13 : Change Control Note

| **Change Control Note:** | **CCN Number :** |
|---|---|
| **Part A : Initiation** | |
| Title: | |
| Originator: | |
| Sponsor: | |
| Date of Initiation: | |
| **Details of Proposed Change** | |
| (To include reason for change and appropriate details/specifications. Identify any attachments as A1, A2, and A3 etc.) | |
| Authorised by TUFIDCO | Date: |
| **Name:** | |
| **Signature:** | |
| **Received by the bidder:** | **Date:** |
| **Name:** | |
| **Signature:** | |
| **Change Control Note:** | **CCN Number :** |
| **Part B : Evaluation** | |
| (Identify any attachments as B1, B2, and B3 etc.)<br>Changes to Services, payment terms, payment profile, documentation, training, service levels and component working arrangements and any other contractual issue | |
| **Brief Description of Solution:** | |
| **Impact:** | |
| **Deliverables:** | |

| | |
|---|---|
| **Timetable:** | |
| **Charges for implementation including a schedule of payments)** | |
| Other Relevant Information:<br><br>(including value-added and acceptance criteria) | |
| **Authorized by the Bidder** | **Date:** |
| **Name:** | |
| **Signature:** | |
| **Change Control Note** | **CCN Number :** |
| **Part C : Authority to Proceed** | |
| Implementation of this CCN as submitted in Part A, in accordance with Part B is: (tick as appropriate) | |
| **Approved**<br><br>**Rejected**<br><br>**Requires Further Information** (as follows, or as Attachment 1 etc.) | |
| **For TUFIDCO and its nominated Agencies** | **For MSI** |
| Signature | Signature |
| Name | Name |
| Title | Title |
| Date | Date |

# 15. Annexure 14: Form of Agreement

**[TO BE EXECUTED ON STAMP PAPER]**

**Master Services Agreement**

This Agreement is made on _____ day of _____, 2017 at Chennai, Tamil Nadu

BY AND BETWEEN

TUFIDCO, a company incorporated under the Companies Act, 1956 having its registered office at 490, Anna Salai, Nandanam, Chennai-35(hereinafter referred to as the 'Authority', which expression shall, unless repugnant to the meaning hereof, would include its successors in interest and assigns) of the First Part

AND

_____, a company incorporated under the Companies Act, _____, having its registered office at _____, (hereinafter referred to as the 'MSI', which expression shall, unless repugnant to the context, would include its successors in interest and permitted assigns) of the Second Part

AND

[Insert name and details of the company in case of a consortium]

Each of the parties mentioned above are collectively referred to as the 'Parties' and individually as a 'Party'.

**WHEREAS**

1. The Authority has been authorized by seven smart cities to _____ through Power of Attorney dated _____;

2. The Authority has issued an RFP bearing number _____ dated _____ for 'Selection of Master System Integrator for providing a Cloud based Common Integrated Data Center & Disaster Recovery Center and establish City Integrated Command and Control Centers for the Smart Cities of Tamil Nadu' (hereinafter the 'RFP'), for an on behalf of the seven smart cities of the State of Tamil Nadu;

3. The MSI has submitted its proposal dated _____ (hereinafter referred to as the 'Proposal', which term shall include all clarifications and additional documents submitted by MSI with reference to the Proposal) in response to the RFP;

4. The Authority has accepted the Proposal and has agreed to appoint the MSI for execution of the scope of work under the RFP and has issued a letter of award notifying the MSI of its selection as successful bidder vide letter dated _____ ('Letter of Award');

5. In consideration of the foregoing and the mutual covenants and promises contained herein and other good and valuable consideration, the receipt and adequacy of which is hereby acknowledged, the Parties intend to be bound legally by the terms and conditions agreed in this Agreement.

NOW THIS AGREEMENT WITNESSETH AS FOLLOWS:

1. The MSI [and Consortium Partner] agree to provide goods and services and perform other obligations as per the terms and conditions of this Agreement;

2. The Authority, for itself and on behalf of the seven smart cities of State of Tamil Nadu, agrees to perform its obligations as per the terms and conditions of this Agreement.

3. The following documents shall form an integral part of this Agreement:

   (i) The RFP, along with all schedules, annexures, corrigendum and clarifications thereto and all documents referred to in the said RFP;
   (ii) The Proposal, along with all schedules, annexures, clarifications and additional documents thereto.

In witness whereof, the Parties hereto have caused this Contract to be signed in their respective names as of the day and year first above written.

| **For and on behalf of First Party:** | **For and on behalf of Second Party:** | **For and on behalf of Third Party:** |
|---|---|---|
| Signature: | Signature: | Signature: |
| Name:<br>Employee Code:<br>Designation: | Name:<br>Employee Code:<br>Designation: | Name:<br>Employee Code:<br>Designation: |
| **In Witness of** | **In Witness of** | **In Witness of** |

| | | |
|---|---|---|
| Signature:<br><br>Name:<br>Address: | Signature:<br><br>Name:<br>Address: | Signature:<br><br>Name:<br>Address: |

# 16. Annexure 15: Details of ICT Systems of Smart Cities in Tamil Nadu

## As-Is and To-Be Comparison

*The Purpose of As-Is and To-Be Comparison is to project the data flow and bandwidth required for the envisaged ICT components for future integration.*

**Comparison for the below mentioned ICT components are listed below**:

- ICT enabled Smart Classrooms
- Smart Water Metering Solution
- Smart Parking
- ICT enabled Solid Waste Management
- Smart Street Lighting
- Smart Surveillance Systems
- Smart Traffic Management System

As-Is and To-Be Comparison for ICT enabled Smart Classrooms for Vellore

| Existing Infrastructure | Required Infrastructure |
|---|---|

| # | Description | Qty | Comments (Observations) | Description | Qty | Remarks (rationale and background behind the input provided - along with clarity in terms of additional requirements defined) |
|---|---|---|---|---|---|---|
| 1 | Total Number of Schools in the city | 79 | The information collected from the staff | Total Number of Schools required in the city | 0 | No Additional school required in the city |
| 2 | Average number of Class rooms in each school | 7 | | Average number of Class rooms required in each school | 0 | No Additional classrooms required in each school |
| 3 | Total number of schools with Smart Classrooms in the city | - | | Total number of schools with Smart Classrooms required in the city | 79 | The VSCL has given the priority to start smart class rooms in all the schools. The smart classroom includes smart learning techniques, advanced technology (systems, specialised software, digital learning materials, projector & multimedia devices). |
| 4 | Average number of Smart Classroom in each school | - | | Average number of Smart Classroom required in each school | 5 | Initially we have planned at least 5 smart classrooms in each school. VSCL will take further steps to implement all the class rooms to be converted into smart classrooms in future. |

| | | | | | | |
|---|---|---|---|---|---|---|
| 5 | Average number of Smart Classrooms with Video Conferencing Facility | - | | Average number of Smart Classrooms with Video Conferencing Facility required in each school | (5+2 - CEO & DEO) = 7 | At present we have decided to start minimum 7 video conferencing facilities within the school premises. |
| 6 | Average number of Smart Classrooms with dedicated online portal for syllabus | - | | Average number of Smart Classrooms required with dedicated online portal for syllabus | 5 | All Smart Classrooms required Online portal system. |

**As-Is and To-Be Comparison for Smart Water Metering Infrastructure for Vellore**

| **Existing Water Metering Infrastructure** | | | | **Required Water Metering Infrastructure** | | |
|---|---|---|---|---|---|---|
| **#** | **Description** | **Qty** | **Comments (Observations)** | **Description** | **Qty** | **Remarks (rationale and background behind the input provided - along with clarity in terms of additional requirements defined)** |
| 1 | Total Number of Commercial Water Meter Connections | 205 | The data collected from the corporation staff | Required Number of Commercial Water Meter Connections (Smart Meter) | 305 | Need to replace old water meters with SCADA enabled water meters |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2 | Total Number of Residential Water Meter Connections | 60,772 | | Required Number of Residential Water Meter Connections (Smart Meter) | 1,20,772 | Need to replace old water meters with SCADA enabled meters |
| 3 | SCADA enabled Water Meters | No | | Total no of Manpower required for capturing meter readings - Zone Wise | 0 | |
| | If Yes - Mention the Make, Model and the connectivity used for SCADA operations | - | | **Requirement of SCADA enabled Water Meters** | Yes | |
| 4 | **Privatized Electricity Departments** | No | | If Yes - Mention the connectivity to be used for SCADA operations | - | |

**As-Is and To-Be Comparison for Smart Parking Management System for Vellore**

| **Existing Parking Infrastructure** | | | | **Required Parking Infrastructure** | | |
|---|---|---|---|---|---|---|
| **#** | **Description** | **Qty** | **Comments (Observations)** | **Description** | **Qty** | **Remarks (rationale and background behind** |

| | | | | | | **the input provided - along with clarity in terms of additional requirements defined)** |
|---|---|---|---|---|---|---|
| 1 | Number of Government Owned Parking lots | 3 | The details are furnished from the corporation staff | Required Average Parking Area (in SQ.FT) | 18,000 MLCP | |
| 2 | Average Parking Area (in SQ.FT) | 9,000 | | Average number of slots/Parking lot required | 2,000 | |
| 3 | Average number of slots/Parking lot | 1,200 | | Average no of Slot - Two Wheeler/Parking Slot required | 2,000 | |
| 4 | Average no of Slot - Two Wheeler/Parking Slot | 1,200 | | Average no of Slot - Four Wheeler/Parking Slot required | 300 | |
| 5 | Average no of Slot - Four Wheeler/Parking Slot | - | | Total no of parking with Automated Ticketing System required | 10 | We have planned to start a minimum 10 numbers of automated ticketing system. |
| 6 | Total no of parking with Manual Ticketing System | 3 | The data collected from the officials | Total no of Manpower required per parking lot | 9 | The planned manpower is to monitor and do the necessary services in |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | the parking stations. |
| 7 | Total no of parking with Automated Ticketing System | - | | Total no of parking lots with Parking Sensors required | 10 | VSCL has planned to initiate the parking sensors in every parking locations. It will be helpful to find a parking space more efficient and convenient. |
| 8 | Total no of Manpower required per parking lot | 27 | The data collected from the officials | Requirement of E-Rickshaw Charging Enabled parking lots | Yes | |
| 9 | Total no of parking lots with Parking Sensors | - | | If Yes - Mention total slots for E-Rickshaw Charging/Parking required | 10 | |
| 10 | E-Rickshaw Charging Enabled parking lots | No | | Requirement of CCTV Surveillance | Yes | |
| 11 | If Yes - Mention total slots for E-Rickshaw Charging/Parking | - | | If Yes - Mention the type of cameras required in Parking | 5 (4 static + 1 360 deg.) | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 12 | CCTV Surveillance | No | | Mention the video storage required for CCTV cameras - Capacity/Type | 2 TB | VSCL planned the storage capacity as 2 TB. In future we need to increase the storage capacity upto 12 TB depending upon the usage of CCTVs. The video feeds captured by CCTV should be stored for at least one month. |
| 13 | If Yes - Mention the type of cameras used in Parking | - | | Mention Average number of cameras required in each parking lot | 5 | We need to monitor and control over the safety and security of the parked vehicles |

**As-Is and To-Be Comparison for ICT enabled Solid Waste Management for Vellore**

| **Existing Solid Waste Management System** | | | | **Envisaged Solid Waste Management System** | | |
|---|---|---|---|---|---|---|
| **#** | **Description** | **Qty** | **Comments (Observations)** | **Description** | **Qty** | **Remarks (rationale and background behind the input provided - along with clarity in terms of** |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | **additional requirements defined)** |
| 2 | Name of Road (Landfills) | 1) Saduperi 2) Sathupalaiyam | | Name of Road (landfills) | 1) Saduperi 2)Sathupalaiyam | No New landfill is required |
| 3 | Total no of Landfills in the City | 2 | The information collected from the corporation staff | Total number of Bins in the City with sensors required | 290 | Volume Sensor required in all the Bins |
| 4 | Total number of Garbage trucks in the city (All Garbage Vehicle ) | 54 | | Type of Sensors required at the Bins (Weight or Volume Sensor) | Yes (Volume Sensor) | |
| 5 | Total number of Garbage collection carts in the city (Battery Operated Riksha, Tricycle & Pushcarts) | 400 | | Requirement of ICT enabled Solid Waste Management System in city | Yes | |
| 6 | Total number of Bins in the City | 290 | | If Yes - Mention Total number of Garbage trucks with GPS | 54 | Only GPS to be installed in Existing Vehicles |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | required in the city | | |
| 7 | Total number of Bins in the City with sensors | NIL | | Total number of Garbage collection carts with GPS required in the city | 250 | |
| 8 | Frequency of Garbage collection by trucks for each Bin | Daily | | Requirement of RFID tagging system used for Local Bins | Yes | |
| 9 | Frequency of Garbage collection by carts for each Bin | Daily | | Define suggestive Manpower required for routine garbage collection in the city | Yes | |
| 10 | ICT Solid Waste Management System already exists ? | No | | Requirement of CCTV Surveillance at Garbage bins | Yes | |
| 11 | If Yes - Mention Total number of Garbage trucks in the city with GPS | NIL | | Mention total number of cameras required at each Garbage Bin | 1 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 12 | Total number of Garbage collection carts in the city with GPS | NIL | | Weight Bridge at Main Dumpyard | Yes | |
| 13 | City has a centralised portal for tracking all the vehicle | No | | Requirement of connecting Weight Bridge with CCC | Yes | |
| 14 | Weight Bridge at Main Dumpyard | Yes | | City requires a centralised portal for tracking all the vehicle | Yes | |
| 15 | Define total Manpower required for routine garbage collection in the city | 1787 | The information furnished from the corporation staff | Heat Sensor required at landfill in the city | Yes | |

**As-Is and To-Be Comparison for Smart Street Lighting System for Vellore**

| **Existing Street Lighting System** | | | | **Envisaged Smart Street Lighting System** | | |
|---|---|---|---|---|---|---|
| **#** | **Description** | **Qty** | **Comments (Observations)** | **Description** | **Qty** | **Remarks (rationale and background behind the input provided - along with clarity in terms of additional requirements defined)** |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | Number of Street light Poles | 19,218 | The information collected from the corporation staff | Total Number of Street light Poles | 4,000 | The new poles to be planted in the PAN city. |
| 2 | Average height of Pole (in Meters) | 6 Mts | The details furnished form the corporation staff | Required Pole Height (in Meters) | 9 Mts | To accommodate additional provision such as CCTV, advertisement screen, panic button etc. |
| 3 | Switching Capabilities - Manual / Automatic | Manual & Automatic | | Required Switching Capabilities - Manual / Automatic | Automatic | |
| 4 | Total no of lights on Pole | 20,850 | The information collected from the corporation staff | Required No of lights on Pole | 4,500 | To cover the PAN city area |
| 5 | Wattage of Light | 15,20, 24,36, 70,150 ,250,400,80 | The information collected from the corporation staff | Required Wattage of Light | 20, 80, 150 LED | To have lesser power consumption |
| 6 | Sensor Equipped | No | | Requirement of Sensors in Pole? | Yes | |

**As-Is and To-Be Comparison for Smart CCTV Surveillance System for Vellore**

| Existing CCTV Surveillance Setup | Required CCTV Surveillance System |
|---|---|

| # | Description | Qty | Comments (Observations) | Description | Qty | Remarks (rationale and background behind the input provided - along with clarity in terms of additional requirements defined) |
|---|---|---|---|---|---|---|
| 1 | Total Number of CCTV Cameras Installed in the City | 30 - Police | The information collected from the staff | Total Number of CCTV Cameras required in the Educational Institutions | 395 | It helps to identify, monitoring and keeping track of activities in educational institutions |
| 2 | Total Number of CCTV Cameras Installed in the Educational Institutions | - | | Average Number of CCTV Cameras required in each Educational Institution | 5 | VSCL has proposed to install the CCTVs to monitor the activities in institutions. |
| 3 | Average Number of CCTV Cameras Installed in each Educational Institution | - | | Total Number of CCTV Cameras required in the Hospitals (4 - Cameras , 6 - Hospitals) | 24 | CCTV surveillance system help to monitor the hospital management and create |
| 4 | Total Number of CCTV Cameras Installed in the Hospitals | - | | Average Number of CCTV Cameras | 4 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | required in each Hospital | | safety environment |
| 5 | Average Number of CCTV Cameras Installed in each Hospital | - | | Total Number of CCTV Cameras required in the Markets (10 - markets) | 70 | It can help to monitor and tracking the activities at the market to identify any illegal activity |
| 6 | Total Number of CCTV Cameras Installed in the Markets | - | | Average Number of CCTV Cameras required in each Market | 10 | |
| 7 | Average Number of CCTV Cameras Installed in each Market | - | | Total number of Indoor Cameras required in the City (3 - Bus stand) | 40 | It can help to monitor the activities of public in the bus stand |
| 8 | Total number of Indoor Cameras Installed in the City | 32 Office | The information collected from the staff | Total number of Outdoor Cameras required in the City (Police Department) | 300 | It can help to monitor the activities of public |
| 9 | Total number of Outdoor Cameras Installed in the City | - | | Total Number of PTZ (Point Tilt Zoom) Cameras required in the City | 300 | It can help to monitor the activities of public |
| 10 | Total Number of PTZ (Point Tilt Zoom) Cameras installed in the City | 30 Police | The information collected from the staff | Total Number of Fixed Dome Cameras required in the City | - | |
| 11 | Total Number of Fixed Dome Cameras installed in the City | 32 Office | | Total Number of Wireless Cameras required in the City | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 12 | Total Number of Wireless Cameras installed in the City | - | | Total Number of Wired Cameras required in the City | 340 | It can help to monitor the activities of public |
| 13 | Total Number of Wired Cameras installed in the City | 46 | The information collected from the staff | Average Video Storage capacity required in each Department/Institution | 24 TB | For retrival of fottage of previos days for verification by police or the departmen t |
| 14 | Average Video Storage capacity in each Department/Institution | - | | Is it required to be Centrally Monitored? | Yes | |
| 15 | Is it Centrally Monitored | No | | If Yes - Define the authority monitoring the cameras | Office - 1 Police - 2 | |

**As-Is and To-Be Comparison for Smart Traffic Management System for Vellore**

| **Existing Traffic Management System** | | | | **Envisaged Traffic Management System** | | |
|---|---|---|---|---|---|---|
| **#** | **Description** | **Qty** | **Comments (Observations)** | **Description** | **Qty** | **Remarks (rationale and background behind the input provided - along with clarity in terms of additional requirements defined)** |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | Total Number of Traffic Signal Installed in the City | 28 | The data collected from the official | Total Number of Traffic Signal required in the City | 30 | - |
| 2 | Total Number of Automated Signals Installed in the City | 21 | | Total Number of Automated Signals required in the City | 22 | - |
| 3 | Total number of junctions with Red Light Violation Detection (RLVD) Cameras Installed in the city | - | - | Total number of junctions with Red Light Violation Detection (RLVD) Cameras required in the city | 22 | - |
| 4 | Average number of RLVD cameras installed in each junction | - | - | Average number of RLVD cameras required in each junction | 4 | - |
| 5 | Total number of junctions with Automated Number Plate Recognition (ANPR) Cameras Installed in the city | - | - | Total number of junctions with Automated Number Plate Recognition (ANPR) Cameras required in the city | 22 | - |
| 6 | Average number of ANPR cameras installed in each junction | - | - | Average number of ANPR cameras required in each junction | 2 | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| 7 | Average Number of CCTV Cameras Installed in each Market | - | - | Total number of Buses with GPS required in the City ( Private - 50 , Government - 150) | 200 | - |
| 8 | Total number of Variable Messaging Displays (VMD) Installed in the city | - | - | Total number of Variable Messaging Displays (VMD) required in the city | 50 | - |
| 9 | How messages are fed into VMD (Remotely / Onsite) | - | - | Is there a requirement for Centralised portal for Monitoring GPS enabled Buses | Yes | - |
| 10 | Centralised portal for Monitoring GPS enabled Buses | No | - | Is there a requirement for Passenger information system at bus stops? | Yes | - |

**As-is and To-Be comparison for Smart Classrooms in Madurai**

| **Existing Setup of Classrooms / Schools** | | | | **Envisaged Setup of Classrooms / Schools** | | |
|---|---|---|---|---|---|---|
| # | Description | Qty | Comments | Description | Qty | Remarks (rationale and background behind the input provided - along with clarity in terms of additional requirements defined) |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | Total Number of Schools in the city | 97 | | Total Number of Schools required in the city | - | |
| 2 | Average number of class rooms in each school | 12 | | Average number of class rooms required in each school | - | |
| 3 | Total number of schools with Smart Classrooms in the city | 6 | | Total number of schools with Smart Classrooms required in the city | 17 | |
| 4 | Average number of Smart Classroom in each school | Each school allotted 1 class room | | Average number of Smart Classroom in each school required | - | |
| 5 | Average number of Smart Classrooms with Video Conferencing Facility | No | | Average number of Smart Classrooms with Video Conferencing Facility required | No | |
| 6 | Average number of Smart Classrooms with dedicated online portal for syllabus | No | | Average number of Smart Classrooms required with dedicated online portal for syllabus | No | |

**As-is and To-Be comparison for Smart Water Metering System in Madurai**

| **Existing Setup of Water Meters** | | | | **Envisaged Setup of Smart Water Metering System** | | |
|---|---|---|---|---|---|---|
| # | Description | Qty | Comments | Description | Qty | Remarks (rationale and background behind the input provided - along with clarity in terms of additional |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | requirements defined) |
| 1 | Total Number of Commercial Water Meter Connections | 4,451 | 1. Lack of planned maintenance schedules<br>2. Lack of data or response in case of emergency repairs<br>3. Ineffective grievance redressed for water distribution failures and sewage system blocks.<br>4. Polluted water distribution during rainy reason.<br>5. No live data from the distribution system of its normal functioning, usages pattern and blockages. | Required Number of Commercial Power Meter Connections | 4,451 | It is proposed to meter the entire water network through a combination of conventional meters and AMRs (Automated Meter Reading). The AMRs would be installed for bulk consumers and at the distribution zones. Pressure, Flow and Water quality sensors would be installed to monitor the service parameters across the network and SCADA based monitoring of the entire system. Billing would be automated by the SCADA system and payments would be enabled through Kiosks, web and mobile applications. SCADA to be installed at 13 OHT |
| 2 | Total Number of Residential Water Meter Connections | 152,918 | | Required Number of Residential Power Meter Connections | 152,918 | |
| 3 | Make and Model (Mention all Makes and Models) | flat rate connections | | Required no of Digital Meters | 157,369 | |
| 4 | Meter type - Digital/Analog/Semi Digital | -- | | Total no of Manpower required for capturing meter readings - Zone Wise | 8 | |
| 5 | Average number of Digital Meters | -- | | Requirement of SCADA enabled Power Meters | Yes | |
| 6 | Average number of Semi Digital Meters | -- | | If Yes - Mention the connectivity to be used for SCADA operations | SCADA | |
| 7 | Average number of Analog Meters | -- | | Requirement of Handheld devices used for Capturing meter reading | Yes | |
| 8 | Total no of Manpower required for capturing meter readings - Zone Wise | 100 | | If Yes - Mention the total number of Handheld Devices required | 8 | |

**As-is and To-Be Comparison of Parking Management System in the Madurai**

| Existing Setup of Parking | Envisaged Setup of Smart Parking Management System |
|---|---|

| # | Description | Qty | Comments | Description | Qty | Remarks (rationale and background behind the input provided - along with clarity in terms of additional requirements defined) |
|---|---|---|---|---|---|---|
| 1 | Number of Government Owned Parking lots | 3 | 1. There is no centralized and organized parking system present in the city. 2. There are is no information available on location of parking lots, availability of parking spaces. 3. No mechanism available to levy parking charges for on-street parking. | Required Average Parking Area (in SQ.FT) | 100000 ( 21 Location) | All the parking locations will be earmarked. On-street and off-street parking facilities will be specified with rated capacity on all locations. Consumers will be using solar operated kiosks to avail the parking facility tickets. The Kiosks will be connected to a backend system which will have real-time parking availability information. The real time parking information and ticketing and payment facilities will be available to the customer through these kiosks, web and mobile applications. |
| 2 | Average Parking Area (in SQ.FT) | 165,000 | | Average number of slots/Parking lot required | 3,500 | |
| 3 | Average number of slots/Parking lot | 7,000 | | Average no of Slot - Two Wheeler/Parking Slot required | 3,000 | |
| 4 | Average no of Slot - Two Wheeler/Parking Slot | 7,000 | | Average no of Slot - Four Wheeler/Parking Slot required | 500 | |
| 5 | Average no of Slot - Four Wheeler/Parking Slot | Nil | | Total no of parking with Automated Ticketing System required | 10 No's | |
| 6 | Total no of parking with Manual Ticketing System | 1 | | Total no of Manpower required per parking lot | 100 No's | |
| 7 | Total no of Manpower required per parking lot | 20 | | Total no of parking lots with Parking Sensors required | 10 No's | |
| 8 | E-Rickshaw Charging Enabled parking lots | No | | Requirement of E-Rickshaw Charging Enabled parking lots | Nil | |
| 9 | If Yes - Mention total slots for E-Rickshaw Charging/Parking | Nil | | If Yes - Mention total slots for E-Rickshaw Charging/Parking required | Nil | |
| 10 | CCTV Surveillance | Yes | | Requirement of CCTV Surveillance | Yes | |
| 11 | If Yes - Mention the type of cameras used in Parking | Static | | If Yes - Mention the type of cameras required in Parking | Static | |
| 12 | Mention the video storage used for CCTV cameras - Capacity/Type | 2TB | | Mention the video storage required for CCTV cameras - Capacity/Type | 5TB | |
| 13 | Mention Average number of cameras installed in each parking lot | 5 | | Mention Average number of cameras required in each parking lot | 4 | |

**As-Is and To-Be Comparison of Solid Waste Management System in Madurai**

| **Existing Setup of Solid Waste Management** | | | | **Envisaged Setup of Solid Waste Management** | | |
|---|---|---|---|---|---|---|
| # | Description | Qty | Comments | Description | Qty | Remarks (rationale and background behind the input provided - along with clarity in terms of additional requirements defined) |
| 1 | Name of Road (Landfills) | Vellakkal Road | | Name of Road (landfills) | Name of Road (Landfills) | GPS based vehicle monitoring system with weigh-bridge system integration for monitoring regular collection and transportation of MSW and other waste. |
| 2 | Total no of Landfills in the City | 3 Nos | 1 Nos Completed<br>2 Nos in Progress | Total number of Bins in the City with sensors required | 1409 | 1256 - Dumper Bins<br>153 - Compactor Bins |
| 3 | Total number of Garbage trucks in the city | 187 | 147 corporation owned vehicles<br>40 corporation hired vehicles | Type of Sensors required at the Bins (Weight or Volume Sensor) | Volume | To utilize the full capacity of vehicle volumetric basis monitoring is required |
| 4 | Total number of Garbage collection carts in the city | -- | | Requirement of ICT enabled Solid Waste Management System in city | Yes | All CPM Solid Waste Management based vehicles (140 nos) are fixed with GPS divices. 40 private vehicles to be fixed. |
| 5 | Total number of Bins in the City | 1409 | 1256 - Dumper Bins<br>153 - | If Yes - Mention Total number of Garbage trucks with GPS required in the city | 40 | Private vehicles hired on rental basis. |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | Compactor Bins | | | |
| 6 | Total number of Bins in the City with sensors | -- | | Total number of Garbage collection carts with GPS required in the city | -- | |
| 7 | Frequency of Garbage collection by trucks for each Bin | Everyday | | Requirement of RFID tagging system used for Local Bins | Yes | Required for 1409 bins |
| 8 | Frequency of Garbage collection by carts for each Bin | -- | | Define suggestive Manpower required for routine garbage collection in the city | 300 Nos | 3 persons per ward (100 wards) |
| 9 | ICT Solid Waste Management System already exists ? | Yes | | Requirement of CCTV Surveillance at Garbage bins | Yes | |
| 10 | If Yes - Mention Total number of Garbage trucks in the city with GPS | 147 | 40 Nos hired vehicles requires GPS | Mention total number of cameras required at each Garbage Bin | One | |
| 11 | Total number of Garbage collection carts in the city with GPS | -- | | Weight Bridge at Main Dumpyard | Yes | Already existing (2 nos) |
| 12 | City has a centralised portal for tracking all the vehicle | No | | Requirement of connecting Weight Bridge with CCC | Yes | Already existing |
| 13 | Weight Bridge at Main Dumpyard | Yes | 2 Nos | City requires a centralised portal for tracking all the vehicle | Yes | |
| 14 | Define total Manpower required for routine garbage collection in the city | 4466 Nos / day | 100 wards | Heat Sensor required at landfill in the city | Yes | |

**As-Is and To-Be Comparison of Street Lighting System in Madurai**

| Existing Setup of Street Lighting System | Envisaged Setup of Street Lighting System |
|---|---|

| # | Description | Qty | Comments | Description | Qty | Remarks (rationale and background behind the input provided - along with clarity in terms of additional requirements defined) |
|---|---|---|---|---|---|---|
| 1 | Name of Road | Madurai | 1. High power consumption costs for the city towards street lighting No automated method to switch on/off the street lights during night and low visibility time. | Name of Road | Madurai | Solar based Smart LED lights will be installed in the streets. These lights will sense the ambient sunlight and will get lit automatically night and low visibility conditions. The lights will be turned off when the ambient sun light increases. The smart lights will be connected in the local area to an intelligent smart hub, which send information to a monitoring system. The following information will be collected and used in making decisions. |
| 2 | Number of Street light Poles | 52384 Nos (100 Wards) | | Total Number of Street light Poles | 4383 Nos | |
| 3 | Average height of Pole (in Meters) | 7.5/8.0/9.15 Mtr | | Required Pole Height (in Meters) | 8 Mts | |
| 4 | Switching Capabilities - Manual / Automatic | Manual & Automatic | | Required Switching Capabilities - Manual / Automatic | Automatic | |
| 5 | Total no of lights on Pole | 55260 Nos (100 Wards) | | Required No of lights on Pole | 4833 Nos | |
| 6 | Wattage of Light | 20,28,40,72, 70,150,250,400,4x24,2x36 | | Required Wattage of Light | 20, 40,70,80,135,240w (LED Only) | |
| 7 | Sensor Equipped | Yes | | Requirement of Sensors in Pole? | Yes | |
| 8 | If Yes - Mention type of Sensor and owner of the Data Pings | GPRS/GSM, Sabhari electricals (added 28 wards only) | | If Yes - Mention type of Sensor and owner of the Data Pings | GPRS / GSM | |
| 9 | Raw Material of Pole | RCC Pole, RSJ Pole | | Requirement of SCADA Enabled Street Poles? | Yes | |
| 10 | SCADA Enabled | | | If Yes - Mention type of Sensor and Controller required | GPRS / GSM | |
| 11 | If Yes - Mention type of Sensor and Controller Used | GPRS/GSM | | Mention about the Connectivity to be used for SCADA | GPRS Mode | |
| 12 | Mention about the Connectivity used for SCADA (OFC,GPRS,LoRA) | GPRS | | Required Number of Poles with LED Light | 4383 Nos | |
| 13 | Number of Poles with LED Light | 16178Nos | | Requirement of Un-interrupted Power facility for Light Poles | No | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 14 | Number of Poles with Bulb | 36206 Nos | | If Yes - List out the locations with UPS power facility for Street Light Poles | - | |

**As-Is and To-Be Comparison of Surveillance System in Madurai**

| **Existing Setup of Surveillance System** | | | | **Envisaged Setup of Surveillance System** | | |
|---|---|---|---|---|---|---|
| **#** | **Description** | **Qty** | **Comments** | **Description** | **Qty** | **Remarks (rationale and background behind the input provided - along with clarity in terms of additional requirements defined)** |
| **1** | **Name of Area** | **Madurai** | **1. There are no system available to monitor the sensitive areas which witness crowd surges. No video recordings available to monitor offline for forensic purposes.** | **Total Number of CCTV Cameras required in the City** | **650** | **CCTV surveillance of core-city area to monitor crowd movement and enable early response in case of emergencies. The system will also provide control center for the city surveillance operator for ease of use** |
| **2** | **Total Number of CCTV Cameras Installed in the City** | **88 No's** | | **Total Number of CCTV Cameras required in the Educational Institutions** | **6250** | |
| **3** | **Total Number of CCTV Cameras Installed in the Educational Institutions** | **4350** | | **Average Number of CCTV Cameras required in each Educational Institution** | **5 No's** | |
| **4** | **Average Number of CCTV Cameras Installed in each Educational Institution** | **5 No's** | | **Total Number of CCTV Cameras required in the Hospitals** | **14850** | |
| **5** | **Total Number of CCTV Cameras** | **9520** | | **Average Number of CCTV Cameras** | **10** | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **Installed in the Hospitals** | | | **required in each Hospital** | | **communication to various crowd management entities such as city police, traffic police and emergency response teams. The system will be integrated with Public Announcement System which will be setup on crowd surge areas. This will enable effective crowd management from a single console.** |
| **6** | **Average Number of CCTV Cameras Installed in each Hospital** | **7 No's** | | **Total Number of CCTV Cameras required in the Markets** | **500** | |
| **7** | **Total Number of CCTV Cameras Installed in the Markets** | **375** | | **Average Number of CCTV Cameras required in each Market** | **12** | |
| **8** | **Average Number of CCTV Cameras Installed in each Market** | **12** | | **Total number of Indoor Cameras required in the City** | **77500** | |
| **9** | **Total number of Indoor Cameras Installled in the City** | **1800** | | **Total number of Outdoor Cameras required in the City** | **80000** | |
| **10** | **Total number of Outdoor Cameras Installled in the City** | **1200** | | **Total Number of PTZ (Point Tilt Zoom) Cameras required in the City** | **8000** | |
| **11** | **Total Nmber of PTZ (Point Tilt Zoom) Cameras installed in the City** | **18** | | **Total Number of Fixed Dome Cameras required in the City** | **800** | |
| **12** | **Total Number of Fixed Dome Cameras installed in the City** | **65** | | **Total Number of Wireless Cameras required in the City** | **200** | |
| **13** | **Total Number of Wireless Cameras installed in the City** | **475** | | **Total Number of Wired Cameras required in the City** | **300** | |
| **16** | **Is it Centrally Monitored** | **Yes / No** | | **Is it required to be Centrally Monitored?** | **Yes / No** | |
| **17** | **If Yes - Define the authority monitoring the cameras** | **No** | | **If Yes - Define the authority monitoring the cameras** | **Madurai City Police Department** | |

**As-Is and To-Be Comparison of Traffic Management System in Madurai**

| **Existing Setup of Traffic Management System** | | | | **Envisaged Setup of Traffic Management System** | | |
|---|---|---|---|---|---|---|
| **#** | **Description** | **Qty** | **Comments** | **Description** | **Qty** | **Remarks (rationale and background behind the input provided - along with clarity in terms of additional requirements defined)** |
| **1** | **Total Number of Traffic Signal Installed in the City** | **52** | **1. No live information on public transport for consumers 2. Decreasing share of public transport 3. No feedback mechanism for transport amenities to the public. 4. No data on the performance patterns of individual transport units (Buses and Mini** | **Total Number of Traffic Signal required in the City** | **80** | **Here will be system which will have the collection of the transport routes, live status of the transport system fetched from GPS enabled transport units. The system will monitor the transport units against their dedicated routes for timely operation and bus stop compliance through combined GPS and GIS technology.** |
| **2** | **Total Number of Automated Signals Installed in the City** | **28** | | **Total Number of Automated Signals required in the City** | **50** | |
| **3** | **Total number of junctions with Red Light Violation Detection (RLVD) Cameras Installed in the city** | **12** | | **Total number of junctions with Red Light Violation Detection (RLVD) Cameras required in the city** | **40** | |
| **4** | **Average number of RLVD cameras installed in each junction** | **2** | | **Average number of RLVD cameras required in each junction** | **6** | |
| **5** | **Total number of junctions with Automated Number Plate Recognition (ANPR) Cameras Installed in the city** | **--** | | **Total number of junctions with Automated Number Plate Recognition (ANPR) Cameras required in the city** | **5** | |
| **6** | **Average number of ANPR cameras installed in each junction** | **--** | | **Average number of ANPR cameras required in each junction** | **5** | |
| **7** | **Average Number of CCTV Cameras Installed in each Market** | **12** | | **Average Number of CCTV Cameras required in each Market** | **12** | |
| **8** | **Total number of Buses with GPS in the City** | **--** | | **Total number of Buses with GPS required in the City** | **--** | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **9** | **Total number of Variable Messaging Displays (VMD) Installed in the city** | **--** | **buses) and routes.** | **Total number of Variable Messaging Displays (VMD) required in the city** | **--** | **The system user will be able to view the bus time-table, routes and real time bus arrival. The system will improve the operational efficiency of the operating company (TNSTC). Traffic Mobil App, Automatic fare collection system and Common Card / e-Wallet based ticketing systems will further enhance the experience of the citizens which by increase the usage of the public transport for transit.** |
| **10** | **How messages are fed into VMD (Remotely / Onsite)** | **--** | | **Is there a requirement for Centralised portal for Monitoring GPS enabled Buses** | **Yes / No** | |
| **11** | **Centralised portal for Monitoring GPS enabled Buses** | **Yes / No** | | **Is there a requirement for Passenger information system at bus stops?** | | |

`

**As-Is and To-Be Comparison of Smart Classrooms in Thanjavur**

| **Existing Setup of Classrooms / Schools** | | | **Envisaged Setup of Classrooms / Schools** | | |
|---|---|---|---|---|---|
| **#** | **Description** | **Qty** | **Description** | **Qty** | **Remarks (rationale and background behind the input provided - along with clarity in terms of additional requirements defined)** |
| **1** | **Name of Area** | **Thanjavur** | **Name of Area** | **Thanjavur** | |
| **2** | **Total Number of Schools in the city** | **17** | **Total Number of Schools required in the city** | **17** | **Existing schools are considered.** |
| **3** | **Average number of Class rooms in each school** | **10** | **Average number of Class rooms required in each school** | **10** | |
| **4** | **Total number of schools with Smart Classrooms in the city** | **-** | **Total number of schools with Smart Classrooms required in the city** | **5** | **Schools with higher student strength are considered (based on Corporation Data)** |
| **5** | **Average number of Smart Classroom in each school** | **-** | **Average number of Smart Classroom in each school required** | **5** | **25 Smart Classrooms in total for the city.** |
| **6** | **Average number of Smart Classrooms with Video Conferencing Facility** | **-** | **Average number of Smart Classrooms with Video Conferencing Facility required** | **10** | **In two Smart Classrooms per school** |

| | | | | | |
|---|---|---|---|---|---|
| 7 | **Average number of Smart Classrooms with dedicated online portal for syllabus** | **-** | **Average number of Smart Classrooms required with dedicated online portal for syllabus** | **25** | **In all 25 Smart Classrooms** |

**As-Is and To-Be Comparison of Power Metering Infrastructure in Thanjavur**

| **Existing Setup of Power Metering Infrastructure** | | | **Envisaged Setup of Power Metering Infrastructure** | | |
|---|---|---|---|---|---|
| **#** | **Description** | **Qty** | **Description** | **Qty** | **Remarks (rationale and background behind the input provided - along with clarity in terms of additional requirements defined)** |
| **1** | **Total Number of Commercial Power Meter Connections** | **6,530** | **Required Number of Commercial Power Meter Connections** | | |
| **2** | **Total Number of Residdential Power Meter Connections** | **67,761** | **Required Number of Residdential Power Meter Connections** | | |
| **3** | **Make and Model (Mention all Makes and Models)** | | **Required no of Digital Meters** | **74,291** | **The existing analog meters to be replaced with digital.** |
| **4** | **Meter type - Digital/Analog/Semi Digital** | **Analog** | **Total no of Manpower required for capturing meter readings - Zone Wise** | **TBD** | |
| **5** | **Average number of Digital Meters** | | **Requirement of SCADA enabled Power Meters** | **Yes** | |
| **6** | **Average number of Semi Digital Meters** | | **If Yes - Mention the connectivity to be used for SCADA operations** | **GPRS** | **To be reviewed subsequently.** |
| **7** | **Average number of Analog Meters** | **74,291** | **Reqirement of Handheld devices used for Capturing meter reading** | **Yes** | |
| **8** | **Total no of Manpower required for capturing** | **412** | **If Yes - Mention the total number of Handheld Devices required** | **TBD** | |

| | | | | | |
|---|---|---|---|---|---|
| | **meter readings - Zone Wise** | | | | |
| **9** | **SCADA enabled Power Meters** | **No** | | | |
| **10** | **If Yes - Mention the Make, Model and the connectivity used for SCADA operations** | | | | |
| **11** | **Handheld devices used for Capturing meter reading** | **Yes** | | | |
| **12** | **If Yes - Mention the Make and Model** | | | | |
| **13** | **Privatized Electricity Departments** | **No** | | | |
| **14** | **If Yes - Mention the Company Name** | | | | |
| **15** | **Mention the Zones and Areas covered under each company (In case multiple companies involved)** | | | | |

**As-Is and To-Be Comparison of Water Metering Infrastructure in Thanjavur**

| **Existing Setup of Water Metering Infrastructure** | | | **Envisaged Setup of Water Metering Infrastructure** | | |
|---|---|---|---|---|---|
| **#** | **Description** | **Qty** | **Description** | **Qty** | **Remarks (rationale and background behind the input provided - along with clarity in terms of additional requirements defined)** |
| **1** | **Total Number of Commercial Water Meter Connections** | **NIL** | **Required Number of Commercial water Meter Connections** | **1,300** | **Existing 1129 and 15% additional considered for future.** |
| **2** | **Total Number of Residdential Water Meter Connections** | **NIL** | **Required Number of Residential water Meter Connections** | **29,060** | **Existing 25268 and 15% additional considered for future.** |

| | | | | | |
|---|---|---|---|---|---|
| **3** | **Make and Model (Mention all Makes and Models)** | **NIL** | **Required no of Digital Meters** | **30,360** | **(26, 397 existing and additional 3603 for future)** |
| **4** | **Meter type - Digital/Analog/Semi Digital** | **NIL** | **Total no of Manpower required for capturing meter readings - Zone Wise** | **30** | |
| **5** | **Average number of Digital Meters** | **NIL** | **Requirement of SCADA enabled water Meters** | **YES** | **Under progress as part of AMRUT.** |
| **6** | **Average number of Semi Digital Meters** | **NIL** | **If Yes - Mention the connectivity to be used for SCADA operations** | **GPRS** | **To be reviewed subsequently.** |
| **7** | **Average number of Analog Meters** | **NIL** | **Reqirement of Handheld devices used for Capturing meter reading** | **Yes** | |
| **8** | **Total no of Manpower required for capturing meter readings - Zone Wise** | **NIL** | **If Yes - Mention the total number of Handheld Devices required** | **30** | **To be reviewed subsequently.** |
| **9** | **SCADA enabled Power Meters** | **(No)** | | | |
| **10** | **If Yes - Mention the Make, Model and the connectivity used for SCADA operations** | | | | |
| **11** | **Handheld devices used for Capturing meter reading** | **(No)** | | | |
| **12** | **If Yes - Mention the Make and Model** | | | | |
| **13** | **Privatized Electricity Departments** | **(No)** | | | |
| **14** | **If Yes - Mention the Company Name** | | | | |
| **15** | **Mention the Zones and Areas covered under each company (In case multiple companies involved)** | | | | |

**As-Is and To-Be Comparison of Parking Management System in Thanjavur**

| **Existing Setup of Parking Management** | | | **Envisaged Setup of Parking Management** | | |
|---|---|---|---|---|---|
| **#** | **Description** | **Qty** | **Description** | **Qty** | **Remarks (rationale and background behind the input provided - along with clarity in terms of additional requirements defined)** |
| **1** | **Name of Road** | | **Name of Road** | | |
| **2** | **Number of Government Owned Parking lots** | **5** | **Required Average Parking Area (in SQ.FT)** | **30,000** | **For ABD Area, additional parking space required.** |
| **3** | **Average Parking Area (in SQ.FT)** | **20,000** | **Average number of slots/Parking lot required** | **60** | |
| **4** | **Average number of slots/Parking lot** | **40** | **Average no of Slot - Two Wheeler/Parking Slot required** | **600** | |
| **5** | **Average no of Slot - Two Wheeler/Parking Slot** | **400** | **Average no of Slot - Four Wheeler/Parking Slot required** | **60** | |
| **6** | **Average no of Slot - Four Wheeler/Parking Slot** | **40** | **Total no of parking with Automated Ticketing System required** | **2** | **One Near Old Bus Stand and one near Railway Station.** |
| **7** | **Total no of parking with Manual Ticketing System** | **5** | **Total no of Manpower required per parking lot** | **8** | **Four per parking lot.** |
| **8** | **Total no of parking with Automated Ticketing System** | | **Total no of parking lots with Parking Sensors required** | **2** | |
| **9** | **Total no of Manpower required per parking lot** | **20** | **Requirement of E-Rickshaw Charging Enabled parking lots** | **Yes** | |
| **10** | **Total no of parking lots with Parking Sensors** | **-** | **If Yes - Mention total slots for E-Rickshaw Charging/Parking required** | **5** | **Planned considering future. To be reviewed subsequently.** |
| **11** | **E-Rickshaw Charging Enabled parking lots** | **no** | **Requirement of CCTV Surveillance** | **Yes** | |

| | | | | | |
|---|---|---|---|---|---|
| **12** | **If Yes - Mention total slots for E-Rickshaw Charging/Parking** | **-** | **If Yes - Mention the type of cameras required in Parking** | **cctv** | |
| **13** | **CCTV Surveillance** | **no** | **Mention the video storage required for CCTV cameras - Capacity/Type** | **30 days** | |
| **14** | **If Yes - Mention the type of cameras used in Parking** | **-** | **Mention Average number of cameras required in each parking lot** | **4** | |
| **15** | **Mention the video storage used for CCTV cameras - Capacity/Type** | **-** | | | |
| **16** | **Mention Average number of cameras installed in each parking lot** | **-** | | | |

**As-Is and To-Be Comparison of Solid Waste Management System in Thanjavur**

| **Existing Setup of Solid Waste management** | | | **Envisaged Setup of Solid Waste Management** | | |
|---|---|---|---|---|---|
| **#** | **Description** | **Qty** | **Description** | **Qty** | **Remarks (rationale and background behind the input provided - along with clarity in terms of additional requirements defined)** |
| **1** | **Name of Road (Landfills)** | | **Name of Road (landfills)** | | |
| **2** | **Total no of Landfills in the City** | **1** | **Total number of Bins in the City with sensors required** | **270** | **PAN City (240 existing + 30 additional). Based on the assessment of Municipal Corporation** |
| **3** | **Total number of Garbage trucks in the city** | **32** | **Type of Sensors required at the Bins (Weight or Volume Sensor)** | **Yes** | **Volume Sensor** |

| | | | | | |
|---|---|---|---|---|---|
| **4** | **Total number of Garbage collection carts in the city** | **120** | **Requirement of ICT enabled Solid Waste Management System in city** | **Yes** | |
| **5** | **Total number of Bins in the City** | **240** | **If Yes - Mention Total number of Garbage trucks with GPS required in the city** | **40** | **32 existing plus 8 additional trucks.** |
| **6** | **Total number of Bins in the City with sensors** | **-** | **Total number of Garbage collection carts with GPS required in the city** | **150** | **120 existing plus 30 additional carts.** |
| **7** | **Frequency of Garbage collection by trucks for each Bin** | **Daily** | **Requirement of RFID tagging system used for Local Bins** | **Yes** | |
| **8** | **Frequency of Garbage collection by carts for each Bin** | **Daily** | **Define suggestive Manpower required for routine garbage collection in the city** | **TBD** | |
| **9** | **ICT Solid Waste Management System already exists ?** | **No** | **Requirement of CCTV Surveillance at Garbage bins** | **Yes** | |
| **10** | **If Yes - Mention Total number of Garbage trucks in the city with GPS** | | **Mention total number of cameras required at each Garbage Bin** | **1** | |
| **11** | **Total number of Garbage collection carts in the city with GPS** | | **Weight Bridge at Main Dumpyard** | **Yes** | |
| **12** | **City has a centralised portal for tracking all the vehicle** | **No** | **Requirement of connecting Weight Bridge with CCC** | **Yes** | |
| **13** | **Weight Bridge at Main Dumpyard** | **No** | **City requires a centralised portal for tracking all the vehicle** | **Yes** | |
| **14** | **Define total Manpower required for routine garbage collection in the city** | | **Heat Sensor required at landfill in the city** | **Yes** | |
| **15** | **CCTV at Garbage Bins and Landfills** | **No** | | | |

**As-Is and To-Be Comparison of Street Lighting System in Thanjavur**

| **Existing Setup of Solid Waste Management System** | | | **Envisaged Setup of Solid Waste Management System** | | |
|---|---|---|---|---|---|
| **#** | **Description** | **Qty** | **Description** | **Qty** | **Remarks (rationale and background behind the input provided - along with clarity in terms of additional requirements defined)** |
| **1** | **Number of Street light Poles** | **10,971** | **Total Number of Street light Poles** | **2,000** | **Additional 2000 poles required in PAN City. Based on the assessment of the Municipal Corporation.** |
| **2** | **Average height of Pole (in Meters)** | **9** | **Required Pole Height (in Meters)** | **12** | |
| **3** | **Switching Capabilities - Manual / Automatic** | **Manual** | **Required Switching Capabilities - Manual / Automatic** | **Automatic** | |
| **4** | **Total no of lights on Pole** | **10,971** | **Required No of lights on Pole** | **1** | |
| **5** | **Wattage of Light** | **40,70,150,400,250** | **Required Wattage of Light** | **40,70,150,400, 250** | |
| **6** | **Sensor Equipped** | **Yes / No** | **Requirement of Sensors in Pole?** | **Yes** | |
| **7** | **If Yes - Mention type of Sensor and owner of the Data Pings** | | **If Yes - Mention type of Sensor and owner of the Data Pings** | **TDB** | |
| **8** | **Raw Material of Pole** | **MS, RCC** | **Requirement of SCADA Enabled Street Poles?** | **Yes** | |

| | | | | | |
|---|---|---|---|---|---|
| **9** | **SCADA Enabled** | **(No)** | **If Yes - Mention type of Sensor and Controller required** | **TBD** | |
| **10** | **If Yes - Mention type of Sensor and Controller Used** | | **Mention about the Connectivity to be used for SCADA** | **TBD** | |
| **11** | **Mention about the Connectivity used for SCADA (OFC,GPRS,LoRA)** | | **Required Number of Poles with LED Light** | **2,000** | |
| **12** | **Number of Poles with LED Light** | **309** | **Requirement of Un-interrupted Power facility for Light Poles** | **Yes** | |
| **13** | **Number of Poles with Bulb** | **10,662** | **If Yes - List out the locations with UPS power facility for Street Light Poles** | | **Examples - Near Railway Station, Old Bus Stand** |
| **14** | **Units consumed by LED lighting Poles in a Day** | **11** | | | |
| **15** | **Units consumed by Bulb Lighting Poles in a Day** | | | | |
| **16** | **Un-interrupted Power facility for Light Poles** | **No** | | | |
| **17** | **If Yes - List out the locations with UPS power facility for Street Light Poles** | | | | |

**As-Is and To-Be Comparison of Transport Management System in Thanjavur**

| **Existing Setup of Traffic management System** | | | **Envisaged Setup of Traffic Management System** | | |
|---|---|---|---|---|---|
| **#** | **Description** | **Qty** | **Description** | **Qty** | **Remarks** |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | **(rationale and background behind the input provided - along with clarity in terms of additional requirements defined)** |
| **1** | **Name of Area** | **All** | **Name of Area** | **All** | |
| **2** | **Total Number of Traffic Signal Installed in the City** | **7** | **Total Number of Traffic Signal required in the City** | **20** | **Existing and proposed (PAN City)** |
| **3** | **Total Number of Automated Signals Installed in the City** | **5** | **Total Number of Automated Signals required in the City** | **20** | |
| **4** | **Total number of junctions with Red Light Voilation Detection (RLVD) Cameras Installed in the city** | | **Total number of junctions with Red Light Voilation Detection (RLVD) Cameras required in the city** | **20** | **To be reviewed subsequently.** |
| **5** | **Average number of RLVD cameras installed in each junction** | | **Average number of RLVD cameras required in each junction** | **4** | |
| **6** | **Total number of junctions with Automated Number Plate Recognition (ANPR) Cameras Installed in the city** | | **Total number of junctions with Automated Number Plate Recognition (ANPR) Cameras required in the city** | **20** | **To be reviewed subsequently.** |
| **7** | **Average number of ANPR cameras installed in each junction** | | **Average number of ANPR cameras required in each junction** | **4** | |
| **8** | **Average Number of CCTV** | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | **Cameras Installed in each Market** | | | | |
| **9** | **Total number of Buses with GPS in the City** | | **Total number of Buses with GPS required in the City** | **30** | **Initially planned to be installed in 30 buses on a pilot basis, and subsequently will be considered for extending to all city buses.** |
| **10** | **Total number of Variable Messaging Displays (VMD) Installed in the city** | | **Total number of Variable Messaging Displays (VMD) required in the city** | **TBD** | |
| **11** | **How messeges are fed into VMD (Remotely / Onsite)** | | **Is there a requirement for Centralised portal for Monitoring GPS enabled Buses** | **Yes** | |
| **12** | **Centralised portal for Monitoring GPS enabled Buses** | **Yes / No** | **Is there a requirement for Passenger information system at bus stops?** | **Yes** | |

**As-Is and To-Be Comparison of CCTV Surveillance System in Thanjavur**

| **Existing Setup of Traffic management System** | | | **Envisaged Setup of Traffic Management System** | | |
|---|---|---|---|---|---|
| **#** | **Description** | **Qty** | **Description** | **Qty** | **Remarks (rationale and background behind the input provided - along with clarity in terms of additional** |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | **requirements defined)** |
| **1** | **Total Number of CCTV Cameras Installed in the City** | | **Total Number of CCTV Cameras required in the Educational Institutions** | **34** | **Based on the assessment of Municipal Corporation** |
| **2** | **Total Number of CCTV Cameras Installed in the Educational Institutions** | **nil** | **Average Number of CCTV Cameras required in each Educational Institution** | **2** | **Based on the assessment of Municipal Corporation** |
| **3** | **Average Number of CCTV Cameras Installed in each Educational Institution** | **nil** | **Total Number of CCTV Cameras required in the Hospitals** | **8** | **Based on the assessment of Municipal Corporation** |
| **4** | **Total Number of CCTV Cameras Installed in the Hospitals** | **nil** | **Average Number of CCTV Cameras required in each Hospital** | **2** | **Based on the assessment of Municipal Corporation** |
| **5** | **Average Number of CCTV Cameras Installed in each Hospital** | **nil** | **Total Number of CCTV Cameras required in the Markets** | **8** | **Based on the assessment of Municipal Corporation** |
| **6** | **Total Number of CCTV Cameras Installed in the Markets** | **nil** | **Average Number of CCTV Cameras required in each Market** | **4** | **Based on the assessment of Municipal Corporation** |
| **7** | **Average Number of CCTV Cameras Installed in each Market** | **nil** | **Total number of Indoor Cameras required in the City** | **TBD** | |
| **8** | **Total number of Indoor Cameras Installled in the City** | | **Total number of Outdoor Cameras required in the City** | **TBD** | |
| **9** | **Total number of Outdoor Cameras Installled in the City** | | **Total Number of PTZ (Point Tilt Zoom) Cameras required in the City** | **TBD** | |
| **10** | **Total Nmber of PTZ (Point Tilt Zoom) Cameras installed in the City** | | **Total Number of Fixed Dome Cameras required in the City** | **TBD** | |

| | | | | | |
|---|---|---|---|---|---|
| **11** | **Total Number of Fixed Dome Cameras installed in the City** | | **Total Number of Wireless Cameras required in the City** | **TBD** | |
| **12** | **Total Number of Wireless Cameras installed in the City** | | **Total Number of Wired Cameras required in the City** | **TBD** | |
| **13** | **Total Number of Wired Cameras installed in the City** | | **Average Video Storage capacity required in each Department/Institution** | **30 days** | **To be reviewed subsequently.** |
| **14** | **Average Video Storage capacity in each Department/Institution** | | **Is it required to be Centrally Monitored?** | **Yes** | |
| **15** | **Is it Centrally Monitored** | **Yes** | **If Yes - Define the authority monitoring the cameras** | **TBD** | |

**As-Is and To-Be Comparison of Smart Classrooms in Thoothukudi**

| **Detailed Analysis of Existing Classrooms/Schools** | | | | **Requirements for Envisaged Smart Classrooms** | | | |
|---|---|---|---|---|---|---|---|
| **1** | **Name of the City** | **Thoothukudi** | **Comments (Observations)** | **1** | **Name of the City** | **Thoothukudi** | **Remarks (rationale and background behind the input provided - along with clarity in terms of additional requirements defined)** |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **2** | **Name of Area** | **1.Samuelpuram HSS 2.North Pathirakaliamman street School 3.Melur Pandurangan street school 4.South New street school 5.S.V. Middle school 6.Gin Factory road school 7.Sivanthakulam school 8.Tooveypuram Middle school 9.Shanmugapuram Middle school 10.Thangammalpuram school 11.J.S.Nagar school 12.Athimarapatti school 13.Mudukkukadu school 14.Bharathinagar school** | | **2** | **Name of Area** | **1.Murugesanagar 2.P&T Colony** | |
| **3** | **Total Number of Schools in the city** | **14** | | **3** | **Total Number of Schools required in the city** | **2** | |
| **4** | **Average number of Class rooms in each school** | **8** | | **4** | **Average number of Class rooms required in each school** | **12** | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **5** | **Total number of schools with Smart Classrooms in the city** | **-** | | **5** | **Total number of schools with Smart Classrooms required in the city** | **14** | |
| **6** | **Average number of Smart Classroom in each school** | **-** | | **6** | **Average number of Smart Classroom in each school required** | **2** | |
| **7** | **Average number of Smart Classrooms with Video Conferencing Facility** | **-** | | **7** | **Average number of Smart Classrooms with Video Conferencing Facility required** | **1** | |
| **8** | **Average number of Smart Classrooms with dedicated online portal for syllabus** | **-** | | **8** | **Average number of Smart Classrooms required with dedicated online portal for syllabus** | **1** | |

**As-Is and To-Be Comparison of Power Metering in Thoothukudi**

| **Detailed Analysis of Existing Power Metering Infrastructure** | | | | **Requirement of Envisaged Smart Power Metering Infrastructure** | | | |
|---|---|---|---|---|---|---|---|
| 1 | Name of the City | Thoothukudi | Comments (Observations) | 1 | Name of the City | Thoothukudi | Remarks (rationale and background behind the input provided - along with clarity in terms of additional requirements defined) |
| 2 | Total Number of Commercial Power Meter Connections | 180599 | | 2 | Required Number of Commercial Power Meter Connections | 180,599 | |
| 3 | Total Number of Residdential Power Meter Connections | 37827 | | 3 | Required Number of Residdential Power Meter Connections | 37,827 | |
| 4 | Make and Model (Mention all Makes and Models) | LANDISGYR-LGM405, Genus-03C, Capital-CS12, Vision Tek-APT102, Genus-O1B, Avon-AEM306, HPL-PPEM01, Secure-E3D108 | | 4 | Required no of Digital Meters | 45,711 | |
| 5 | Meter type - Digital/Analog/Semi Digital | Digital | | 5 | Total no of Manpower required for capturing meter readings - Zone Wise | 29 | |
| 6 | Average number of Digital Meters | 93524 | | 6 | **Requirement of SCADA enabled** | No | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | **Power Meters** | | |
| 7 | Average number of Semi Digital Meters | 20895 | | 7 | If Yes - Mention the connectivity to be used for SCADA operations | - | |
| 8 | Average number of Analog Meters | 24816 | | 8 | **Reqirement of Handheld devices used for Capturing meter reading** | yes | |
| 9 | Total no of Manpower required for capturing meter readings - Zone Wise | 29 | | 9 | If Yes - Mention the total number of Handheld Devices required | 45 | |
| 10 | **SCADA enabled Power Meters** | No | | | | | |
| 11 | If Yes - Mention the Make, Model and the connectivity used for SCADA operations | - | | | | | |
| 12 | **Handheld devices used for Capturing meter reading** | No | | | | | |
| 13 | If Yes - Mention the Make and Model | SANDS-DMRI 1010, SANDS-DMRI 1006, Analogics-AXT 2019 | | | | | |
| 14 | **Privatized Electricity Departments** | No | | | | | |
| 15 | If Yes - Mention the Company Name | - | | | | | |
| 16 | Mention the Zones and Areas covered under each company (In case multiple companies involved) | - | | | | | |

**As-Is and To-Be Comparison of Water Metering in Thoothukudi**

| **Detailed Analysis of Existing Water Metering Infrastructure** | | | | **Requirement of Envisaged Smart Water Metering Infrastructure** | | | |
|---|---|---|---|---|---|---|---|
| 1 | Name of the City | Thoothukudi | Comments (Observations) | 1 | Name of the City | Thoothukudi | Remarks (rationale and background behind the input provided - along with clarity in terms of additional requirements defined) |
| 2 | Total Number of Commercial Water Meter Connections | 1787 5(Industries) | | 2 | Required Number of Commercial Water Meter Connections (Smart Meter) | 8077+22 | |
| 3 | Total Number of Residdential Water Meter Connections | 47,483 | | 3 | Required Number of Residdential Water Meter Connections (Smart Meter) | 41172 | |
| 4 | Make and Model (Mention all Makes and Models) | Anand,Dosmaster,Konark | | 4 | Required no of Digital Meters | - | |
| 5 | Meter type - Digital/Analog/Semi Digital | Analog | | 5 | Total no of Manpower required for capturing meter readings - Zone Wise | North-15<br>West-14<br>East-18<br>South-12 | |
| 6 | Average number of Digital Meters | - | | 6 | **Requirement of SCADA enabled Water Meters** | No | |
| 7 | Average number of Semi Digital Meters | | | 7 | If Yes - Mention the connectivity to be used for SCADA operations | - | |
| 8 | Average number of Analog Meters | | | 8 | **Reqirement of Handheld devices used** | No | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | **for Capturing meter reading** | | |
| 9 | Total no of Manpower required for capturing meter readings - Zone Wise | North-15 West-14 East-18 South-13 | | 9 | If Yes - Mention the total number of Handheld Devices required | - | |
| 10 | **SCADA enabled Water Meters** | No | | | | | |
| 11 | If Yes - Mention the Make, Model and the connectivity used for SCADA operations | - | | | | | |
| 12 | **Handheld devices used for Capturing meter reading** | No | | | | | |
| 13 | If Yes - Mention the Make and Model | - | | | | | |
| 14 | **Privatized Electricity Departments** | No | | | | | |
| 15 | If Yes - Mention the Company Name | - | | | | | |
| 16 | Mention the Zones and Areas covered under each company (In case multiple companies involved) | - | | | | | |

**As-Is and To-Be Comparison of Smart Parking in Thoothukudi**

| **Detailed Analysis of Existing Parking Management System** | | | | **Requirement for Envisaged Smart Parking Management System** | | | |
|---|---|---|---|---|---|---|---|
| **1** | **Name of the City** | **Thoothukudi** | **Comments (Observations)** | **1** | **Name of the City** | **Thoothukudi** | **Remarks (rationale and background behind the input provided -** |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | **along with clarity in terms of additional requirements defined)** |
| **2** | **Name of Road** | **New Bus stand, Old Bus stand** | | **2** | **Name of Road** | | |
| **3** | **Number of Government Owned Parking lots** | **2** | | **3** | **Required Average Parking Area (in SQ.FT)** | **15000(HLCP)** | |
| **4** | **Average Parking Area (in SQ.FT)** | **3,000** | | **4** | **Average number of slots/Parking lot required** | **1,600** | |
| **5** | **Average number of slots/Parking lot** | **500** | | **5** | **Average no of Slot - Two Wheeler/Parking Slot required** | **1,600** | |
| **6** | **Average no of Slot - Two Wheeler/Parking Slot** | **500** | | **6** | **Average no of Slot - Four Wheeler/Parking Slot required** | **250** | |
| **7** | **Average no of Slot - Four Wheeler/Parking Slot** | **-** | | **7** | **Total no of parking with Automated Ticketing System required** | **3** | |
| **8** | **Total no of parking with Manual Ticketing System** | **2** | | **8** | **Total no of Manpower required per parking lot** | **9** | |
| **9** | **Total no of parking with Automated Ticketing System** | **-** | | **9** | **Total no of parking lots with Parking Sensors required** | **3** | |
| **10** | **Total no of Manpower required per parking lot** | **6** | | **10** | **Requirement of E-Rickshaw Charging Enabled parking lots** | **No** | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **11** | **Total no of parking lots with Parking Sensors** | **-** | | **11** | **If Yes - Mention total slots for E-Rickshaw Charging/Parking required** | **-** | |
| **12** | **E-Rickshaw Charging Enabled parking lots** | **No** | | **12** | **Requirement of CCTV Surveillance** | **Yes** | |
| **13** | **If Yes - Mention total slots for E-Rickshaw Charging/Parking** | **-** | | **13** | **If Yes - Mention the type of cameras required in Parking** | **6 (4 static + 2 (360 deg.)** | |
| **14** | **CCTV Surveillance** | **No** | | **14** | **Mention the video storage required for CCTV cameras - Capacity/Type** | **2 TB** | |
| **15** | **If Yes - Mention the type of cameras used in Parking** | **-** | | **15** | **Mention Average number of cameras required in each parking lot** | **5** | |
| **16** | **Mention the video storage used for CCTV cameras - Capacity/Type** | **-** | | | | | |
| **17** | **Mention Average number of cameras installed in each parking lot** | **-** | | | | | |

**As-Is and To-Be Comparison of Solid Waste Management in Thoothukudi**

| **Details of Existing Solid Waste Management System** | **Requirements of Envisaged ICT Based Solid Waste Management System** |
|---|---|

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **1** | **Name of the City** | **Thoothukudi City Municipal Corporation** | **Comments (Observations)** | **1** | **Name of the City** | **Thoothukudi City Municipal Corporation** | **Remarks (rationale and background behind the input provided - along with clarity in terms of additional requirements defined)** |
| **2** | **Name of Road (Landfills)** | **-** | | **2** | **Name of Road (landfills)** | **Tharuvaikulam** | |
| **3** | **Total no of Landfills in the City** | **Nil** | | **3** | **Total number of Bins in the City with sensors required** | **210** | |
| **4** | **Total number of Garbage trucks in the city (All Garbage Vehicle )** | **13 + ( Pvt ) 18** | | **4** | **Type of Sensors required at the Bins (Weight or Volume Sensor)** | **Yes (Volume Sensor) Type** | |
| **5** | **Total number of Garbage collection carts in the city (Battery Operated Riksha, Tricycle & Pushcarts)** | **60 + (Pvt ) 80** | | **5** | **Requirement of ICT enabled Solid Waste Management System in city** | **Yes** | |
| **6** | **Total number of Bins in the City** | **75 + (Pvt) 80** | | **6** | **If Yes - Mention Total number of Garbage trucks with GPS required in the city** | **35** | |
| **7** | **Total number of Bins in the City with sensors** | **NIL** | | **7** | **Total number of Garbage collection carts with GPS required in the city** | **210** | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 8 | **Frequency of Garbage collection by trucks for each Bin** | **5** | | 8 | **Requirement of RFID tagging system used for Local Bins** | **Yes** | |
| 9 | **Frequency of Garbage collection by carts for each Bin** | **2** | | 9 | **Define suggestive Manpower required for routine garbage collection in the city** | **Yes. 1420** | |
| 10 | **ICT Solid Waste Management System already exists ?** | **Yes** | | 10 | **Requirement of CCTV Surveillance at Garbage bins** | **Yes** | |
| 11 | **If Yes - Mention Total number of Garbage trucks in the city with GPS** | **12 + (Pvt ) 5** | | 11 | **Mention total number of cameras required at each Garbage Bin** | **210** | |
| 12 | **Total number of Garbage collection carts in the city with GPS** | **NIL** | | 12 | **Weight Bridge at Main Dumpyard** | **Yes** | |
| 13 | **City has a centralised portal for tracking all the vehicle** | **Yes** | | 13 | **Requirement of connecting Weight Bridge with CCC** | **Yes** | |
| 14 | **Weight Bridge at Main Dumpyard** | **Yes** | | 14 | **City requires a centralised portal for tracking all the vehicle** | **Yes** | |
| 15 | **Define total Manpower required for routine garbage collection in the city** | **255 + (Pvt) 501** | | 15 | **Heat Sensor required at landfill in the city** | **Yes** | |
| 16 | **CCTV at Garbage Bins and Landfills** | **No** | | | | | |

**As-Is and To-Be Comparison of Street Lighting System in Thoothukudi**

| **Detailed Analysis of Existing Street Lighting System** | | | | **Requirement for Envisaged Smart Street Lighting System** | | | |
|---|---|---|---|---|---|---|---|
| **1** | **Name of the City** | **Thoothukudi City Municipal Corporation** | **Comments (Observations)** | **1** | **Name of the City** | **Thoothukudi City Municipal Corporation** | **Remarks (rationale and background behind the input provided - along with clarity in terms of additional requirements defined)** |
| **2** | **Name of Road** | **Thoothukudi** | | **2** | **Name of Road** | **Thoothukudi** | |
| **3** | **Number of Street light Poles** | **15,078** | | **3** | **Total Number of Street light Poles** | **15,078** | |
| **4** | **Average height of Pole (in Meters)** | **6 Mts** | | **4** | **Required Pole Height (in Meters)** | **9 Mts** | |
| **5** | **Switching Capabilities - Manual / Automatic** | **Manual & Automatic** | | **5** | **Required Switching Capabilities - Manual / Automatic** | **Automatic** | |
| **6** | **Total no of lights on Pole** | **15,078** | | **6** | **Required No of lights on Pole** | **15,078** | |
| **7** | **Wattage of Light** | **15,20,24,36,70,150,250,400,80** | | **7** | **Required Wattage of Light** | **20,80,150 LED** | |
| **8** | **Sensor Equipped** | **No** | | **8** | **Requirement of Sensors in Pole?** | **Yes** | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 9 | If Yes - Mention type of Sensor and owner of the Data Pings | - | | 9 | If Yes - Mention type of Sensor and owner of the Data Pings | - | |
| 10 | Raw Material of Pole | - | | 10 | Requirement of SCADA Enabled Street Poles? | No | |
| 11 | SCADA Enabled | No | | 11 | If Yes - Mention type of Sensor and Controller required | - | |
| 12 | If Yes - Mention type of Sensor and Controller Used | - | | 12 | Mention about the Connectivity to be used for SCADA | - | |
| 13 | Mention about the Connectivity used for SCADA (OFC,GPRS,LoRA) | - | | 13 | Required Number of Poles with LED Light | - | |
| 14 | Number of Poles with LED Light | - | | 14 | Requirement of Un-interrupted Power facility for Light Poles | No | |
| 15 | Number of Poles with Bulb | - | | 15 | If Yes - List out the locations with UPS power facility for Street Light Poles | - | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **16** | **Units consumed by LED lighting Poles in a Day** | **-** | | | | | |
| **17** | **Units consumed by Bulb Lighting Poles in a Day** | **-** | | | | | |
| **18** | **Un-interrupted Power facility for Light Poles** | **-** | | | | | |
| **19** | **If Yes - List out the locations with UPS power facility for Street Light Poles** | **No** | | | | | |

**As-Is and To-Be Comparison of Surveillance System in Thoothukudi**

| **Detailed Analysis of Existing CCTV Surveillance Setup** | | | | **Requirements for Envisaged Smart CCTV Surveillance Setup** | | | |
|---|---|---|---|---|---|---|---|
| | | **Thoothukudi** | **Comments (Observations)** | | | **Thoothukudi** | **Remarks (rationale and background behind the input provided - along with clarity in terms of additional requirements defined)** |
| **1** | **Name of the City** | | | **1** | **Name of the City** | | |
| **2** | **Name of Area** | | | **2** | **Total Number of CCTV Cameras required in the City** | | |
| **3** | **Total Number of CCTV Cameras Installed in the City** | **20 - Police** | | **3** | **Total Number of CCTV Cameras required in the Educational Institutions** | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **4** | **Total Number of CCTV Cameras Installed in the Educational Institutions** | **-** | | **4** | **Average Number of CCTV Cameras required in each Educational Institution** | | |
| **5** | **Average Number of CCTV Cameras Installed in each Educational Institution** | **-** | | **5** | **Total Number of CCTV Cameras required in the Hospitals (4 - Cameras , 6 - Hospitals)** | | |
| **6** | **Total Number of CCTV Cameras Installed in the Hospitals** | **-** | | **6** | **Average Number of CCTV Cameras required in each Hospital** | | |
| **7** | **Average Number of CCTV Cameras Installed in each Hospital** | **-** | | **7** | **Total Number of CCTV Cameras required in the Markets (10 - markets)** | | |
| **8** | **Total Number of CCTV Cameras Installed in the Markets** | **-** | | **8** | **Average Number of CCTV Cameras required in each Market** | | |
| **9** | **Average Number of CCTV Cameras Installed in each Market** | **-** | | **9** | **Total number of Indoor Cameras required in the City (3 - Bus stand)** | | |
| **10** | **Total number of Indoor Cameras Installled in the City** | | | **10** | **Total number of Outdoor Cameras required in the City (Police Department)** | | |
| **11** | **Total number of Outdoor Cameras Installled in the City** | | | **11** | **Total Number of PTZ (Point Tilt Zoom) Cameras required in the City** | | |
| **12** | **Total Nmber of PTZ (Point Tilt Zoom) Cameras installed in the City** | | | **12** | **Total Number of Fixed Dome Cameras required in the City** | | |
| **13** | **Total Number of Fixed Dome Cameras installed in the City** | | | **13** | **Total Number of Wireless Cameras required in the City** | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 14 | **Total Number of Wireless Cameras installed in the City** | | | 14 | **Total Number of Wired Cameras required in the City** | | |
| 15 | **Total Number of Wired Cameras installed in the City** | | | 15 | **Average Video Storage capacity required in each Department/Institution** | | |
| 16 | **Average Video Storage capacity in each Department/Institution** | | | 16 | **Is it required to be Centrally Monitored?** | | |
| 17 | **Is it Centrally Monitored** | | | 17 | **If Yes - Define the authority monitoring the cameras** | | |
| 18 | **If Yes - Define the authority monitoring the cameras** | - | | | | | |
| 19 | **Average Number of CCTV Cameras required in each Market** | | | | | | |

**As-Is and To-Be Comparison of Traffic Management System in Thoothukudi**

| **Detailed Analysis of Existing Traffic Management System** | | | | **Requirements for Envisaged Smart Traffic Management System** | | | |
|---|---|---|---|---|---|---|---|
| **1** | **Name of the City** | **Thoothukudi** | **Comments (Observations)** | **1** | **Name of the City** | **Thoothukudi** | **Remarks (rationale and background behind the input provided - along with clarity in terms of additional requirements defined)** |
| **2** | **Name of Area** | | | **2** | **Name of Area** | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **3** | **Total Number of Traffic Signal Installed in the City** | **3** | | **3** | **Total Number of Traffic Signal required in the City** | **4** | |
| **4** | **Total Number of Automated Signals Installed in the City** | **3** | | **4** | **Total Number of Automated Signals required in the City** | **4** | |
| **5** | **Total number of junctions with Red Light Voilation Detection (RLVD) Cameras Installed in the city** | **-** | | **5** | **Total number of junctions with Red Light Voilation Detection (RLVD) Cameras required in the city** | **7** | |
| **6** | **Average number of RLVD cameras installed in each junction** | **-** | | **6** | **Average number of RLVD cameras required in each junction** | **8** | |
| **7** | **Total number of junctions with Automated Number Plate Recognition (ANPR) Cameras Installed in the city** | **-** | | **7** | **Total number of junctions with Automated Number Plate Recognition (ANPR) Cameras required in the city** | **-** | |
| **8** | **Average number of ANPR cameras installed in each junction** | **-** | | **8** | **Average number of ANPR cameras required in each junction** | **-** | |
| **9** | **Average Number of CCTV Cameras Installed in each Market** | **-** | | **9** | **Total number of Buses with GPS required in the City ( Private - 50 , Government - 150)** | **6** | |
| **10** | **Total number of Buses with GPS in the City** | **-** | | **10** | **Total number of Variable Messaging Displays (VMD) required in the city** | **-** | |
| **11** | **Total number of Variable Messaging Displays (VMD) Installed in the city** | **-** | | **11** | **Is there a requirement for Centralised portal for Monitoring GPS enabled Buses** | **No** | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 12 | **How messeges are fed into VMD (Remotely / Onsite)** | - | | 12 | **Is there a requirement for Passenger information system at bus stops?** | - | |
| 13 | **Centralised portal for Monitoring GPS enabled Buses** | **No** | | | | | |
| 14 | **Is there a Passenger information system at bus stops?** | - | | | | | |

**As-Is and To-Be Comparison of Smart Classrooms in Tiruchirapalli**

| **Detailed Analysis of Existing Classrooms/Schools** | | | **Requirements for Envisaged Smart Classrooms** | | |
|---|---|---|---|---|---|
| **1** | **Name of the City** | **Tiruchirappalli City Corporation** | **1** | **Name of the City** | **Tiruchirappalli City Corporation** |
| **2** | **Name of Area** | **Tiruchirappalli** | **2** | **Name of Area** | **Tiruchirappalli** |
| **3** | **Total Number of Schools in the city** | **111** | **3** | **Total Number of Schools required in the city** | **-** |
| **4** | **Average number of Class rooms in each school** | **16** | **4** | **Average number of Class rooms required in each school** | **70** |
| **5** | **Total number of schools with Smart Classrooms in the city** | **13** | **5** | **Total number of schools with Smart Classrooms required in the city** | **70** |
| **6** | **Average number of Smart Classroom in each school** | **0** | **6** | **Average number of Smart Classroom in each school required** | **70** |

| | | | | | |
|---|---|---|---|---|---|
| **7** | **Average number of Smart Classrooms with Video Conferencing Facility** | **1** | **7** | **Average number of Smart Classrooms with Video Conferencing Facility required** | **92** |
| **8** | **Average number of Smart Classrooms with dedicated online portal for syllabus** | **-** | **8** | **Average number of Smart Classrooms required with dedicated online portal for syllabus** | **92** |

**As-Is and To-Be Comparison of Solid Waste Management System in Tiruchirapalli**

| **Details of Existing Solid Waste Management System** | | | **Requirements of Envisaged ICT Based Solid Waste Management System** | | |
|---|---|---|---|---|---|
| **1** | **Name of the City** | **Tiruchirappalli City Corporation** | **1** | **Name of the City** | **Tiruchirappalli City Corporation** |
| **2** | **Name of Road (Landfills)** | **-** | **2** | **Name of Road (landfills)** | **-** |
| **6** | **Total no of Landfills in the City** | **-** | **5** | **Total number of Bins in the City with sensors required** | **1,108** |
| **7** | **Total number of Garbage trucks in the city** | **189** | **6** | **Type of Sensors required at the Bins (Weight or Volume Sensor)** | **Yes / No** |
| **8** | **Total number of Garbage collection carts in the city** | **286** | **7** | **Requirement of ICT enabled Solid Waste Management System in city** | **Yes** |
| **9** | **Total number of Bins in the City** | **1,108** | **8** | **If Yes - Mention Total number of Garbage trucks with GPS required in the city** | **189** |
| **10** | **Total number of Bins in the City with sensors** | **-** | **9** | **Total number of Garbage collection carts with GPS required in the city** | **-** |
| **11** | **Frequency of Garbage collection by trucks for each Bin** | **Daily** | **10** | **Requirement of RFID tagging system used for Local Bins** | **Yes** |
| **12** | **Frequency of Garbage collection by carts for each Bin** | **-** | **11** | **Define suggestive Manpower required for routine garbage collection in the city** | **Yes** |
| **13** | **ICT Solid Waste Management System already exists ?** | **No** | **12** | **Requirement of CCTV Surveillance at Garbage bins** | **No** |

| | | | | | |
|---|---|---|---|---|---|
| **14** | **If Yes - Mention Total number of Garbage trucks in the city with GPS** | **-** | **13** | **Mention total number of cameras required at each Garbage Bin** | **-** |
| **15** | **Total number of Garbage collection carts in the city with GPS** | **-** | **14** | **Weight Bridge at Main Dumpyard** | **Yes** |
| **16** | **City has a centralised portal for tracking all the vehicle** | **No** | **15** | **Requirement of connecting Weight Bridge with CCC** | **Yes** |
| **18** | **Weight Bridge at Main Dumpyard** | **Yes** | **16** | **City requires a centralised portal for tracking all the vehicle** | **Yes** |
| **19** | **Define total Manpower required for routine garbage collection in the city** | | **17** | **Heat Sensor required at landfill in the city** | **No** |
| **20** | **CCTV at Garbage Bins and Landfills** | **No** | | | |

**As-Is and To-Be Comparison of Street Lighting System in Tiruchirapalli**

| **Detailed Analysis of Existing Street Lighting System** | | | **Requirement for Envisaged Smart Street Lighting System** | | |
|---|---|---|---|---|---|
| **1** | **Name of the City** | **Tiruchirappalli City Corporation** | **1** | **Name of the City** | **Tiruchirappalli City Corporation** |
| **2** | **Name of Road** | | **2** | **Name of Road** | |
| **3** | **Number of Street light Poles** | **43,461** | **3** | **Total Number of Street light Poles** | **43,461** |
| **4** | **Average height of Pole (in Meters)** | **8.5** | **4** | **Required Pole Height (in Meters)** | **8.5** |
| **5** | **Switching Capabilities - Manual / Automatic** | **Automatic** | **5** | **Required Switching Capabilities - Manual / Automatic** | **Automatic** |

| | | | | | |
|---|---|---|---|---|---|
| 6 | Total no of lights on Pole | 36,800 | 6 | Required No of lights on Pole | 6661 No's |
| 7 | Wattage of Light | 20w,24w,36w,70w,150w,250w,400w | 7 | Required Wattage of Light | 20w,24w,36w,70w,150w,250w,400w |
| 8 | Sensor Equipped | NO | 8 | Requirement of Sensors in Pole? | No |
| 9 | If Yes - Mention type of Sensor and owner of the Data Pings | Not Applicable | 9 | If Yes - Mention type of Sensor and owner of the Data Pings | Not Applicable |
| 10 | Raw Material of Pole | G.I | 10 | Requirement of SCADA Enabled Street Poles? | Yes |
| 11 | SCADA Enabled | Yes | 11 | If Yes - Mention type of Sensor and Controller required | Street light Controller 4KVA |
| 12 | If Yes - Mention type of Sensor and Controller Used | Street light controler Voltage Controler | 12 | Mention about the Connectivity to be used for SCADA | GPRS |
| 13 | Mention about the Connectivity used for SCADA (OFC,GPRS,LoRA) | GPRS | 13 | Required Number of Poles with LED Light | 6661 No's |
| 14 | Number of Poles with LED Light | 28,179 | 14 | Requirement of Un-interrupted Power facility for Light Poles | No |
| 15 | Number of Poles with Bulb | 8,549 | 15 | If Yes - List out the | Not Applicable |

| | | | | | |
|---|---|---|---|---|---|
| | | | | **locations with UPS power facility for Street Light Poles** | |
| **16** | **Units consumed by LED lighting Poles in a Day** | **7,558** | | | |
| **17** | **Units consumed by Bulb Lighting Poles in a Day** | **24,197** | | | |
| **18** | **Un-interrupted Power facility for Light Poles** | **No** | | | |
| **19** | **If Yes - List out the locations with UPS power facility for Street Light Poles** | **No** | | | |

**As-Is and To-Be Comparison of Traffic Management System in Tiruchirapalli**

| **Detailed Analysis of Existing Traffic Management System** | | | **Requirements for Envisaged Smart Traffic Management System** | | |
|---|---|---|---|---|---|
| **1** | **Name of the City** | **Tiruchirappalli** | **1** | **Name of the City** | **Tiruchirappalli** |
| **2** | **Name of Area** | **Tiruchirappalli** | **2** | **Name of Area** | **Tiruchirappalli** |
| **3** | **Total Number of Traffic Signal Installed in the City** | **10** | **3** | **Total Number of Traffic Signal required in the City** | **-** |
| **4** | **Total Number of Automated Signals Installed in the City** | **10** | **4** | **Total Number of Automated Signals required in the City** | **-** |
| **5** | **Total number of junctions with Red Light Voilation** | **-** | **5** | **Total number of junctions with Red Light Voilation Detection** | **10** |

| | | | | | |
|---|---|---|---|---|---|
| | **Detection (RLVD) Cameras Installed in the city** | | | **(RLVD) Cameras required in the city** | |
| **6** | **Average number of RLVD cameras installed in each junction** | **-** | **6** | **Average number of RLVD cameras required in each junction** | **40** |
| **7** | **Total number of junctions with Automated Number Plate Recognition (ANPR) Cameras Installed in the city** | **-** | **7** | **Total number of junctions with Automated Number Plate Recognition (ANPR) Cameras required in the city** | **40** |
| **8** | **Average number of ANPR cameras installed in each junction** | **-** | **8** | **Average number of ANPR cameras required in each junction** | **4** |
| **9** | **Average Number of CCTV Cameras Installed in each Market** | **-** | **9** | **Average Number of CCTV Cameras required in each Market** | **4** |
| **10** | **Total number of Buses with GPS in the City** | **-** | **10** | **Total number of Buses with GPS required in the City** | **-** |
| **11** | **Total number of Variable Messaging Displays (VMD) Installed in the city** | **2** | **11** | **Total number of Variable Messaging Displays (VMD) required in the city** | **4** |
| **12** | **How messeges are fed into VMD (Remotely / Onsite)** | **Remotely** | **12** | **Is there a requirement for Centralised portal for Monitoring GPS enabled Buses** | **No** |
| **13** | **Centralised portal for Monitoring GPS enabled Buses** | **No** | **13** | **Is there a requirement for Passenger information system at bus stops?** | **Yes** |
| **14** | **Is there a Passenger information system at bus stops?** | **No** | | | |

**As-Is and To-Be Comparison of Smart Power Metering System in Coimbatore**

| **Detailed Analysis of Existing Power Metering Infrastructure** | | | **Requirement of Envisaged Smart Power Metering Infrastructure** | | |
|---|---|---|---|---|---|
| 1 | Name of the City | **Coimbatore - South** | 1 | Name of the City | **Coimbatore - South** |
| 2 | Total Number of Commercial Power Meter Connections | 12,618 | 2 | Required Number of Commercial Power Meter Connections | 19,255 |
| 3 | Total Number of Residdential Power Meter Connections | 98,456 | 3 | Required Number of Residdential Power Meter Connections | 31,418 |

| | | | | | |
|---|---|---|---|---|---|
| 4 | Make and Model (Mention all Makes and Models) | | 4 | Required no of Digital Meters | 2,962 |
| 5 | Meter type - Digital/Analog/Semi Digital | | 5 | Total no of Manpower required for capturing meter readings - Zone Wise | NIL |
| 6 | Average number of Digital Meters | 57,439 | 6 | Requirement of SCADA enabled Power Meters | No |
| 7 | Average number of Semi Digital Meters | 50,673 | 7 | If Yes - Mention the connectivity to be used for SCADA operations | |
| 8 | Average number of Analog Meters | 2,962 | 8 | Reqirement of Handheld devices used for Capturing meter reading | Yes |
| 9 | Total no of Manpower required for capturing meter readings - Zone Wise | 27 Nos | 9 | If Yes - Mention the total number of Handheld Devices required | 27Nos |
| 10 | SCADA enabled Power Meters | No | | | |
| 11 | If Yes - Mention the Make, Model and the connectivity used for SCADA operations | | | | |
| 12 | Handheld devices used for Capturing meter reading | Yes | | | |
| 13 | If Yes - Mention the Make and Model | | | | |
| 14 | Privatized Electricity Departments | No | | | |
| 15 | If Yes - Mention the Company Name | | | | |
| 16 | Mention the Zones and Areas covered under each company (In case multiple companies involved) | TANGEDCO LTD | | | |

## 17. Annexure 16: POC Evaluation Criteria.

Capabilities of ICCC to be demonstrated using hosted environment for different City applications domains as listed below through the relevant Use cases in India context for respective application/s infrastructure (sensors/gateways) in following city services domains.

1. Smart Parking
2. Smart Lighting
3. Smart Public Transport
4. Smart water distribution, Smart metering for utilities
5. Smart surveillance
6. Smart public events management
7. Smart WiFi
8. Disaster Management (in city area)
9. Emergency Services (in case of fire or accident or causality in urban area etc.)
10. Environmental sensors
11. Flooding/water logging management
12. Smart waste management, Managing city cleanliness and hygiene services
13. City traffic management
14. Enterprise resource planning (ERP)
15. Water SCADA integration
16. Electricity SCADA integration
17. Information Outreach - Public announcement and Connected signage
18. Shared Fiber infrastructure
19. Citizen services Applications (City Apps)
20. Social Media Response

# 18. Annexure 17: Sample Use Cases for ICCC operations

## Use Case for Disaster Management

**Primary Stakeholders** – Citizens

**Pre-requisites:**

- Citizen Mobile Application integrated with CCC Platform
- Environment Sensors installed within the city and should be integrated with CCC Platform
- Installation of Public Addressing system in major crowd gathering areas Schools, Markets, Hospitals etc. which are integrated with CCC Platform

**Smart City SPV's contribution:**

- Implementation of Citizen Mobile application
- Implementation of Environment Sensors and Public addressing Systems

**Benefits:**

- Improved safety of Citizen
- Efficient response time
- Less causalities
- Citizen Participation
- Automated Alerts through SMS and Announcements

**Use Case – Disaster Management**:

- Environment Sensors installed in the city detects the rising air pressure and water level
- Information is communicated through the OFC to the city CCC
- CCC uses the information received through sensor and predictions to generate an alert for Storm at specific area
- SOPs activated for Storm in impacted area
- Messages display at all lead roads to the impacted area
- SMS/USSD push in impacted area to alert citizens
- Appropriate storm water drainage pumping station activated
- Alert generated for Hospitals near the impacted areas for preparedness

## Use Case for Police

**Primary Stakeholders** – Police Department

**Pre-requisites:**

- Installation and integration of CCTV surveillance cameras in the city with CCC Platform
- Installation of Public Addressing system in major crowd gathering areas Schools, Markets, Hospitals etc. which are integrated with CCC Platform
- Integration of Police Department with CCC platform
- Citizen Mobile Application

**Smart City SPV's contribution:**

- Implementation of Surveillance cameras across the city
- Integration of Police Department with CCC platform
- Implementation of Video Analytics Module in CCC platform
- Implementation of Citizen application

**Benefits:**

- Improved safety of Citizen
- Video Analytics for the identification of anti-social elements like Mobs or known criminals
- Efficient Policing & Control over the mobs
- Efficient response time
- Less Crime in the City
- Automated Alerts through SMS and Announcements
- Automated capture of Evidence (Video Feeds) through CCC
- Citizen participation in crime reporting through Citizen Application

**Use Case – Crime Reporting**:

- Mr. Shyam, a resident of Vellore City, witnesses a car theft at 8 AM near his office. He immediately used his Citizen Mobile application to report a crime
- Mr. Shyam, recorded a video of the incident and shared it with Police by using the Citizen Mobile Application
- CCC operator immediately acted upon the receipt of complaint from Mr. Shyam by coordinating with Police department and sharing the results of video analytics performed on the video feed received from Mr. Shyam and CCTV cameras installed near the theft location
- Police officer checks the vehicle registration database for identifying the owner of the stolen vehicle and validates the theft
- CCC performs a check on all the ANPR cameras installed in the city for getting the Current location of the stolen vehicle using video analytics

## Use Case for Traffic Department - Speed limit Violation

**Primary Stakeholders** - Traffic Police Department

**Pre-requisites:**

- Installation of ANPR and RLVD Cameras at Main Junctions and Main Roads
- E-Challan module installed at CCC for automated challan generation

**Smart City SPV's contribution**:

- Implementation of Surveillance infrastructure (ANPR and RLVD camera) within the city
- Integration of E-Challan Module in CCC platform

**Benefits:**

- Revenue Generation
- Automated Policing
- Safety of citizens
- Real-time Alert Generation
- Automated Evidence Collection

**Use Case - Speed Violation**:

- Vehicle enters the city through Main Road at the speed of 120 Km/h (Beyond permissible limit)
- RLVD camera detects the speeding vehicle, captures the speed and activates the ANPR camera
- ANPR camera Captures the Vehicle registration number and share the vehicle details with CCC operator and alerts the traffic police
- E-Challan module validates the registration number and issues an e-challan which is mailed with photographs/Videos captured as an evidence to officer in charge for validation
- After validating the incident, officer in charge mails the e-challan to the offender’s email address

## Use Case for Fire

**Primary Stakeholders** – Citizens

**Pre-requisites:**

- Citizen Mobile Application integrated with CCC Platform
- Installation and integration of CCTV surveillance cameras in the city with CCC Platform
- Installation of Public Addressing system in major crowd gathering areas Schools, Markets, Hospitals etc. which are integrated with CCC Platform
- Integration of fire department with CCC

**Smart City SPV's contribution:**

- Implementation of Citizen Mobile application
- Implementation of Surveillance cameras across the city

**Benefits:**

- Improved safety of Citizen
- Efficient response time
- Less causalities
- Citizen Participation
- Automated Alerts through SMS and Announcements

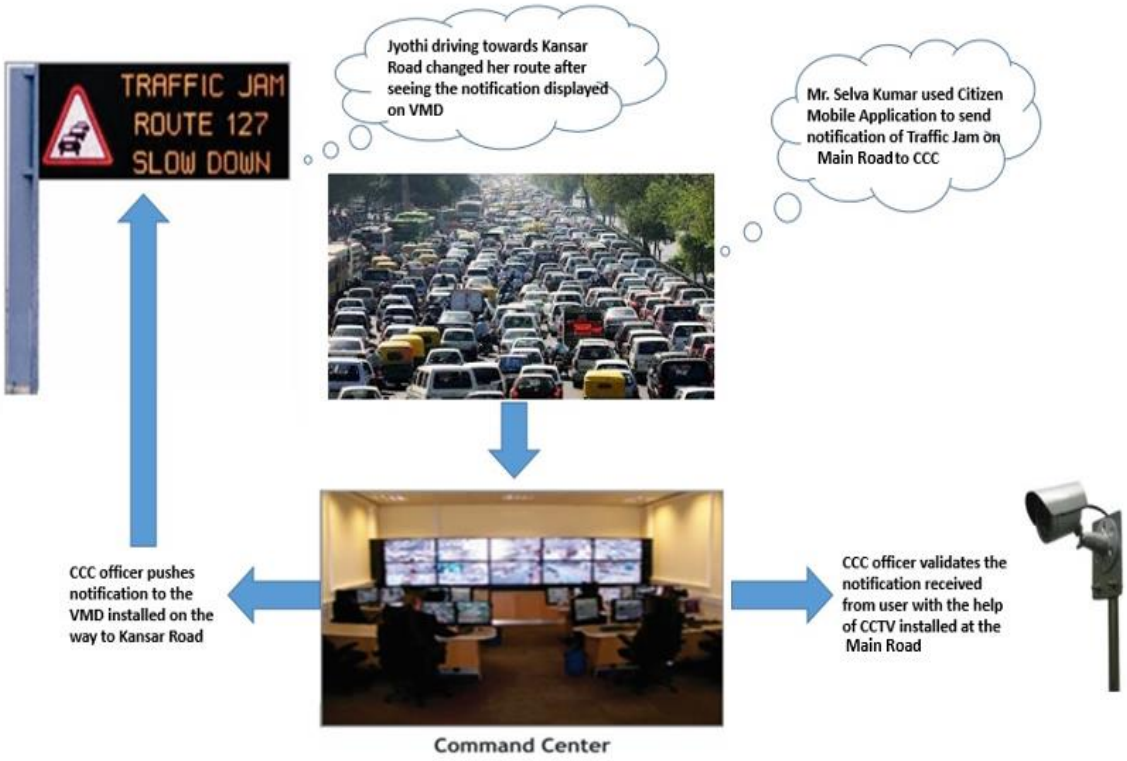
**Use Case – Fire**:

- A student studying in the Vellore University detects the fire incident and notifies the CCC operator using the command and control center application
- CCC operator uses the surveillance cameras installed in Vellore University to validate the incident
- CCC uses the information received through citizen application and CCTV cameras to dispatch the nearest fire tender
- CCC runs a simulation to predict the fire spread
- CCC identifies the friends and foes in the event of fire
- SOPs activated for Fire in Vellore University
- Petrol pump near the fire is evacuated in advance
- SMS/USSD push in impacted area to alert citizens
- Nearest water sources and OT identified
- Nearest hospitals informed of emergency care and trauma patients

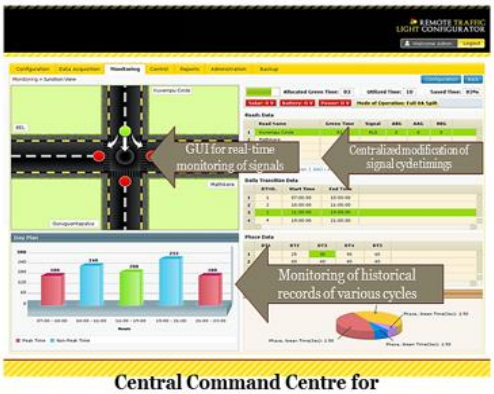
## Illustrative use case for City Operations (for Traffic Violators)


1. Vehicle Enters the City from Main Road (200 Ft) at very high speed
2. Automatic Number Plate Recognition (ANPR) system raises alarm to detect violations
3. Database checked for stolen vehicles
4. City Police and Traffic Management Informed based on the alert generated

## Illustrative example for VMD



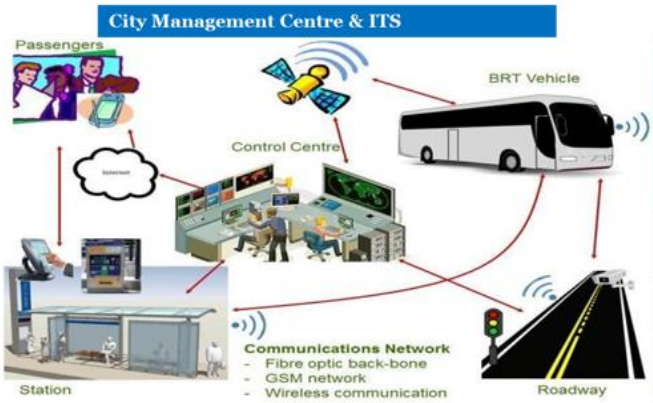

## Illustrative example for Smart Transportation with key interventions

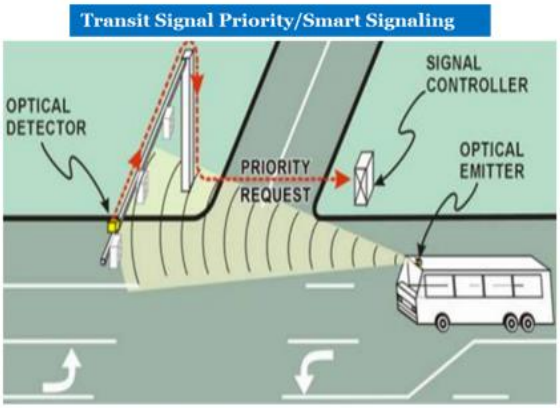




Central Command Centre for Signalling


- **Online citizen and departmental services pertaining to transportation system**
- **GIS based traveller information web and mobile applications**
- **GPS based tracking and route information of public transport**
- **Smart Parking & Incident Management System**
- **Smart Traffic Lights & Integration with City Management Centre**
- **Single Fare Card and Integrated Transit Hubs**
- **Policy interventions on Electric vehicles, charging stations and management platforms**

## Illustrative example for Smart Transportation with key interventions




**Passenger Information System, GPS Tracking**

- Real-time display of vehicle locations on map display & on route specific line diagrams
- Monitoring of schedule adherence
- Display of messages displayed at stops & on-bus
- Preparation of custom messages for display at stops and on buses
- Comprehensive past performance data analysis & report generation
- Assignment or reassignment of buses to routes

**User Information**

- Information screen for passengers
- Voice Information System-Transmission speakers in stations
- Speakers & audio adjusting systems

**Automated Fare Collection**

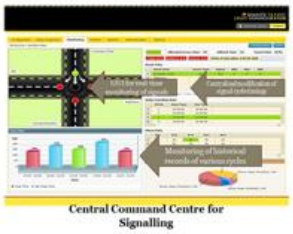
- Internet based ticket recharging
- Dealer/ Agent based ticket sale system
- Smart Card/ RFID Single Journey Coins
- Bus Card Validator

## Illustrative example for Law Enforcement


**Surveillance Cameras** - Incident detection and monitoring all directions of a junction.


**Enforcement Cameras**

- Speed Detection –.
- Signal Jumping Detection




**Command Centre for Signaling System**

– Management , Monitoring and controlling of all the city traffic components

**Variable Message Sign**

Real-time Information dissemination is the key to sound traffic management. VMS is a tool which helps in displaying critical messages to commuters.

**Speed Control Signs and Lane Violation**

## Illustrative example for Urban Storming Scenario



1. Sensors detect rising water levels, air pressure
2. Information communicated through OFC to CCC

1. CCC uses water levels, rainfall prediction and past data to generate an alert for Storm at specific area (Bishop David Nagar)
2. SOPs activated for Storm

1. Messages display at all lead up roads to Bishop David Nagar
2. SMS/ USSD push in impacted area to caution citizens
3. Appropriate storm water drainage pumping station activated

## Illustrative example for Fire


1. Citizen call in to report a fire at Vellore University
2. CCTV cameras detect fire at Vellore University

1. CCC initiates the SOP for a fire and dispatches nearest fire tender
2. CCC runs a simulation to predict fire spread
3. CCC identifies friends and foes in event of fire

1. Petrol pump nearby fire is evacuated in advance
2. Nearest water sources and OT identified
3. Nearest hospital informed of emergency care and trauma patients

**Some of the other examples of use cases are provided in the form of table (given below).**

| # | Function | Use Case |
|---|---|---|
| 1 | Accounts | View the spending pattern across the budget heads with a facility to drill down. The view should allow the facility to change the time scale from 1 hr. to 1 year, with daily, weekly, monthly, quarterly and yearly views available. |
| 2 | Accounts | View area wise budget spent across the city on a city map. |
| 3 | Accounts | View the feeds received from ERP system on the city map. |
| 4 | Assets | View geo tagged movable assets on the map based on their classification. |
| 5 | Assets | View non-civic infrastructure assets on the map based on their classification. |
| 6 | Assets | View civic infrastructure assets on the map based on their classification. |
| 7 | Birth Registration | View normal births registered on the city map. The view should allow the facility to change the time scale from 1 hr. to 1 year, with daily, weekly, monthly, quarterly and yearly views available. |
| 8 | Birth Registration | View abnormal births on the city map. The view should allow the facility to change the time scale from 1 hr. to 1 year, with daily, weekly, monthly, quarterly and yearly views available. |

| | | |
|---|---|---|
| 9 | Birth Registration | View turnaround times for issuance of certificate on the city map. The view should allow the facility to change the time scale from 1 hr. to 1 year, with daily, weekly, monthly, quarterly and yearly views available. |
| 10 | Birth Registration | View the feeds received from ERP system on the city map. |
| 11 | Building Permission | View the building permissions (unique view for each license type) issued on the city map. The view should allow the facility to change the time scale from 1 hr. to 1 year, with daily, weekly, monthly, quarterly and yearly views available. |
| 12 | Building Permission | View the building permission turnaround times (unique view for each license type) issued licenses on the city map. The view should allow the facility to change the time scale from 1 hr. to 1 year, with daily, weekly, monthly, quarterly and yearly views available. |
| 13 | Building Permission | View the demand required (water, waste, sewerage, etc.) as a result of building permissions given in the city on the city map. |
| 14 | Building Permission | View the feeds received from ERP system on the city map. |
| 15 | Civic Center / Ward | View the aggregate transactions performed at a given civic center on the city map. The view should allow the facility to change the time scale from 1 hr. to 1 year, with daily, weekly, monthly, quarterly and yearly views available. |
| 16 | Civic Center / Ward | View the rating of civic centers based on collections, services offered and staff availability on the city map. The view should allow the facility to change the time scale from 1 hr. to 1 year, with daily, weekly, monthly, quarterly and yearly views available. |
| 17 | Civic Center / Ward | View the feeds received from ERP system on the city map. |
| 18 | Connectivity | View consumption patterns of data across Wi-Fi access points |
| 19 | Connectivity | View list of URLs accessed from a public IP based on a given time frame and IP address |
| 20 | Connectivity | View the coverage and usage patterns superimposed on the city map. The view should allow the facility to change the time scale from 1 hr. to 1 year, with daily,weekly, monthly, quarterly and yearly views available. |
| 21 | Connectivity | View connectivity status of all field devices/sensors superimposed on the city map. |
| 22 | Connectivity | View the bandwidth utilization of all field devices superimposed on the city map. |
| 23 | Death Registration | View deaths registered on the city map. The view should allow the facility to change the time scale from 1 hr. to 1 year, with daily, weekly, monthly, quarterly and yearly views available. |

| | | |
|---|---|---|
| 24 | Death Registration | View turnaround times for issuance of certificate on the city map. The view should allow the facility to change the time scale from 1 hr. to 1 year, with daily, weekly, monthly, quarterly and yearly views available. |
| 25 | Death Registration | View the feeds received from ERP system on the city map. |
| 26 | Display | View the messages displayed at the Variable Messaging Sign Board (display boards) in a specific area of the city. The geographical selection can be in terms of a polygon or could be linear. |
| 27 | Display | View all the messages displayed on a given Variable Messaging Sign Board (display boards). The view should allow the facility to change the time scale from 1 hr. to 1 year, with daily, weekly, monthly, quarterly and yearly views available. |
| 28 | Display | Change the message to be displayed on a specific display board, display board in an area or across the city. |
| 29 | Display | View the advertisements displayed at the display board (Bill Board) on iPoles in a specific area of the city. The geographical selection can be in terms of a polygon or could be linear. |
| 30 | Display | View all the advertisements displayed on a given iPole Display board (Bill board). The view should allow the facility to change the time scale from 1 hr. to 1 year, with daily, weekly, monthly, quarterly and yearly views available. |
| 31 | Grievances | View outstanding grievances based on number of outstanding days on the city map. The view should allow the facility to change the time scale from 1 hr. to 1 year, with daily, weekly, monthly, quarterly and yearly views available. |
| 32 | Grievances | View open grievances, closed grievances, in progress grievances on the city map. The view should allow the facility to change the time scale from 1 hr. to 1 year, with daily, weekly, monthly, quarterly and yearly views available |
| 33 | License | View the licenses (unique view for each license type) expired (not renewed) on the city map. The view should allow the facility to change the time scale from 1 hr. to 1 year, with daily, weekly, monthly, quarterly and yearly views available. |
| 34 | License | View the licenses (unique view for each license type) issued on the city map. The view should allow the facility to change the time scale from 1 hr. to 1 year, with daily, weekly, monthly, quarterly and yearly views available |
| 35 | License | View the license turnaround times (unique view for each license type) issued licenses on the city map. The view should allow the facility to change the time scale from 1 hr. to 1 year, with daily, weekly, monthly, quarterly and yearly views available. |

| | | |
|---|---|---|
| 36 | License | View the feeds received from ERP system on the city map. |
| 37 | Material Management | View the feeds received from ERP system on the city map. |
| 38 | Procurement View | View the feeds received from ERP system on the city map. |
| 39 | Project Systems | View the project status (physical completion and financial completion) for each ongoing project in the city. |
| 40 | Project Systems | View the feeds received from ERP system on the city map. |
| 41 | Property Tax | View the tax collected on the city map. The view should allow the facility to change the time scale from 1 hr. to 1 year, with daily, weekly, monthly, quarterly and yearly views available. |
| 42 | Property Tax | View the tax to be collected and shortfall (from tax value) on the city map. The view should allow the facility to change the time scale from 1 hr. to 1 year, with daily, weekly, monthly, quarterly and yearly views available. |
| 43 | Property Tax | View turnaround times for collection of property tax on the city map. The view should allow the facility to change the time scale from 1 hr. to 1 year, with daily, weekly, monthly, quarterly and yearly views available. |
| 44 | Property Tax | View the feeds received from ERP system on the city map. |
| 45 | Sensors | View NOX levels across the city, view threshold breaches, and view data superimposed on a map. The view should allow the facility to change the time scale from 1 hr. to 1 year, with daily, weekly, monthly, quarterly and yearly views available. |
| 46 | Sensors | View SO2 levels across the city, view threshold breaches, and view data superimposed on a map. The view should allow the facility to change the time scale from 1 hr. to 1 year, with daily, weekly, monthly, quarterly and yearly views available. |
| 47 | Sensors | View CO2 levels across the city, view threshold breaches, and view data superimposed on a map. The view should allow the facility to change the time scale from 1 hr. to 1 year, with daily, weekly, monthly, quarterly and yearly views available. |
| 48 | Sensors | View O2 levels across the city, view threshold breaches, and view data superimposed on a map. The view should allow the facility to change the time scale from 1 hr. to 1 year, with daily, weekly, monthly, quarterly and yearly views available. |
| 49 | Sensors | View noise levels across the city, view threshold breaches, and view data superimposed on a map. The view should allow the facility to change the time scale from 1 hr. to 1 year, with daily, weekly, monthly, quarterly and yearly views available. |

| | | |
|---|---|---|
| 50 | Sensors | View ambient light levels across the city, view threshold breaches, and view data superimposed on a map. The view should allow the facility to change the time scale from 1 hr. to 1 year, with daily, weekly, monthly, quarterly and yearly views available. |
| 51 | Sensors | View humidity light levels across the city, view threshold breaches, and view data superimposed on a map. The view should allow the facility to change the time scale from 1 hr. to 1 year, with daily, weekly, monthly, quarterly and yearly views available. |
| 52 | Sensors | View UV light levels across the city, view threshold breaches, and view data superimposed on a map. The view should allow the facility to change the time scale from 1 hr. to 1 year, with daily, weekly, monthly, quarterly and yearly views available. |
| 53 | Sewerage | View the underground network on the map. |
| 54 | Solid Waste | View waste related grievances on the city map. The view should allow the facility to change the time scale from 1 hr. to 1 year, with daily, weekly, monthly, quarterly and yearly views available. |
| 55 | Solid Waste | View movement of Garbage pickup vehicles on the city map. |
| 56 | Solid Waste | View the feeds received from ERP system on the city map. |
| 57 | Solid Waste | View the feeds received from Solid Waste Management system on the city map. |
| 58 | Storm Water | View the underground network on the map. |
| 59 | Traffic | View cycle times for signals (where adaptive traffic control has been implemented) across all junctions in the city with a facility to drill down. |
| 60 | Traffic | View ambient volume count across all ATCS junctions in the city with a facility to drill down volume count on eah arm |
| 61 | Traffic | View traffic volume count super imposed on the map. The view should allow the facility to change the time scale from 1 hr. to 1 year, with daily, weekly, monthly, quarterly and yearly views available. |
| 62 | Transit | View the feeds received from GPS Devices from Public Transport buses) on the city map. |
| 63 | Water | View water related grievances on the city map. The view should allow the facility to change the time scale from 1 hr. to 1 year, with daily, weekly, monthly, quarterly and yearly views available. |
| 64 | Water | View the distribution network status on the city map. |
| 65 | Water | View the distribution volumes on the city map. |
| 66 | Water | View the feeds received from SCADA system on the city map. |
| 67 | Water | View the underground utility network on the map. |

| | | |
|---|---|---|
| 68 | Welfare Schemes | View the benefits issued (unique view for each benefit) issued on the city map. The view should allow the facility to change the time scale from 1 hr. to 1 year, with daily, weekly, monthly, quarterly and yearly views available. |
| 69 | Welfare Schemes | View the feeds received from ERP system on the city map. |

Additional Smart City use cases: Use Cases to be implemented using Cloud based artificial Intelligence/Machine Learning/Big Data Analytics through various data capture inputs from cameras, sensors etc at the edge / field devices.

- Graffiti and Vandalism detection
- Debris and Garbage detection
- Attendance of sanitation workers on site by face recognition
- Sweeping and cleaning of streets/ bins before and after
- Tracking of garbage truck movement and quantity of garbage dumped at dumpsite
- Detection and recognize the pattern of demonization and conflicts in crowd
- Detection and classification of human, animals and vehicles to provide statistics
- Safety detection and classification based on
    - Parking violation
    - Speeding vehicle
    - Accident detection
    - Person/face recognition
    - Gesture recognition: identification through gesture change
- Wrong way or illegal turn detection
- Water quality sensors at district metered area level
- Environmental condition detection
- Air Quality detection

# 19. Annexure 18: ICCC capabilities envisaged

| # | Description | |
|---|---|---|
| 1. | CCC Operations Capabilities Policies, Events and Incident Response | a) Can you demonstrate Disaster / Incident management and capability of resources management during events?<br>b) Can you demonstrate how policies and events can be configured and executed on Smart City Platform?<br>c) Can you demonstrate how events and alerts are visualized and managed on the platform?<br>d) Can you demonstrate the ability to bring multiple stake holders together on a common collaboration tool for a timely response to a critical event or during an incident response?<br>e) Can you demonstrate the ability to automate the process for incident response?<br>f) Can you showcase that CCC can handle both Video and non-video data?<br>g) Can you show case a Video analytics alert captured at the CCC and Video can be pulled on-demand? |
| 2. | Analytics Capability | a) Can you demonstrate that the platform's analytics engine has the capability to correlate various events? (at least 3 use cases)<br>b) How will you apply the outcome / insight of the analytics back in to the platform?<br>c) Can you showcase prediction based analytics for at least 3 use cases? |
| 3. | Open data and Monetization capability, API Management | a) Can you showcase how the normalizing the data from different types of sensors and devices that will allow the city to publish open data through APIs, so that ISV application developer does not need to customize or write vendor specific codes?<br>b) Capability of generating a report across the city irrespective of what kind of IoT sensors that's got deployed? (example energy saving report, Optimized route management, etc.)<br>c) Can you prove that the platform is agnostic to the underlying network technology / communication protocol (example Zigbee, LoRa, etc.)?<br>d) Can you demonstrate that the 3rd party application can subscribe for the platform events? This should cities to push / publish events as they occur to interested applications<br>e) Can you demonstrate that the platform has a pluggable architecture? (Example plugin a new GIS engine with no effect to any other modules / policies in the platform)<br>f) Can you demonstrate API Management capabilities of your platform including API Life cycle, API Security, API Monitoring, API Monetization capabilities? |
| 4. | Cloud Operations | a) Can you demonstrate that your platform can be operated from a cloud infrastructure? |

| # | Description | |
|---|---|---|
| | | b) Can you demonstrate the cloud operations dashboard, cloud operations tool sets and standard operating procedures for Cloud Operations of the platform?<br>c) Can you prove that the CCC platform on cloud can't be accessed by unauthorized persons by demonstrating?<br>a. only the resource with appropriate permissions and grants has access to any specific resource?<br>b. All access and changes carried out are logged, cannot be tampered with and be auditable?<br>d) Can you demonstrate the ability that the deployment is isolated between its different sub-components with appropriate gates and restrictions in place?<br>e) Can you demonstrate multi-tenancy of CCC to showcase how different cities or agencies would manage security, metering and high availability?<br>f) Can you demonstrate the usage of different cities (based on multi-tenancy) with an objective of usage based billing for individual agencies or cities?<br>g) The IoT services should be natively offered as a PaaS service by CSP with 99.9% availability SLA of the service to send messages to and receive messages from registered devices.<br>h) Can CSP perform create, read, update, and delete operations on IoT service.<br>i) Can CSP should provide IoT messages ingestion as a dynamic platform Service with capacity to ingest 100 million or more messages per day from unlimited no. of sensors.<br>j) CSP should be able to charge for the IoT message ingestion service in pay per message mode.<br>k) Can CSP should provide media streaming services as a native cloud capability (PaaS); It should support both Live and on-demand streaming; Content should be secured using AES or multi-DRM.<br>l) Can CSP providing ability to scale the solution vertically/horizontally at any time, without prior notification to the cloud provider. It should be possible to automate this process of scaling up and down automatically.<br>m) Can the CSP offer "Government Community Cloud" services if required.<br>n) The CSP should allow a tour of their data center to demonstrate the hyperscale, high availability and security of Government Data once they are hosted on cloud services. |

| # | Description | |
|---|---|---|
| **5.** | Cloud Security | a) Can you demonstrate that the platform isn't vulnerable to various security attacks like DoS / DDoS attacks, DNS attacks, Perimeter security etc.?<br>b) Can you demonstrate that the platform has the capability to continuously monitor for application security vulnerabilities, coupled with alerting mechanism that analyzes centralized logs, application uptime and takes appropriate action / notification?<br>c) Can you showcase your documentation around security operations of the platform and international best practices adopted by your Cloud Operations? |
| 6. | Non-Cloud availability / Edge Computing | a) Can you demonstrate how some critical use cases can run without cloud being available through locally hosted module of basic city level edge analytics in terms of raising alarms / alerts to enable decision making for critical systems?<br>b) Can you demonstrate the management layer of how number of edge computing nodes can be installed, upgraded and monitored?<br>c) Can you demonstrate how the provisioning of different third-party software on top of an edge computing nodes?<br>d) Demonstrate how the end to end security will be managed of data coming from the edge computing nodes against the remote unauthorized local access? |

## 20. Annexure 19: Common Framework based Web Portal for each Smart City

| # | Description | Bidder Compliance (Yes / No) |
|---|---|---|
| 1. | Home Page<br>A clean, visually compelling home page that quickly conveys to the visitor, the City's mission and what Urban Local Body does. It will include (but not limited to) the following information either directly or linked through other pages:<br>▪ About Corporation<br>▪ City Profile<br>▪ Master Plan<br>▪ Investment opportunities<br>▪ Key statistics<br>▪ Tourist Locations<br>▪ GIS map of the City<br>▪ Photo Gallery<br>▪ Online Services listing (e-governance services)<br>▪ Opportunities; Tenders, Careers, Empanelment, Training<br>▪ Downloads<br>▪ Links to Facebook, twitter etc.<br>▪ FAQs<br>▪ Feedback<br>▪ Contact Us<br>▪ Search<br>▪ News & Updates<br>▪ Log in<br>▪ Privacy Policy, Disclaimer, Visitors count, Important links, Site map | |
| 2. | Branding: Clearly communicates a sense of 'identity' at first glance. | |
| 3. | Visual appeal: The site must have an attractive mix of text, images, audio and video. | |
| 4. | Fast Loading Pages: Optimization of web pages for a faster browsing experience with compatibility with key industry browsers and platforms. | |

| | | |
|---|---|---|
| 5. | Responsive Design: The site must be mobile-optimized through responsive design methods. Therefore, it should detect that a mobile device is being used and present the user with the mobile version first. The user should be able to switch to the desktop version and adjust resolution and format accordingly. | |
| 6. | Bilingual<br>The portal shall be available in Hindi & English and Unicode complaint. | |
| 7. | Simple and clear navigation: The site should be easy to navigate. Information should be grouped and presented in a logical manner and require no more than three levels of “drill down” for the user to find the desired information thus creating a clean, clear, easy and satisfying user experience. This should include drop down menus, so that the visitor can easily find what they are looking for with a few clicks of the mouse. | |
| 8. | Search Tools: Provide search capabilities using key words or phrasing that will provide access to content from throughout the site. Additionally, make it possible to download historical and recent data whereby the user can define his/her preference. Platform should allow users to search content of the portal easily and quickly without the need of high speed bandwidth. | |
| 9. | Important Links: Links should be placed within the portal to allow individuals to contact institutions affiliated with the Corporation and access to the portal as well the respective departments/agencies/corporations/ministries. | |
| 10. | Easy access to Key performance indicators (Infographics): Seamless presentation of dashboard data to provide continuously updated graphs and charts. | |
| 11. | News/Update feed: Constant and dynamic update feed on portal home page. Displays announcements and notifications for new content additions on front page of portal. | |
| 12. | Calendar and bookings: A dynamic calendar that displays events as well as filters for searching events and booking any available venues/functions. | |
| 13. | Contact Form: Provides a web-based contact form with antispam controls and shall allow stakeholders to track the status of request at any point of time, if any. | |
| 14. | e-Mails: automatically send follow-up emails to our stakeholders (subscribers) if they visited a specific web page, or completed some specific task (e.g. survey) on the website. | |

| | | |
|---|---|---|
| 15. | Social Media Engagement Tools: New tools to improve interaction with social media. | |
| 16. | Search Engine Optimization (SEO): Portal availability using common search engines to ensure it is optimized using SEO. | |
| 17. | Search capability: Portal should provide search engine with advanced full-text search capabilities. | |
| 18. | Compatibility: Site must be compatible with common operating platforms including<br>*a. Apple Safari (10.*, 9.*)*<br>*b. Google Safari(60+)*<br>*c. Microsoft Edge(40.*)*<br>*d. Microsoft Internet Explorer(11.*)*<br>*e. Mozilla Firefox(52+)* | |
| 19. | Mobile Access: Portal must be “responsively designed” to accommodate mobile users. This also includes accommodations for slower, cellular internet connections. This includes compatibility with iOS, Android and other industry standard platforms. | |
| 20. | Settings: Portal must not require plug-ins as a default. | |
| 21. | Performance: Portal must be able to handle multimedia (video) with high performance. | |
| 22. | HTML Compliance: Full compliance with HTML 5.0 or higher. | |
| 23. | GIS: web GIS view depicting information through various layers would be shown to stakeholders; showing occupied and vacant land parcels, access to information on industries, residential properties, education & health facilities, transportation etc. | |
| 24. | Security: Portal shall be secure against hacking and other vulnerable activities. | |
| 25. | Content Management System: | |

| | | |
|---|---|---|
| | ✓ shall have Content Management System to update the content on the Portal which shall have minimum following capabilities:<br>▪ Content Authoring<br>▪ Content Publishing<br>▪ Content Delivery<br>▪ Content Storage Management<br>▪ Content Archival<br>✓ Separation of content from presentation, which allows authors to focus on content rather than web design.<br>✓ Content storage management of all types of content; text graphic, audio, video etc.<br>✓ Portal should enable content publishing within portal framework | |
| 26. | The Portal should support open standards-based Java / C# / .net built using to ensure interoperability between portlets and portals, addressing the areas of aggregation, personalization, presentation, and security. | |
| 27. | Integration with other applications: Different existing and future applications/modules shall have to be seamlessly integrated with the portal. It is envisaged that GIS and the proposed systems shall work in an integrated manner to allow stake holders to extract maximum benefits from the system. | |

| | | |
|---|---|---|
| 28. | Design and Construction<br>▪ Work closely with the Stake holders at each stage of the design to identify user needs and corresponding user interface requirements, workflows, and functionalities<br>▪ Ensure integration of all elements including content, information format, compatibility with software platforms used by corporation and standards for content management<br>▪ Platform should allow easy integration of multimedia products and user-friendly administrator interface<br>▪ Create wireframes, storyboards and prototypes to propose options for implementation. Provide five (5) template designs for review to select a concept<br>▪ Concepts should reflect the City's identity, nature and purpose<br>▪ Develop corresponding user interface components (web templates, style sheets, scripts, images, dashboards, social media interfaces) as needed<br>▪ Use simple, cost-effective techniques to test designs with representatives of target audience prior to launch of portal<br>▪ Submit the final concept to officials for review prior to 'going live'<br>▪ Secure the existing portal prior to transitioning to the new platform<br>▪ Keep a full backup of the portal through the currency of the Project<br>▪ Manage all upgrades and updates on the website including content update in an efficient and integrated manner<br>▪ Portal design shall support easy upgrades and updates on content without the need to redo the base design. | |

# 21. Annexure 20: eGovernance Application Scope

Technical Requirements,

A. Background

0.1 Acronyms Used in These Technical Requirements

B. Business Function and Performance Requirement

1.1 Business Requirements to be met by the System

1.2 Other Requirements to be met by the System

Technical Requirements

A. Background

The SI will only use Cloud based Platform as a Service / Software as a Service for new developments and SI may use Infrastructure as a Service for integration without adding additional infrastructure at CMA/ULB office to perform tasks as Testing, Deployment, Training, etc.

Develop cloud based application as per SRS and FRS already available with CMA

Few of the modules listed be may involve direct integration vs. re-engineering for cloud deployments.

The Detailed Project Report submitted by the Consultants, as approved by the State Level Review Committee is a long term ambitious plan for the CMA.

(a) Software development as per the Functional Requirements Specifications mentioned in the DPR.

(b) Utilize Cloud based Platform as a service / Software as a Service for ULB ERP Application implementation

(c) Roll out in 9 smart cities

(e) Training

0.1 Acronyms Used in These Technical Requirements

Acronym - Description

AE/JE Assistant Engineer / Junior Engineer

| | |
|---|---|
| AMC | Annual Maintenance Contract |
| AMC | Ahmedabad Municipal Corporation |
| AP | Assistant Programmer |
| ARV | Annual Rentable Value |
| ARV | Annual Rental Value |
| B&DR | Birth & Death Registrar |
| BA | Building Application |
| BCP | Business Continuity Plan |
| BL | Building License |
| BPR | Business Process Re-engineering |
| BPV | Bank Payment Voucher |
| BRV | Bank Receipt Voucher |
| BSNL | Bharat Sanchar Nigam Limited |
| CAD | Computer Aided Drawing |
| CAP | Content Archival Policy |
| CAPEX | Capital Expenditure |
| CARE | Complaints & Grievance Redressal Management |
| CC | Citizen Centre |
| CC | Collection Centre |
| CFC | Citizen Facilitation Center |
| CHO | Corporation Health Officer |
| CL/EL/ML | Casual Leave/Earned Leave/Medical Leave |
| CMA | Commissionerate of Municipal Administration |
| CMAP | Contribution, Moderation and Approval Policy |
| CMDA | Chennai Metropolitan Development Authority |
| CMM | Capability Maturity Model |
| CMWSS Board | Chennai Metropolitan Water Supply & Sewerage Board |
| CO | Community Organizers |

| | |
|---|---|
| CPF | Contributory Pension Fund |
| CRP | Content Review Policy |
| CSC | Common Service Centre |
| D&O | Dangerous & Offensive |
| D2D | Department to Department |
| DARPG | Department of Administrative Reform and Public Grievances of India |
| DCB | Demand Collection Balance |
| DEO | Data Entry Operator |
| DEP | Delegation of Power |
| DMP | Dot-matrix Printer |
| DOB | Date of Birth |
| DPR | Detailed Project Report |
| DR | Disaster Recovery |
| DTCP | Directorate of Town and Country Planning |
| ECS | Electronic Clearance Service |
| EIP | Enterprise Information Portal |
| ELCOT | Electronics Corporation of Tamil Nadu |
| EMD | Earnest Money Deposit |
| ERP | Enterprise Resource Planning |
| ESS | Employee Self Service |
| FAQ | Frequently Asked Questions |
| FAS | Financial Accounting System |
| FC | Facilitation Centre |
| FD | Fixed Deposit |
| FRS | Functional Requirement Specifications |
| G2B | Government to Business |
| G2C | Government to Citizen |
| GIS | Geographical Information System |

| | |
|---|---|
| GoTN | Government of Tamil Nadu |
| GPS | Global Positioning System |
| HoD | Head of Department |
| ICT | Information and Communication Technology |
| IDC | Institutional Development component |
| ISC | Information Security Committee |
| ISM | Information Security Manager |
| ISO | International Standards Organization |
| ISP | Internet Service Provider |
| ITIL | IT Infrastructure Library |
| ITS | Information Technology Specialist |
| IVRS | Interactive Voice Response System |
| JC | Joint Commissioner |
| Kbps | Kilobits per second |
| KPI | Key Performance Indicator |
| KV | Kilo Volt |
| KVM | Keyboard, Video, Mouse |
| LAN | Local Area Network |
| LBS | Licensed Building Surveyors |
| LCD | Liquid Crystal Display |
| LFA | Local Fund Audit |
| LPA | Local Planning Authority |
| LTC | Leave Travel Concession |
| MAWS / MA&WS | Municipal Administration and Water Supply (Department) |
| Mbps | Megabits per second |
| MHO | Municipal Health Officer |
| MIS | Management Information System |
| MSDG | Mobile Service Delivery Gateway |

| | |
|---|---|
| MSW | Municipal Solid Waste |
| NAC | Non-Availability Certificate |
| NeGP | National e-Governance Plan |
| NOC | No Objection Certificates |
| O&M | Operations and Maintenance |
| OEM | Original Equipment Manufacturer |
| OPEX | Operational Expenditure |
| ORM | Object Relationship Management |
| PAN | Permanent Account Number |
| PDA | Personal Digital Assistant |
| PF | Pension Fund |
| PIC | Project Implementation Committee |
| PMS | Personnel Management System |
| PMU | Project Management Unit |
| PP | Planning Permissions |
| QA | Quality Assurance |
| RDMA | Regional Directorate of Municipal Administration |
| RFP | Request for Proposal |
| RoI | Return on Investment |
| RTI | Right to Information |
| RTO | Regional Transport Officer |
| RWH | Rainwater Harvesting |
| SA | System Analyst |
| SAN | Storage Area Network |
| SI | System Integrator |
| SLA | Service Level Agreement |
| SMS | Short Messaging Service |
| SOA | Service Oriented Architecture |

| | |
|---|---|
| SOP | Standard Operating Procedures |
| SOR | Schedule of Rates |
| SoW | Scope of Work |
| SPF | Special Provident Fund |
| SRP | Special Revision Petition |
| SRS | System Requirement Specifications |
| SS | Sanitory Supervisor |
| SSDG | State Service Delivery Gateway |
| STP | Sewage Treatment Plant |
| SWM | Solid Waste Management |
| T&CP | Town & Country Planning |
| TA | Technical Assistance |
| TDS | Tax Deducted at Source |
| TIN | Tax Identification Number |
| TNA | Training Need Analysis |
| TOR | Terms of Reference |
| ToT | Training of Trainer |
| TPI | Town Planning Inspector |
| TPO | Town Planning Officer |
| TSLR | Town Survey Land Records |
| TSP | Turnkey Solution Provider |
| TUFIDCO | Tamil Nadu Urban Finance & Infrastructure Development Corporation Limited |
| TWAD Board | Tamil Nadu Water Supply & Drainage Board |
| UAT | User Acceptance Test |
| UGD | Underground Drainage |
| ULB | Urban Local Bodies |
| ULB | Urban Local Body |

UPS Uniterrupted Power Supply

UWMS User Workflow Management System

VA-NVA Value Added-Non Value Added

VLT Vacant Land Tax

VPN Virtual Private Networks

VRS Voluntary Retirement System

WCAG Web Content Accessibility Guidelines

## B. BUSINESS FUNCTION AND PERFORMANCE REQUIREMENTS

The following are the broad level requirements,

People Deploy personnel resources for

- Application Development
- Cloud Deployment
- Training
- Operations and Maintenance

The SI will only use could based Platform as a Service for new developments and may use Infrastructure as a Service for integration without adding infrastructure at CMA office to perform tasks as Testing, Deployment, Training, etc.

Develop cloud based application as per SRS and FRS already available with CMA

### 1.1 Business Requirements to be met by the System

This section lists that various business requirements that needs to be met by the application. Business requirements for the application development have been described based on the modules required for each department / section of various ULBs.

1.1.1 Revenue Section: Revenue section primarily deals with collection of demands from various stakeholders as Citizens and Businesses. Following modules for the Revenue section have been envisaged:

☐ Property Tax Module

☐ Profession Tax Module

☐ Non Tax Module

Following functional requirements of the modules for the Revenue Section are described below.

1.1.1.1 Property Tax Module: The following table details the functionality that may be required for the Property Tax module.

**Functionality**

A] Capture of various details of the Property

i. Ward/ Zone/ Block/Route – Administration or Geographical divisions

ii. Property Holder‘s Name – One or multiple owners

iii. Property Holder‘s Email ID / Mobile No.

iv. Property Holder‘s Address (Present Address, Permanent Address)

v. Property Location details (Survey No., etc.)

vi. Property address

vii. Linkage with Building Permission Module to carry forward building details

B] Capture of various details required for Property Assessment

i. Type and Sub Type of Property

ii. Usage of Property

iii. Construction Class / Vicinity Factor / Amenity Factor

iv. Age of Building

v. Property tax as per rent assessment.

vi. Any other factor required for Assessment

C] Self-Assessment Module - Integration required with

i. Allow citizens to enter their property details through Web Portal Web Portal

ii. Option to the citizens to submit their Assessment to the department for confirmation GIS

D] System based calculation of Ratable Value

i. Room-wise / Flat-wise/ Whole Property Assessment

E] Tax Generation

i. Tax Generation as per Annual Rental Value (ARV) calculations

ii. Tax Exemptions

iii. Bifurcation of rates for General Tax, Fire Fighting, Educational Cess, Underground Drainage charge and others as required.

F] Other relevant Details for Property

i. Property history

ii. Advance property tax payment

iii. Property Rental details

G] Other Departmental Process

i. Generation of Special Notice

ii. Objection

iii. Hearing

iv. Property Billing

a. Individual flat-wise billing/ Property wise billing

b. Interest Calculation

c. Consideration of Advance paid earlier

v. Demand Notice Generation

vi. Issue of Warrant Notice

vii. Seizure of Property

viii. Auction of Property

ix. Rebate Calculations Accounts

x. Automatic mailing of Bills / Notices to the E-Mail ID

xi. Advance / Excess Collection / Refunds Accounts

xii. Cheque Dishonor and Outstation Cheque charges

xiii. Facility for online tracking of bounced checks

xiv. E-Mail / SMS to be sent to the owner upon transactions SMS Gateway / Web Server

H] Citizen Services

i. Change in Property Ownership

Accounts

ii. Splitting of Property Tax Assessment

iii. Duplicate Bill

iv. Assessment Certificate

v. Copy of Property Tax Assessment Extract

vi. No Dues Certificate

vii. Payment of Property Tax

viii. A separate stand-alone web based property tax calculator to be designed for each ULB

ix. Linkage with Grievance module for Property Tax related Grievance

1.1.1.2 Profession Tax: The following table details the functionality that may be required for the Profession Tax module.

Functionality

A] Capture of various details of the Assesses and Organizations

i. Ward/ Zone/ Block/Route – Administration or Geographical divisions

ii. Assessee Name – One or multiple owners

iii. Assessee Email ID / Mobile No.

iv. Assessee Address(Present Address, Permanent Address)

v. Assessee Location / Organization details and Contact – GIS Integration

vi. Property address

B] Capture of various details required for Profession Tax Assessment

i. Organizations and Employees, Self-employed persons

ii. Income and Income details

iii. Filing of Returns by Employers and Citizens

iv. Any other factor required for Assessment

C] System based calculation of Profession Tax

D] Other Departmental Process

i. Demand Notice Generation

ii. Automatic mailing of Bills / Notices to the E-Mail ID

iii. Advance / Excess Collection / Refunds Accounts

iv. Cheque Dishonor and Outstation Cheque charges

v. Facility for online tracking of bounced checks

vi. E-Mail / SMS to be sent to the owner upon transactions SMS Gateway / Web Server

E] Citizen Services

i. Duplicate Bill Accounts

ii. No Dues Certificate

iii. Payment of Tax

iv. Linkage with Grievance module for Tax related grievances

F] MIS

i. Demand / Collection / Balance Register

ii. Assessment Register

iii. Closing Register

iv. Ward-wise / Zone-wise Recovery reports

v. Top Defaulters Report

vi. Tax-wise Recovery Details

vii. Tax-wise Demand Details

viii. Advance Payment Reports

G] Other Requirements

i. Data Porting / Data Entry Suite

ii. Query of Tax Dues Centers, Web Portal

1.1.1.3 Non tax: One of the non-tax activities of the Revenue section is to collect revenue from the properties owned by ULBs. This activity is known as Estate Management. The functional requirements for the same are captured in the Land and Estate Management module.

1.1.2 Accounts Section: Following modules for the Accounts section have been envisaged:

☐ Accounts Module

☐ Audit Module

Following functional requirements of the modules for the Accounts Section are described below.

1.1.2.1 Accounts Module: The following table details the functionality that may be required for the Accounts module.

Functionality

A] General

i. Provides all procedural functions of a fund accounting system in conformity with Indian Accounting systems and conventions as per Government of India, Government of Tamil Nadu and the Institute of Chartered Accountants of India apart from other statutory organizations

ii. System supports Double entry system of book-keeping and can generate all reports accordingly

iii. Ability to adhere to International Financial Accounting Standards norms and procedures

iv. Supports Cash and Accrual basis of accounting

v. Budgets should be linked with expenditures

vi. Support National Accounting Manual for Municipalities modified by Government of Tamil Nadu

B] Masters

i. Ability to define Organizational elements within the Account Heads to support the organizational structure of CMA, RDMA, Municipalities across Fund, Projects, Schemes, Head Office, Departments, Sections, Programs, etc.

ii. Maintain independent hierarchies in the account structure to support different roll-ups (e.g. financial reporting, budget reporting, project accounting, grant reporting, departmental reporting, contracts, etc.).

iii. Account Head Definition

iv. Account Grouping and Sub-Grouping

v. Bank Account Details

vi. Vendor Details

C] Departmental Process

i. Budget Preparation, Distribution and Management System

a. Budget Classification

b. Department-wise estimated provision, revision for income and expenditure

c. Budget Appropriation between different budget heads through approval process

d. Administrative approval / dis-approval of works linked to budget availability

e. Department wise budget roll ups and approvals

f. Budget document publishing

ii. Receipts through Internet / CCs / KIOSKs

a. Counter-wise Collection Detailed and Summary Reports

b. Revenue Stamp Management

c. Cheque/ Cash Deposit Slips into Bank

d. Capture of Cheque Dis-honor cases, Remittance entry

iii. Payment Management

a. Bill / Liability Entry

b. Payment Authorization

c. Payment Voucher (Full or Partial Amount)

d. Maintaining Check details, Check Printing

e. Recording of Check Issuance Details

f. Recording of Cheque Cancellation details

iv. Encumbrance and Pre-encumbrance tracking.

v. Security Deposit / Earnest Money Deposit Management

vi. Zone/Ward/CC wise Bank Collections

vii. Loans Management

a. Maintenance of Loan Details

b. Alerts for Loan Instalment Payments

c. Loan Instalment Payments

viii. Grants Management

a. Maintenance of Grant Details

b. Utilization Details

c. Utilization Certificates

ix. Debt Management

x. Accrued Payment Management

xi. Investment Management

a. Maintenance of Investment Register

b. Alerts on due dates

c. Comparison of different options for Investments

xii. Advance Managements

xiii. Bank Reconciliation

xiv. TDS/ VAT Register, Online Payment of Tax

xv. Maintenance of Bank Account wise balances

xvi. Integration of Ledger A/c with ECS Payment

D] Closing

i. Multiple accounting periods as weekly, monthly, quarterly, yearly, user defined, etc.

ii. Period-end processing at any point in time, as well as multiple times, after the end of the period

iii. Close at end of period by Fund, Account, Project, Department, etc.

E] Vendor Self Service

i. Vendor registration

ii. Changes to vendor file including Address, Contact information, Preferred payment method, etc.

iii. Automatic notification through email (and vendor self service)

iv. Record customer information including Last accounting activity, customer name, PAN, TIN, etc.

v. Submit invoices, track invoice status and payment status

F] Reports

i. Cost Centered Accounting Reports

ii. Ratio Analysis, Trend Analysis

iii. Department-wise, Cost Center-wise Income / Expenditure reports

iv. Generation of Deposit Slips

v. Security Deposit Register

vi. Grants Register

vii. Loans Register

viii. Investment Register

ix. Advance Register

x. Bill Register

xi. Payment Register

xii. Outstanding Bill Register

xiii. Reports on Receivables

xiv. Cash Book (Detailed & Summary)

xv. Function-wise Expense Subsidiary Ledger

xvi. Journal Book

xvii. Ledger Book

xviii. Cheque Issue Register

xix. Trial Balance, Income & Expenditure Statement

xx. Balance Sheet

xxi. Bank Reconciliation Statement

xxii. Cheque Dishonor Report

xxiii. Analysis on unspent amount of previous years

xxiv. Various reports required for submission to Standing Committee

xxv. Liability Estimation with respect to Material Bill entry or Receipt of Material

xxvi. Report on expenditure data (direct and indirect) from fiscal year, calendar year, quarter, month, week, etc.

1.1.2.2 Audit Module: The following table details the functionality that may be required for the Audit module.

Functionality

A] Departmental Process

i. Pre-Audit of Tenders, Estimates Accounts

ii. Audit Para Entry

iii. Post Audit of the Departments

iv. Inspection of Contractor & Supplier Bills

v. Inspection of Other Bills like Telephone Bills

vi. Inspection of Advance Adjustment proposals

B] Reports

i. Department-wise Budget Provision v/s Expenditure Report

ii. Status report on Audit Para

iii. Various statutory reports to be submitted to Standing Committee

iv. Exception Reports (w.r.t. deletionof records, adjustment entries, etc.) Accounts, Other Modules

1.1.3 Engineering Section: The Engineering Section performs key tasks as supplying for Water Connections, Disconnections of connections, performing tendering work for wards amongst others. Following modules for the Engineering section have been envisaged:

☐ Water Supply Module

☐ Underground Drainage Module

☐ Procurement Module

☐ Ward Works Module

Following functional requirements of the modules for the Engineering Section are described below.

1.1.3.1 Water Supply Module: The following table details the functionality that may be required for the Water Supply module.

Functionality

A] Citizen Services

i. New water Connection

ii. Closing of Connection (Permanent / Temporary)

iii. Change of use

iv. Reconnection

B] Defining Various Charges

i. Water consumption Charges for metered and non-metered connections

ii. Water connection charges

iii. Scrutiny Charges

iv. Deposit for various connection size & category.

C] Departmental Process

i. Capture of various details of the Water Connection

a. Consumer Details- Property Details, Owners Details, Link to Property Number.

b. Metered/ Non Metered Connections

c. Multiple Usage type - Domestic, Commercial, Industrial, etc. Tariff Category.-

Property GIS Integration

ii. Connection Pressure Details- Connection Size, Distribution Line, GIS

iii. Compliance for _No dues‘ for property Tax Property Tax

iv. Meter Information - Meter Number / Make / Cost

v. Meter Restoration / Replacement Details

vi. Scrutiny at various levels for citizen services

vii. Road digging charges adjustment

viii. Facility for recording details of site scrutiny through PDA/mobile

ix. Flow control valve should commercial/industrial bulk usersbe checkedin

x. Work Order Printing for new connections, re-connections and closing of connections

xi. Meter Reading Entry (in case of available meter, else Flat rate or as per provision)

a. Meter Reading Data Entry

b. Meter Cut off- Restoration

xii. Scope for PDA/Mobile based Meter Reading Capture & Bill Generation and uploading of PDA data to system or sending data directly using mobile interface

xiii. Temporary Disconnection

xiv. Bill Generation

a. Billing for Metered and non-metered connections

b. Billing schedule for different connection category

c. Consideration of advance paid if any

d. Interest / Penalty calculation on arrears

e. Bill correction

f. Handheld device may be used for generating bill on- the-spot

xv. Bill Printing

xvi. Collection from CC

xvii. Handling Cheque dishonor and outstation Cheque charges Accounts

D] MIS

i. Connection Outstanding Register

ii. Bill Acceptance Register

iii. Meter reading report

iv. Consumption statement

v. List of consumers ward, category & size wise

vi. List of connections

vii. List of closed connections

viii. Ward-wise / Zone-wise Recovery reports

ix. Top Defaulters Report

x. Tax-wise Recovery Details

xi. Tax-wise Demand Details

xii. Advance Payment Reports

xiii. Bill status for bill generation

xiv. Faulty Meter Report

xv. Illegal connection reports (Based on complains)

xvi. Water quality test report

xvii. Ward wise / zone wise / line water pressure report

E] Other Requirements

i. Data Porting / Data Entry Suite

ii. Query Water Dues CCs, Web Portals

1.3.2 Underground Drainage Module: The following table details the functionality that may be required for the Underground Drainage module.

Functionality Integration required with

A] Citizen Services

i. New Connection

Accounts

ii. Closing of Connection

iii. Change of use

iv. Reconnection

B] Defining Various Charges

i. Connection charges

ii. Scrutiny Charges

iii. Deposit for various connection size & category.

C] Departmental Process

i. Capture of various details of the Connection

a. Consumer Details- Property Details, Owners Details, Link to Property Number.

b. Multiple Usage type - Domestic, Commercial, Industrial, etc. Tariff Category.

Property Tax, GIS Integration

ii. Connection Details

iii. Compliance for _No dues‘ for property Tax

iv. Scrutiny at various levels for citizen services

v. Road digging charges adjustment

vi. Facility for recording details of site scrutinythrough PDA/mobile

vii. Work Order Printing for new connections, re- connections and closing of connections.

viii. Bill Generation

a. Billing provisions

b. Interest / Penalty calculation on arrears

c. Bill correction

d. Handheld device may be used for generating bill on-the-spot

ix. Bill Printing

x. Collection from CC Accounts

xi. Handling charges Cheque dishonor and outstation Cheque Accounts

D] MIS

i. Connection Outstanding Register

ii. Bill Acceptance Register

iii. List of consumers ward, category & size wise

GIS

iv. List of connections

v. List of closed connections

vi. Ward-wise / Zone-wise Recovery reports

vii. Top Defaulters Report

viii. Tax-wise Recovery Details

ix. Tax-wise Demand Details

x. Advance Payment Reports

xi. Bill status for bill generation

E] Other Requirements

i. Data Porting / Data Entry Suite

ii. Query UGD Dues CCs, Web Portals

1.1.3.3 Procurement: While the following table details the functionality that may be required for the Procurement module, it is required that the Tamil Nadu e-Tendering system may be used. Currently, though the requirement is to use the e-Tendering solution for projects worth Rs. 10 Lakhs or more, it is recommended that for projects of even smaller value.

Functionality

A] E-Tendering Web-Site Functionality

i. Firms should be able to register with various essential data

Web Portal, Payment Gateway

ii. FAQs for all tender related queries

iii. Registered firms should be able to view various published tenders and essential information in user friendly manner

iv. Secure Login authentication

v. Auto-generation of various communications to the registered bidders (SMS / E-Mails)

B] Tendering Functionality

i. Raise Indents as per the requirement.

Web Portal

ii. Receive indents

iii. Generation of information for press Advertisements

iv. Check-list for Tender Notice

v. Publish Tender Notice Web Portal

vi. Check-list for Tender Terms & Conditions

vii. Publish Tender Document

viii. Reports to assist Tender Document preparation

ix. Purchase of Tender Documents Accounts, CC, Web Portals

x. Submission of bids (Commercial & Technical) Web Portal

xi. Technical bid evaluation

xii. Cross-check of vendors with Vendor Database and their previous records

xiii. Commercial bid evaluation

xiv. Cross-check of rates with similar projects in past

xv. Award of contract Projects

xvi. Ability to use Digital Signatures of appropriate class for uploading of tender documents and applying of tender.

C] Procurement via Local Market / through quotations

i. Invitation of Quotations

ii. Issue of Purchase order

iii. Receipt of Material Stores

iv. Payments Accounts

D] MIS

i. Technical Bid Comparison Reports

ii. Financial Bid Comparison Reports

iii. List of Vendors registered

1.1.3.4 Ward Works: The following table details the functionality that may be required for the Ward Works module.

Functionality

A] Project Initiation

i. Defining New Project - System allows unique project numbers to be assigned Automatically based on user defined criteria

ii. Supports multiple-year projects

iii. Projects can be identified as Capital Projects, Operating projects, Special Projects, Maintenance Projects, Grants projects etc. or other user defined project types (could be more than one)

iv. Supports parent/child relations for projects and sub-projects

v. Selection of Department, Officers for scrutiny Integrated Personnel Management System

vi. Selection of Budget Code Accounts

vii. Maintain general financial project information as budget, encumbrances, expenditures, B/S accounts, Revenues Funding sources, Amendments, Resolutions, etc.

B] Project Estimation

i. Identification of different items, defining units

ii. Selection of SOR / Market Rates

iii. Preparation of Measurement Sheet

iv. Preparation of Abstract sheet

i. Preparation of Rate Analysis Sheet

ii. Preparation of Recapitulation Sheet

iii. Defining various Milestones / Time limit

C] Technical Sanction

i. Workflow for Technical sanction as per chart of competent authorities

Workflow System

ii. Workflow system to support To & Fro movement of proposal

D] Administrative Sanction

i. Workflow for Administrative sanction as per Delegation of Powers(DEP)

Workflow System

ii. Workflow system to support To & Fro movement of proposal

iii. Negotiation

E] Tendering

i. Generation of information for press Advertisements

ii. Check-list for Tender Notice

iii. Special conditions for contract if any

iv. Publish Tender Notice on Web Portal Web Portal, e- Tendering

v. Publish Tender Document on Web Portal

vi. Reports to assist Tender Document preparation

vii. Check-list for Tender Terms & Conditions

viii. Purchase of Tender Documents Accounts, Facilitation Centers, Web Portals

ix. Submission of bids Manual, e-Tendering

x. Submission of bid Web Portal

xi. Technical bid evaluation

xii. Cross-check of vendors with the approved Vendor list

xiii. Commercial bid evaluation

xiv. Cross-check of rates with similar projects in past

xv. Award of contract e-Tendering, Accounts

xvi. Milestone entry

F] Project Execution

i. Project Scheduling

ii. Measurement Book Entry and it‘s movement diary Accounts

iii. Tracking and recording of delays and reasons for each project

iv. Monitoring of progress

v. Quality Control (PMC / TPIA report)

vi. Notices to agencies / vendors (for delay, for poor quality, any other reason)

vii. Levy of Penalty Accounts

viii. Agencies Black-listed / restricted for certain period

ix. Approval process is built in.

G] Billing & Completion Certificate

i. Running Account Bills

ii. Billing for Extra / Excess items

iii. Completion / utilization certificate

H] MIS Reports

i. Project wise comparison of Budgeted Expenditure Vs. Actual Expenditure Accounts

ii. Milestone Monitoring Report

iii. Measurement Sheet / Abstract Sheet / Rate Analysis Sheet / Recapitulation Sheet

iv. Technical Bid Comparison

v. Financial Bid Comparison

vi. Billing Information

vii. Project Summary Sheet

viii. Reasons for delay in achieving milestones.

ix. Reports / Alerts through other systems for New Projects

a. Building Permission Module

b. Grievance Redressal Module

c. Alerts for Road Re-surfacing / Repairing

x. Cross-departmental information as alerts while defining new projects

E.g. : Water Department should get alerts for Pipeline laying, if the Road (location, measurement) is being prepared / re-surfaced / Grouting / Paving

I] Other Requirement

i. Registration of contractors

ii. Up-gradation of contractors data / Blacklisting of contractors

iii. Contractors Register

iv. Confidential Register of Contractors

v. Road register (Traffic (PCU) / Road history / Defect liability)

vi. Manual followed by dept for implementation of projects (IRC / CPHEO / WHO / ISO / etc.)

vii. Bridges register (history / annual maintenance / Continuous monitoring / details of PCU)

viii. Monitoring of Sewerage treatment plants. History & all the relevant data (Monthly report of influent & effluent characteristics of sewage, electricity consumption, GPCB reports, Third Party Reports, etc.)

ix. Revenue generation from STP

x. Expense for O&M of Sewerage System

a. Collection Cost

b. Sewage Treatment cost

c. O&M of Pumping Station

xi. Monitoring of Drainage Pumping Stations. History & all the relevant data (Monthly report of functioning, electricity consumption, etc.)

xii. Monitoring of Water treatment plants. History & all the relevant data (Monthly report of raw & treated characteristics of water, electricity consumption, Central Laboratory / Health Dept, Third Party Reports, etc.)

xiii. Monitoring of Water Pumping Stations. History & all the relevant data (Monthly report of functioning, electricity consumption, etc.)

xiv. Expense for O&M of Water Distribution System

a. Raw water cost

b. Production cost

c. Distribution Cost

xv. Monitoring of Hot mix plant (material stock, consumption, TPIA reports, etc.)

xvi. Track project information as Milestones, Achievements, Progress, etc.

1.1.4 Town Planning Section: Following modules for the Town Planning section have been envisaged:

☐ Building Permission System

☐ Land and Estate Management Module

☐ Non Tax Module

Following functional requirements of the modules for the Revenue Section are described below.

1.1.4.1 Building Permission System: The following table details the functionality that may be required for the Building Permission module.

Functionality

A] Citizen Services

i. Layout Approval

CC, Web Portals, Accounts, GIS

ii. Building Permission / Commencement Certificate

iii. Revised Building Permission

iv. Renewal of Building Permission

v. Plinth Completion Certificate

vi. Occupancy Certificate

vii. Cancellation of License

viii. Architect License

ix. Zone Certificate

x. Transfer of Development Rights

xi. Certified copy of plan

xii. Old property data retrieval

xiii. RTI – Apply online for information related to proposal

xiv. Single complaint can be handled by multiple department

xv. Online submission facility should be made available for registered Architects

B] Defining Charges

i. Development Charges

ii. Scrutiny Charges

iii. Other Charges as applicable based on application, size of building, size of plot, etc.

C] Departmental Process

i. Scrutiny of Applications – CAD based Automatic Scrutiny System - Building Permission module, GIS, Integrated Personnel Management System

ii. Provision of uploading 4 photos of site – blank site, work- in-progress-2, completed

iii. Site Reports

iv. NOCs from different departments

v. Alert to be sent to Property Tax Department after issuance of Building permission, Plinth , Completion & Occupancy Certificate (Color code based GIS system) - GIS Integration

vi. Versioning of proposal for more than one iterations Building Permission module

vii. Facility for query for the stage of completion to be made available - Building Permission module, GIS

viii. Advocate dates for departmental cases - Legal

ix. Audit objection / Para for departmental cases Audit

x. TDR awarded information - Land & Estate

D] MIS

i. Application Pendency Report

ii. Building Permissions / Occupancy Certificates taken for a particular period - GIS integration

iii. List of Building Permissions taken but Occupancy Certificate not Taken

iv. Impact analysis for Drainage / Water based on the building permission given.

v. Revenue Related Reports (Scrutiny Charges / Development Charges)

vi. Official Visit scheduling Integrated Personnel Management System

vii. E-Mail / SMS to be sent to the applicants SMS Gateway / Web Server

A] Other Requirements

i. Data Porting / Data Entry Suite

ii. Integration with Building Permission module

iii. Generation of Alerts to other departments w.r.t. infrastructure requirements, upon completion certificate Workflow, Projects, SWM, Water

1.1.4.2 Land and Estate management Module: The following table details the functionality that may be required for the Land and Estate Management module. Land acquisition is often one of the challenging aspects in any project and it would need to be tracked with utmost care.

Functionality

A] Land Management

i. Proposal for Land Acquisition GIS

ii. Scrutiny of Land Details - Workflow Management System

iii. Valuation of Land

iv. TDR Process & Possession of Land

v. Transfer of Details to Concerned Department (Bhavan for Construction, Other department for Information) Legal

B] Estate Management

i. Creation of Record in the Estate Register

a. Hand-over from other agencies

b. Hand-over by Builders

c. Construction by Projects Dept.

ii. Issuance of Municipal Property on rent / lease

iii. Generation of Bills

iv. Acceptance of Payment

v. Renewal of Rent / Lease Legal

vi. Remission to Lease

vii. Cancellation of lease

viii. Allotment of House to the employee Integrated Personnel Management System

ix. Maintenance of Property on Contract

x. Maintenance Inspection report

C] MIS

i. Land Register GIS

ii. Land Acquisition related reports

iii. Revenue Reports for Estate on Rent / Lease

iv. Outstanding Register for Estate on Rent / Lease - GIS

v. Top Defaulters List

D] Other Requirements

i. Data Porting / Data Entry Suite

1.1.5 Public Health Section: Public Health Section performs important functions of Registration of Birth and Death, printing certificates for the same, granting of licenses, Solid waste Management and Fleet management. Following modules for the Public Health section have been envisaged:

☐ Birth and Death Module

☐ Licenses Module

☐ Solid Waste Management Module

☐ Vehicle Management Module

Following functional requirements of the modules for the Public Health Section are described below.

1.1.5.1 Birth and Death Module: The following table details the functionality that may be required for the Birth and Death module.

Functionality

A] Registration of Birth / Death

i. Registration of Birth (Hospital / Home / Jail / etc.)

a. Normal & Delayed Registration

b. Child Details – Gender, DOB, Time, Weight, GIS

(for marking the hospital + address) Name, Birth Place etc.

c. Parent Details – Name, Address, Qualification, Occupation

d. Delivery Method, Informant Details, Attachments in case of delayed registrations

ii. Registration of Still Birth

a. Fatal Death Cause along with other birth registration details

iii. Child Name Insertion

iv. Registration of Death

a. Normal & Delayed Registration

b. General Details – Gender, DOB, Time, Name, Attention type, Pregnancy related Death

c. General Details –Death place type, death place, Cemetery type, Informants Details

d. Medical Certificate Details - Death Cause, Death Manner

e. Create link with Birth Database by giving lookup while registering the death

GIS (for marking the location)

v. Online Registration of Birth / Death by Hospitals through proper Authentication Web

vi. Defining charges For Birth and Death Services

a. Delay Charges based on no. of days of delay

b. Birth Certificate charges

c. Death Certificate charges

d. NOC charges For Birth & Death

e. Child Name Insertion charges

i. Linking of Birth / Death with Property Tax & GIS Database Property Tax / GIS

B] Citizen Services

i. Issue of Birth Certificate

a. Free Copy as per rule.

b. Charges for additional copies

c. Search Charges

d. Generation of On-line Certificate with auto generated letter by the department confirming the authenticity of the Certificate CCC, Accounts

ii. Birth Registration Correction

iii. Issue of NOC for Birth

iv. Death Certificate

v. Death Registration Correction

vi. Issue of NOC for Death

vii. Issue of Cremation Certificate

viii. Online Birth / Death Certification Web portal, Accounts

ix. Integration with Web to validate the Birth / Death Certificate Web Portal

C] MIS

i. Variety of Reports to be sent to State / Central govt. authority

ii. Monthly Summary Report of Birth

iii. Monthly Summary Report of Still Birth

iv. Monthly Summary Report of Death

v. Birth Reports for Polio Vaccination Drives

vi. Birth / Death reports for various Health Schemes

vii. PNDT report

viii. Reports to Health Department w.r.t. Death Causes in a particular period, for particular location GIS

ix. Reports to analyze services delivered through various delivery channels

D] Other Requirements

i. Data Porting / Data Entry Suite

ii. Search various parameters like name, date of birth / death, hospital name etc.

1.1.5.2 Licenses Module: The following table details the functionality that may be required for the Licenses (including D&O Licenses) module

Functionality

B] Citizen / Business Services

iii. Issue of New License

Facilitation Centers, Web Portal, Accounts

iv. Duplicate License

v. Change in Name of Business

vi. Change in Business

vii. Transfer of License

viii. Renewal Of License

ix. Cancellation of License

C] Issuance of License

i. Capture of License Details

a. License Holder‘s Details – One or multiple owners

b. Capture of Mobile No. / E-Mail ID

c. License holder‘s photograph(s) (optional)

d. Link to Property Number (optional)

e. License Details – Temporary/ Permanent License, Name of Business

f. Trade/ Business Details – License Type, Subtype - multiple levels to define types and sub types.

g. License type, sub-type, unit of measure wise license amount.

Property Tax Assessment

Other relevant modules

ii. Calculation of License Fee

iii. License Certificate

D] Other Departmental Process

iv. Scrutiny of Applications Workflow System

v. Inspection Entry

vi. Generation of Show cause Notice

vii. Hearing

viii. Reminder Notice for Renewal

ix. Cancellation of License by Force

E] MIS

i. License Register

ii. List of Defaulters GIS

iii. Reminder Notice for Renewal

iv. Demand / Collection Register

v. Reports showing Changes in License Types, Business Partners, Cancellation etc.

vi. Facility to forecast the impact of reduction / deduction of License Fee

vii. Reports w.r.t. Bills / Notices generated

viii. E-Mail / SMS to be sent to the owner upon transactions SMS Gateway / Web Server

F] Other Requirements

i. Data Porting / Data Entry Suite

1.1.5.3 Solid Waste Management Module: The following table details the functionality that may be required for the Solid Waste Management (SWM) module.

Functionality

A] Area details

i. Area information (Zone / Ward / Colony / Society) GIS

ii. Population details

iii. Volume of the Solid waste which includes Wet & Dry waste (Recycled & Non Recycled)

iv. Resources required

v. Collection procedure ( i.e. Primary : Residential & Commercial collection, Gate to Dump / Transfer Station; Secondary : Community Bin to dump site / transfer station)

B] Garbage Collection Scheduling

i. Assign SWM Vehicles to pick-up the Garbage. Route / Category wise assignment like A: High flow waste, B: Medium flow, C: Low flow. GIS, Fleet Mgmt.

ii. Ward wise / Location-wise / Bit wise assignment of Sanitation Staff GIS, Integrated Personnel Management System

iii. Scheduling of garbage collection and cleaning activities with the objective of maximizing citizen friendliness on the one hand and optimum use of resources on the other.

iv. Assigning routes to the SWM vehicles / Dumper placers / Compactor bucket vehicles etc. GIS, Fleet Mgmt.

C] Primary Garbage Collection & Disposal through weigh bridge

i. Record the volume of garbage collected and disposed on a daily basis. Waste sent to different processing plants Fleet Mgmt.

ii. Linkage with Garbage Bins / Land Fill Sites, in case of Citizen Grievance

iii. Keeping certain Checks as per environmental regulations, like minimum frequency of lifting garbage, transportation mode, etc.

D] Treatment of Waste & Disposal of Inert Waste at Landfill site

i. Reports on Input of Waste by plants, final products made by the plants

ii. Reports on inert waste sent to the land fill site by the plants

iii. Revenue generation from the plants

D] MIS

i. Monitor the deployment of pickup trucks and personnel based on the schedule originally drawn. GIS

ii. Alerts if the use of Land Fill sites is above some thresh-hold

iii. Generation of registers like: Contracts Register for SWM, Site Register (landfills), Contractors Register, etc.

iv. SWM Contract Wise Status Reports, Site Wise Progress Summary, Contractor wise Performance Analysis, etc.

v. Comparison of expenditure on SWM activities over different geographical areas, years, agencies, etc. GIS

vi. Daily / Monthly reports of comparison for how much garbage has to be lifted as per target & how much garbage is actually lifted. If less lifted then reasons for the same for e.g. Breakdown / Labour problem.

vii. MIS report for expenditure incurred on primary sweeping, door-to-door / gate-to-dump / transfer station Integrated Personnel Management System

viii. MIS report for expenditure incurred on transportation

ix. MIS on total quantity of SW collected by private agencies and payment as per the total quantity of SW collected

1.1.5.4 Vehicle Management Module: The following table details the functionality that may be required for the Fleet Management / Vehicle Management module.

A] Vehicle Scheduling & Fuel Management

i. Vehicle Scheduling- Asset Module

ii. Assigning Driver - Integrated Personnel Management System

iii. Re-filling of Fuel

B] Vehicle Tracking

i. Identification of Vehicles for Tracking Asset System Mgmt.

ii. Online Tracking of Vehicles (Start-time, speed indicator, idle time, end time)

iii. Linking of SWM vehicles with Container Sites / Bins, Dumping Ground / Transfer Stations / Processing Plants / Land-fill sites

GIS

iv. Use of GPS for online vehicle tracking GIS

C] Vehicle Maintenance

i. Entry of the reason for repair

ii. Approval from the authority Document Mgmt. System, Accounts

iii. Vehicle Issuance details

iv. Receipt of Vehicle, entry of repair work details

v. Purchase of New Items (like Tyres, Battery, etc.)

Asset, Accounts

vi. Insurance Cross-check & RTO Validation

D] MIS

i. Department-wise / officer wise Vehicle Inventory Asset Mgmt. System

ii. Fuel consumption report for various vehicles GIS, GPS

iii. Route Tracking for SWM Vehicles, cess pull tankers, water tankers, fogging machines, jetting machines, super suckers etc.

GIS

iv. Analysis of Time spent by SWM vehicles while idling

v. Average Fuel expenditure for various vehicles (based on the mileage & traveled distance

vi. No. of trips made to the Dumping Ground

vii. System Alerts

a. If the petrol expense claimed by the driver is more than system calculated

b. If No. of trips made to the Dumping ground are less than proposed

c. If any particular Dust Bin was not covered

E] Other Requirements

i. Data Porting / Data Entry Suite

1.1.6 General/Establishment Section: Following modules for the General / Establishment section have been envisaged:

☐ Integrated Personnel Management System

☐ Employee Self Service Module

☐ Inventory / Materials Management Module

☐ Agenda Module

Following functional requirements of the modules for the Revenue Section are described below.

1.1.6.1 Integrated Personnel Management System: The following table details the functionality that may be required for the Human Resource Management module.

Functionality

A] Generic Features – Mandatory requirements

i. System should provide for Retrospective calculations to be handled for all types of scenarios (employee joining, leaving, pay hike, promotions, etc.)

ii. System should be able to handle all statutory regulations and maintain the details directly in the screens provided for data entry. All rules related to such acts should be preconfigured in the system.

iii. Vendor to provide for Legal change updates to cater for any statutory changes.

iv. System should provide the capability to upload documents of employees like certificates, transfer, promotion letters in a scanned format into the system and ability to retrieve them whenever required

Document Mgt. System

v. Capability to integrate with Web portal for employees self service Web Portal

B] Recruitment and Manpower Planning

i. Facility to carry out recruitment for different types of employees separately viz., Officers, Special Officers, Clerks, subordinates, Sanitation Staff, etc.

ii. Provision to define requirement plans (periodic) in terms of specific skills, Qualifications, experience, designation, etc.

iii. Provision for mainstream, specialist and part time employee recruitment

iv. Provision for Dependent (legal heir) Recruitment

v. Storing NOC from other family members

vi. Support to analyze the cadre-wise / ward or office-wise / department – wise staff strength – sanctioned/working strength and the gap for which recruitment is required

vii. Facility to capture the data relating to resignations / retirements / VRS / suspension / death / unfitness, etc.

C] Employee Master Data

i. System should be able to record and store Master Data Information for an Employee / Councilors for following areas and should be able to provide a snapshot of employee‘s history at any point in time on a click

ii. Name

iii. Address

iv. Education Qualification

v. Previous Employment

vi. Phone Numbers / Contact Information / E-Mail ID

vii. Date of birth

viii. Work Experience

ix. Languages known

x. Family Information

xi. Employee photo, Signature

xii. PAN No./ Passport / PF number/GPF No/ TAN No. for dept.

xiii. Bank account information

xiv. Employee blood group

xv. Property Tax No. Property Tax Module

xvi. Any other information that company may require should be easy to enter and report on

xvii. Employee Type– (Permanent / Temporary / contract workers / Project Based)

xviii. Employee category (SC/ST/OBC/Others)

xix. Ex-service man / Handicap / Sports man etc.

xx. Location (HO/zone/ward/Election ward/branch)

xxi. Department

xxii. Job code/designation/ Class with scale efficiency bar

xxiii. Grade/cadre (with facility for sub grouping)

xxiv. Job Role (access rights to different modules will be assigned based on the roles)

xxv. Job history covering details of appointments

xxvi. Health Check-up while joining the duty & as per the policy

xxvii. History of election duties attended

xviii. Promotions, transfers

xxix. Deputation, temporary transfers

xxx. Increments

xxxi. Increment for passing of Govt. Exams.

xxxii. Date of pay rate change, etc. – Increment

xxiii. Date of joining

xxiv. Date of probation/confirmation

xxxv. Date of termination/retirement

xxvi. Previous employment details

xxvii. Union Information (if applicable)

xviii. Compensation data including components of pay

xxix. Compensation of pay for calculation of gratuity and pension

xl. Family photo in case of pension, nominee photograph.

xli. Provision to define Roles and Designations and assigning employee to the same.

xlii. Uniform, Equipment given (period-wise & quantity-wise)

D] Payroll Management

i. Ability to define flexible periods such as day, week, month for pay calculation

ii. Ability to enable multiple payrolls that are generated based on employee‘s assignment

iii. Ability to define payroll for pensioners

iv. Ability to define the employee bank to credit the salary

v. Facility for Electronic Clearing system (ECS)

vi. Bank-wise / Bank branch wise summary statement

vii. Ability to provide automatic calculation of deductions / earnings based on leave, bonus declaration, GPF Loan, Home Loan, Computer loan , tax deductions, Quarter Rent - HRR (person won‘t be eligible for HRA), etc.

viii. TA / DA submissions

ix. Medical reimbursements

x. Ability for rule based pay calculation in case of pay hikes / Pay Commission with retrospective effect

xi. Ability to define unlimited pay elements/types. These pay elements should be classified as Earnings, Reimbursements, deductions, tax deductions, PF, etc. Pay elements should be also classified as Recurring & non-recurring

xii. Ability to apply the payment rules at personal / department / designation / organization level

xiii. Ability to allow exception definitions at employee / designation / department level

xiv. Ability to define all India specific taxation rules.

xv. Ability to automate increments (based on pre-defined rules – employee / designation / department / organization specific)

xvi. Facility to run payroll processing any number of times before authorization to ensure accurate pay calculation

xvii. Provision to allow deductions for specific purposes (like earthquake relief fund, CM relief fund, etc.)

xviii. Ability to share information with Accounting module of the current e-Governance solution with respect to payment or receipt related transactions

xix. Ability to share information with the Accounting module of the current e-Governance solution for all necessary Double Entry Accounting related information (salary payable at the end of financial years, etc.)

E] General Provident Fund Management

i. Issuing GPF no. to employees

ii. Application acceptance for advances / Loan against GPF

iii. Scrutiny of the applications

iv. Payment of Advance / Loan to Employees

v. Interest Rate for GPF calculation

vi. Repayment Installment adjustment against salary

vii. Generation of various MIS (Monthly / Yearly)

F] Employee Promotions / Transfers and Development

i. Transfers

ii. Time bound Promotions

iii. Grade and Pay changes

iv. Ability to create standard career paths in the Corporation in terms of various possible moves from the current level / grade in the Corporation

v. Ability to define grade advancements within a level on the basis of time based as well as merit based criteria

vi. Ability to define the rules for promotion eligibility in terms of tenure, consistent achievement of high performance grades, etc.

vii. Ability to define additional rules specific to service in terms of suspensions, disciplinary actions

viii. Facility to intimate employees of promotion / rejection through mail

/ workflow / letters

ix. Facility to create offer letter on promotion

x. Ability to define short / long term goals for employees and provide a framework to assess and update completion of the same

xi. Ability to identify key positions for the purpose of succession planning

xii. Ability to plan for vacancy of the key position in advance

xiii. Identify the gaps / developmental areas between the slated employees and requirements of the key position

xiv. Maintenance of complete history of employee transfers since his recruitment

xv. Transfer/redeployment of officers based on requirement/sanction strength of different regions/zones

xvi. Generation of seniority list

xvii. Posting / transfer of officers upon their promotions

xviii. Maintenance of records for officers transferred out of parent state and also officers to be transferred back to home state on completion of required tenure

xix. Maintenance of transfer records of specialist transfer, identification of vacancies and issue of transfer orders based on the recommendations received from the respective specialist departments

xx. Provision to maintain lateral transfer details and transfers on promotion

xxi. Generation of list of eligible staff members for transfer based on the user defined criteria (like those who complete 3 years‘ service at one place, those who working more than 10 years in one region, those who have not worked outside the state in a particular scale or overall position

xxii. Maintenance of exemptions given in transfers with a facility to record the reasons for the same

xxiii. Provision to record the transfer orders cancelled/deferred/modified and follow up with the respective regional/zonal offices for implementation

xxiv. Capture of details of officers on deputation to outside agencies, etc.

xxv. Without transfer allotment (salary at original dept.)

xxvi. Mass allotment for programs like elections, pulse polio etc.

G] Time Management and Leave Management

i. Support attendance entry from various sources such as direct entry, rule-based and automatic (through biometric device / swipe card / smart card)

ii. Definition and maintenance of leave calendars for different types of leave depending upon the scales of the employee

iii. Provision to maintain all types of leave like CL, PL, ML SL extra- ordinary leave, special leave etc.

iv. Ability to maintain leave eligibilities for each type of leave depending on the rules specified

v. Facility to identify Collisions when Employee goes for Leave and take appropriate action

vi. Ability to maintain rules for leave taken in terms of rules for availing leave, enchasing leave, accrual of leaves, lapsing of leaves, ceilings for accumulation of leaves, rules for combination of leave types, etc.

vii. Ability to record actual leaves taken

viii. Ability to calculate actual leave balance at any point in time

ix. Link Leave management to payroll and employee history

x. Provision to accounting of leave including automatic credit of leave and also provision with manual credit / debit / modification / cancellation etc.

xi. Leave cancellation and leave extension / amendments advancement, postponement of leave

xii. Supports extra-ordinary leave on loss of pay

xiii. Leave availing / carry-over processes administration as per the statutes laid down by the government /CMA / ULB

H] Performance Appraisal

i. Capability tocreate Performance documents for employees depending on the cadre / grade in the organization

ii. Ability to define competency wise / parameter wise desired levels of performance for each cadre / grade in the organization

iii. Ability to define proficiency descriptions for each parameter for each cadre / grade so as to ensure that the same measures of performance are communicated to the appraiser as well as the appraisee

iv. Facility to attach different rating model (5 point scale, 7 point scale) depending upon the cadre / grade in the organization

v. Ability to define the period for which appraisal is being carried out

vi. Capture appraisal details as given by the appraising authority, reviewing authority

vii. Support parameter wise ratings, final ratings, strengths / weakness and suggestions / recommendations for improvements by the appraising/reviewing authority

viii. Facility to give weightage to each parameter and points against each rating attained

ix. Facility to consolidate the overall points and calculate an overall grade for the appraisee

x. Facility to import Short / Long term goals (particularly at officer level and above) in the Performance appraisal document

xi. Support maintenance of history of performance appraisals and promotions

xii. Support maintenance of automatic release of time based increments

xiii. Release of increments for qualifications acquired

xiv. Increments released should automatically be integrated with the payroll module and other relevant modules

xv. Support generation of increments due for each month or for user defined period for employees – cadre wise/scale wise/other user defined combination

xvi. Support to generate reminder letters / mails / workflows to the employees / appraising authorities in case of non-submission of self-appraisals, etc.

xvii. Support memo letters / mails / workflows to be issued to the employee in case of unsatisfactory performance

I] Departmental Enquiry

i. Ability of software to record the details of sanction given by Commissioner or Additional Commissioner for departmental enquiry.

ii. Ability of software to note charges against the employees

iii. Ability of software to record the clarification given by the employee under charge

iv. Ability of software to record the appointment of Enquiry Officer & Presentation Officer

v. Ability of software to record the enquiry scrutiny details like history, evidence, papers submitted, relevant documents , photographs etc.

vi. Ability of software to record the _Finding Report‘ of Enquiry Officer & Presentation Officer

vii. Ability of software to record the _Explanation details‘ given by the employee

viii. Ability of software to record the details of _ Proposal for action‘ submitted to commissioner

ix. Ability of software to record the order given by the commissioner

x. Ability of software to generate the _Show Cause Notice/Enquiry Notice‘

xi. Ability of software to record the clarification given by the employee under charge sheet

xii. Ability of software to record the punishment order or penalty

xiii. Ability of software to record details of suspension & suspension order.

xiv. Ability of software to capture details of resetting of service

xv. Ability of software to record the _enquiry start date‘ & _enquiry finish date‘

xvi. Ability of software to record the inward/outward details like inward/outward number & date

J] Reporting

i. Reporting capabilities for Adhoc Reporting

ii. Reports on Demographic

iii. Reports on Vacancies

iv. Report on Employees Salary Details

v. Report on Leave Availed

vi. Report on Leave Entitlements

vii. Employee Attendance List for a Business Event

viii. List of the Departmental Enquiries being conducted at a point of time or for a specific time with drill down option to get further details on the enquiries

ix. Headcount Report

x. Report on time spent in a grade / employee tenure

xi. Transfer List

xii. Form 16 with Form 12 BA

xiii. Report for _E' forms

xiv. Income Tax related reports

xv. Summarized Pay Register

xvi. Form 24

xvii. Provident Fund Returns: Monthly returns to the Regional Provident Fund Commissioner for joining (Form 5) or leaving employees (Form 10) and the contributions paid (Form 12A) as well as monthly returns for Pension contributions for exempted trusts for joining (Form 4) or leaving employees (Form 5) and the contributions paid (Form 6)

xviii. Profession Tax returns

xix. Form 6 and Form 7, the Quarterly / half yearly returns to be generated by the payroll for the eligible employees with the relevant annexure listing the employees and the amounts earned and deducted

xx. Facility to configure and use the system to develop additional reports on a need basis with tools like Tableau / PowerBI / any other cloud based business intelligence dashboard visualization tools

K] Additional Features

xxi. Maintain comprehensive record of employee grievance

xxii. Track disciplinary action taken against employees, capturing the costs incurred along with the activities undertaken as part of the disciplinary action. Automate salary deductions, if proposed.

xxiii. Recovery from employees along with reasons & faculty to divide it in installments.

xxiv. Reports on trainings / workshops / seminars attended by employee.

F] Other Requirements

i. Data Porting / Data Entry Suite

ii. E-Mail / SMS to be sent to all / selected categories / Selected employees

a. Pay-Slips / Regular Communications

b. Urgent Communications

c. Notices Web Server

1.1.6.2 Employee self-service module: The following table details the functionality that may be required for the Employee Self Service (ESS) module.

A] Employee Self Service

i. Ability to allow employee request to modify personal, skill, family details

Integrated Personnel

Management System, Workflow Management System

ii. Employee should be able to make leave requests

iii. Supervisory officer should be able to get an alert when any Self Service Request of sub-ordinate staff is received by him

iv. Supervisor authorization of modification of the employee requests or leave application

v. Employees should be able to view the status of their requests

vi. Ability to facilitate self-appraisal by employees

vii. Ability to undertake online appraisal of the sub- ordinates (CRs)

viii. Ability to define customized NOC requests (like NOC for Passport application, retirement benefits, etc.)

ix. Various health benefits available to employee

x. Register Employee Complaints - Grievance Redressal

xi. Allow employees to request any other information from any other department

xii. Online submission of annual property statement

B] Reports

i. Salary Details Integrated Personnel Management System

ii. Leave Availed

iii. Income Tax related reports

iv. Other reports as needed

1.1.6.3 Inventory / Materials Management Module: The following table details the functionality that may be required for the Inventory / Materials Management module.

Functionality,

A] Masters

i. Categorization of Stores

a. Central Stores

b. Street Light Department Stores

c. Water Supply & Drainage Dept.

d. Roads & Building Dept.

e. Central Workshop Stores Dept

f. Dead stock Register (for movable assets)

ii. Defining Various Items under each category

iii. Approved Vendor List Accounts

B] Rate Contracting or Individual Orders

i. Tendering Accounts

ii. Sanction from Standing Committee Municipal Secretary

iii. Proposal submission for Individual Orders

iv. Purchase Orders

C] Indent Processing

i. Facility to each department to indent material Accounts

ii. Issue of Material by Stores Staff

iii. Order to vendor by Stores Dept.

iv. Material receipt forecast

v. Reminder to vendor in case of delay in delivery

vi. Receipt of Material, Stock Updating, Capture of Sr. No., Batch No.

vii. Maintenance of Reorder level i.e. procurement after reaching reorder level.

viii. Payment to Vendor Accounts

D] Disposal of Dead Stock

i. Department-wise submission of details

ii. Tendering by Stores Dept.

iii. Disposal of Dead Stock

E] MIS

i. List of Vendor-wise / Material-wise orders

ii. Material-wise, Department-wise consumption report

iii. Disposal of Dead Stock

iv. Status report to department w.r.t. their order

v. Comparison of price bids with history prices

vi. Alerts if the Batch No‘s or Sr. No. is not in order

vii. ABC Analysis, EOQ analysis, Min order, Max. order etc.

F] Other Requirements

i. Data Porting / Data Entry Suite

ii. Logins to suppliers to update their status

1.1.6.4 Agenda Module: The following table details the functionality that may be required for the Agenda module.

Functionality,

A] Executive Wing Database

i. Database of members of various committees, etc.

B] Agenda Preparation

i. Submission of proposals from various Councilors

ii. Selection of Type of Meeting (General Body / Standing

Committee / Special committee / Tree Authority committee / Name committee / Ward Committee / special committee's like Women & Child welfare committee, Law committee & City improvement committee)

iii. Schedule of meetings of various committees

iv. Generation of Agenda Copy

v. Issue of Agenda to Members & approval. Administration after Work-flow

vi. Issuance of letters received from various departments

C] Minutes of Meeting

i. Capture of Proceedings

ii. Capture of Attendance of the members

iii. Printing of Minutes after approval Work-flow

iv. Printing of Minutes

D] Resolution Preparation

i. Preparation of Resolution

ii. Distribution of Resolution

iii. Publishing of resolutions on Web Portal

E] MIS

i. List of issues discussed department-wise & committee wise in a specific time period

ii. Attendance Details Integrated Personnel Management System

iii. Resolution Details - Monitoring Council Resolutions. i.e., number of resolutions passed and number of resolutions executed, etc.

iv. Data required for the preparation of annual report (Total number of resolutions passed, meetings held etc.)

1.1.7.4 Document & Workflow Management System: The following table details the functionality that may be required for the Document and Workflow module.

Functionality

A] File Tracking System

i. Scanning & Marking the inward to the respective department Facilitation Centers, Web Portals

ii. Incorporation of separate hierarchy for RTI letter movements

a. Fresh applications

b. Appeals Facilitation Centers, Web Portals, Web, KIOSK

iii. Tracking of the Inward Facilitation Centers, Web Portals

B] Document Management

i. Storing of document (Image & Metadata)

ii. Support for viewing a large number of file formats without the need of having the parent application. The system should support all commonly used file formats as MSOffice, Acrobat, TIF, JPEG, GIF, BMP, etc.

iii. Association of the document with Workflow Management System

iv. Movement of the document based on selected parameters

v. Provision to edit the document Metadata

vi. Versioning of the document

vii. Provision for marking comments

viii. Archival of data on pre-defined parameters

ix. Role based access to the documents Integrated Personnel Management System

x. Final Decision by the Decision Authority

C] Workflow Management System

i. Movement of Proposals on various parameters Projects

ii. Facility to mark the application to pre-defined hierarchy

iii. Inbox for officers (listing applications received)

iv. FIFO principle for taking action on application

v. Creation of a Note Sheet for Scanned Documents

vi. Alerts for delay in action

vii. Pre-defined scrutiny for citizen applications

viii. Display of all application data during scrutiny process Accounts

ix. Check-list for rejection

x. Facility to mark the application to other officer

xi. Facility to mark the application to other department for their NOC / Comments / Input
Workflow Module

xii. Final Decision by the Decision Authority

1.1.7.5 Asset Management Module: The following table details the functionality that may be required for the Asset Management module. GIS module would need to be closely connected with the Immovable assets that should be tracked in the system.

Functionality - Integration with GIS for all immovable assets is required

A] Classification of Assets

i. Immovable Assets, including

a. Land

b. Building

c. Roads, Footpaths

d. Bridges, Culverts, Flyovers, Subways & causeways

e. Drains including underground drains

f. Water Works Distribution

g. Public Lighting System

h. Lakes and Ponds

i. Capital Work-in Progress

ii. Movable Assets

a. Plant and Machinery – including machinery of Water Works & Drainage, Road dept. machinery

b. Vehicles

c. Furniture & Fixtures

d. Office Equipment

e. Other Equipment

f. Live Stock

iii. Investments Accounts

iv. Capture Various details for the Assets

a. Ownership

b. Cost Details (construction / Purchase / Transfer)

c. Depreciation Principles

d. Other details to arrive at Current Value

v. Preparation of Opening Balance for Asset Valuation Accounts

vi. Asset Transactions

vii. Purchase of New Assets

viii. Acquisition of Land

ix. Asset Sale

x. Investment on Assets (like construction of new floors, road re-surfacing, etc.)

xi. Insurance Details

xii. Insurance Claim Related Information capture

B] MIS

i. Asset Register- GIS

ii. Revenue Report

iii. Outstanding Register

iv. Search facility for various information (like search for name of road

C] Other Requirements

i. Data Porting / Data Entry Suite

1.1.7.6 Legal Module: The following table details the functionality that may be required for the Legal module.

Functionality,

A] Masters

i. Advocates, their fees

ii. Court Master

B] Suit Management

i. Registration of new cases, allocate advocate, allocate officer Integrated Personnel Management System

ii. Facility to attach various documents related to the case

iii. Entry of Date of Hearing

iv. Alerts to officers w.r.t. hearing date

v. Entry of hearing details

vi. Capture of judgment

vii. Details of payments to the advocates

viii. Linkage to the departmental data Departmental Modules

ix. Linkage to GIS to capture location references for case

C] Legal Opinion on various departmental queries, agreement formats

D] MIS

i. Case Pendency reports (Department-wise / advocate-wise / Officer-wise)

ii. Reports w.r.t. Cases won / Lost / Appeals made

iii. Payments to the Legal Advisors

iv. Repository for various act and provision with search option

v. Integration / Link to Gujarat government site for GR references.

vi. Repository of all the cases since 1950 by High court and Supreme Court with search feature.