PATNA SMART CITY LIMITED

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SHORT NOTICE INVITING QUOTATION

NIQ No.- PSCL/ISWM/NIQ-01/2020 **Dated-20.04.2020**

Patna Smart City Ltd. (PSCL) invites quotations through email/post/hand for items/software, likely to be used in the Intelligent Solid Waste Management Project, for arriving at items/software wise rates, latest by 30.04.2020 upto 17:00 hours. The Detailed Technical Specifications are available on PSCL website smartpatna.co.in.

20/4/2020

Managing Director
Patna Smart City Limited, Patna.

ज्ञापांक 2144, पटना, दिनांक- 20/04/2020 ई0।
प्रतिलिपिः- निदेशक, सूचना एवं जन-संपर्क विभाग को महानगरीय स्तर के हिन्दी एवं अंग्रेजी दैनिक समाचार पत्र के संस्करण में प्रकाशित करने हेतु समर्पित।

20/4/2020

Managing Director
Patna Smart City Limited, Patna.

1.1 PROJECT BACKGROUND:

Patna is the capital city of Bihar and the largest urban area. As per the census 2011, it is the 19th largest city in India with a population of 16,84,297. There are 75 wards in PMC and Ward Councillors have been elected for each ward.

As per the Government of India's guidelines, Patna Municipal Corporation has formed a separate Special Purpose Vehicle (SPV) as Patna Smart City Ltd. (PSCL) for the implementation of projects under the Smart City Mission for the city of Patna. This SPV shall carry end to end responsibility for vendor selection, implementation, and operationalization of various smart city projects.

Patna Municipal Corporation is responsible for the collection and disposal of Solid Waste Management across 99 sq. km. city area. PMC has taken various initiatives in the field of Solid Waste Management to make the city clean. The proposed intelligent intervention in Solid Waste Management System is proposed to be taken up Smart City Mission.

2.1 EXISITING SWM INFRASTRUCTURE:

The average quantity of MSW collection is 750-1000 MT. The Existing Infrastructure of SWM in PMC area which involves the following activities at present:

a) **Door to door garbage collection system**: Garbage is collected from individual households under Door-to-Door collection system with 182 e-carts, 375 closed tippers and 84 skid loaders (Robot/Bobcat).

b) **Secondary Transportation**: Garbage collected is brought to two secondary dump yards (transfer stations) at Gardanibagh and Agamkuan. 154 open tippers are utilized for collection of garbage from select dumping sites. Garbage at the secondary dump yard is mechanically compacted with compactors and then transported to Ramchak Bairiya by Hywa (10 nos.) and trucks (Tata 407)

c) Four additional transfer stations are also likely to come up soon.

d) The existing weighbridge at dumping yard (Ramchak Bairiya) needs replacement with associated facilities include control room.

3.1 CHALLENGES FACED AT PRESENT:

Monitoring waste management process across city has some challenges which are mentioned below:

a) There is neither RFID tag nor QR code put on the household/property from where waste material is picked initially. It is proposed to cover around 3,40,000 households expected to come up in near future.

b) Difficulty in ensuring whether the vehicle attends the household/societies at the specified time and whether the allotted route is visited or not by a vehicle.

c) Non-availability of reports of SWM personnel attendance, vehicle movement, total garbage collected etc.

d) Difficulty in getting holistic view of Solid Waste Collection and disposal activities.

4.1 SCOPE OF WORK:

The primary scope will include End-to-End Solution to implement and to provide support services & maintenance will include the following.

1. Supply and Commissioning of QR Code tags and readers for effective "Door to Door Collection Monitoring System"
2. Design, develop and integrate the application software for existing Vehicle Tracking with new Monitoring System (data feed access would be provided by PSCL)
3. Commissioning of Digital Static Weight Automation System at Dumpyard with Control Room.
4. Implementation of Workforce Management system through Biometric attendance.
5. Supply of necessary hardware / software and their installation, configuration Implementation of the IT solution.
6. Sizing of Hardware, software and network devices required in the data Centers for using the Integrated SWM.
7. Design, Development, Supply, and Deployment & Implementation of Web Based Application software integrated with GPS, RFID devices, weighbridge application, Treatment & disposal facilities, and complaint management modules.
8. Testing and commissioning of the solution for necessary hardware
9. Monitoring of the usage, comprehensive maintenance for the period of 5 years post successful Go Live, SI shall maintain the sufficient spares to ensure 24 x 7 uptime.
10. Maintenance of all devices and after warranty period including the replacement of devices in cases of damage, new vehicle or any other change.
11. Maintenance of web-based application for Integrated SWM., during and after warranty period.
12. Imparting Training & Capacity Building Program / Workshops for all staff regarding operation of new digital devices and its features for speedy actions in SWM processes.
13. Development of Mobile Application for workforce and citizens in both language (Hindi & English) versions as per the requirements of PSCL.
14. Install the application and database software in the Servers allotted for the same in the data center being installed as part of ICCC Project, configure the same to suit the needs of the stake holders.
15. Responsibility of integrating this application with the Smart Command and Control Centre through appropriate APIs (Application Programming Interfaces).
16. SI will be Responsible for providing distributed cloud server with multiple nodes till the Application is migrated to ICCC data center of Patna Smart City.

17. SI will be responsible for complete end to end implementation of the project. PSCL/PMC will only provide necessary space and electricity to setup monitoring control room.
18. SI should also take into account the Project implementation and management cost during the DLP period of 6 months.
19. SI will be provided the GIS layers present with the PMC and it will be responsible to integrate the existing GIS data with the proposed Intelligent SWM Solution.
20. SI shall provide the bandwidth required for operationalizing the project. The bandwidth requirement shall be analyzed and procured by the SI at its own cost / risk.
21. SI shall Install and commission connectivity across all designated locations.
22. SI shall establish high availability, reliability and redundancy of the network elements to meet the Service Level requirements.
23. SI shall be responsible for planning and design of the access network architecture (access controllers, backhaul connectivity, routers, switches, etc.) to meet the technical, capacity and service requirements of the Project.
24. SI shall be responsible for up-gradation, enhancement and provisioning additional supplies of network (including active / passive components), hardware, software, etc. as requisitioned by Authority.
25. SI shall ensure that the infrastructure provided under the project shall not have an end of life within 24 months from the date of bidding.
26. SI shall ensure compliance to all mandatory government regulations as amended from time to time.
27. The SI shall ensure that all the peripherals, accessories, sub-components required for the functionality and completeness of the solution, including but not limited to devices, equipment, accessories, patch cords (fiber), cables, software, licenses, tools, etc. are provided according to the requirements of the solution.
28. PSCL shall not be responsible if the SI has not provisioned some components, sub- components, assemblies, sub-assemblies as part of Bill of Materials in the RFP. The SI shall have to provision these & other similar things to meet the solution requirements at no additional cost and time implications to PSCL.
29. All the software licenses that the SI proposes shall be perpetual software licenses along with maintenance, upgrades and updates for the currency of the contract. The software licenses shall not be restricted based on location and Authority shall have the flexibility to use the software licenses for other requirements if required.
30. The SI shall ensure there is a 24x7 comprehensive onsite support for duration of the contract for respective components to meet SLA requirement. The SI shall ensure that all the OEMs have an understanding of the service levels required by Authority.
31. Considering the criticality of the infrastructure, SI is expected to design the solution considering the RFP requirement of no single point of failure with high level of redundancy and resilience to meet the network uptime requirements.

32. SI shall be responsible for periodic updates & upgrades of all equipment, cabling and connectivity provided at all locations during the contract period.
33. SI shall be responsible for setting up / building / renovating the necessary physical infrastructure including provisioning for network, power, rack, etc. at all the locations.
34. SI is expected to provide following services, including but not limited to:
    - Provisioning hardware and network components of the solution, in line with the proposed authority's requirements.
    - Size and commission for network devices (like Router, switches, security equipment including firewalls, IPS / IDS, routers, etc. as per the location requirements with the required components/modules, considering redundancy and load balancing in line with RFP.
    - Size and provision the WAN bandwidth requirements across all locations considering the application performance, data transfer, DR and other requirements for smart city initiatives.
    - Size and provision the internet connectivity for Service Provider network and Network Backbone.
    - Size and provision for bandwidth as a service for operations of CCTV surveillance
    - Liaise with service providers for commissioning and maintenance of the links.
    - Furnish a schedule of delivery of all IT/Non-IT Infrastructure items.
    - Authority may at its sole discretion evaluate the hardware sizing document proposed by the SI. SI needs to provide necessary explanation for sizing to the Authority.
    - Complete hardware sizing for the complete scope with provision for upgrade.
    - Specifying the number and configuration of the racks (size, power, etc.) that shall be required at all the locations.

5.1 REQUEST FROM QUOTATIONERS:

Keeping in view the scope of work the system integrator, OEM, authorized sellers/resellers and vendors in this field are required to quote the rates inclusive of all taxes which should be competitive so that the same can be utilized for framing the estimate for Integrated Solid Waste Management of Patna Municipal Corporation area. Even if the quoted rates are adopted, PSCL is not bound to give the work order to any quotationers at this stage because this is being collected only for finalization of estimates.

The quotations are being invited by the **Managing Director, PSCL, 5th Floor, Biscomaun Bhawan, Patna – 800001** in two parts, CAPEX and OPEX. The quotationers may fill as much items as possible so that these can be used for the intended purpose mentioned above.

6.1 CAPEX PORTION

Sr. No.	Component	Tentative Quantity/Specification	Unit Rate With all taxes (including GST)	Remarks (indicate if any deviation for given Specification)
1	SWM Software Applications	Specification enclosed		
2	Citizen Grievance Redressal Mobile Application (Android/iOS)	Specification enclosed		
3	Mobile App for Supervisors and Drivers	Specification enclosed		
4	Weighbridge Desktop Application	Specification enclosed		
5	Toll free Number, GSM Gateway and Helpdesk Software with server	1		
6	QR Code on Households/Shops	Up to 5 lacks		
7	Handheld Mobile Devices	1200		
8	Data SIM Cards(4G)	2400		
9	Wall mounted Biometric Device	75		
10	Property Survey with GIS Mapping	Up to 5 lacks		
11	CCTV (PTZ cameras) with DVR	2		
12	Computer, UPS(Workstations)	12		
13	Internet connection (Lease line 6Mbps/10Mbps) annual /Internet Data Card	8		
14	Monitoring LED TV (55 inch)	8		
15	IP Phones	4		
16	Vehicle Tracking Device (GPS devices)	1125		
17	RFID Readers with Pole Mount at Weigh Bridge	2		
18	Windshield RFID Tags for Compactor Vehicles	28		
19	Boom Barrier	1		
20	Dot Matrix Printer	1		
21	Static Digital Weighbridge	1		
22	All-in-One Printer	1		

Technical & Functional Specifications:

The technical/functional specifications for the proposed digital solutions are detailed further in this section.

1. SWM Software Application

S.No.	Module	Functional Specification
1.	Executive Dashboard	a. Dashboard feature shall provide quick and easy view to know the overall fleet status on real time basis. It shall display status information of waste collections across the municipal area and the dumping yard at Ramchak Bairiya. The solution shall have option to customize dashboard, based on user role, including citizens, for data available in public domain. The dashboard of operator can be different from the dashboard of higher officials. The Dashboard view shall provide the following minimum information: a. Ward wise/Circle wise collections of garbage b. Activity report- contractor wise c. Activity report category wise for auto tipper, compactor, etc. d. Summary of the activity at transfer area/processing facility e.g. no. of vehicle trips, weight of garbage collected, etc. e. Daily, weekly, monthly collection dashboard f. Granular information about all mapped routes and waste vehicles travelling on the route g. Status of waste collecting vehicle (running/idle etc.) in the form of chart (e.g. pie chart) h. Detailed information about vehicles (e.g. company name, vehicle number, detail of driver etc.)
		Total vehicles belonging to PMC/contractors with status of vehicles viz. running, idle or standby etc.
		Vehicle type wise status e.g. Tipper, Manual, Compactors etc.
		Scheduled routes of vehicles and deviations.
		Route Adherence Dashboard
		Vehicles routes violations: Total and individual
		GPS Status Dashboard e.g. working, power off etc.
		Vehicles incidents, breakdown and messages
		Department and ward wise separate authentication based on vehicle tracking module.
		Primary waste collection from PMC Households and Primary Vehicles Dashboard.
		Biometric Public Health worker attendance and street sweeping coverage.
		Efficiency of Primary and Secondary Vehicles engaged in various MSW activities.

S.No.	Module	Functional Specification
		The dashboards shall be customizable, where operator monitoring the solution can filter out columns/fields required, as and when necessary.
2.	GIS Map Layers	The GIS Module in the SWM application will help in monitoring the activities on the Google Maps.
		Licensed Google MAPs should be used for demarcation of the PMC area.
		Collect and configure the Geo-Locations as per the project requirement.
		Development of GIS system with spatial database and integrate with the Data captured above for geographic queries and normal data queries.
		Geocoding / surveying of the following components shall be done • Waste Collection points (POls) & Routes • Specific transfer areas • Circle Offices • Ward offices • Processing facilities • Societies/localities • Others (as and when new components get added)
		GIS Mapping should contain a layer of uniquely identified building points with area polygons which will assist in User Charges Calculation.
		Another layer of streets and roads must be created which must be linked in the software with building points. This will help identifying the missed property due to lack of service.
		The assignment of tipper vehicles and public health workers will be done in the software for proper monitoring of the MSW activities of waste collection, street sweeping.
		GIS MAP layer which also monitor the status of waste collection through mapping of building unique identification with the QR Codes should be created.
		Assignment of various resources like public health workers, vehicles to GIS ward layers should be done on regular basis through control room.
		Dynamic Route Management: Ability to create and assign routes based on the landmarks and stoppages with option to assign single or multiple vehicles on the route created
	Route Mapping & Optimization	Time Place Movement (TPM) mapping: i. Facility to define route and waste collection points on map ii. All routes and its collection points shall be accurately mapped (for tabular / map report, analysis) iii. Facility to define the schedule for each route and waste collection points there in, with respect to its collection in terms of start time, end time and grace period if any iv. Facility to assign a specific or multiple route to a contractor/vehicle / driver

S.No.	Module	Functional Specification
		v. Administration of defined route as per new / updated requirement
		Time Place Movement (TPM) Monitoring: i. Monitoring the route attendance by designated vehicle in terms of in time, out time and duration ii. Monitoring of vehicle movement & stopping points with time stamps iii. Route and collecting points shall be displayed on the city map is to be displayed in reports as well as on map with necessary available details. iv. Through GPS movement, entry/exit and stoppages of vehicle shall be monitored v. Every collecting point is mapped with the stoppage time interval. If vehicle stops at least for defined stoppage time at that collection point, it can be assumed that waste is collected from that point vi. Alert shall be configurable for notifying incidence of missed route, missed Pol, on missing time schedule
		System shall have functionality to optimize garbage collection route, which can be based on following (but not limited to) parameters: i. Dynamic creation of geo-fence ii. Dynamic allocation of collection points raised by citizens iii. Shortest route iv. Shortest time v. Speed limit restriction vi. Traffic volume at different times of the day vii. One-way streets viii. Turn restrictions ix. Obstacles
		System shall have alert generation facility against delays or other issues during solid waste pickup duties
3.	Vehicle Tracking System	Vehicle Tracking System should give a quick and easy view to know overall fleet status on real time basis. It should display status information of all vehicles i.e. Running, Idle or Standby. The Dashboard view should provide the following information: Circle name, Ward Name, Selected integrator Name, Vehicle No, Vehicle Type, Current Location & Last Updated Date & Time of each vehicle. It should give alert message if GPS device gets disconnected from a vehicle. Dashboard should have search parameter where different searches i.e. Vehicle Number wise, Circle & Ward wise, Running/ Idle / standby vehicle wise and "No communication" wise searches can be done. It should also give an indication regarding the running speed of the vehicle i.e. Normal speed, Alarming speed and above Alarming speed. There should be provision to see any vehicle on map.
		Live Status of all the vehicles should available in various views like tabular and maps. It should guide the control room to monitor the running, idle, stopped, not-started vehicles in the system.

S.No.	Module	Functional Specification
		Information like Circle Name, Ward Name, Vehicle Type, Contact Number, Current Speed, Maximum Speed, Average Speed, Trip Time, Idle Time, Distance Travelled & Last updated Date & Time should be displayed. The live vehicle view also should have facility for various alerts i.e. Ignition on / off, Speed status, Battery Removal Alert, No Communication from device. In live vehicle map view, real time location of vehicle and the path taken by the vehicle to reach its current location should be plotted. A very important feature of Live Vehicle view should be the user can create Landmark i.e. any important point or location name w.r.t. the application of vehicle.
		Route replay feature is very important in knowing the vehicle movement in a specified period. Here the user should be able to select a date and time and can see where exactly the vehicle moved in that specified period. There should be various selection parameters i.e. Circle Name, Ward Name, Vehicle Number, Date, Time and provision for viewing the over speed done and the stoppages (as per pre-defined time for each collection point) taken by the vehicle. User also should be able to view Route statistics like vehicle type, speed violations, total alerts, trip time, idle time, maximum speed, average speed and distance travelled by the vehicle for that specified period in map view.
		Several Customized MIS Reports should be available: Report on door to door collection. In addition, following reports also should be available. Daily KM, Distance Report, Event Report, Trip Report, Engine Utilization Report, Idle Report, Geo-fence Entry Exit Report, Collection Point Served / Un-served Report
4.	Vehicle Maintenance	There should be a provision in the system to report breakdown/maintenance of an MSW vehicle. History of Maintenance log should be archived for future analysis. The system should prompt an alert for vehicle maintenance as per the standard schedule provided. This would help the supervisor and circle head to know the actual status of the MSW Vehicles and take necessary action.
		The real-time breakdown reporting and maintenance activity logging will provide information about efficient management of the vehicles.
5.	Door to Door Collection Monitoring	The QR Code Scanning done public health workers will help the system monitor the percentage coverage of waste collected from households in each ward, circles and the whole of PMC area. This waste pickup should be shown on the map in real-time basis for centralized monitoring.
		Waste collection from the secondary collection point should also be monitored by QR Code scanning and image of the cleaned area. The image should be saved in the cloud for at least 3 months for verification.
		The GPS co-ordinates from the MSW vehicles along with QR Code scanning will assist the supervisors and monitoring staff to provide the percentage coverage in terms of waste collection.

S.No.	Module	Functional Specification
		QR Code on each property should be linked with the citizen app and the citizen should receive notification once the waste is picked up and scanned at the property. In case of un-appropriate pick-up, citizen can raise a complain using the citizen app instantaneously.
6.	Attendance Management System	All the Public Health workers and hierarchy must be updated in the system on a regular basis. This would include all the master information that will be provided by the PMC.
		All the public Health workers with their roles will be mapped in the GIS system.
		The system must generate alert in case of any deviation in the attendance of the public health workers which would affect the MSW operations of the particular area. This would help the supervisors and circle in charge to take necessary action.
		Biometric attendance of all the public health workers will be updated in the cloud.
7.	Complaint Redressal System	Complain/Grievance registration through Toll free number and call center executive can be done in this system. The complaint will be tagged with circle, ward. Based on the address location the complaint will be forwarded automatically to the supervisor on his mobile app.
		Complains will automatically integrated from the citizen app module which will follow the same resolution step. The resolution process will be finalized by the department at the time of implementation.
		Application should generate a system-based complaint reports and their status and such report should be generated on daily basis.
		These system reports will enable the PMC SWM Department to assess the category of complaints and will give valuable inputs in addressing the waste management related issue.
		The MIS report of the complaint resolution status must be auto mailed to the respective in charge for monitoring purposes.
		The complaint unique id will be generated automatically and sms will be sent to the customer for tracking the status of the complaint.
		Full redressal workflow management system with auto escalation of grievances as per set time period & escalation hierarchy.
		Integration with Simple Mail Transfer Protocol (SMTP) to facilitate notifications to involved stakeholders/ parties through email.
8.	Control room Real Time Monitoring	Analytics Dashboard along with Map Visualization should be provided to the control room supervisor, which would provide the number of vehicles, Attendance of the public health workers, number of served areas with % of waste collection completed.
		The control room supervisor can search a circle, ward based on filter. This would help monitor the situation and analyze the data in real time.

S.No.	Module	Functional Specification
9.	Admin	Should have facility to add, edit and delete the user. The rights of information to be viewed by the user can also be controlled by the admin. The admin can assign vehicles to ward, circle and Selected integrator.
		The software solution shall have facility to register users by capturing necessary user details. Admin can create roles and hierarchy as per the need of the organization and user can be mapped accordingly. The administrator shall have feature to reset password for users.
		The administrator can define specific privileges for a user role (The solution shall have capability to show/hide based on user roles).
		Admin can manage contracts, i.e create/edit/delete contracts with details of SLA, payments and penalty
		The admin can maintain various masters like POI, Parking, Waste Collection Points, GIS Geo-Fencing, Device Vehicle Resource Mapping etc.
		Create & Manage masters pertaining to circle, wards, routes, vehicles. Contractor Management is an essential part of the system.
		Mapping of circle, ward with contractor and vehicles. Mapping vehicles with drivers, parking and various vehicles POI.
		The admin can manage allowed threshold (delay) for garbage collection coverage for specific vehicle/group of vehicles.
		Upon specific user request, the admin user/manager shall have functionality to revert/alter any transactional record. Necessary audit trails shall be maintained in the solution.
		Create/Edit/Delete group and subgroup for various parameters like vehicle type, circle & wards, contractors, etc.
10.	MIS Reports	Customized MIS reports must available for all the modules as per the needs of the PMC. Reports can be generated on type-wise, ward wise, circle wise for any period. Standard reports required for Daily, Weekly, Monthly basis should be generated in xls and pdf formats.
		The system shall have role-based view for viewing the dashboard and reports. (It shall also include the parking spot, fuel station and transfer station which are tagged to a vehicle; in case the same are located outside the ward to which the vehicle belongs) Ward (Default view) Circle (Default view)
		Verification Report & Exception reports to be developed
		Date wise, Circle wise, Route wise, collection points served, not served
		Date wise, Circle wise, Route wise number of vehicles (with vehicle details) used
		Date wise, Circle wise, Route wise list of vehicles transferred / not transferred garbage to processing facility
		Date wise, Circle wise, Route wise details of garbage collected

S.No.	Module	Functional Specification
		Date wise, Circle wise, Route wise list of vehicles violated their routes
		Vehicle wise, date wise vehicle in operation/not in operation details
		Date wise, vehicle wise number of trips at processing facility
		Date wise, Circle wise list of vehicles with nonfunctional GPS
		Display of real time/archived vehicle traversal route on the map (Scheduled Actual)
		Display of Geo-fence, Geo-locations on the map
		Vehicle summary report (vehicle id, first and last collection points, Collection start time and end time for the day, Total distance travelled, Total no of speed violations, Maximum speed attained throughout journey, Graphical as well as tabular display of total collection points served, and points not served by selected vehicle for any particular day
		Show all collection point with their scheduled serve time
		Stoppage Report (Halt Start Time, End Time, Halt Location, and total Halt time for any selected vehicle for specific date)
		Vehicle History (Total distance covered, alerts, violations, average speed, high speed between start and end date (on weekly and monthly basis per Vehicle)
		Payment report for Contractors (Based on weight/trips per vehicle per day)
		Penalty report for Contractors (Based on weight/trips per vehicle per day)
		During the implementation of the project; the dashboard and MIS reports shall be developed in discussion with BBMP to enable trouble shooting, on field intervention, data driven performance monitoring and decision making.
11.	Data Storage	GPS data should be stored for at least 1 year.
12.	IoT Gateway	The SI should implement efficient technology for handling large volume of data. The system should be capable of handling at least 5 million data per day with distributed minimum 3 node cluster architecture. The system should have capability to handle 200 concurrent connections per second with processing of 200 events per second.
		The IOT core should have device registry capability, Pub/Sub broker and should support protocols like Mqtt, Http, Web-sockets.
		The system should have real-time stream processing like spark stream processing for real time dashboards.
		The database used should be Cassandra with distributed. For storing SQL data warehousing standard sql database engines should be used.
		The system should have future integration capabilities with Business Intelligence applications for dynamic reporting.

2. Citizen Grievance Redressal Mobile Application (Android/iOS)

S.No.	Module	Functional Specification
1.	Complaint Registration	Citizen can register complains about waste pickup and related issues
		Complain Status and update
		Toll free number integration and app dialing to customer care.
		SMS and App notification for complain number and status update.
2.	Track Waste Pickup	Notification of waste pickup on the citizen application
		Track vehicle on the map assigned for pickup in the ward/area
		Know the waste pickup schedule in an area.
3.	Waste Collection Information	All the relevant information about door to door collection, street sweeping, supervisors and vehicles responsible.
4.	Public Utilities	List all the public convenience depending on the location of the citizen.
5.	User Profile	Authentication using mobile number and OTP
		Guest Login with restricted access
		QR Code and user info-based profile creation
		Multiple user login for same household
6.	Social Integration	Integration of PMC social media handles in the app like facebook, twitter etc.
7.	Integrations	User Collection Charges integration
		UPI and Payment gateway integration
8.	Technologies	Android 6.0+ and iOS – native application
		Offline support using firebase database support
		Syncing of firebase database with sql database.
		Google Maps support for tracking vehicles

3. Mobile App for Supervisors and Drivers

S.No.	Module	Functional Specification
1.	Vehicle Tracking	The supervisor and circle head can track the live location of the vehicle assigned to them for operation in a ward or sector.
		Route of the vehicle with replay feature and stoppage points.
		Notify and alert unscheduled or long stoppage to the supervisor.
2.	Attendance	View the daily, weekly and monthly attendance report of all the public health workers reporting to the supervisor/circle head.
3.	Complain Management	All complains of a ward and circle will be automatically notified to the supervisor and circle head.
		The supervisor will close complains from the app after taking necessary action and feedback from the citizen.
		Complain Dashboard and Reports on the mobile app will help monitor the status of complains in the ward on the daily basis.
4.	Door to Door Service	This feature will be provided to the waste collectors who will scan the QR code after pickup of the waste from a location. This information will be sent to the control room MSW software for real-time reporting.
5.	Secondary Service	The Secondary waste collection through compactor and Hyva will be monitored by scanning of QR code at the secondary point.
		The image of the cleaned site will also be clicked in the app and uploaded in the cloud for verification through MSW application.
		The image will be geo-tagged and shown on the map with image for monitoring purposes.
6.	Dashboard	Cleanliness of a ward, circle and city can be monitored from the app.
7.	Technologies	Android 6.0+ native application
		Offline support using mobile real-time database support
		Syncing of firebase database with sql database.
		Google Maps support for tracking vehicles

4. Weighbridge Desktop Application

S.No.	Module	Functional Specification
1.	Dumpsite Vehicle Entry	The Secondary vehicles which collect waste from the City enter into the dumpsite for waste processing. The Vehicle should be weighed on the weighbridge at the entry and exit.
		Module must enable tracking of vehicles' inward/outward movement; weight of solid waste transported through the SWM Facilities and transfers the same to the central control center without any ability to change the data locally.
		Module must also enable the highlighting of the routes covered by the compactors/ tippers/ other vehicles involved through GIS mapping
2.	Vehicle Management	Vehicle Master Creation, Updating by admin login
		Types and category of vehicle
		Automatic vehicle number detection based on windshield RFID tags
3.	Integrations	Digital Weighbridge integration for automatic weight reading
		CCTV integration for taking image of the MSW vehicles
		Boom Barrier Integration for automatic door opening and closing through software
4.	Data Storage	Offline capability and sync weight data in cloud storage whenever network is available.
		All the data shall be stored locally for a min. period of 60 days including the video and images captured. Internet connectivity & storage to be provided by SI.
5.	Weighbridge Slips	Slip is generated automatically once the vehicle exits the dump-yard.
6.	MIS Reports	Daily, Weekly MSW weight(tonnage) report
		Missed vehicle entry report
		Unauthorised Vehicle entry report
		Vehicle Wait time analysis report
		Daily, Weekly and Monthly trip report
7.	Web Analysis	Analytics Dashboards like fuel vs tonnage, vehicle vs trip
		Online Report for weighbridge slips with export options like xls and pdf
8.	Technology	.net/Java application with MS access database
		Application must enable integration with SMS gateway to facilitate update of status as well as notification through SMS. SI shall provide the SMS gateway. The cost towards this shall be part of Price Component of OPEX.

5. Toll free number GSM Gateway with Helpdesk Software with server

S.No.	Module	Functional Specification
1.	Toll Free Number	The Citizen grievance redressal setup needs to have tollfree number facility with minimum of handling 10,000 calls from the PMC area. Tollfree number if not provided by the PMC must be in the scope of the SI. This number must be purchased in the name of PMC with prior approval from the authority.
2.	GSM Gateway	8 port VOIP GSM gateway with supporting 8 channels
		Ethernet Interface: 2 LAN 10/100M
		GSM: Quad-band 850/900/1800/1900MHz
		Up to 8 Concurrent Calls
		Flexible Dial Rules and Manipulation Rule
		Voice Activity Detection (VAD)
		Call Progress Tone Generation
		Call Waiting and Call Forwarding Feature
		SIP Registration and Trunk group management
		Web based configuration option
		Various call statistics and call log
3.	Call Centre Dialler Application	Should support skill-based routing and it should be possible to put all the agents into a single skill group and different skill groups
		Automatic Call Distribution (ACD) support routing of incoming calls based upon caller input to menus, real-time queue statistics, time of day, day of week, ANI, dialed number etc.
		ACD should support call routing based on longest available agent, Circular agent selection algorithms.
		ACD should support the playing of customizable queuing announcements based upon the skill group that the call is being queued to, including announcements related to position in queue and expected delay.
		Agents should be able to chat with other Agents or supervisor from the Agent desktop software
		Supervisor should be able to see the real-time status of agents; supervisors should be able to make agent ready or logout from the supervisor desktop
		Should support Queuing of calls and playing different prompts depending on the type of call and time in the queue. In future if required, the ACD should support active and standby server mode, where the server can be put in DC and DR.
		CRM integration with the proposed SWM software and mobile application.
		Call Record should be maintained for at least a year on the local server with continuous backup on the cloud.

S.No.	Module	Functional Specification
		Interactive Voice Response should be possible
		Live/Current Agent Monitoring with Agent Call intervention. Call Transfer and call retrieval facility.
4.	IP Phones	Operating Temp – 0 to 40 degrees centigrade
		Height – 8''
		Width – 10.5''
		Depth – 6''
		Power – 100 to 240V AC, 50 to 60 Hz
		Cables support CAT6 & CAT5

6. QR Code on Households/Shops

S.No.	Module	Functional Specification
1.	Type	Acrylic, U-PVC
2.	Print	Print QR code with two logo (PSCL & PMC) and QR code
3.	Size	110mm x 60mm
4.	Fixing Details	Shall be able to fix with two screws and adhesive
5.	Operation Temp.	0 to 60 degrees
6.	IP Classification	IP 65
7.	Adhesive	3M
8.	Weather	Heat, dust proof & waterproof

7. Handheld Mobile Devices

S.No.	Parameters	Technical Specification
1.	Type	4G and above
2.	Sim Type	SS
3.	OS Version	Android 5.1 and above
4.	Chipset	Qualcomm
5.	CPU Ghz	1.2 | Quad
6.	RAM	2 GB and above
7.	ROM	8 GB and above
8.	Size	5.5'' and above
9.	Resolution	1024 x 600
10.	Screen Type	TFT
11.	Camera Rear	5MP autofocus
12.	Battery	3600 mAh
13.	GPS	GPS, AGPS
14.	Wi-fi Connectivity	802.11 b/g/n 2.4 GHz
15.	Sensors	Accelerometer

8. **Data SIM Cards**

S.No.	Parameters	Technical Specification
1.	Sim Type	Minimum 4G sim cards with 2 GB data per month.

9. Wall mounted Biometric Device

S.No.	Parameters	Technical Specification
1.	Storage capacity	Fingerprints templates - 4000
		Face Capacity – 3000 (1: N), 3000 (1:1)
		Card Storage – 10000
		Transaction Storage – 1,00,000
		Card Reader- inbuilt proximity card reader
		CPU- 800 Mhz 32-bit Microprocessor
2.	Fingerprint sensor	500 DPI Optical Sensor
3.	Display	4.3-inch touch display
	LED indicator	Green/red
4.	Communication	TCP/IP, USB, WIFI, GPRS
5.	Push Data	Yes
6.	Battery	2000 mAh
7.	Card Reader	Mifare/HID Prox
8.	Attendance Compatible Software	Web based for more than 5000 users with automatic real-time sync to cloud server. No manual data extraction process needed.

10. Property Field/Contact Survey with GIS Mapping

S.No.	Module	Functional Specification
1.	Contact Survey	Review of existing situation, survey and ground truthing of all available data from PMC/PSCL
		Detailed survey of each property/holding through contact survey and its database generation
		Database structure design for property/holdings to keep all records collected during field survey and as mandated for property Tax calculation as per Bihar Municipal Act 2007 and its amendments
2.	Integration	Integration and verification of existing data available with PMC/PSCL through contact survey
		The PMC/PSCL has approx. 2.26 lac data that needs to verify and integrated in the existing system.
3.	Details to be collected during contact survey	Details of the owner name, Property/holding address, occupancy status, building age, property type and other details.
		Status of municipal facilities like water connection, sewerage connection.
		Floor wise property details
		Digital photograph of each property within the PMC area and its linking with respective property database
		Linking of roads/streets with the property.

11. CCTV (PTZ cameras) with DVR

S.No.	Parameters	Specifications
1	Image sensor	1/2.5" progressive scan RGB CMOS or better.
2	Total sensor pixel	12MP @ 25/30 fps or better
3	Effective Pixel-Resolution 360°	Min 2640 x 2640 (7MP) @ 25/30 fps
4	Lens- 360°	1.8mm fixed focus IR Corrected Single sensor lens or better
5	Minimum Illumination	Color: 0.6Lux @ 30 IRE B/W": 0.2 or better
6	White Balance Range	2,500° to 10,000°K
7	Signal to Noise Ratio	>50 dB
8	Compression	Minimum H.264/H.265
9	Wide Dynamic Range	90db or more
10	Day/Night Camera	Auto day/night configuration.
11	Number of Streams	3 streams fully configurable frame rate and resolution.
12	Shutter speed	1/30 to 1/10000
13	Tamper detection	ON/OFF
14	Streaming	Camera should support unicast and multicast streams.
15	Edge Storage	Support for 128 Gb SD Card.
16	Ethernet, Network protocols	10/100 Base-T, autosensing, half/full duplex. IPv4, IPv6, UDP, TCP, HTTP, HTTPS, RTP/ RTCP, IGMP V2/V3, ICMP, ICMPv6, RTSP, FTP, Telnet, ARP, DHCP, APIPA (Auto-IP, link local address), NTP (SNTP), SNMP (V1, MIBII), 802.1x,
17	Discovery interface	OEM interface to detect the cameras automatically and configure network settings.
18	De-fog	Defog automatically adjusts parameters for best picture in foggy or misty Scenes
19	Power requirement	Power supply Poe and Local power supply for camera

S.No.	Parameters	Specifications
20	Operating Temperature	-10 C to 50 C Degrees.
21	Operating Humidity	10 to 90% RH non-condensing.
22	Regulatory Approvals	UL, EN, ·CE, FCC, ·ONVIF Profile S, Profile G Conformant
23	DVR/NVR	8 Channel video input with storage of about 1 TB

12. Computer, UPS(Workstations)

S.No.	Parameters	Specifications
1.	Processor	Intel Core i5 7th generation Processor
2.	Chipset	Compatible Chipset on Intel motherboard
3.	Memory	8 GB DDR4 RAM upgradable to 16 GB
4.	Storage	500 GB 7200 Serial ATA HDD or higher
6.	Monitor	47 cm (18.5 inch) TFT LED Digital Colour Monitor, TCO' 06 certified monitors
7.	Bays	Min. 3 nos.
8.	Keyboard	OEM USB Keyboard
9.	Mouse	Two button USB Optical Scroll Mouse
10.	Cabinet	Small Form Factor
11.	I/O Ports	One Serial Port, 1 RJ45 port for Gigabit Ethernet, min. 2 USB3.0 ports in the front, min. 4 USB ports at the back, Headphone (front), Microphone(front), Line in, Line out, VGA Port
12.	Network Features	10/100/1000 on board integrated network port
13.	Graphic	2 Gb Graphics
14.	Slots	Minimum 1 * x16 PCI Express, 1 * x1 PCI Express
15.	Multimedia	Integrated Audio and Graphic Controller
16.	Preloaded Software	Windows 10 Professional or latest With OEM recovery partition
17.	Antivirus	5 years Antivirus

13. Internet connection

S.No.	Parameters	Technical Specification
1.	Internet connection	(Lease line 6 Mbps/10 Mbps) annual /Internet Data Card at 7 locations

14. Monitoring LED TV (55 inch)

S.No.	Module	Technical Specification
1.	Technology	LED Display
2.	Screen Size	55''
3.	Resolution	3,840 x 2,160 (ULTRA HD)
4.	Response Time	Up to 9 ms (GTG)
5.	Connectivity	HDMI, Audio, USB 3.0, Digital Audio Out, RF, External Speaker out, Headphone Out, HDMI/HDCP, RS232C, RJ(Ethernet)
6.	Control	IR Remote Control
7.	Power Supply	100-240V~, 50/60Hz
8.	Typical / Smart Energy Saving	125W (Typ) / 90W(SES) or Less
9.	Operation Temperature	0 °C to 40 °C
10.	Operation Humidity	10% to 80%
11.	Warranty	5-Year comprehensive on-site OEM Warranty from the date of installation

15. IP Phone

S.No.	Module	Technical Specification
1.	IP Phones	Operating Temp – 0 to 40 degrees centigrade
		Height – 8''
		Width – 10.5''
		Depth – 6''
		Power – 100 to 240V AC, 50 to 60 Hz
		Cables support CAT6 & CAT5

16. Vehicle Tracking Device (GPS devices)

S.No.	Parameters	Technical Specification
1.	GSM Frequency	850/900/1800/1900 Mhz
2.	GPRS	Class 12, TCP/IP
3.	Memory	32+64 MB
4.	Receiving Sensitivity	Class IIRBER2%(-106dBm)
5.	GPS	Quectel L89
6.	Location accuracy	<10m
7.	Tracking Sensitivity	-163dBm
8.	IP Rating	IP 66

17. RFID Readers with Pole Mount at Weigh Bridge

S.No.	Parameter	Specifications
1	Transponder Protocol	EPC Global – Gen 2 (ISO 1800-6C)
2	Antenna	Integrated mono static or Bi-static or External
3	RF Power Output	From 10 dBm to 30 dBm (1 W), +/-1 .0 dBm accuracy
4	Frequency	865-867 MHz or Any other frequencies approved by WPC India
5	Data Control Interface	Industrial port: 10/100 Base-T Ethernet interface, Serial RS232 port/ GPRS.
6	External DC Power	10 - 30 VDC supply voltage.
7	Maximum DC power	up to 40W
8	Operating temp.	From -5°C to +50°C
9	Storage Temperature	From -40°C to +70°C
10	TAG Buffer	More than 50,000 tags
12	Minimum TAG Read distance	Up to 10m

18. Windshield RFID Tags

S.No.	Parameters	Technical Specification
1.	Operating Frequency	840-960 MHz EPC global Class 1 Gen 2
2.	Protocol	ISO/IEC 18000-6C compliant
3.	Read Distance	>10m
4.	Type	Alien Higgs-3
5.	Memory	512 bit
6.	IP Rating	IP 65
7.	Dimension	30mm x 12 mm
8.	Material	PVC
9.	Mounting	3M Adhesive

19. Boom Barrier

S.No.	Parameters	Technical Specification
1.	Length of Boom	2m (minimum)
2.	Opening Time (Up/Down)	6s
3.	Ingress Protection Degree	IP54
4.	Mode	Automatic/Manual
5.	Auto-Closing time	1-80s
6.	Dimension (in mm)	268 x 348 x 1050
7.	Arm Material	Aluminum
8.	Operating Temperature	-20 to +50 degrees
9.	Incorporated Control Panel	3 push buttons. STOP/UP/DOWN to control the motor
10.	Input Interface for	Photocell, air switch, loop detector
11.	Output Interface	Lamp
12.	SMPS Input	AC 220V/110V, 50 Hz/60 Hz
13.	Motor Power	90W, 220V AC

20. Dot Matrix Printer

S.No.	Parameters	Technical Specification
1.	Pins	9 pins
2.	Print Speed (cps)	476 cps @ High Speed Draft 10 cpi
3.	Input Buffer	128 kb
4.	Paper Handling	Paper feeder: optional (single bin) Tractor feeder: Pull
5.	Paper Path	Tractor. (Front or Rear In, Top Out)
6.	Interfaces	Standard: USB (ver.1.1) I/F Type B I/F Level 2 (Option)
7.	MTBF (hrs. at 25% duty cycle)	12000 POH
8.	Copy Capability	1 original + 4 copies always
9.	Life of Print head (million characters)	200 Million Strokes/Wire
10.	Black Ribbon Life (million characters)	12 million characters

21. Static Digital Weighbridge

S.No.	Parameters	Technical Specification
1.	Weighbridge Capacity	25MT X 4 Load Cells = 100 MT
2.	Weighbridge Construction	Pit-less with approach ramps on both sides and non-skid type steel plates
3.	No. of Load Cells	4(min)
4.	Material Handled	Garbage Trucks (in general)
5.	Platform Size	9m X 3m
6.	Weighing Console	Microprocessor based with suitable memory for storing data of 90 days with 100 trucks/day transactions.
7.	Corrosion Allowance for fabricated items	3 mm
8.	Material of Construction	IS 2062 for fabricated structure/component
9.	Control Room	The Control Room needs to be constructed besides way bridge with proper furniture (2-3 persons) and window air condition (1.5 ton). The room will be airtight with proper operator furniture and computer system.
		Room Size- 10′ X 10′

22. All-in-One Printer

S.No.	Parameters	Technical Specification
1.	Printer Type	Multi-function
2.	Printing Method	LaserJet
3.	Printer Functions	Print/Copy/Scan
4.	Printing Output	Duplex Monochrome
5.	Duty Cycle-Monthly	Up to 10,000 pages
6.	Print Speed	28 ppm
7.	Output Tray Capacity	Up to 100 sheets
8.	Input Tray Capacity	150-sheet input tray 10-sheet priority tray
9.	Interface	USB 2.0, Fast Ethernet 10/100
10.	Print Resolution	600 X 600 dpi and above
11.	Compatible Operating system	Windows/Linux/MAC
12.	Scan: Optical Scanning Resolution	600 x 600 dpi and above
13.	Copy: Maximum Copies	Up to 99 copies

7.1 OPEX PORTION

Rate (NPV) needs to be quoted for one year only

(However, please note that the O&M will be for 5 years period)

S. No.	Component	Tentative Quantity/Specification	Unit Rate With all taxes (including GST)	Remarks (indicate if any deviation for given Specification
1	SMS Gateway, Notification Gateway (50000 SMS per day)	Refer ICT Services requirement below		
2	Helpdesk Contact Centre Application License	3		
3	Cloud Server Hosting annual for 1 year (till ICCC data center is setup)	Refer ICT Services requirement below		
4	GIS Map License (Google Maps) per year	-		
5	HQ connectivity charges- (broadband 10 mbps) for 1 year	-		
6	Circle connectivity charges- (broadband 6 mbps) per year for 7 locations	-		
7	Data Sim Cards (4 G) (Quote Rate per 1000)			

ICT SERVICES (

#	Parameters	Technical Specification
1.	Cloud Server	Distributed Scalable Multi-node Cloud Infrastructure Minimum 5 Node Cluster with following configuration of single node: • Minimum RAM 8 GB • CPU 4 Core • SSD Storage - 160GB • Network In – 40 Gbps • Network Out – 5000 Mbps • Transfer – 5TB
2.	SMS Gateway	Minimum req. 50k SMS per month
3.	Mobile Notification Gateway	Minimum req. 2 lacs per month