Request for proposal for Setting up Smart Bio Toilets including Designing, Constructing / Installation, Operating and Maintenance for a period of Five (5) Years

Volume II: SCOPE OF WORK AND SPECIFICATIONS

Guwahati Smart City Limited,
Guwahati, Assam

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1. BACKGROUND

As the part of the Smart City plan GSCL invites bid from eligible bidders for "**Installation of Smart Bio-Toilets** at different public places in the City of Guwahati. The Project will be implemented on a Design built and Operate basis,

2. SCOPE OF WORK

2.1. About Smart Bio-Toilets

Smart Bio-Toilet system shall be a modular, pre-fabricated public bio-toilet made of appropriate material suitable to the local conditions and is integrated with user-friendly electronic interfaces. These are sophisticated unmanned, automated smart toilets having remote monitoring facilities, by integrating electrical, mechanical and GPS technology. Toilets shall be provided with bio digester tank for hygienic decomposition of the soil waste and discharging environment safe effluent as per norms set in this document.

2.2. Features of Smart Bio-Toilets;

Smart Bio-Toilets, shall confirm to the following parameters;

2.1.1 Body to be built up of metal sheet with finish suitable for the local climatic conditions.

2.1.2 The built form shall give a simplistic, pleasant unitised look to each toilet block

2.1.3 The external wall and roof of the toilet cubicle shall be fully water tight and weather proof

2.1.4 The roof of the toilet blocks shall be so designed that no water accumulation takes place.

2.1.5 The external finish shall be weather proof

2.1.6 Each toilet cubicle shall be fitted with Coin validator system for entering to the toilet.

2.1.7 Internal finish and assemblies of the toilet should be fully water and leak proof

2.1.8 Smart features like Pre Flush, Auto flush, automatic platform cleaning mechanism (to clean the toilet before and after usage) shall be provided.

2.1.9 Occupancy indicator with LED display shall be provided on outside of the toilet

2.1.10 Display boards where instructions in Hindi, English and local language shall be written for the aid of the user. Such display boards shall be distinctly visible during night hours.

2.1.11 In built water tank with LED indicator showing water level shall be provided.

2.1.12 GPS Connectivity which will help in the monitoring the health status of the unit from a remote location

2.1.13 Power and water backup for its users in case of sudden power outage or water discontinuation

2.1.14 Each unit to be provided with distinctly visible symbol for Ladies and Gents identification

2.1.15 Each toilet shall be provided with bio digester tank, suitable for maintenance free processing the soil waste. The bio digester shall be of anaerobic DRDO type with six (6) compartments followed by disinfection. The compartments shall have polygrass mats for protection of bacteria on side partition walls. The bio digester shall be fitted with ball valve or bypass arrangement.

2.1.16 Each bio digester tank shall be dosed with suitable microbial solution in specific intervals to keep the tank fully functional throughout its service life.

2.1.17 The successful bidder may put an advertisement panels on which public messages or corporate advertisements can be displayed to generate revenue.

2.1.18 The effluent discharged from the toilets shall meet the following standards;

Quality for waste water discharged from bio digester tank	
Parameter	**MOEF Standards (A)**
BOD, mgl/L	30
SS, mg/L	100
TN, mg/L	100
Dissolved P, mg/L	5
Total Residual chlorine mg/lit max	1.0

(A) General Standards, Environmental Protection Rule, 1986 & as authorised by PCB

2.3. **Functional Description**

2.3.1 The unit may have an Indian style closet or a western style WC, health faucet, lights, status display and instruction boards, etc. An uPVC water tank shall be fitted on top of the toilet unit for storage and supply of water required for the toilet usage and maintenance. This tank shall be fitted with LED indicator showing water level.

2.3.2 There should be display light outside the toilet unit, which shows whether the unit is “Occupied" indicating with Red light or “Unoccupied" indicating with Green light. The user should be able to enter and close the door manually, similar to a conventional toilet.

2.3.3 The entry to the toilet cubicles shall be controlled through a coin insert mechanism. On dropping the desired coins the door shall be automatically unlocked for using the toilet.

2.3.4 Upon entering the toilet, indoor light and exhaust fan should be switched on automatically. Pre-flush system will wet the closet initially. Toilet flush can be activated using a manual flush cock provided inside the toilet. Even if the user forgets to flush after usage, the system should automatically flush after the exit. Exit from

the unit is completely manual. An automatic floor cleaning mechanism should also be provided through which, the floor will be cleaned automatically. The floor cleaning should be activated either through a push switch or it may be programmed to function after a specified usage.

2.3.5 The Smart bio-toilets, though must integrate several electronic technologies for its smooth operations, should not provide any complex electronic interface for the user. The electronic systems should be utilized for effective management of such toilets.

2.3.6 The Smart bio-toilets must be connected to an anaerobic bio-digester of 2000 litre capacity which will be sufficient for up to 200 defecations per day.

2.3.7 The bio digester shall be of anaerobic DRDO type with six (6) compartments followed by disinfection. The compartments shall have polygrass mats for protection of bacteria on side partition walls. The bio digester shall be fitted with ball valve or bypass arrangement

2.3.8 The discharge from bio toilet should meet the desired level after chlorination as specified before.

2.3.9 The discharged water from the toilets shall be connected to nearest drainage network.

2.4. Location of Smart Bio Toilets in Guwahati

Number, capacity and location of Smart Bio- toilets shall be as per the following table;

LOCATION WISE REQUIREMENT OF SMART BIO TOILET			
Sl no.	**Location**	**No. of units**	
		Double unit comprising of one Gents and one ladies toilet	**Single unit comprising of one gents toilet**
1	Basistha Temple	1	0
2	Sankardev Kalakshetra	1	0
3	State Zoo	1	0
4	Science Centre,Khanapara	1	0
5	Bhangagarh	1	1
6	Borosola Beel	1	0
7	Paltan Bazar (ASTC Bus Stand)	1	0
8	Fancy Bazar	1	0
9	Jalukbari	1	0
10	Kamakhya	2	0
	Total	**11**	**1**

2.5. Scope of Work

The successful bidder will be responsible for Engineering, Procurement and construction/ installation of Modular type Smart Bio-toilets at specified locations of Guwahati city. The “Scope of Work” is given below while complying with applicable laws including but not limited to the local by-laws:

2.5.1 Installation of Smart Bio-Toilets at the designated sites identified by GSCL.

2.5.2 Undertaking survey of locations for installation of Toilets with bio digester tank and water tank, including identifying storm drain, sewerage line, water supply, power connection and process for obtaining approval from all concerned statutory bodies.

2.5.3 Operation and maintenance of Smart Bio-Toilets and advertisement panels that may be installed on the super-structure of the toilet blocks for the Concession Period.

2.5.4 Certification of structural safety of the installation and barring force majeure, accidents, vandalism the bidder shall make good any structural faults in the installation, if any at the earliest.

2.5.5 Effluent from each bio-digester should be connected to nearest drainage system.

2.5.6 The installation to be completed and the unit should be brought to operation within three (3) Months from the date of signing of contract as directed by GSCL.

2.5.7 The Authority shall not be responsible for untoward incidence, if occurred due to structural fault. The bidder would be responsible for any civil/criminal proceedings arising out of such incidence and for damage caused to life and property thereof.

2.5.8 Carrying out the installation in a safe and responsible manner without any inconvenience or danger to the public.

2.5.9 The successful bidder shall be allowed to collect and user charges from the Smart bio-toilet block.

2.5.10 All necessary activities related to cleaning and preparation of the site for installation or erection of the toilet blocks

2.5.11 Providing connection of supply water from nearest GSCL water source as well as provision for getting the tanks filled up by mobile tankers. .

2.5.12 Power connection to the toilet from nearest electrical supply point.

2.5.13 All necessary civil work required for installation of the toilet.

2.5.14 Cleaning of all the debris and other material accumulated due to the construction.

2.5.15 Repairing of the site, pavement, road, curb or other structure in case the same is damaged or affected due the construction.

2.5.16 Maintenance of the toilet blocks for a tenure of Five (5) years and processing handing over the same to the Concessioning Authority (GSCL).

2.5.17 Accounts for operating 12 bio toilets to be maintained. The financial statement of these 12 bio toilets is to be audited and submitted to authority.

2.6. Specifications

Each toilet shall be conforming to following **technical specification**

Specification for miscellaneous components of Smart Bio toilet		
Sl. No.	**Items**	**Specification**
1	Inside Area	Width : 1050 minimum, Length : 1500 minimum, Height : 2250 mm minimum all materials inside using Stainless Steel 316 grade
2	Exterior area	Exterior area measurements covered with Aluminium Composite Panels/Glass or similar aesthetic materials and measurements shall be 3.5 Sq. m. or more for single toilet and 7 sq. m. or more for duplex toilet
3	Floor	Floor upper layer stainless steel AISI 316 with 3 mm thickness perforated & non slippery. Floor inner layer water proof and ventilated 1 mm stainless steel sheet with AISI 304 slopped and connected with Bio digester tank
4	Wall & Roof	Double skin insulated panels, with 1mm thick 316 grade stainless steel inside skin and exterior grade 4mm thick PVDF coated ACP outside facia. Inside hollow space shall be filled up with High density (16 kg/m3) 40 thick (EPS) Expanded Polystyrene insulation
5	Access control	Front Panel LED sign box for Coin mechanism, voice guidance system
6	Door	Flush Door with 1mm thick Stainless steel (AISI 316) on both sides with EPS insulation
7	Foot step or Ramp	Minimum 600mm wide with Wood plastic composite (WPC) exterior grade anti skidding floor panels
8	Locks	Locks with electric strike door opener and door closure with single way retractable door handle
9	Ventilation	Ventilation with minimum 4" Exhaust fan and wall mounted SS louvers to ensure fresh air flow inside toilet
10	Plumbing	0.5 HP Pressure Boosting Pump, CPVC Plumbing material, Spiral Cleaning Nozzle, water Tank 1000 liter capacity for double toilets and 500 liters for single toilets
11	Electrical	600VA UPS, 60 AH Battery minimum with leakage and surge protection
12	Toilet Pan	Vandal proof Indian style stainless steel 316 grade toilet pan merged with 3mm perforated floor
13	Mirror	Stainless steel Mirror panel
14	Waste Bin	stainless steel waste bin with push door to outside toilet cubicle
15	Water Tap	Chromium plated water tap with mug (fixed with SS chain) and SS health faucet

Specification for miscellaneous components of Smart Bio toilet		
Sl. No.	**Items**	**Specification**
16	Inside Lock	Tower bolt from inside to lock the door manually
17	Fan/LED light	Vandal proof Fan and LED lights (activated only when the toilet is occupied)
18	Handle/handrail	1" dia Stainless Steel Handle/handrail for aged people
19	Bag Holder	Stainless Steel Bag Holder
20	Cleaning System	Water pressure cleaning system to clean wall, toilet pan and perforated floor
21	Access Control	Coin mechanism and optional Press Button
22	Pre-wetting	Automatic Pre-wetting system with minimum water
23	After use flushing	Automatic flushing after use and its Manual overriding
24	Manual Exit	Manual exit like normal toilet door from APT
25	Emergency Exit	Manual overriding of door opening of toilet from outside in case of emergencies
26	Emergency Numbers	Emergency contact local numbers should be displayed inside
27	Self-Cleaning with pre-programmed intervals	Self-cleaning of floors and walls After pre-programmed intervals
28	Technology Features required	IoT enabled Remote Monitoring, Desktop Application for Remote Monitoring
29	Plumbing pipes	CPVC
30	Pressure Boosting Pump (to generate required pressure for flushing and pressure cleaning)	0.5 HP
31	UPS (For power back up)	600VA
32	Battery (For power back up)	60AH
33	wash basin	Stainless steel (316 grade) wash basin with sensor operated chromium plated pillar cock and sensor operated soap dispenser
34	Bio digester tank	2000 litre capacity, made of FRP. The bio digester shall be of anaerobic DRDO type with six (6) compartments followed by disinfection. The compartments shall have polygrass mats for

Specification for miscellaneous components of Smart Bio toilet		
Sl. No.	**Items**	**Specification**
		protection of bacteria on side partition walls. The bio digester shall be fitted with ball valve or bypass arrangement. Dosed with approved microbial solution at recommended interval.
35	Chlorinator	In-line tablet chlorination system

3. GENERAL REQUIREMENTS

3.1. The Contractor is advised to analyse the waste water of requisite sample size on their own before quoting their rates in **Financial Bid, Volume III.** No extra claim will be entertained after the allotment of the work on this account.

3.2. The output waste water quality should comply MoEF guideline.

3.3. The Contractor has to design supply, install, commission, and maintain the Smart Bio Toilets for Five years. The Contractor will maintain a **safe, clean and hygienic environment in and around the Smart Bio Toilets.**

3.4. The Contractor should have their own testing facilities for water testing process. The Contractor should analyse the waste water sample for all parameters as per Environmental Pollution rules 1986 and National River Conservation Directorate Guidelines for Faecal Coliforms and Other applicable MoEF standards in daily and weekly manner or as and when required by the Authority. Contractor shall maintain proper record in this regard. The Attendant of Contractor shall do periodical visit to places of installation to monitor the same.

3.5. The maintenance of pipelines etc. from point of discharge to the GSCL discharge system shall be responsibility of Contractor during the Contract Period.

3.6. Making connection for raw water:-

The Contractor shall be responsible for executing works for making connection for supply water tank of the Smart Bio Toilets from the source provided by the GSCL including cost of all material and labour etc.

3.7. Disposal of waste generated at each Smart Bio Toilets:-

The disposal of waste generated at each Toilet shall be disposed by the contractor at his own cost to the nearest GSCL system. In case of non performance severe penalties would be levied on the Contractor by GSCL as applicable under existing laws related to littering in public areas.

3.8. The Contractor shall install the required equipment and maintain the same for a period of five years from the date of commissioning of Smart Bio Toilets, as per the conditions prescribed in this document, and in the time frame prescribed at his own cost.

3.9. After completion of Contract period the Smart Bio Toilets will become the property of the GSCL. The Contractor shall handover the Smart Bio Toilet in Good working conditions complete to the satisfaction of Authority.

3.10. The Contractor shall perform all routine maintenance to ensure that all Smart Bio Toilets shall remain in working condition.

3.11. The Contractor will depute duly trained Operators at each Smart Bio Toilet. The Contractor shall ensure routine inspection of the equipment by the equipment supplier.

3.12. The Contractor will be responsible for maintaining the effluent standard conforming to all parameters as per Environmental Polution rules 1986 and National River Conservation Directorate Guidelines for Faecal Coliforms and Other applicable MoEF standards,and local statutory regulations as well as Pollution Control Board Guidelines, otherwise penalty will be levied as per penalty clause.

3.13. The Contractor shall provide trained manpower to maintain the Smart Bio Toilets to ensure the provision of quality services.

3.14. The Contractor shall provide and maintain the electronic, electrical and plumbing fittings of all types at the Smart Bio Toilets in good working condition.

3.15. Contractor should ensure that all the Smart Bio Toilets (in a pocket) are working all the time and annual repair/maintenance (coloring , dechoking, cleaning etc.)shall be carried out periodically at his own cost. Certificates on annual maintenance and repairs to be generated from Chief Engineer for submission to authority.

3.16. All expenses shall be borne by the Contractor.

3.17. To maintain premises clean, safe hygienic and risk free in and around the Smart Bio Toilets (approx. Two meter radii outside the periphery of units) is the responsibility of Contractor.

3.18. Water & Electric supplied through connection by the GSCL (if any), will be charged from Contractor on Commercial rates applicable from time to time.

3.19. Online information of daily report to GSCL.

3.20. GSCL has reserve the right to inspect any such Toilet at any time during the contract period.

3.21. GSCL has right to take sample of bio discharged water at any time.

3.22. During the non-availability of piped water from GSCL, It will be obligation of contractor to get the supply water tank filled up at his own cost. Source and quality of water should be as approved by GSCL.

3.23. The water storage capacity at each Smart Bio Toilet should be 1000 litre unless otherwise required by GSCL.

3.24. The Bio digester tank capacity for each double unit (Gents + Ladies) should be 2000 litre and proportionate there of unless otherwise required by GSCL.

3.25. Physical Security of Smart Bio Toilets shall be responsibility of the Contractor. Insurance of Appropriate Amount (i.e sum assured to be equivalent to the cost of construction), as required by GSCL shall be taken by the Contractor for each Smart bio Toilet. Insurance shall be in the name of GSCL, required premium for same shall be paid by the Contractor.

3.26. The Contractor shall ensure that safe, clean and hygienic environment is maintained in and around each Smart Bio Toilet

3.27. The Contractor shall indemnify, defend and hold harmless the GSCL and its officers, employees, and affiliates against any and all claims of loss, damage and expense of whatever kind and nature, including all related costs and expenses incurred in connection with
Shortfalls in Standard norms laid down by Environmental Polution rules 1986 and National River Conservation Directorate Guidelines for Faecal Coliforms and Other applicable MoEF standards,and local statutory regulations as well as Pollution Control Board Guidelines,

3.28. GSCL shall collect the Cash accumulated due to use of coins for using Smart Bio Toilets from the units either daily or on weekly basis at 10.00 AM.

3.29. During installation period, payment to contractor shall be done only after testing and commissioning of individual Toilet and its Mechanical, Electrical and Electronic accessories and compliance of discharged water quality parameters with Environmental Polution rules 1986 and National River Conservation Directorate Guidelines for Faecal Coliforms and Other

applicable MoEF standards,and local statutory regulations as well as Pollution Control Board Guidelines, Contractor shall submit payment statement to GSCL and payment shall be made within 30 (thirty) days from certification of payment certificate by Engineer-in-Charge and along with Chartered Accountant (CA). After completion of all works and on issuance of Completion certificate, the Contractor shall submit Final payment certificate to the GSCL and Payment shall be made not later than 60 days from date of submission of Final payment certificate

3.30. Contractor shall quote for yearly Operation and Maintenance Charges. The same shall be paid on Quarterly instalments year wise (i.e after every 3 months) only after satisfying Regularity of operation and weekly discharge. Water quality output parameters requirement and satisfactory carrying out other required tests on discharged water. Payment certificates on operations and maintenance to be certified by Chartered Accountant to submit authority on quarterly basis.

4. OTHER REQUIREMENTS:

4.1. All the successful Contractors will have to ensure collection of the waste water samples from the respective sites and meeting of the design criteria.

4.2. Bidders would need to submit their O&M expenditure information to the Engineer-in-Charge on a quarterly basis for the records of GSCL.

4.3. Any deviation from the proposed design needs to be approved by the GSCL.

5. TESTING AND INSPECTION

5.1. Third Party inspection

The charges for third party inspection, if any, would initially be borne by the Contractor.

5.2. Site tests

After erection at site, all components, equipment as described shall be tested to prove satisfactory performance and /or fulfilment of functional requirements without showing any sign of defect as individual equipment and as well as a system.

6. DELIVERY/COMMISSIONING

The commissioning of all the Smart Bio Toilets is 3 months (90 days) from the date of the confirmed Letter of intent or handing over of site whichever is later.

7. Penalty In case of Non-performance

In case of non-performance of more than 3 hours in a particular day between the operating hours, 1 day non-operation will be considered and penalty will be levied as per the table below.
In case the quality of waste water is not as per conditions mentioned in 3.2 and 3.4, GSCL will impose a penalty of Rs 1000 for each such event at the Smart Bio Toilet concerned.
Penalty in case of Non-operational beyond 3 hours in a day with respect to Smart Bio Toilets shall be as follows:

I. Up to 4 days – Rs.2000/- per day/per Smart Bio Toilets
II. 4-7 days – Rs.3000/- per day/per Smart Bio Toilets
III. Above 7 days – Rs.5000/- per day/per Smart Bio Toilets

Failure to report any information pertaining to non-operational/not desired quality of the Smart Bio Toilets would invite additional penalty of Rs. 1,000/- per such case per day of delayed information.
In case of non-compliance of waste water quality and / or non-operation of Smart Bio toilets beyond the stipulated days as approved by GSCL, the contract is liable for termination.

8. SCOPE OF GSCL

I. GSCL will provide nearest Source of water, further arrangement including required plumbing works from source to Smart Bio Toilets shall be borne by the Contractor.
II. GSCL will charge for water required for the Smart Bio Toilets on commercial rates.
III. Single phase or three phase power supply as required at one point further distribution including installation of Electric meters for Smart Bio Toilets shall be in scope of Contractor.
IV. The power consumption charges shall be charged on Commercial rates basis.
V. Whenever GSCL is not able to supply source of water, the successful bidder shall be able to make the arrangement for water through bulk supply from GSCL reservoir on a payment basis for which transport arrangements will be made by the Contractor.

9. CONSTRUCTION REQUIREMENTS FOR Smart Bio Toilets

GENERAL

i. The Contractor shall design Smart Bio Toilets in such a way that material considered for design and construction should only as specified in this document.

ii. The Contractor shall design Smart Bio Toilets in such a way that, in case quality of waste water is not as per required standards, then plant/ Toilet should be shut down. The Contractor should brought matter be to the knowledge of the Engineer-in-charge immediately and it should be sorted out within a day itself to make the toilet back in operation and use.

iii. Specifications, Shape and design of the Smart Bio Toilets shall be provided by the Contractor for each and every location (Please refer to **Annexure I** for illustrative locations) before start of work and only after obtaining clearance from GSCL, Smart Bio Toilets should be installed at respective locations. All designs and drawings shall got approved from GSCL before construction.

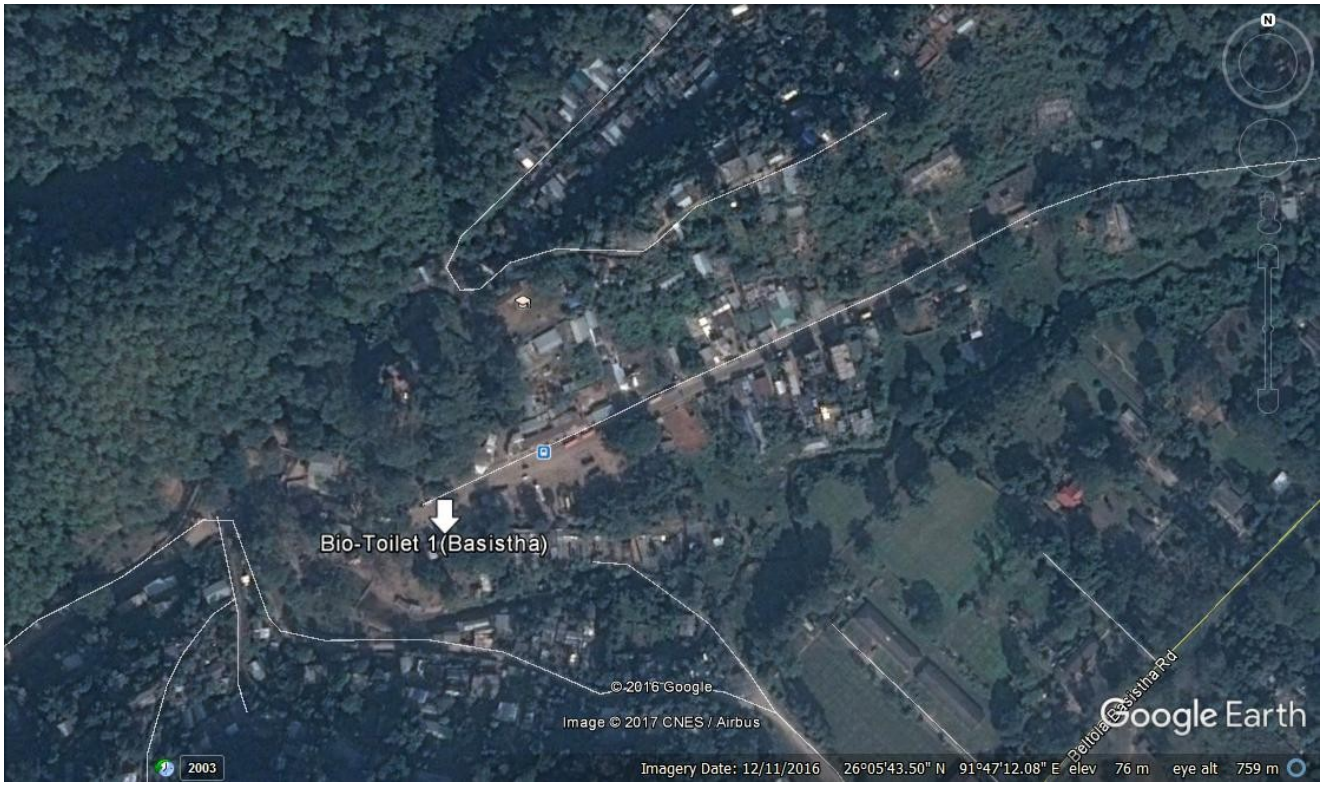
iv. Contractor shall design Smart Bio Toilets that in case of attaining maximum number of stipulated defecations per day with respect to bio digester tank, the Toilet units will be shut down automatically and coins should be returned to the user in such case.

Provided that the Contractor shall ensure that the technology chosen is

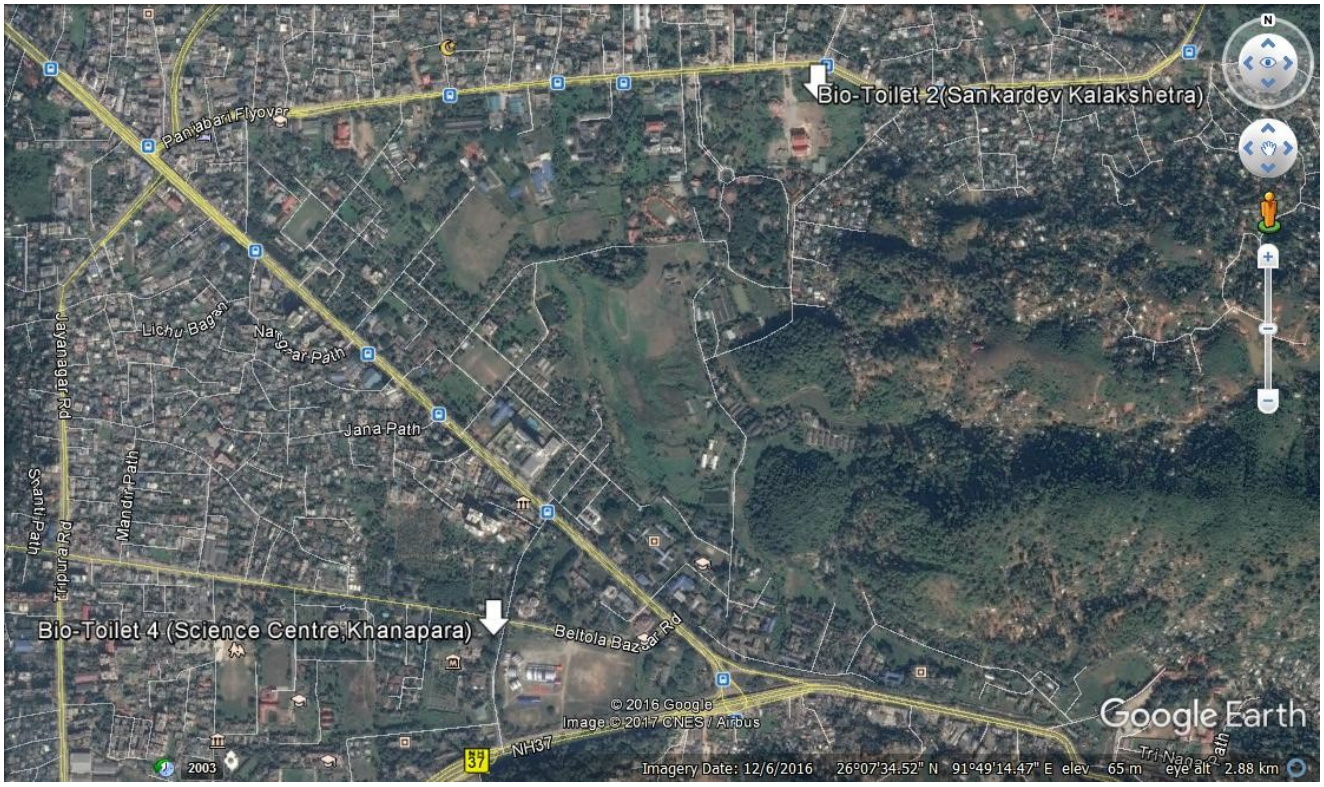
(a) Appropriate to the site and ground situation
(b) Has a precedent for use in a project of similar nature and size
(c) Is supported by the technology/service provider for design, supply, implementation and ongoing maintenance
(d) Addresses all issues of safety, including fire safety, operational safety, and environmental safety

Annexure I

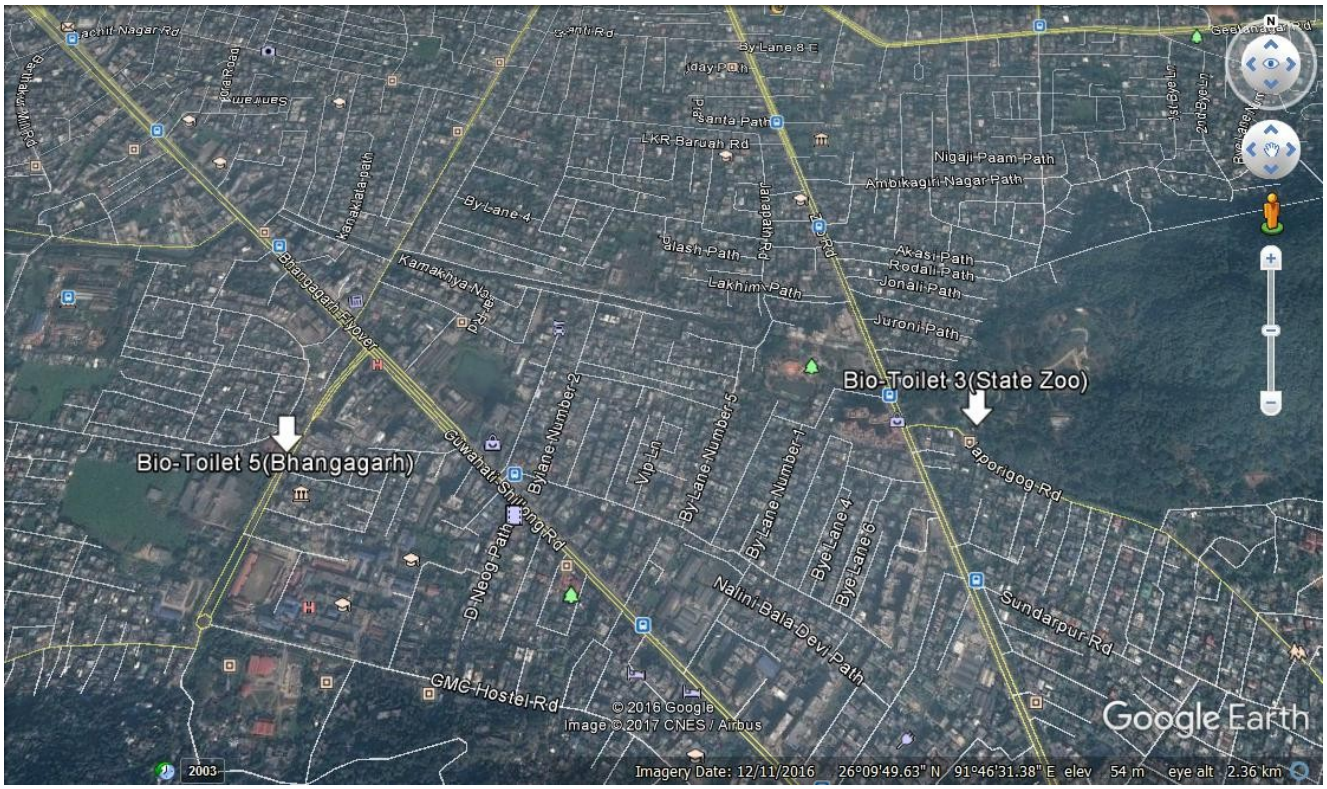
Smart Bio Toilets - illustrative Location



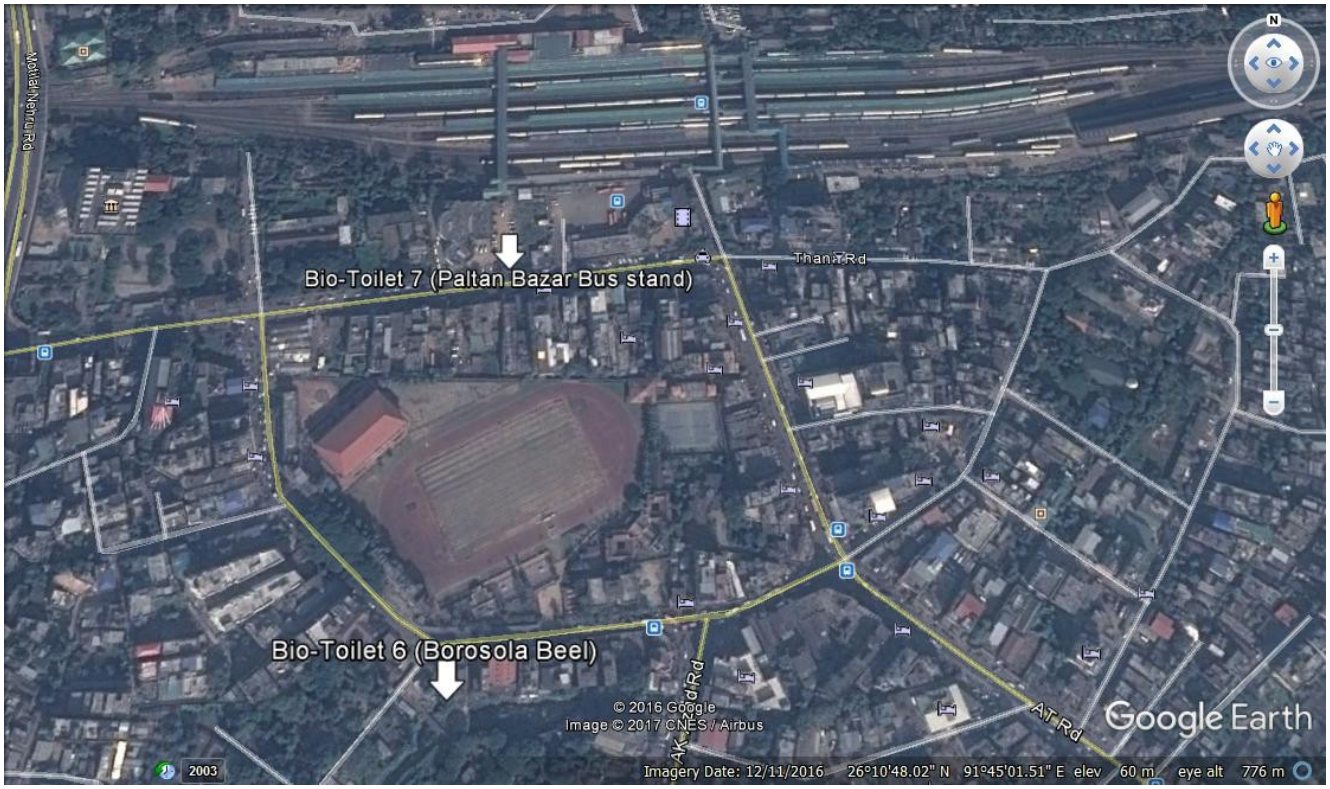
Location of Smart Bio Toilet - 1



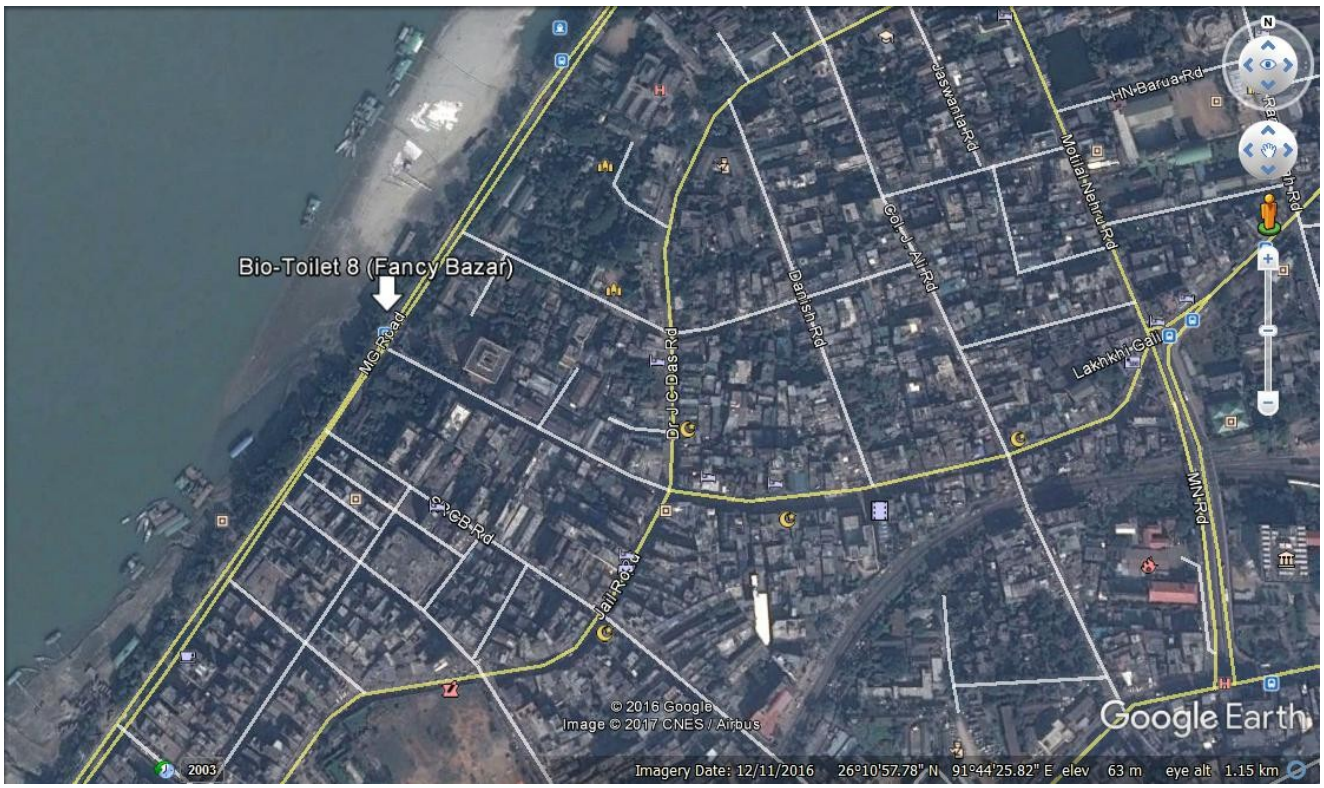
Location of Smart Bio Toilet – 2 and 4



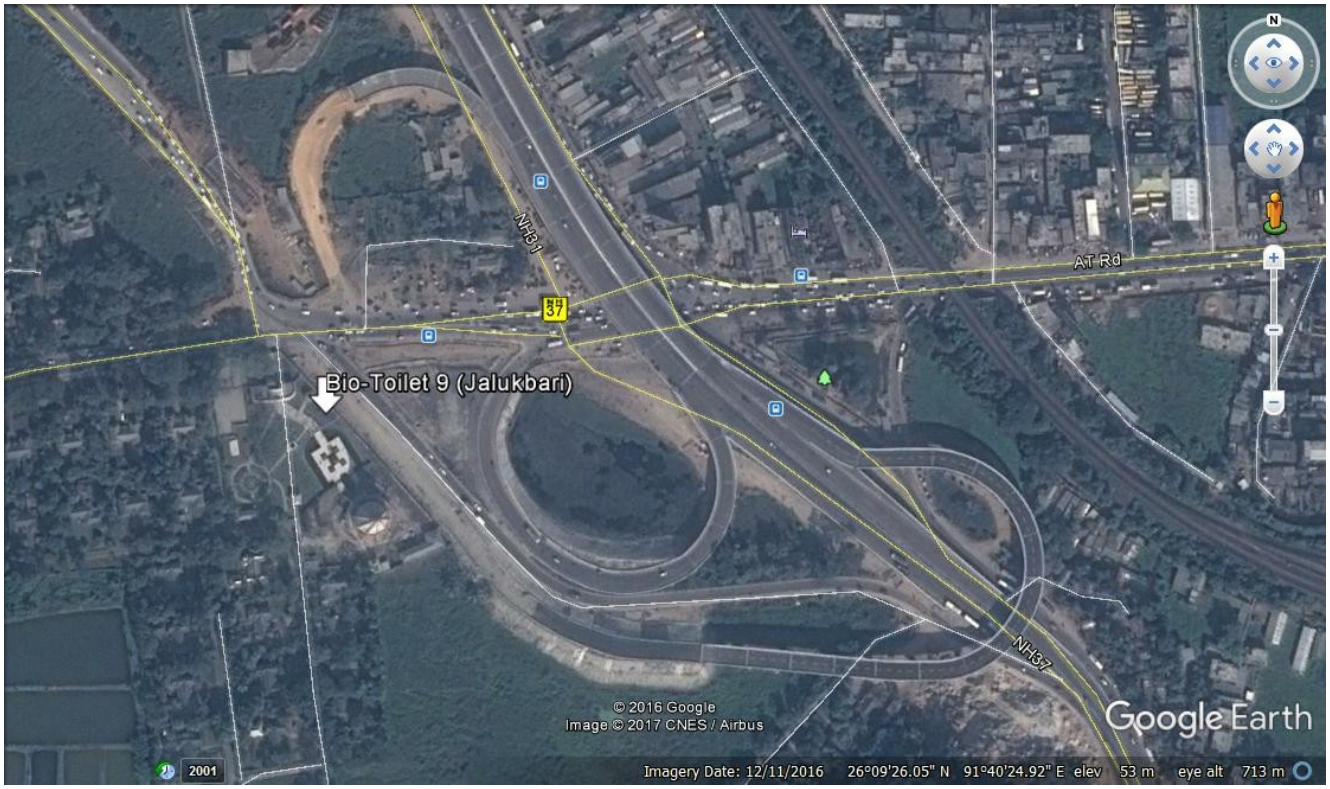
Location of Smart Bio Toilet – 3 and 5



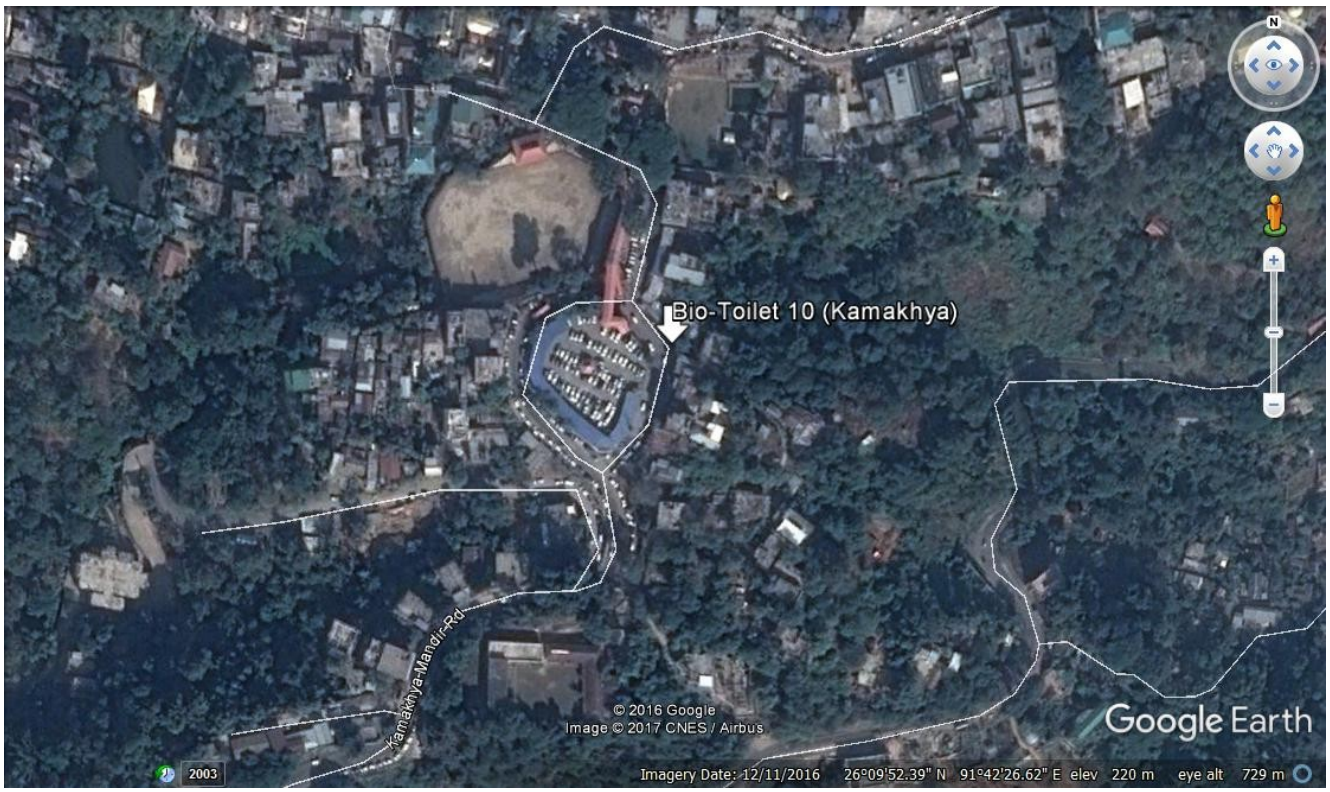
Location of Smart Bio Toilet – 6 and 7



Location of Smart Bio Toilet – 8



Location of Smart Bio Toilet – 9



Location of Smart Bio Toilet – 10