NAMAMI GANGE PROJECT

A BRIEF REPORT

CONSTRUCTION AND TRANSPORTATION MANAGEMENT

SHUBH YADAV
21JE0907

- ENTRY LEVEL ACTIVITIES
- RIVER FRONT DEVELOPMENT
- CONSTRUCTION AND RENOVATION OF GHATS AND CREMATORIUM ON THE GANGE RIVER AND ITS TRIBUTARIES

INTRODUCTION

The "Namami Gange" project, also known as the "National Mission for Clean Ganga," is a flagship initiative launched by the Indian government in 2014 with the aim of cleaning and rejuvenating the Ganges river, one of the most sacred and polluted rivers in the world.

OBJECTIVE OF THE PROJECT

- Ensuring the cleanliness of the river Ganga and its tributaries
- Conserving and rejuvenating the river's ecology
- Creating and maintaining necessary infrastructure to support these objectives
- Raising public awareness and promoting citizen participation in the initiative.

The project has several components, including the construction of sewage treatment plants, riverfront development, afforestation, and public awareness campaigns.

OBJECTIVE OF THE PROJECT

National Mission for Clean Ganga (NMCG) is the implementing authority of Namami Gange programme, which was given a dedicated budget of Rs. 20,000 Crore for a period of 5 years. The NMCG is an empowered organization operating as a two-tier management system having interdependent administrative appraisals and approval powers. Its duties, functions and powers have been specified in Order dated 7th October 2016. The Director General, NMCG, heads both the tiers of the organization.

The Namami Gange project has made some progress in achieving its goals, including the completion of sewage treatment plants and the initiation of various river cleaning initiatives. However, there is still a long way to go, as the Ganga river remains heavily polluted in many parts, and achieving the project's goals will require sustained efforts and resources over an extended period.

MAIN PILLARS OF THE PROJECT

 Sewerage Treatment Infrastructure	 River-Front Development
 River-Surface Cleaning	 Bio-Diversity
 Afforestation	 Public Awareness
 Industrial Effluent Monitoring	 Ganga Gram

This report focuses on the river-front development mission of the programme, specifically 71 Ghats/Crematoria projects for construction, modernization, and renovation of 270 Ghats/Crematoria and Kunds/Ponds have been initiated.

CONTRACT DETAILS

- **Type of Contract:** (a) Item Rate Contract; (b)Lump-sum Turnkey Contract
- **Client:** Engineers India Limited
- Consists of commercial and technical parts.
- Prequalification of bidders required
- Earnest Money Deposit not applicable
- **Cost of Bid Document:** Nil
- The date of the Pre-bid meeting mentioned
- Bidders Qualification Criteria(BQC)

Technical/Experience Criteria

The bidder shall have completed contract(s) of “similar work(s)” as mentioned below during the last SEVEN (7) years to be reckoned from the due date of submission of the bid.

- ONE contract of minimum value of INR 1,988 Lakhs (Rupees One thousand Nine hundred and Eighty-eight Lakhs only).

- OR TWO contracts each of minimum value of INR 1,491 Lakhs (Rupees One thousand Four hundred and Ninety-one Lakhs only)

- OR THREE contracts each of minimum value of INR 994 Lakhs (Rupees Nine hundred and Ninety-four Lakhs only)

Financial Criteria

- **Annual Turnover:** The minimum Annual Turnover of the Bidder in at least one of the immediate preceding three financial years, as on due date of submission of Bid, shall be Rs. 25.13 Crore (Rupees Twenty Five Crore Thirteen Lakh Only).
- **Net-Worth:** The Net worth of the bidder as per the immediate preceding year's audited financial results should be positive. Indian Central Public Sector Undertakings/Enterprises shall be exempted from the requirement of Networth.
- **Working Capital:** The minimum Working Capital of the Bidder as per the immediate preceding year's Audited Financial Statements shall be Rs. 2.51 Crore (Rupees Two Crore Fifty-One Lakh Only). In case, Bidder is unable to meet the working capital requirement as above, the Bidder can supplement the working capital with a Fund based Line of Credit (LOC) from any Scheduled Bank in India or a Commercial Bank having Net worth more than equivalent INR 1000 Million. In such a case, bidder shall furnish a declaration from the bank for availability of unutilized fund based line of credit for the shortfall in working capital below the specified working capital value, in the format attached as Annexure-I to IFB. The letter shall provide the status of Fund based Line of Credit as on any date between the date of Enquiry and Bid Due Date.

TECHNICAL DETAILS

- A total of 197 ghats and 57 crematoriums, in total, 63 projects have been proposed along the river Ganga, along the states, Uttarakhand, Uttar Pradesh, Jharkhand, Bihar and West Bengal.
- Total proposed cost of the projects is 935.79 crores.
- As of today 166 ghats and 46 crematoriums have been completed.

Table 24 A detailed snapshot of various activities undertaken

S. No.	State	No. of Projects	Proposed		Total	Total Cost (In Cr.)	Completed		Ongoing/Under Progress		Under Tendering	
			Ghats	Crematoria			Ghats	Crematoria	Ghats	Crematoria	Ghats	Crematoria
1	Uttarakhand	16	29	27	56	271.19	22	24	6	2	1	1
2	Uttar Pradesh	20	99	15	114	386.25	95	13	4	2	0	0
3	Bihar	17	39	9	48	179.2	25	3	10	2	2	3
4	Jharkhand	4	13	3	16	62.07	13	3	0	0	0	0
5	West Bengal	6	17	3	20	37.08	11	3	5	0	0	0
	TOTAL	**63**	**197**	**57**	**254**	**935.79**	**166**	**46**	**25**	**6**	**3**	**4**

TABLE

Progress

Uttarakhand

The works for development of 29 ghats and 27 crematoria along Ganga River in Uttarakhand at an estimated cost of Rs. 271.19 Crore are at different stages of completion. As on date 22 ghats and 24 crematoria have been completed.

Uttar Pradesh

The works for development of 99 ghats and 15 crematoria along the Ganga river in UP have been taken up at an estimated cost of Rs. 386.25 Crore and are also under different stages of execution. Out of these, 95 ghats and 13 crematoria have been completed.

Bihar

The works for development of 39 ghats and 9 crematoria along the Ganga in Bihar taken up at an estimated cost for Rs. 179.20 Crore. 25 Ghats and 3 Crematoria have been completed.

Progress

- Jharkhand

  Development of 13 ghats and 3 crematoria along the Ganga have been taken up at an estimated cost of Rs. 62.07 Crore and as on date all ghats and crematoria are completed and handed over to concerned ULB.

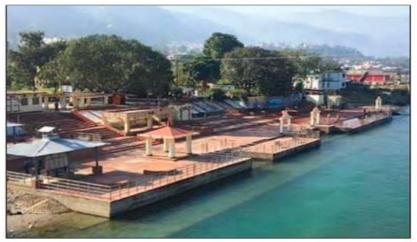
- **West Bengal**

  Development of 17 ghats and 3 crematoria along the Ganga have been taken up at an estimated cost for Rs. 37.08 Crore. Out of these 11 Ghats and 3 crematoria have been completed.

Progress

Ramkund Ghat, Pauri Garhwal

Baradari Ghat, Bithoor



Naithani Ghat, Srinagar

Dalmau Interconnection of Ghats

Balu Ghat-2, Sultanganj

Babua Ghat, Munger

CONSTRUCTION PROCESS

- **Civil/Structural**: Excavation, earthwork, backfilling, sandfilling, foundation, PCC, RCC, shuttering works, brickwork, DPC, dry rubble pitching, plumbing works, shuttering works, drainage works, water supply, ghat/river bank protection works, dismantling of existing structures, crematoria construction, roadworks, scrap/debris removal

- **Architectural**: floor finishing, steel, aluminium works, door and windows, plastering, pointing, painting, polishing, roofing, waterproofing, sanitary fittings and fixtures. Insulation, external and internal cladding, railings, chain for ghats/ steps/ platform, landscaping, sculptures, signage, dismantling and removal of existing structures, fabrication, submission of drawings.

- **Electrical**: power distribution, lighting, earthing, lightning protection, cabling, installation.

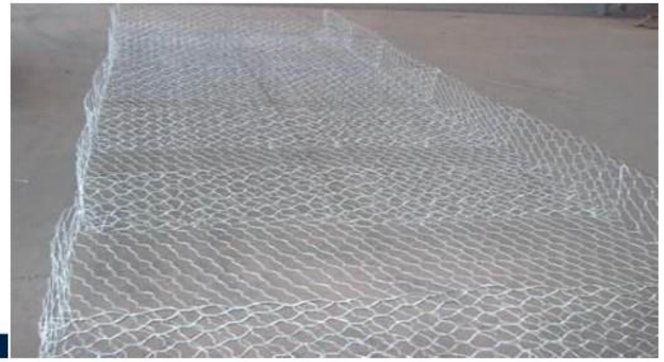
Job Specific Equipments

River Bank/Ghat Protection works

Since ghats are constructions along the riverbank, they require bak protection works using materials such as

1. **Gabion:** gabions are used for slope stabilization and erosion control. They are constructed by filling the cages with stones. The stones act as a barrier and prevent the soil from moving up and down the slope.
2. **Gabion Mattress(Revet Mattress):** It is atype of container with hexagonal meshes and double or triple twisted structure. It is smaller compared to gabions.
3. **Geobags:** Geobags used shall be of pillow shaped, manufactured from nonwoven polypropylene geotextile (Refer table below). These bags to be filled with sand, such that they form stable, durable containers for the application.
4. **Geotextile:** The material should be non-woven needle punched geotextile. The geo-textile shall be preferably made of polypropylene. The material may have about 70% polypropylene and rest may be polyethylene or any other equivalent material.
5. **Stones for launching apron:** Weight of stone / boulders for launching apron shall be of 100Kg to 150Kg and it shall be clean, sound, compact and hard rock of good quality.

Job Specific Equipments



From Top to Bottom; Left to Right: Launching Apron, Revet Matress, Gabion Box, Geobags

Cremation System

Design, Engineering, Detailing, Fabrication, Supply, Installation, testing, and commissioning of Electric cremation system for the following design parameters:

a) Working/Operating Temperature (Inside the furnace) - 650 Degree Celsius

b) Maximum Temperature - 1100 Degree Celsius

c) Cremation duration - 45 to 60 minutes in achieving complete cremation.

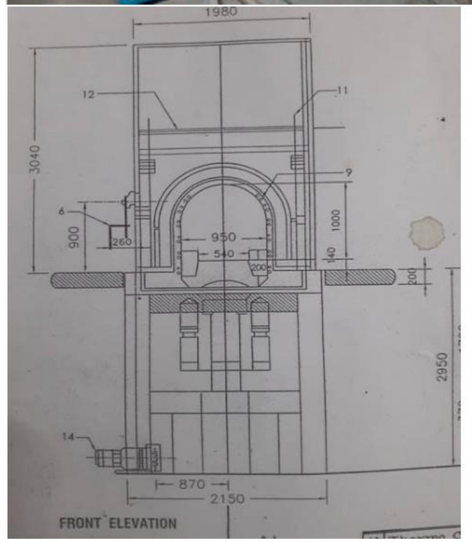
d)The flue gas discharged from the chimney shall meet the emission norms of the State Pollution Control Board (Uttar Pradesh)

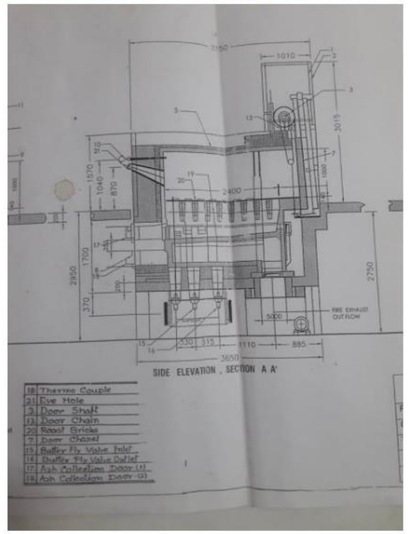
Cremation System

The cremation system shall majorly comprise of below mentioned sub systems/ items (but not limited to the following):

1. The furnace's Hearth and its casing, Charging and Ash Door.
2. The Refractory lining and Insulation system.
3. The heating system of the furnace comprising of Heating elements and its connections.
4. The Electro- mechanical system and items for operations of the cremation system like Fresh Air injection system, Charging Door arrangements, etc.
5. Electrical system to feed the power to complete electric cremation system (with its sub systems) including control panel for furnace and suitable feeding and control arrangements for other electrical provisions including relays, switches, fuses, contactors, isolators ,etc for the protection of the equipments and safety of operators.
6. The pollution control system comprising of scrubber, Induced Draft Fan, 30 mtr. height Chimney made of Mild steel and related instrumentation for temperature control and other parameters.
7. The structural requirement for the complete cremation system.

Cremation System





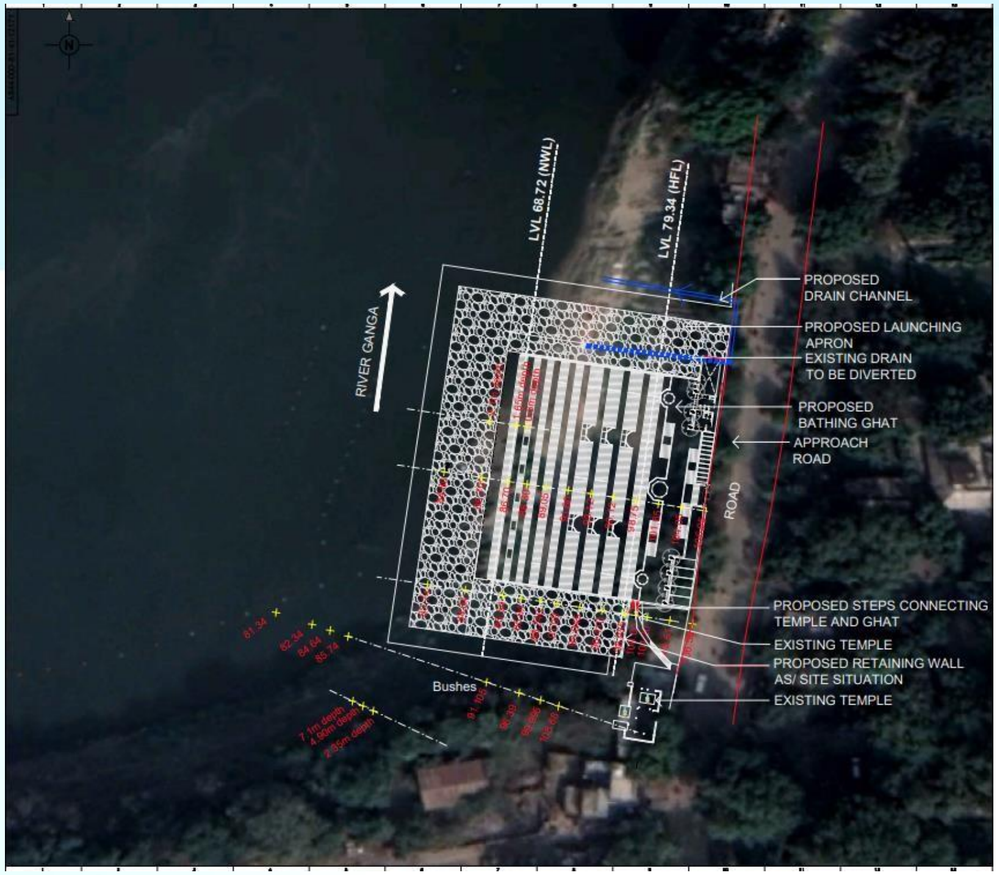
Top and Bottom: Electric Crematorium, Front and Side view of electric crematorium

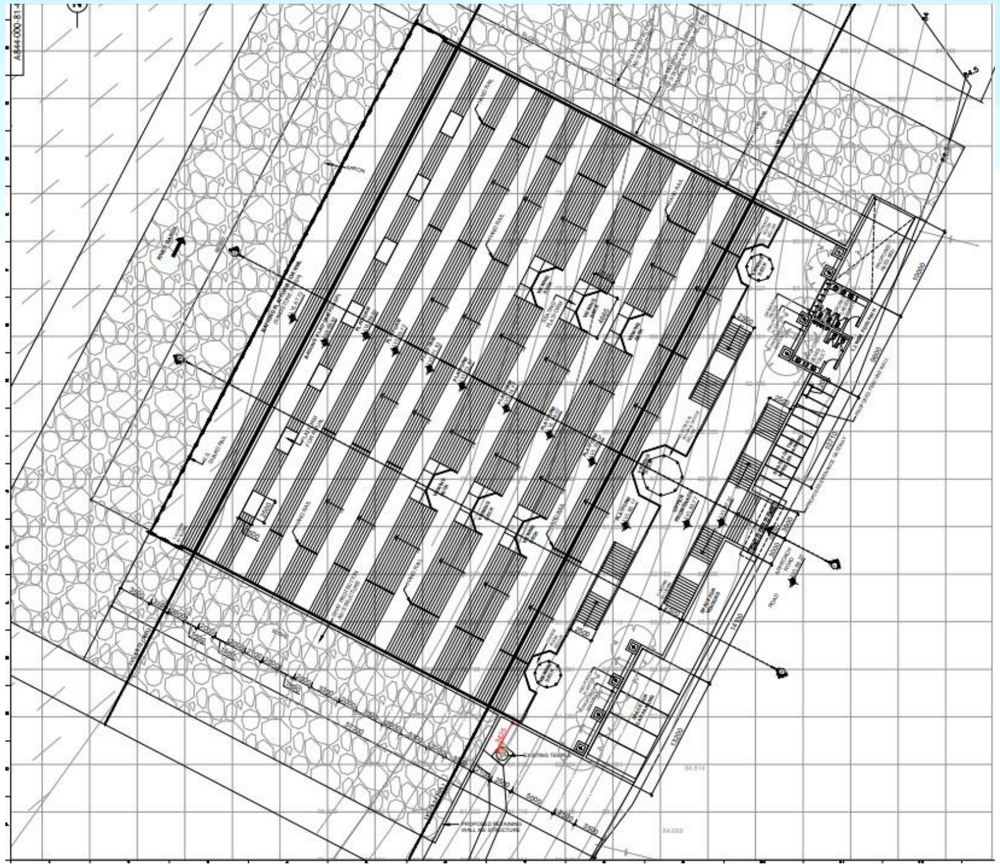
Examples and Site Plans

Site plans and drawings for ghat and crematoria

Software Used: AUTOCAD

Phata Ghat Site Plan





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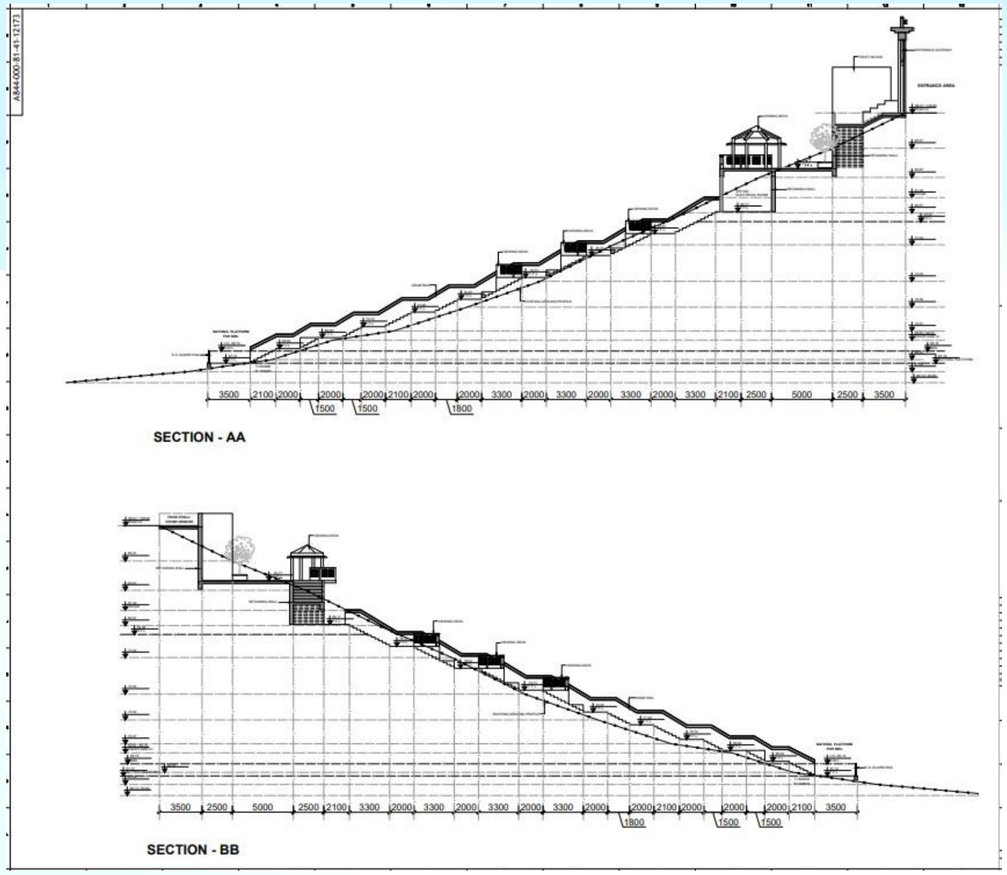

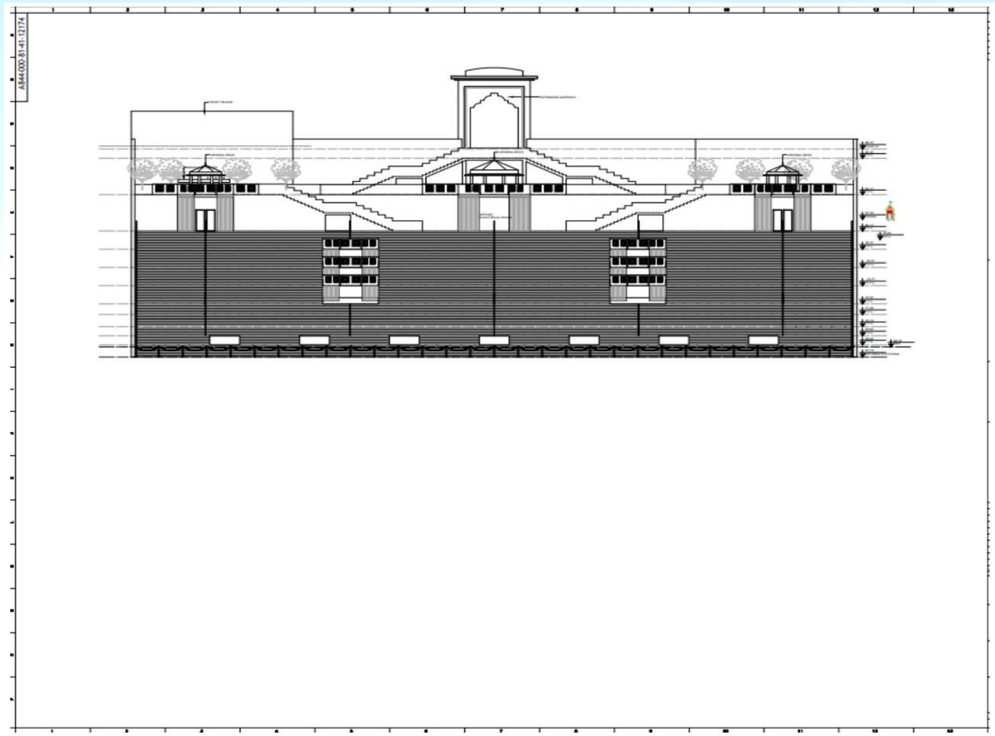

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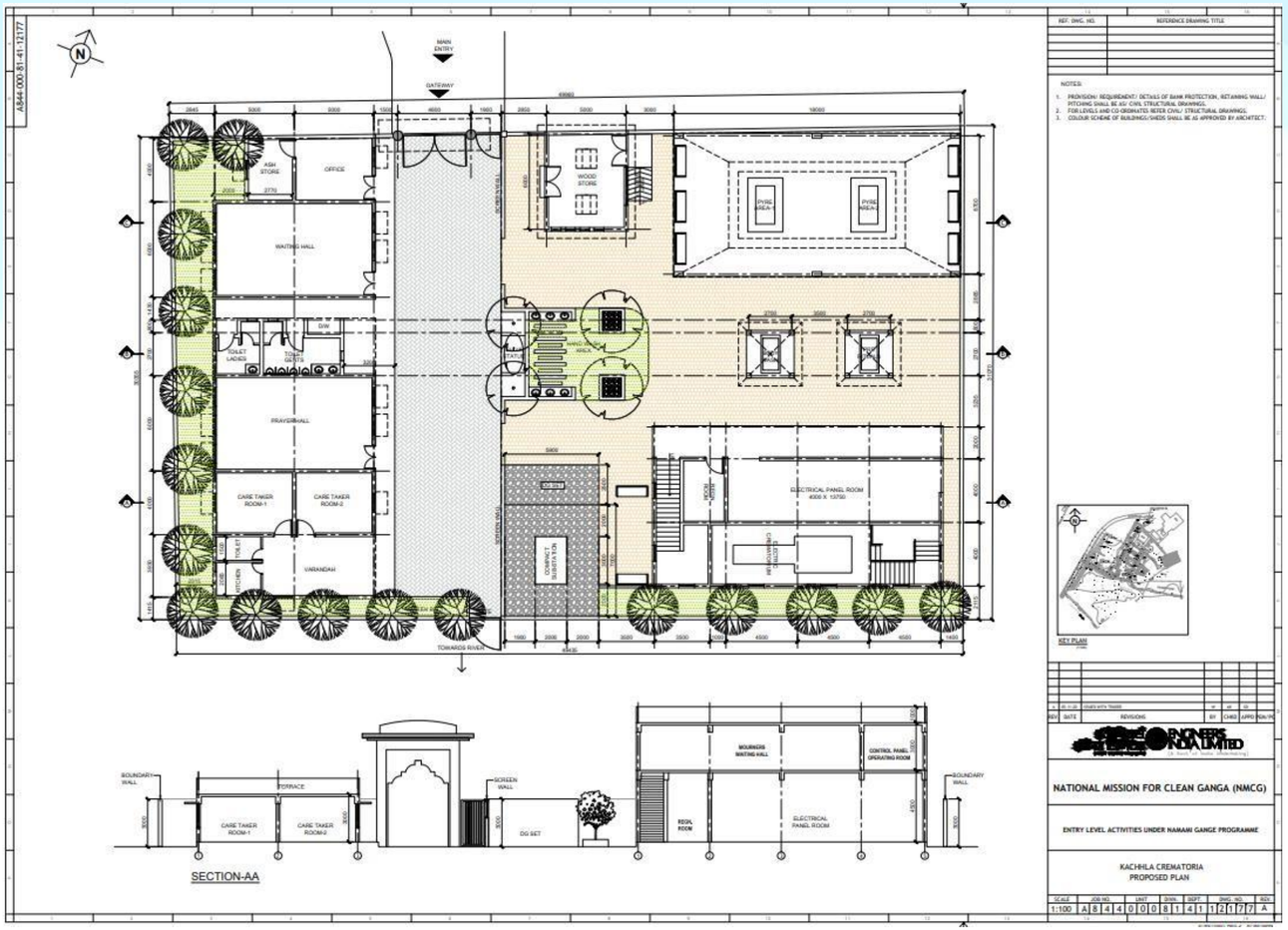


BOQ & SCHEDULE

Detailed BOQ and schedule for Bhogaon crematorium, Mirzapur UP

ENGINEERS INDIA LIMITED								
Development Works of Bhogaon Crematoria Mirzapur (U.P)								
JOB NO. A844/LOA/KNM/2021/1030/44 Dated 08.06.2021								
Contractual Value		**INR**			**2,96,53,436.00**			
Owner	**Engineers India Limited**	**Contrator**			**Universal Contractor & Engineers Private Limited**			
LOA DATE : 8th June 2021		**DURATION : 12 MONTHS**						
S.No.	**Activity Description**	**UOM**	**QTY.**	**Cost**	**% Wtd. Value**	**Start Date**	**Expected Completion Date**	**No. of Days**
	Total Project			**7,76,37,129.06**				
I	**Pre - Construction Phase**							
A	**Obtain Pre- Constructional NOC's**	%	100.00		0%	8-Jun-21	1-Aug-21	54
B	**Mobilisation/Site Establishment**	%	100.00		0%	15-Jun-21	30-Jun-21	15
C	**GFC Drawing Availability**	%	100.00		0%	27-Jun-21	30-Aug-21	64
II	**Construction Phase**							
A	**Bank & Ghat Protection(Geotechnical)**			**1,09,81,950.00**	**14.15%**	1-Jul-21	15-Feb-22	229
1	Construction of Coffer Dam	Cum	100.00	3,04,100.00	0.39%	5-Aug-21	25-Aug-21	20
2	Geotextile	Sqm	3600.00	7,09,200.00	0.91%	2-Aug-21	30-Dec-21	150
3	Geo Bag	Nos.	19800.00	79,39,800.00	10.23%	2-Aug-21	10-Jan-22	161
4	Dismantlling of Coffer Dam	Cum	100.00	91,200.00	0.12%	30-Dec-21	10-Jan-22	11
5	Gabion Box's	Cum	650.00	19,37,650.00	2.50%	10-Oct-21	22-Dec-21	73
B	**Structural Works**			**3,05,56,040.00**	**39.36%**	1-Jul-21	5-May-22	308
1	Earthwork	Cum	1945.00	3,98,000.00	0.51%	10-Aug-21	28-Dec-21	140
2	Reinforcement HYSD (TMT) Bar	MT	130.00	86,19,000.00	11.10%	16-Aug-21	10-Jan-22	147
3	Back Filling	Cum	1965.00	2,76,150.00	0.36%	20-Sep-21	10-Feb-22	143
5	Sand Filling	Cum	455.00	6,09,700.00	0.79%	10-Oct-21	5-Apr-22	177
6	PCC (1:5:10)	Cum	450.00	19,35,000.00	2.49%	12-Aug-21	10-Apr-22	241
7	RCC Superstructure	Cum	415.00	31,41,550.00	4.05%	20-Oct-21	20-Dec-21	61
8	RCC Substructure	Cum	790.00	56,22,700.00	7.24%	18-Aug-21	20-Dec-21	124
9	Expansion Joint	Mtr.	10.00	4,870.00	0.01%	1-May-21	5-May-22	369
10	Shuttering Works	Sqm	5820.00	21,96,720.00	2.83%	7-Aug-21	12-Jan-22	158
11	Brick Work	Cum	1060.00	75,37,030.00	9.71%	10-Sep-21	20-Feb-22	163
12	Precast Cement Concrete	Cum	10.00	1,34,920.00	0.17%	10-Sep-21	20-Feb-22	163
13	Demolishing & Dismantaling	Cum	35.00	43,000.00	0.06%	10-Aug-21	25-Aug-21	15
14	DPC	Sqm	85.00	37,400.00	0.05%	10-Sep-21	20-Feb-22	163
C	**General Civil**			**38,06,625.00**	**4.90%**	1-Jul-21	10-Jun-22	344
1	Earthwork (Excavation)	Cum	2100.00	2,14,200.00	0.28%	10-Aug-21	28-Jan-22	171
2	Earthwork (Filling)	Cum	11500.00	17,17,200.00	2.21%	1-Dec-21	10-Mar-22	99
3	Dry rubble Pitching(Horizontal/Vertical)	Cum	870.00	4,81,400.00	0.62%	30-Aug-21	25-Oct-21	56
4	Supply & Installation of FRP Reed beds	Nos.	1.00	8,90,900.00	1.15%	5-May-22	10-Jun-22	36
5	Supply & Installation of FRP Biodigester	Nos.	1.00	2,70,381.00	0.35%	5-May-22	10-Jun-22	36
6	Tube well	Nos.	1.00	2,32,544.00	0.30%	10-Aug-21	15-Aug-21	5
D	**Architectural Works**			**2,36,79,391.06**	**30.50%**	10-Nov-21	15-Jun-22	217
1	Kota Stone Flooring	Sqm	1295.69	19,39,034.72	2.50%	25-Jan-22	15-Apr-22	80
2	Ceramic Glazed Wall Tile	Sqm	42.00	37,590.00	0.05%	15-Mar-22	15-Apr-22	31
3	Finishing	Sqm	8166.52	19,01,121.73	2.45%	15-Oct-21	10-May-22	207
4	Waterproofing	Sqm	789.26	3,90,681.23	0.50%	4-Apr-22	25-Apr-22	21
5	Horticulture work	%	100.00	1,98,350.72	0.26%	1-Nov-21	15-Jun-22	226
6	S.S. Railing, Signages & SS Engraving work	%	100.00	24,67,299.36	3.18%	4-Feb-22	10-Jun-22	126
7	Aluminium Work	Kg	411.00	2,16,687.02	0.28%	25-Feb-22	5-May-22	69
8	8mm Thick Glass	Sqm	64.00	89,890.61	0.12%	25-Apr-22	5-May-22	10
9	1mm thick Sheet Door(M.S.)	Sqm	15.00	64,095.00	0.08%	20-May-22	25-May-22	5
10	Structural Steel work	Kg	4770.00	5,56,810.00	0.72%	25-Jan-22	10-Mar-22	44
11	Corrugrated G.I. Sheet	Sqm	207.00	2,64,057.00	0.34%	25-Jan-22	10-Mar-22	44
12	Rolling Shutter	Sqm	18.90	53,573.40	0.07%	25-Jan-22	10-Mar-22	44
13	Granite flooring	Sqm	2610.71	88,32,518.27	11.38%	25-Jan-22	15-Apr-22	80
14	S.S. Door frame & Shutter	%	100.00	17,43,834.00	2.25%	25-Feb-22	5-May-22	69
15	4 Nos Body Mortuary Cabinet	Nos	2.00	10,90,754.00	1.40%	20-Jan-22	5-Jun-22	136
16	Shiva tatue	Nos	1.00	3,22,890.00	0.42%	5-Apr-22	2-Jun-22	58
17	Dustbin	Nos	6.00	9,966.00	0.01%	5-Apr-22	2-Jun-22	58
18	Engraving	Sqm	1.00	89,208.00	0.11%	5-Apr-22	2-Jun-22	58
19	Pyre Structure	Kg	6685.00	34,11,030.00	4.39%	20-Jan-22	5-Jun-22	136

WORK BREAKDOWN STRACTURE

Detailed WBS for Bhogaon crematorium, Mirzapur UP

ICT & AUTOMATION USED

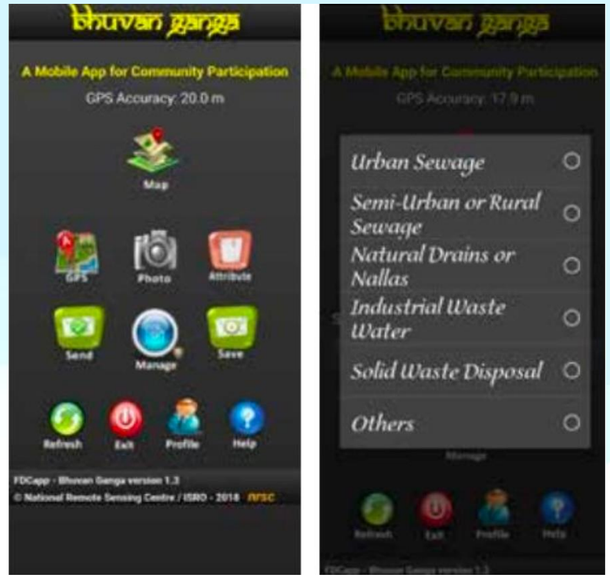
The construction and renovation of ghats and crematoria under the Namami Gange plan involve various technologies to improve their efficiency, reduce pollution, and enhance the overall experience for visitors. Some of the technologies used in this process are:

1. **Geospatial technology:** National Remote Sensing Centre (NRSC), which is a part of Indian Space Research Organization (ISRO) has been supporting NMCG to use geospatial technology for water quality monitoring, hydrological monitoring and evaluation, geomorphological monitoring and evaluation.

2. **Digital Elevation Model (DEM) technology** is being used in the project to enable precise data collection, which is crucial for river basin management planning. DEM technology makes it simple for policymakers to examine the available data and enhance the decision-making process by allowing identification of an area's whole topography. This technology makes it simple to find critical hotspots. Decentralization will also be ensured by the Namami Gange programme's usage of GIS technology. Through geo websites and mobile apps, the local people can quickly be informed of the data gathered and subsequent government actions. People will be able to send their opinion up to the national level thanks to technology, creating a transparent and interactive platform.

ICT & AUTOMATION USED

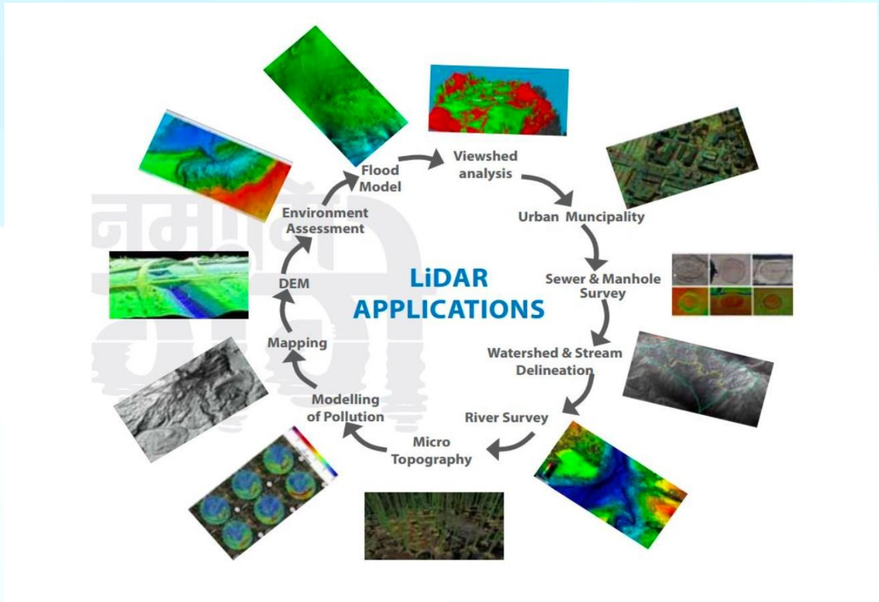
3.While hundreds of millions of rupees have been spent on river cleaning throughout the nation, a new technology called the **"Eco-Bio Block"** system promises to clean the river more effectively and with less labour. The technology that US Environ presented to India is already in use as a pilot project under the government of Narendra Modi's centrepiece "Namami Gange" project.



4.Bhuvan Ganga: Bhuvan Ganga is mobile application developed in participation with ISRO to enable public to collect and report information on various pollution sources that affects the water quality of river Ganga. The main features of the app are: collecting location information using mobile device GPS, taking photograph of the location (two photos), adding the attribute information about pollution source and sending the collected information to Bhuvan Ganga web server, either immediately or later

ICT & AUTOMATION USED

5.**LiDAR Mapping:** NMCG has brought on board Survey of India, to facilitate the Ganga Rejuvenation task by using LiDAR & GIS technology. Mapping of about 45,000 sq km area covering 5 major states namely Uttarakhand, Uttar Pradesh, Jharkhand, Bihar, and West Bengal.



ICT & AUTOMATION USED

6.Corona Archival Imagery: The Corona spy-satellite program collected a large number of earth observation photos in the 60s (1958-1972) by CIA and having resolutions from 1.8 to 7.5 m. The desired Ganga river length is now covered by the archival imagery with +/- 20 m positional accuracy. Corona archive contains over 8000 images of Ganga basin, declassified; offer us a unique view of the Ganga predating the ecological damage occurred.