

Amendment in EC

Total Plot Area: 2,39,196.04 m²
Built-up Area: 196657.79 m²

**Viraat Ramayana
Mandir at Mauza:
Bahuara Harbans,
Kaithwalia, Siswa
Narsingh, Block:
Kesaria &
Kalyanpur, District:-
East Champaran,
State: - Bihar**

**SRI Mahavir Sthan
Nyas Samiti**

**EIA Consultant:
Rian Enviro Pvt.
Ltd.
202 & 401, Mangal
Market, Raja Bazar,
Sheikhpura, Patna,
Bihar- 800 014**

FORM1A

***VIRAAT RAMAYAN MANDIR AT EAST
CHAMPARAN, BIHAR***

APPENDIX II
(See paragraph 6)

FORM-1 A (only for construction projects listed under item 8 of the Schedule)
CHECK LIST OF ENVIRONMENTAL IMPACTS

(Project proponents are required to provide full information and wherever necessary attach explanatory notes with the Form and submit along with proposed environmental management plan & monitoring program)

1. LAND ENVIRONMENT

- 1.1 Will the existing land use get significantly altered from the project that is not consistent with the surroundings? (Proposed land use must conform to the approved Master Plan / Development Plan of the area. Change of land use if any and the statutory approval from the competent authority to be submitted). Attach Maps of (i) site location, (ii) surrounding features of the proposed site (within 500meters) and (iii) the site (indicating levels & contours) to appropriate scales. If not available attach only conceptual plans.**

Land use Pattern: The proposed land is earmarked for construction of Temple on the total plot area of 2,39,196.04 SQM and Total Built-up area of 41583.28 SQM. The Project is granted Environment clearance for total plot area **2,39,196.04 Sqm** and total Built-up area of **41,583.28 Sqm.** vide F. No. SIA/8(a)/1273/ 2021 dated 19/03/2021 (enclosed as **Annexure-I**) for construction of **Viraat Ramayana Mandir at Mauza: Bahuara Harbans, Kaithwalia, Siswa Narsingh, Block: Kesaria & Kalyanpur, District:-East Champaran, State: - Bihar.**

But due the typographical error in our application the Maximum height of building is mentioned 67.07 meter in the EC Copy, whereas the correct maximum height of the building is 82.32 meter. Accordingly, we are applying for Amendment in previous Environment Clearance for revision in height i.e. 82.32 meter.

Project has also obtained CTE vide memo no. 897 dated 28/06/2024, application for extension of validity of CTE is also submitted, copy of receipt of application is enclosed as **Annexure-II.**

The project envisages construction of **VIRAAT RAMAYANA MANDIR**. The project will be consistent to the surrounding.

Land Documents is attached as **Annexure-III** and the Khasra Plan is attached as **Annexure-IV**. The Site Plan is attached as **Annexure-V**.

- i. The site location is shown in **Figure 1**
- ii. The surrounding features of the proposed site within 500 meters is shown in **Figure 2** and
- iii. The Topographical map of 5 km radius is shown in **Figure 3**

**Viraat Ramayana Mandir at Mauza: Bahuara Harbans, Kaithwalia, Siswa Narsingh, Block:
Kesaria & Kalyanpur, District:-East Champaran, State: - Bihar**

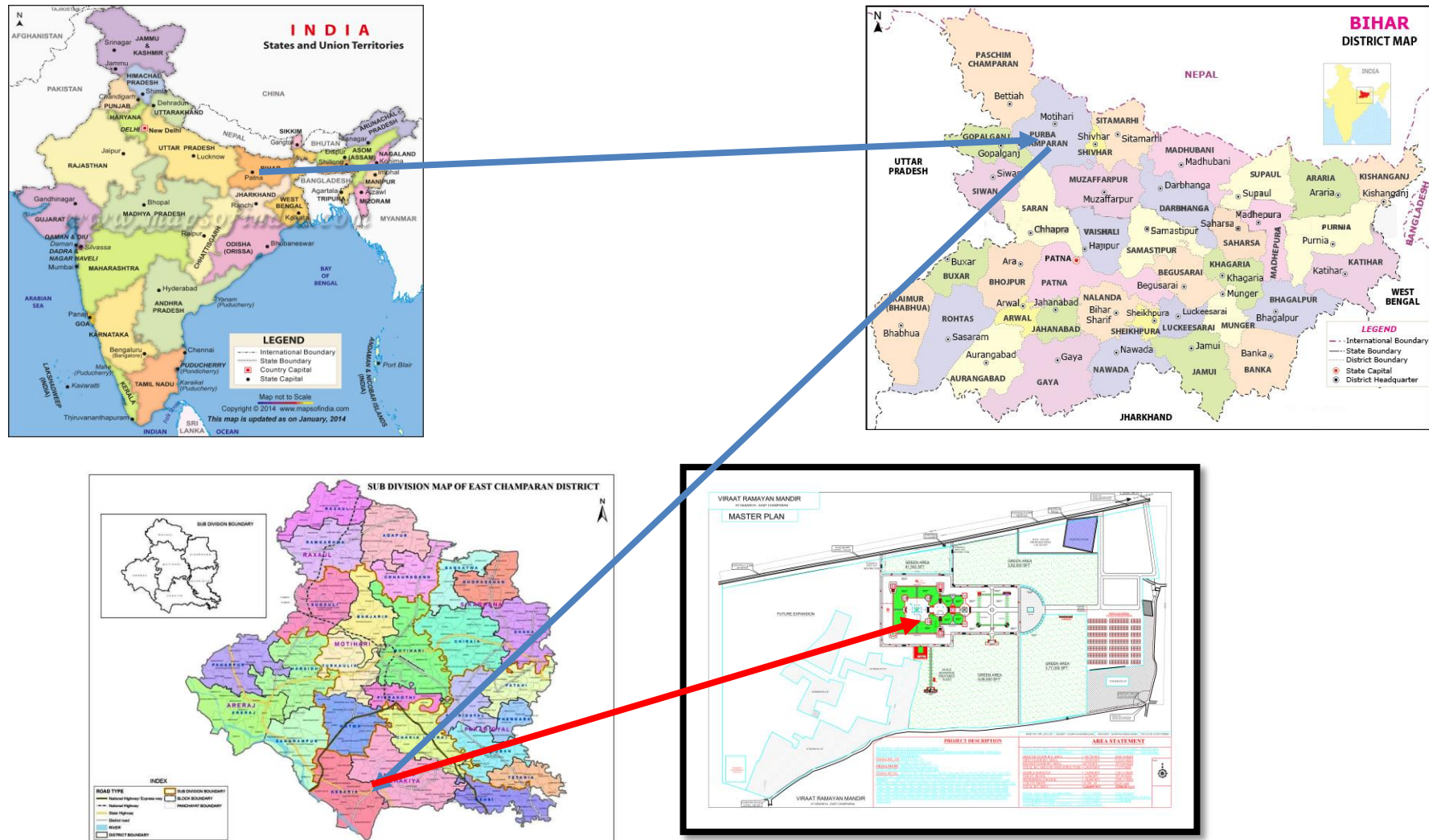


Figure 1: Master Plan showing Project Site

**Viraat Ramayana Mandir at Mauza: Bahuara Harbans, Kaithwalia, Siswa Narsingh, Block:
Kesaria & Kalyanpur, District:-East Champaran, State: - Bihar**

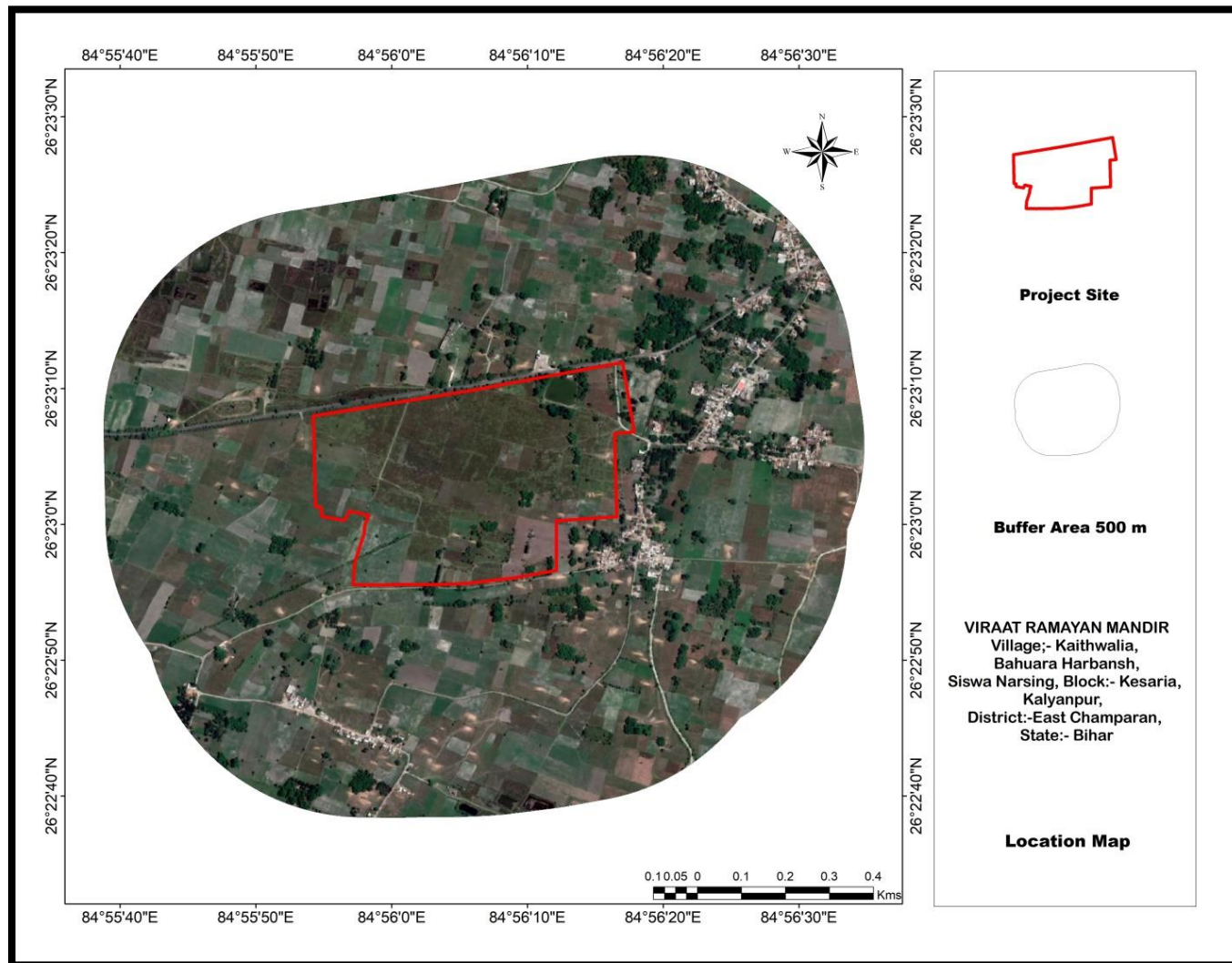


Figure 2: Map showing Project Site Location in 500-meter radius

**Viraat Ramayana Mandir at Mauza: Bahuara Harbans, Kaithwalia, Siswa Narsingh, Block:
Kesaria & Kalyanpur, District:-East Champaran, State: - Bihar**

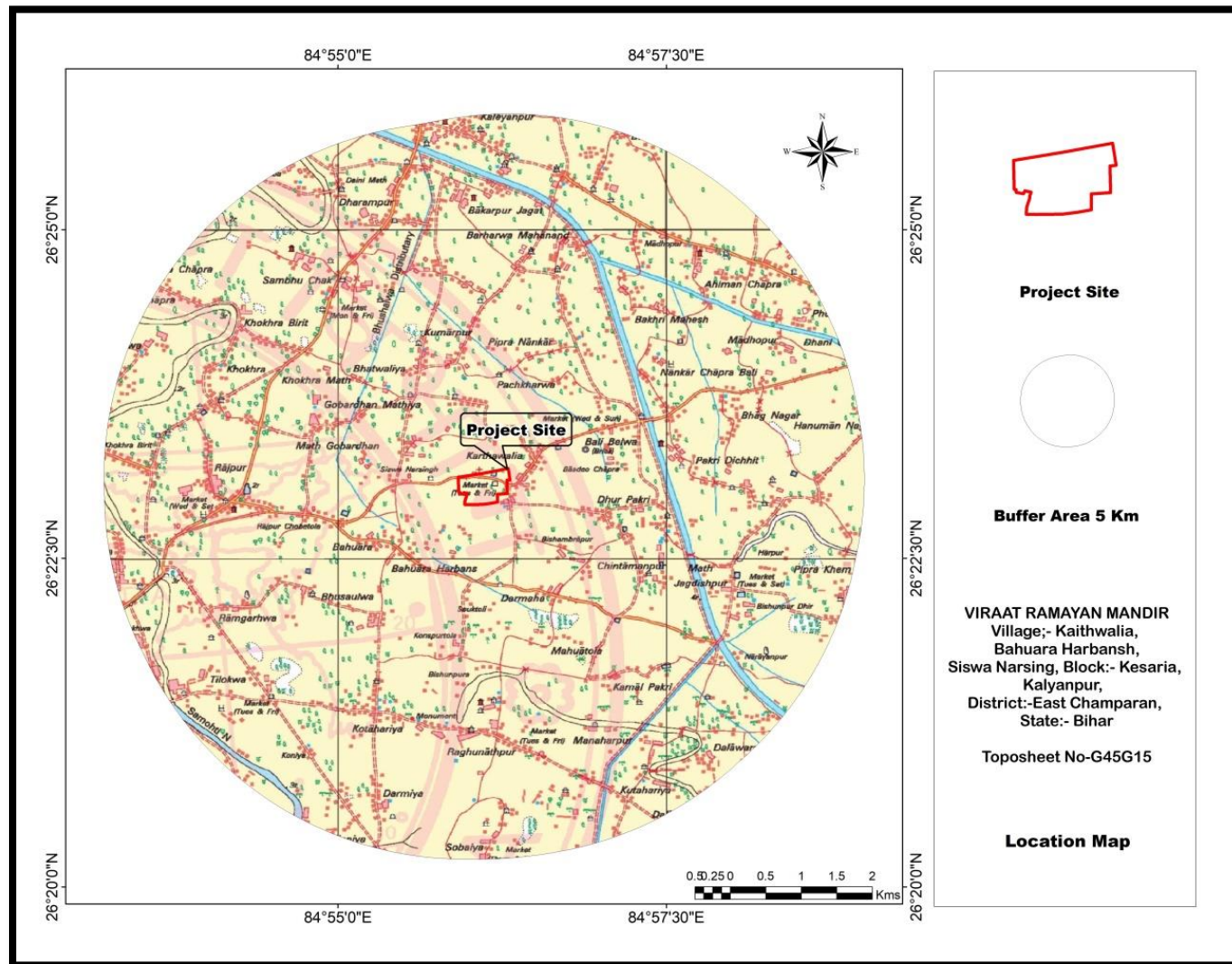


Figure-3: Topographical Map of 5 km radius (Toposheet no G45G15)

**Viraat Ramayana Mandir at Mauza: Bahuara Harbans, Kaithwalia, Siswa Narsingh, Block:
Kesaria & Kalyanpur, District:-East Champaran, State: - Bihar**

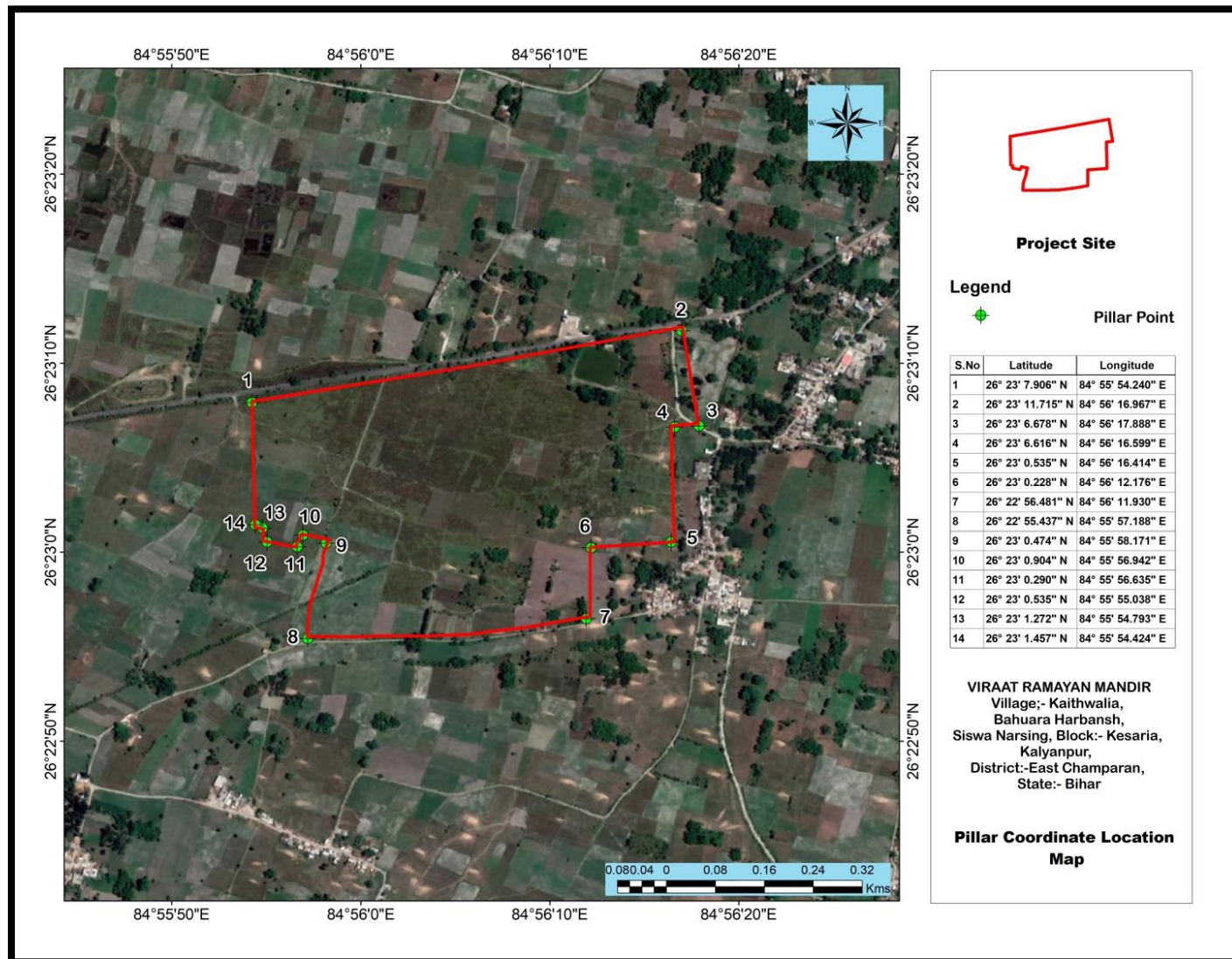


Figure-4: Map showing Project Site Pillars

Surrounding Features:

The Surrounding feature of the project is mentioned in **Table 1**.

Table 1: Connectivity & Site Surrounding

S. No.	Connectivity & Site Surroundings		
	Description		Distance and Direction
1.	Nearest Railway Station	Chakia Railway Station	Approx. 11.7 Km towards ENE
2.	Nearest Airport	Jai Prakash Narayan International Airport	89.0 km towards South
3.	Nearest Village	Siswa Narsingh Kaithwalia Bahuara Harbans Basdeo Chhapra	0.5 km towards NW 0.76 km towards North 2.0 km towards NW 1.4 Km towards East
4.	Nearest Highway/Roads	NH-28 NH-104 Chakia- Kesariya Rd	Approx.12.9 km towards East Approx.13.5 km towards East Approx.0.05 km towards North
5.	Nearest School & College	Primary School Kaithwakia Delhi Public School Arpa International School, Madhopur Chakia, Primary School, Bahuara	0.17 km towards North 4.7 km towards SW 4.3 km towards East 0.07 km towards East
6.	Nearest Hospital	Govt. Hospital Care Hospital, Chakia	0.10 km towards North 12.10 km towards East
7.	Places of worship	Shiv Mandir Hanuman Mandir	0.11 km towards East 1.14 km towards NE
8.	Water Bodies	Gandak river Burhi Gandak River	Approx.14.5 km from the project site in SW Approx. 13.5 km from the project site in East

1.2 List out all the major project requirements in terms of the land area, built up area, water consumption, power requirement, connectivity, community facilities, parking needs etc.

The all major requirement of the project is mentioned in the salient features of the project in **Table 2**. The Area details of the proposed project are mentioned in **Table 3**.

Table 2: SALIENT FEATURES OF THE PROJECT

Sl. No.	Particulars	Details
1.	Nature and size of the project	Viraat Ramayana Mandir at East Champaran, Bihar.
2.	Category of the project	8 (a) Building & construction projects
	Location	
3.	Tehsil	Kesaria & Kalyanpur
4.	District	East Champaran
5.	State	Bihar
6.	Latitude	26°23'3.15"N
7.	Longitude	84°56'7.16"E
8.	Toposheet no.	G45G15,
9.	Plot Area	2,39,196.04 SQM
	Built-up area detail	
10.	Parking facility Required	14554.14 SQM (35 %)
11.	Parking facility Provided	19,199 SQM
12.	Total Built-up Area Proposed	41583.28 SQM
13.	Maximum height	82.32 m
14.	Water requirement	During construction phase approximately 23 KLD of water will be required where waste water from labour colony will be treated through mobile STP and reused. During operation phase: 261 KLD of water will be required for first operation, where potable water requirement will be 98 KLD, where flushing water requirement is 50 KLD, horticulture requirement is 63 KLD and DG requirement is 2 KLD these non-potable requirements will be met through STP treated water and the excess treated water will be send to municipal sewer.
15.	Power requirement	Total Power requirement is 1750 KVA which will be met through state electricity board. In case of power failure backup will be provided through DG set of capacity 2x500 & 1x250 KVA.
16.	Population	7875 Persons
17.	Solid waste	During construction phase: Approx. 20 kg/day solid waste will be generated. During operation phase: Approx. 2367 kg/day

Viraat Ramayana Mandir at Mauza: Bahuara Harbans, Kaithwalia, Siswa Narsingh, Block: Kesaria & Kalyanpur, District:-East Champaran, State: - Bihar

Sl. No.	Particulars	Details
		solid waste will be generated.
18.	STP Capacity	Total Wastewater Generation: 128 KLD STP Capacity: 155 KLD Recycled water: 115 KLD
19.	Rain Water Harvesting Pits	18 Nos.
20.	Landscape Area provided @ 55.88%	133662.825 SQM
21.	Number of Trees Proposed	4784 Nos.
22.	Project Cost	150 Crores
23.	EMP Cost	During Construction: Capital Cost: 18 Lakhs Recurring Cost: 20.25 Lakhs During Operation: Capital Cost: 88.5 Lakhs Recurring Cost: 23.25 Lakhs
	Environmental setting details (with approximate aerial distance & direction plan)	
24.	Nearest town /city	The project is in East Champaran District.
25.	Nearest national highway/state highway	NH-28 Approx.12.9 km towards East NH-104 Approx.13.5 km towards East
26.	Nearest railway station	Chakia Railway Station approx. 11.7 Km towards ENE
27.	Nearest airport	Lok Nayak Jai Prakash Narayan, Patna is at 89.0 km towards South

Table 3: Area Statement

Sl. No.	Components	Area	Area
1	TOTAL PLOT AREA AS /DEED	25,73,749 SFT	2,39,196.04 SQM
2	TOTAL PLOT AREA AS /DRAWING	25,73,749 SFT	2,39,196 SQM
3	GROUND FLOOR B/U AREA	1,53,231 SFT	14,240.79 SQM
4	FIRST FLOOR B/U AREA	1,20,823 SFT	11,228.90 SQM
5	SECOND FLOOR B/U AREA	1,08,675 SFT	10,099.90 SQM
6	TOTAL B/U AREA OF MAIN STRUCTURE	3,82,729 SFT	35,569.59 SQM
7	TEMPLE SERVICES (6-9)	23,000 SFT	2137.54 SQM
8	TOILET BLOCK (02)	3,200 SFT	297.40 SQM
9	DHARMSHALA BLOCK (04)	18,000 SFT	1672.86 SQM
10	VIVAH MANDAP (03)	17,107 SFT	1589.86 SQM
11	SHOPS (05)	3,400 SFT	315.98 SQM

	TOTAL B/U AREA	4,47,436 SFT	41583.28 SQM
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Floor Plan is attached as **Annexure-VI**.

Elevation Plan is attached as **Annexure IX**.

1.3 What are the likely impacts of the proposed activity on the existing facilities adjacent to the proposed site? (Such as open spaces, community facilities, details of the existing land use, disturbance to the local ecology).

The proposed project is located in well-developed area so there is no major negative impact from the proposed project.

The main areas of concern which will have significant impact is Sewerage discharge. Mitigation options that are proposed are mentioned below:

A Sewage Treatment Plant (STP) having of capacity of 155 KLD and the treated water will be reused for landscaping, flushing & DG Set. The bio degradable waste will be used to convert it into compost that will be used inside the campus as manure for green belt, the non-bio-degradable waste to be handed over to authorized dealer for proper disposal.

Further, there will not be any change in the land use pattern due to the proposed project.

The green area will be provided @ 55.88% of the plot area along the buildings will be developed as shelter belt, along with avenue plantation on both sides of road, lawns area including herbs and shrubs. The indigenous/local plants will be planted, which will increase the aesthetic value of the area. Hence, there will be no disturbance to the local ecology of the area.

1.4 Will there be any significant land disturbance resulting in erosion, subsidence & instability? (Details of soil type, slope analysis, vulnerability to subsidence, seismicity etc. may be given).

The project site is a flat land and the proposed activity will not affect any land disturbance resulting in erosion, subsidence and instability. The area is not susceptible to erosion.

Soil Type: The topography of the area is fairly even and has fertile alluvial plains. These alluvial plains are divided into two tracts by the river Burhi Gandak (Little Gandak) with both the plains having remarkably different characteristics. The river Sikarahna (Burhi Gandak) divides the tract from North West to South East. The northern portion of the tract is of older

alluvium and has low land area which is suited for cultivation of kharif but is unsuitable for rabi crops. The southern portion of the tract has recent alluvium deposits of the river Gandak which has changed its course moving further west. This southern portion is suited for cultivation of both Kharif and Rabi crops. The area of this region is characterized by stretches of upland varying in places by large marshy depressions known as 'Chauras'. The major slope of the area is due south-east. The most remarkable feature of the district is presence of a chain of nearly 40 lakes running through the centre of the district covering an area of around 350 sq. km. The important lakes are located at Sugaon, Talsaraiya, Turkaulia, Motihari, Pipra, Siraha, Nawada and Tetaria. The depth of the lakes varies from 1-5 m and remains mostly filled up with water during summers. The prevalent soil is older alluvial type which is characteristic feature of the Gangetic plain. The soil is lighter in texture. In the northern region the soil is strong clay known locally as 'Bangar' covering an area of about two-fifth of the district. In this area, paddy crops are cultivated during sufficient rainfall seasons. In the Southern region of the river, the soil is mainly light sandy loam not suitable for kharif but yields good crops of wheat, mustard linseed etc. Major soil types found in the area are Paleustalfs, Haplaquents and Udifluvents soils.

Source: http://cgwb.gov.in/District_Profile/Bihar/EAST%20CHAMPARAN.pdf

Soil investigation report is attached as **Annexure VI**.

Slope Analysis: The project site is plain land with contour level varies from 97 to 102 msl and therefore not vulnerable to subsidence or erosion.

Subsidence/Erosion: Proper greening and paving of site area will not cause any soil subsidence / Erosion problem.

Seismicity: Tectonic Appraisal of the Area: Bureau of Indian Standards (BIS) has prepared a seismic zoning map of India based on tectonic features and records of past earthquakes. The project site falls under Zone-IV as per the Seismic Zoning map of India (IS 1893, Part I, 2002.) Necessary seismic factors as per codes shall be incorporated suitably while designing the structures to safeguard against earthquake risks.

1.5 Will the proposal involve alteration of natural drainage systems? (Give details on a contour map showing the natural drainage near the proposed project site).

No, proposal will not involve alteration of natural drainage system. Due to this construction project there will be increase in hard area & storm water runoff rates. The

contour map of the project site is attached as **Annexure VII** clearly shows that there is no perennial natural drainage system near the proposed project. Therefore, the proposed project will not alter any natural draining system.

1.6 What are the quantities of earthwork involved in the construction activity-cutting, filling, reclamation etc. (Give details of the quantities of earthwork involved, transport of fill materials from outside the site etc.?).

A very little cutting or filling will be required as the site is fairly plain and devoid of any low laying area. There will not be any requirement for transport of fill material from outside as the earthwork will be done by excavated soil from the project site. The surplus quantity of excavated soil will be used for landscape development.

1.7 Give details regarding water supply, waste handling etc. during the construction period.

Approx. 23 KLD water will be required for domestic as well as for construction purpose. Source of fresh water will be rural water supply. Source of construction water is treated water & tanker water supply.

No use of ground water or surface water

Water used during the construction activity

Cement mixing	10 KLDS
Curing	02 KLD
Sprinkling	02 KLD
Domestic purposes	09 KLD
Total	23 KLD

Waste Generation/Handling:

Approx. 3% of the total quantity construction materials of solid waste comprising of brick, cement, mortar etc. is envisaged to be generated during construction phase which will be used in refilling and landscaping of the project site. All non-recyclable

materials such as glass piece, steel etc. will be sold to local vendors dealing with recyclers.

Approx. 20 kg/day solid waste comprising of bio-degradable and non-biodegradable will be generated during construction phase of the project. The waste will be managed as per the Solid Waste Management Rule 2016.

Solid Waste during Construction Phase is mentioned in Table 4. The solid waste Management during construction phase is shown in **Figure 6.**

Table-4: Waste Composition - During Construction Phase

S. No.	Constituents	Percentage Composition (%)
1	Soil, Sand and Gravel	34.99
2	Brick and Masonry	29.95
3	Concrete	24.98
4	Metal	4.97
5	Bitumen	2.04
6	Wood	2.04
7	Other	1.02
	Total	100

Source: TIFAC Report “Utilization of Waste from Construction Industry,” 2001

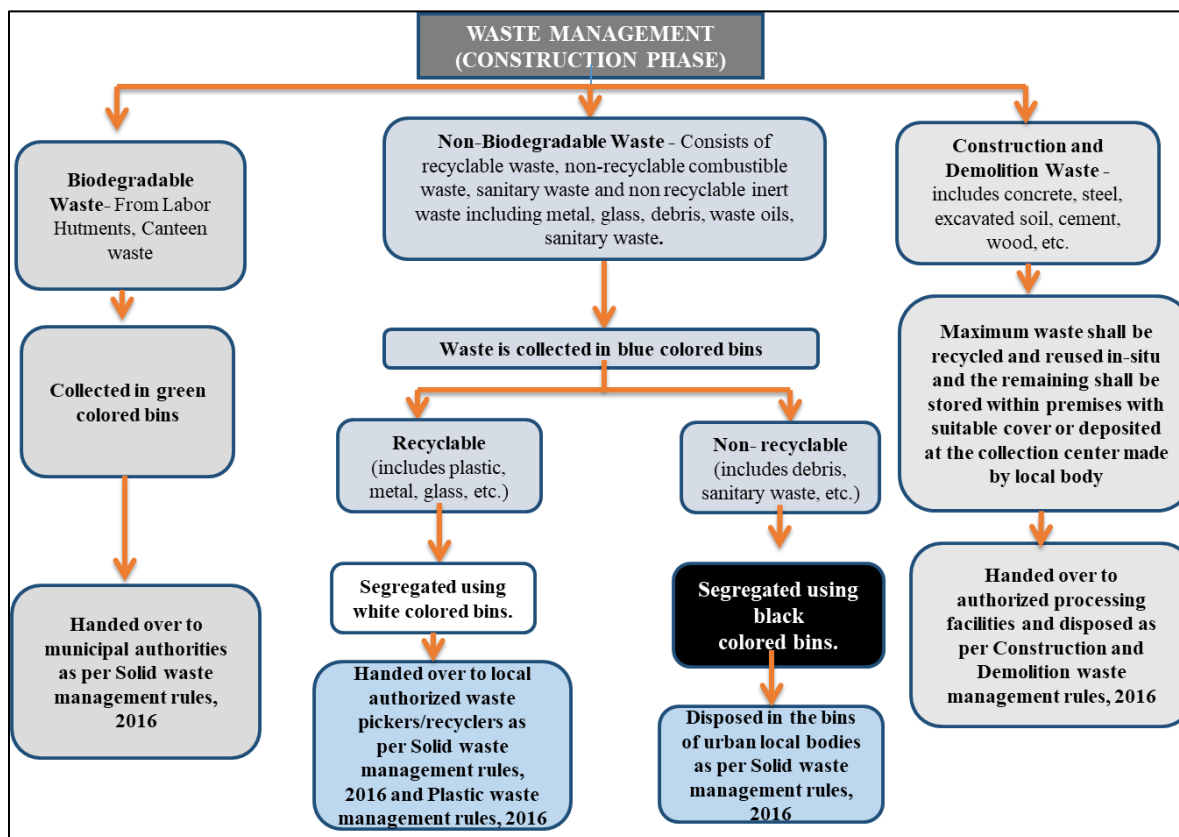


Figure-6: Solid Waste Management during Construction Phase

1.8 Will the low-lying areas & wetlands get altered? (Provide details of how low lying and wetlands are getting modified from the proposed activity).

There is a existing pond within the project site which will be retained and further developed as Ram-Sagar pond (1,36,705 sft). Therefore there is no further alteration in the low lying area & wetlands.

1.9 Whether construction debris & waste during construction cause health hazard? (Give quantities of various types of wastes generated during construction including the construction labor and the means of disposal).

Solid Waste generated during construction phase:

Approx. 3% of the total quantity construction materials of solid waste comprising of brick, cement, mortar etc. is envisaged to be generated during construction phase which will be

used in refilling and landscaping of the project site. All non-recyclable materials such as glass piece, steel etc. will be sold to local vendors dealing with recyclers.

Reuse:

The construction waste will be used in back filling, road making and pavement. Metals, tin cans, glass will be sold to local recyclers.

Solid waste generated from the labor shelter will be Segregated and Collected at site and disposal will be done as per Solid Wastes Management Rules, 2016.

2. WATER ENVIRONMENT

- 2.1. Give the total quantity of water requirement for the proposed project with the breakup of requirements for various uses. How will the water requirement be met? State the sources & quantities and furnish a water balance statement.**

Water Requirement:

During Construction Phase:

During construction phase, the Water requirement will be met from the treated water supply from nearby STP. It is estimated that water demand during the construction phase approx. 23 KLD which will be used in domestic as well as construction purpose.

During Operation Phase:

Water requirement during the operational phase will be met through ground water supply the total water requirement for the project has been estimated to be ~261 KLD (for first time). This includes non-potable water requirement, flushing and landscaping i.e. 115 KLD, which further met through recycled water. The total freshwater requirement for the project is ~98 KLD. The demand of fresh water will be met through ground water supply. The detailed water Balance is mentioned in **Table 5**.

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Table 5: Water Balance Chart

S. No.	Description	No. of units/Area in Sqm.	Unit Population	Population	Unit water consumption (lpcd)	Total water required (kl)	Fresh water required (kld)	Flushing (kld)	Total Wastewater (kld)(80% of domestic + Total flushing)
1	Residential Population of the temple			200	135 (90+45)	27	18	9	23.4
2.	Staff			175	45 (25+20)	7.87	4.375	3.5	7.0
2	Visitors of the population			7500	15 (10+5)	112.5	75	37.5	97.5
3	Horticulture					63			
4	DG Sets	500*2 & 250*1	1 lt./KVA/6 hr			2.0			
5	Fire fighting	..		...		48			
	TOTAL			7875		260.37	97.375	50	127.9
Say						261	98	50	128

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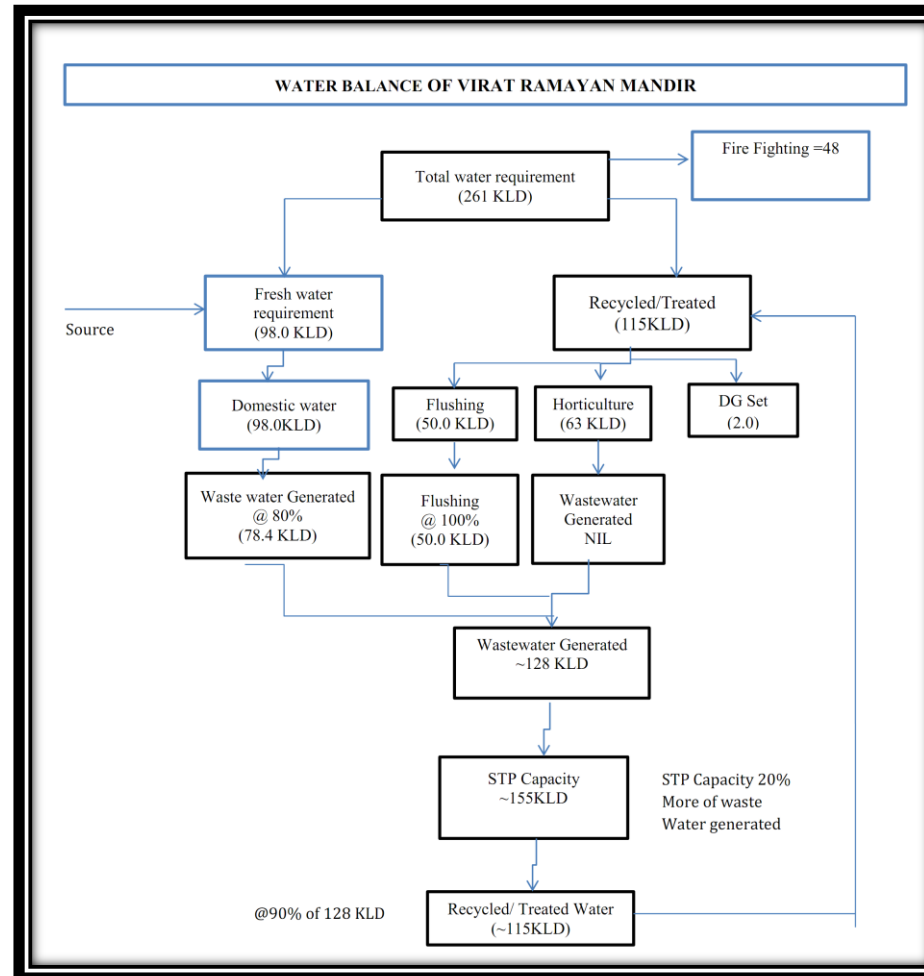


Figure 7: Details of water requirement for project

2.2. What is the capacity (dependable flow or yield) of the proposed source of water?

Construction phase

Approx. 23 KLD water will be required for domestic as well as for construction purpose.

Source of fresh water will be private tanker or rural water supply.

Source of construction water is treated water & tanker water supply. No use of ground water or surface water for Construction purpose.

Operation Phase

Approx. 98 KLD of fresh water will be required during operational phase for daily uses, which will be met through Ground Water.

The well yield varies from 80 – 95 m³ /hr with a water level between 2 to 3 m below ground level indicating thereby that ground water in the area occurs under unconfined to semi confined condition.

2.3. What is the quality of water required, in case, the supply is not from a municipal source? (Provide physical, chemical, biological characteristics with class of water quality)

Water requirement of construction phase will be met from Private water tanker. During operation phase water demand will be met form Ground Water / Bore well. The supplied drinking water to each dwelling unit will be provided as per Bureau of Indian Standards (BIS) and IS: 10500-2012. The Ground water quality near project site is attached as Annexure-XII.

2.4. How much of the water requirement can be met from the recycling of treated wastewater? (Give the details of quantities, sources and usage)

As per the details given in Figure 7 the total water requirement met through treated wastewater from STP is 115 KLD.

The treated water will be used for

- Flushing ~ 50 KLD
- Horticulture and DG cooling – 65 KLD

2.5. Will there be diversion of water from other users? (Please assess the impacts of the project on other existing uses and quantities of consumption).

There will be no such diversion of water from other users as the water demand, during construction phase water will be met from Private water tanker. In operational phase water demand will be met from ground water.

2.6. What is the incremental pollution load from wastewater generated from the proposed activity? (Give details of the quantities and composition of wastewater generated from the proposed activity).

There will be no incremental load in natural system as ~ 128 KLD wastewater generated during operational phase will be treated in the in-house sewage treatment Plant at project site of capacity 155 KLD, which will be higher of than the waste water generated and the proposed STP shall be based on Membrane Bio Reactor (MBR).

The waste water generation is given in **Table-4**. **Table-5** shows expected characteristic of untreated and treated wastewater.

Table 4: Details of Wastewater Generation

Details	Water (KLD)
Water requirement for domestic purpose	98
Wastewater to be generated from domestic use (@ 80% of domestic water requirement)	78
Water requirement for Flushing Purpose	50
Wastewater to be generated from Flushing (@ 100% of flushing requirement)	50
Total Wastewater generated	128
STP capacity 20% higher than total waste water	~155

2.7. Give details of the water requirements met from water harvesting? Furnish details of the facilities created.

(i) Rainwater Collection Potential for Reuse or Recharging

Rainwater harvesting is the activity of direct collection of rainwater. Collected Rainwater is stored for direct use or for recharging the groundwater. Rain Water Harvesting is the technique through which rain water is captured from the roof and paved surfaces and stored in sub-surface ground water reservoir by adopting artificial recharge techniques.

RAINWATER HARVESTING

All storm water piped into external network would be connected to rain water recharge pits for percolations of rain water to ground aquifer. A complete system of storm drainage piping inside the building, collecting water from all roof areas, setback areas, plazas etc. would be provided. All vertical drains will ultimate connect to external drains which will discharge into a storm sewer connection.

Rain water harvesting details and storm water drain calculation is mentioned in **Table 7**.

Table 7: Rainwater Harvesting Proposal

S. No.	Particulars	Area in m2 (A)	Rainfall intensity (mm/hr)	Runoff coefficient (C)	Discharge (mm3/hr)	Discharge m3/hr)
1.	Rooftop area	20254	45	0.85	315491.355	315.49136
2.	Green area	133662.825	45	0.15	902224.0688	902.22407
3.	Paved area	85279.215	45	0.75	2878173.50	2878.17
		239196.04			Total	4095.8854
	Taking 15 minutes retention time, total runoff = $4501 / 4 = 1023.97 \text{ m}^3$					
	Volume of 1 Rain Water harvesting Pit					
1.	Dia. of pit (d) in mtr.	4				
2.	Depth of pit (d) in mtr.	5				
3.	Volume $(3.14 \times 2 \times 2 \times 5)$	63				
	Total No. of pits required	16.25				
	Total No. of pits provided	18 Nos.				

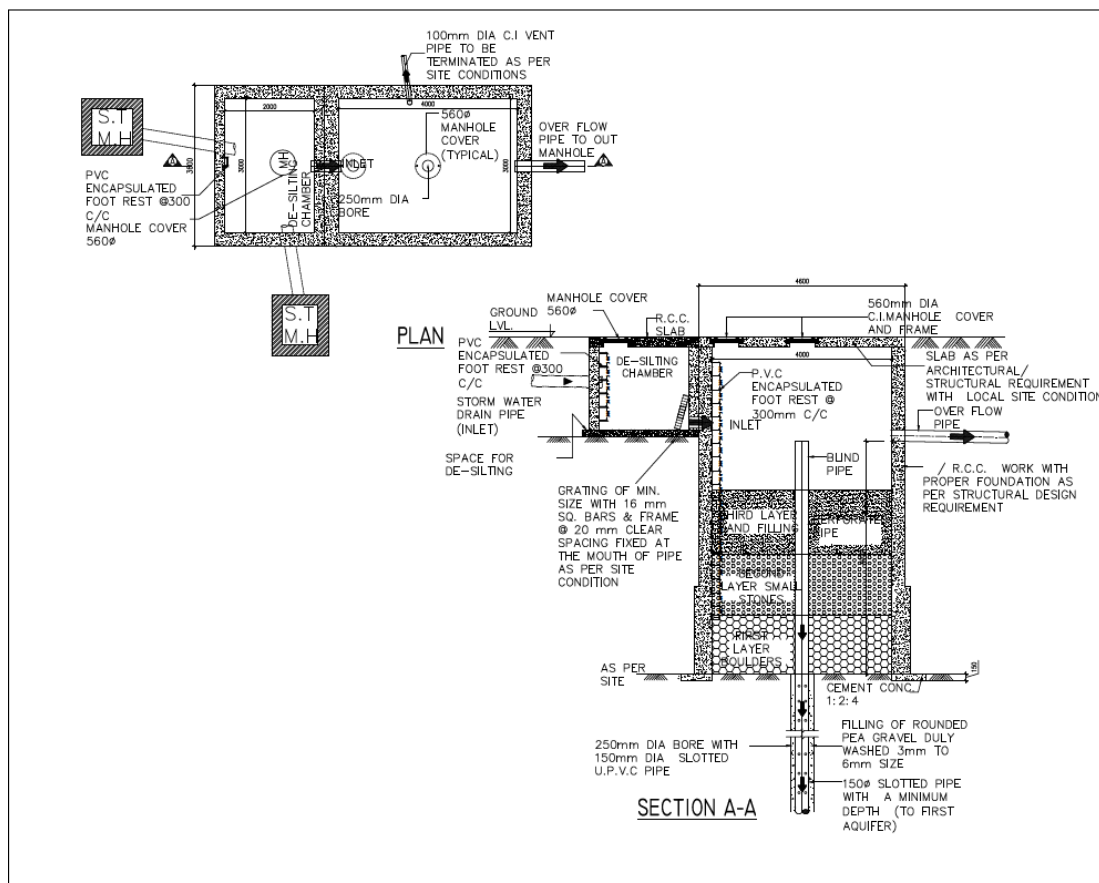


Figure 8: Rain water harvesting sectional plan

2.8. What would be the impact of the land use changes occurring due to the proposed project on the runoff characteristics (quantitative as well as qualitative) of the area in the post construction phase on a long-term basis? Would it aggravate the problems of flooding or water logging in any way?

Total Volume of runoff generated from the proposed campus 1125 cum. All the surface runoff will be routed towards the municipal sewer.

- There is permanent change in the land use due to the construction of the Temple.
- As the project site is almost plain land and the topography of the site is not anticipated to change due to the project activities, hence, no impacts are expected on the drainage profile or runoff characteristics after construction phase.

- A network of storm water drain is proposed all along the direction along the main roads and crossroads of suitable area size. All storm water drains will be covered with RC slabs to prevent the entry of soil and dust.
- The proposed project will have a storm water management system aiming at “Maximum uses of Storm water.”

2.9 What are the impacts of the proposal on the ground water? (Will there be tapping of ground water; give the details of ground water table, recharging capacity, and approvals obtained from competent authority, if any)

There will be no ground water extraction is planned under this construction project

Depth to Water Level

The water level is measured various locations in the district, and it has been found that the pre-monsoon depth to water level generally varies from 1.46 – 5.16 m bgl in major part of the district. The post-monsoon water level generally varies from 0.80 – 3.25 m bgl. The long-term decadal (2001-2011) water level fluctuation shows variation between 0.14 to 1.76 m.

Source –Ground Water Information Booklet East Champaran District, Bihar State

2.9. What precautions/measures are taken to prevent the runoff from construction activities polluting land & aquifers? (Give details of quantities and the measures taken to avoid the adverse impacts)

There shall not be major impact due to the runoff from construction activities. However, channel is planned to collect the surface runoff during rains to collect at a place which will be collected and used during construction period.

- Provision of perimeter drains to intercept storm-runoff from outside the works area. These shall be constructed in advance of site formation works and earthworks. Earth bunds or sandbag barriers should be provided on-site to direct storm water to silt removal facilities. The design of the temporary on-site drainage system will be undertaken by the Contractor prior to the commencement of construction.

- Sand/silt removal facilities such as sand/silt traps and sediment basins should be provided to remove sand/silt particles from runoff.
- All drainage facilities and erosion and sediment control structures should always be regularly inspected and maintained to ensure proper and efficient operation and particularly during rainstorms. Deposited silt and grit should be regularly removed, at the onset of and after each rainstorm to ensure that these facilities are always functioning properly.

A detailed Storm Water Management Plan is developed for operation phase which considers the sources of storm water. The plan incorporates the best management practices which include the following:

- ✓ Regular inspection and cleaning of storm drains.
- ✓ Installation of clarifiers or Oil/Water separators system of adequate capacity around parking areas and garages as per requirement.
- ✓ Cover waste storage areas.
- ✓ Conducting routine inspections to ensure cleanliness.
- ✓ Preparation of spill response plans, particularly for fuel and oil storage areas.
- ✓ Provision of silt traps in storm water drains.
- ✓ Good housekeeping in the above areas.

Precautions /Measures Taken to Prevent the Run-Off from Construction Activities

- **Domestic Wastewater from Toilets:** Mobile STP facility will be provided during the construction phase for the treatment of sewage water.
- **Site Development and Construction:** The wastewater generation during site development and construction mainly includes the storm water run-off from the construction areas, stockpiles of construction materials and wastes, etc. mainly containing high suspended solids (SS), in case these activities are undertaken during rainy season.

2.10. How is the storm water from within the site managed? (State the provisions made to avoid flooding of the area; details of the drainage facilities provided along with a site layout indication contour levels)

Storm water drain of adequate size will be provided to manage storm water within the site.

Detailed storm water management plan will be implemented and regular inspection and cleaning of drains will be carried out.

The plan will incorporate the following best management practices

- ❖ Regular inspection and cleaning of storm water drains
- ❖ Conducting routine inspections to ensure cleanliness
- ❖ Provision of silt traps in storm water drains
- ❖ Good housekeeping in the above area

The Contour Plan of the project site is attached as **Annexure-XIII**.

2.11. Will the deployment of construction laborers particularly in the peak period lead to unsanitary conditions around the project site (Justify with proper explanation).

No, it will not lead to any unsanitary conditions. As mobile STP facility will be provided during the construction phase for the treatment of sewage water. After treatment it will be disposed of in sewage line. So, the additional generation of sewage is not envisaged to be treated and disposed of separately.

2.12. What on-site facilities are provided for the collection, treatment & safe disposal of sewage? (Give details of the quantities of wastewater generation, treatment capacities with technology & facilities for recycling and disposal).

The capacity of Sewage Treatment Plant (STP) for the treatment of wastewater generation from the project ~128 KLD the proposed STP will be based on MBR Technology. The Block wise STPs will be proposed.

Membrane Bioreactor (MBR) is a process that combines a membrane ultra / micro filtration process and activated sludge process. (The MBR process is used in place of the

secondary sedimentation tank and sand filter used for tertiary treatment in the conventional activated sludge process.)

The Volume of wastewater for individual Blocks that will be entering STP is:

Description	Domestic(80%) & Flushing(100%) wastewater (KLD)	STP Capacity (KLD)	Recycled Water (KLD)
Waste Water	128	155	115

Technical Description of MBR Process:

Design basis of Treatment plant: MBR Technology

Technical Description of MBR Process:

Membrane Bioreactor (MBR) is a process that combines a membrane ultra / micro filtration process and activated sludge process. The MBR process is used in place of the secondary sedimentation tank and sand filter used for tertiary treatment in the conventional activated sludge process. The Brief Description of MBR STP is mentioned below:

Pre-treatment:

To reduce the chances of membrane damage, wastewater should undergo a high level of debris removal using screens prior to the MBR. Primary treatment is often provided in larger installations. In addition, all MBR systems require 1 to 3 mm-cutoff fine screens immediately before the membranes, depending on the MBR manufacturer. These screens require frequent cleaning.

Membrane Configuration:

MBR manufacturers employ membranes in two basic configurations: hollow fiber bundles and plate membranes. A number of **bundles** are connected by manifolds into units that can be readily changed for maintenance or replacement.

The other configuration, employ **membranes** in a flatplate configuration, again with manifolds to allow a number of membranes to be connected in readily changed units.

System Operation:

All MBR systems require some degree of pumping to force the water flowing through the membrane. While other membrane systems use a pressurized system to push the water through the membranes, the major systems used in MBRs draw a vacuum through the membranes so that the water outside is at ambient pressure. The advantage of the vacuum is that it is gentler to the membranes; the advantage of the pressure is that throughput can be controlled. All systems also include techniques for continually cleaning the system to maintain membrane life and keep the system operational for as long as possible. All the principal membrane systems used in MBRs use an air scour technique to reduce buildup of material on the membranes. This is done by blowing air around the membranes out of the manifolds.

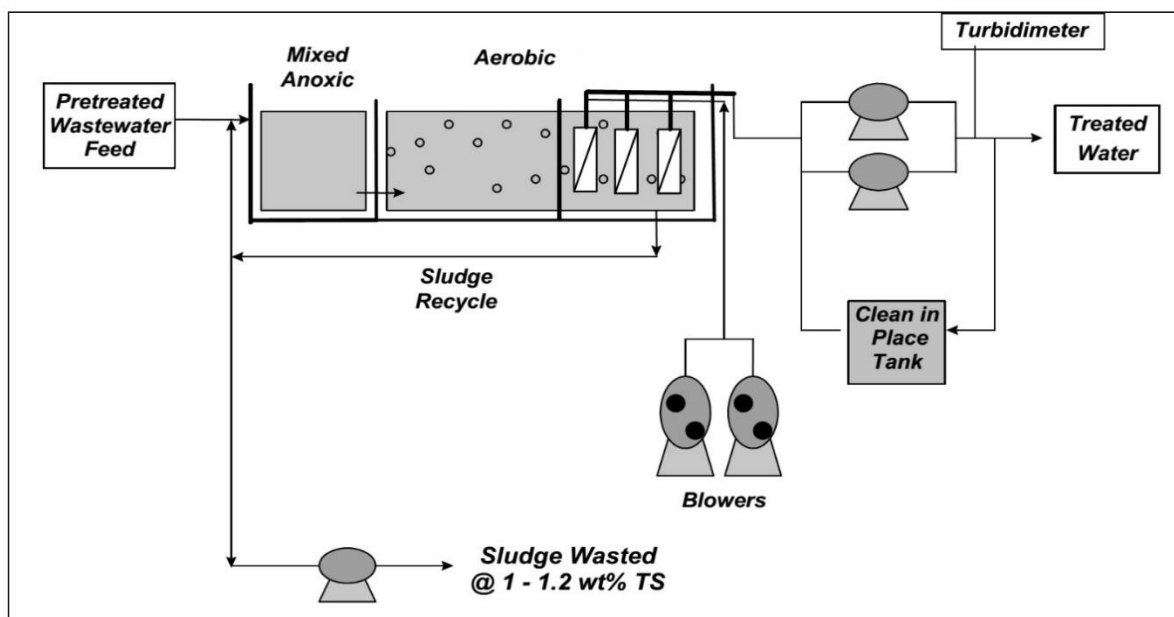


Figure 9: Schematic Diagram of MBR STP

Source:http://www.hitachiaqt.com/products/standard_products/wastewater/membrane/index.html

2.13. Give details of dual plumbing system if treated waste is used for flushing of toilets or any other use.

Dual plumbing system utilizes separate piping systems for freshwater and recycled wastewater is adopted for the project. The recycled water system shall utilize this treated water and serve for non-contact uses such as flushing and horticulture, etc.

3. VEGETATION

3.1. Is there any threat of the project to the biodiversity? (Give a description of the local ecosystem with its unique features, if any)

There is no anticipated threat to the bio-diversity of the study area from the proposed project. The area does not record the presence of any critically threatened species. The list of Fauna present in the study area is mentioned in **Table 8**. The records of Botanical Survey of India also do not indicate presence of any endemic or vulnerable species in this area.

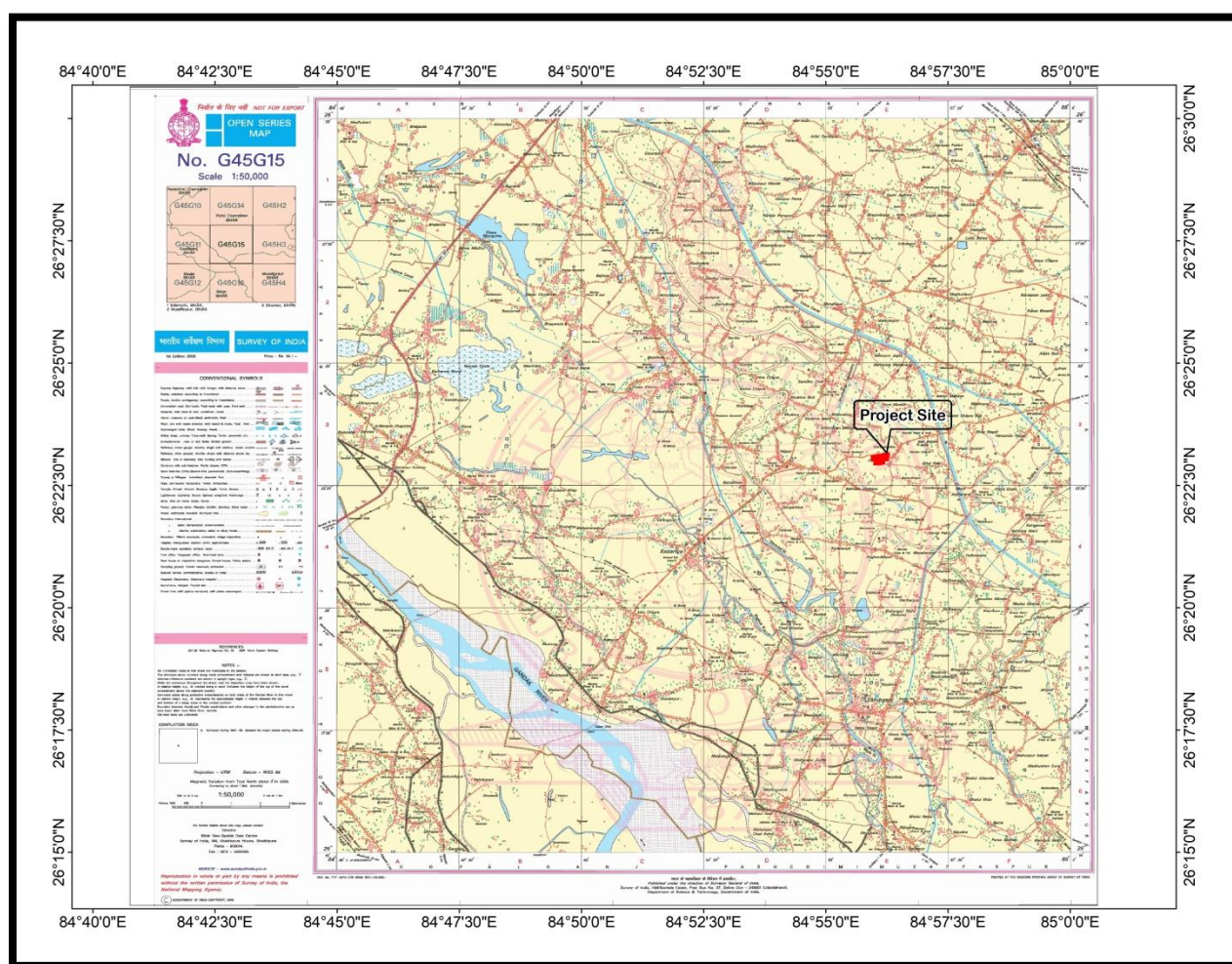


Figure-10: Topomap

3.2. Will the construction involve extensive clearing or modification of vegetation? (Provide a detailed account of the trees & vegetation affected by the project)

The construction of the proposed project site does not involve the clearing or modification of vegetation. The project site is vacant land except there is old small house. There are few trees exists at the site i.e. Aam and Seesam. The all existing trees will be retained in the project site.

3.3. What are the measures proposed to be taken to minimize the likely impacts on important site features (Give details of proposal for tree plantation, landscaping, creation of water bodies etc. along with a layout plan to an appropriate scale?)

The following steps were taken to minimize the likely impacts on the surrounding environment.

The project is vacant land with no trees. Even surrounding areas of project site is devoid of any trees or permanent vegetation. Therefore, it is proposed to undertake suitable landscape planning while developing the housing project including green belt development.

4. FAUNA

4.1. Is there likely to be any displacement of fauna- both terrestrial and aquatic or creation of barriers for their movement? Provide the details.

No impact or any displacement of any fauna both terrestrial and aquatic due to the proposed project.

4.2. Any direct or indirect impacts on the avifauna of the area? Provide details.

There will not any direct impact on the avifauna of the area. The following mitigation measures will be adopted to address the minor impact if any.

- ❖ After green belt development, the planted trees and shrubs will provide shelters and shed especially to the birds and other domesticated animals and human being.
- ❖ Within the proposed project site, proper landscaping has been planned to provide a clean, healthy, and beautiful green environment for the people to live and work in.

- ❖ The common native variety of trees and ornamental flowering species will be planted in the green space.

4.3. Prescribe measures such as corridors, fish ladders etc. to mitigate adverse impacts on fauna.

These measures are not applicable for this project.

5. AIR ENVIRONMENT

5.1. Will the project increase atmospheric concentration of gases & result in heat islands? (Give details of background air quality levels with predicted values based on dispersion models taking into account the increased traffic generation as a result of the proposed constructions)

The project will certainly increase some level of atmospheric concentration of gases resulting into heat island effect as the surrounding area is already existing habitation. The heat island effect will be mitigated by following measures:

Trees and Vegetation- Increasing tree and vegetation cover lowers surface and air temperatures by providing shade and cooling through evapotranspiration.

Green Roofs - Growing a vegetative layer (plants, shrubs, grasses, and/or trees) on a rooftop reduces temperatures of the roof surface and the surrounding air and improves storm water management. Also called “rooftop gardens” or “eco-roofs,” green roofs achieve these benefits by providing shade and removing heat from the air through evapotranspiration.

Cool Roofs - Installing a cool roof – one made of materials or coatings that significantly reflect sunlight and heat away from a building – reduces roof temperatures, increases the comfort of occupants, and lowers energy demand.

Cool Pavements - Using paving materials on sidewalks, parking lots, and streets that remain cooler than conventional pavements (by reflecting more solar energy and enhancing water evaporation) not only cools the pavement surface and surrounding air, but also can reduce storm water runoff and improve nighttime visibility.

The one day ambient air quality monitoring results mentioned below was conducted to assess the background air quality. As the project is located near the roads i.e. Chakia Kesariya Road adjacent to the project site. The Values of air ambient air quality is well within the specified limit of CPCB.

5.2. What are the impacts on generation of dust, smoke, odorous fumes, or other hazardous gases? Give details in relation to all the meteorological parameters.

Wind rose diagram shows that dominant wind direction is from NNE to SSW direction. The wind rose diagram near the project site is mentioned in **Figure 11**. The Ambient Air Quality data collected at the project site is mentioned in **Table 9**. The Ground level concentration of is mentioned in **Table 10**. Since the dust is major source of air pollutant in construction project, therefore, there is chance of dust dispersion primarily in west direction where currently block office and school area are situated. Erection 10 meter-high metal screen sheet along the entire boundary of project land and regular sprinkling of water during hot weather will substantially reduce the dispersion of dust from project site to surrounding areas. The chance of generation of smoke, odors and fumes are very negligible as this is a Temple project.

Viraat Ramayana Mandir at Mauza: Bahuara Harbans, Kaithwalia, Siswa Narsingh, Block: Kesaria & Kalyanpur, District:-East Champaran, State: - Bihar

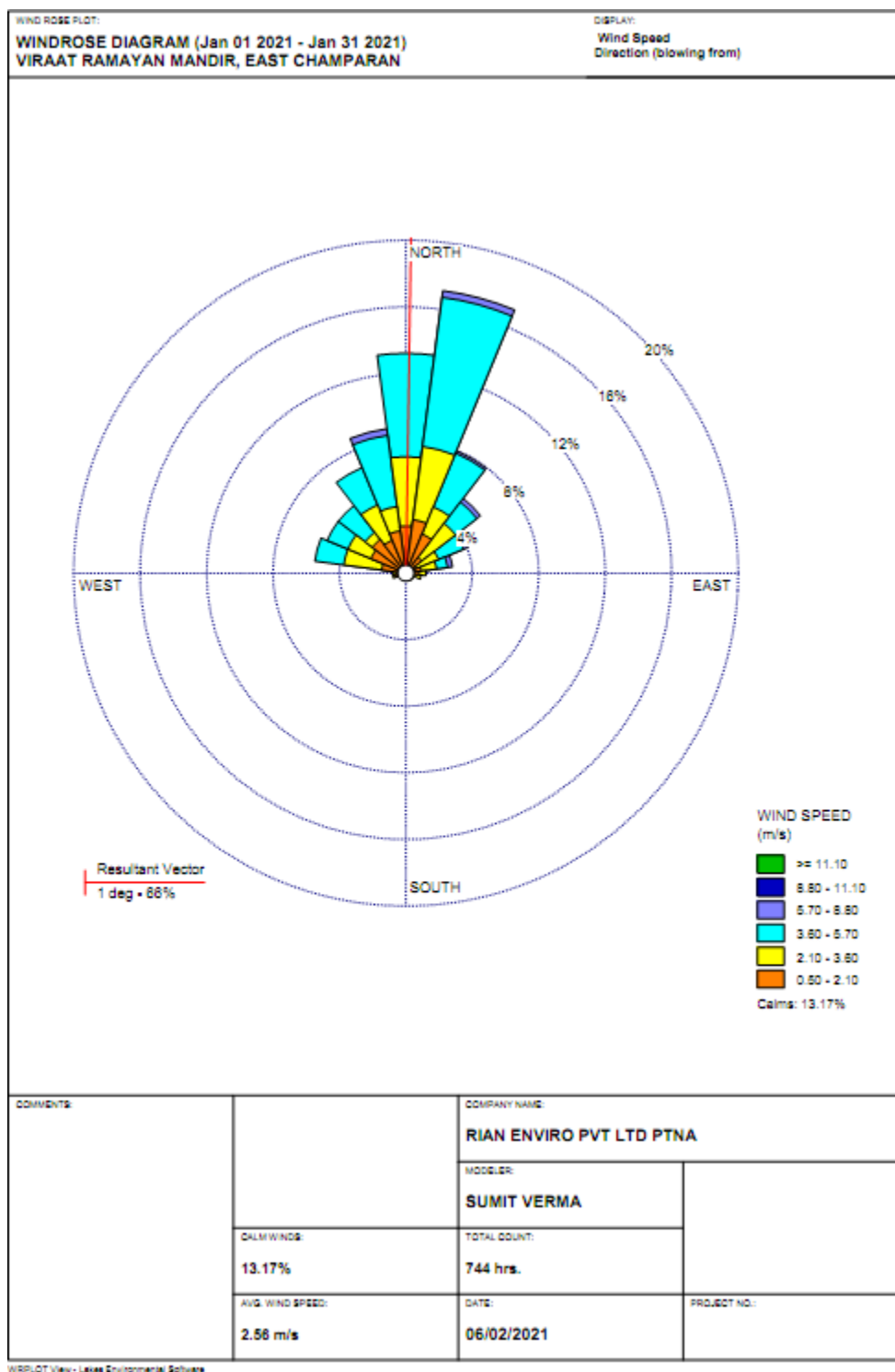


Figure 12: Wind Rose diagram during study period

Table 9: Ambient Air Quality data (At Project Site)

S. No.	Test Parameters	Unit	Result	Specification/ Limit (as Per CPCB)	Test Method
1.	Particulate Matter (PM10)	µg/m ³	76.2	For 24 Hrs.=100	IS: 5182 (Part-23)
2.	Particulate Matter (PM2.5)	µg/m ³	48.6	For 24 Hrs.=60	Gravimetric Method
3.	Sulphur Dioxide (SO ₂)	µg/m ³	12.4	For 24 Hrs.=80	IS: 5182 (Part-2)
4.	Nitrogen Dioxide (NO ₂)	µg/m ³	32.1	For 24 Hrs.=80	IS: 5182 (Part-6)

Table 10: Ground Level Concentration

Dispersion modeling (Incremental load assessment due to increase in traffic volume)

S. No.	Parameter	Unit	Baseline	Incremental	Total GLC
1.	PM10 (24 hr)	µg/cubic meter	76.2	0.228	76.428
2.	NO ₂ (24 hr)	µg/cubic meter	32.1	7.32	39.42
3.	Sulphur Dioxide (SO ₂)	µg/cubic meter	12.4	0.898	13.298
4.	CO (1hr)	µg/cubic meter	--	23.4	23.4

5.3. Will the proposal create shortage of parking space for vehicles? Furnish details of the present level of transport infrastructure and measures proposed for improvement including the traffic management at the entry & exit to the project site.

No, the project will not create shortage of parking space for the vehicle as sufficient no of parking space has been provided in the plan.

The Well-designed traffic management will be planned with following features;

- Approach road is the main connecting road is Chakia Kesariya Road Adjacent to the project site. All interior roads of 6.20 meter width Drive way conforming to NBC-2016 guidelines and local byelaws.
- Adequate provision of parking exceeding the provisions of NBC-2016 guidelines and

local byelaws.

- c) Existing peak traffic on approach road is approx. 100 PCU/hour. Traffic addition due to proposed project is <100 PCU (during peak hours for maximum of 2 hours a day)
- d) Well defined entry and exit routes to avoid conflict free movement
- e) Segregated movement path for pedestrians
- f) Routes/paths for vehicle movement routes and parking to be clearly identified and marked

5.4. Provide details of the movement patterns with internal roads, bicycle tracks, pedestrian pathways, footpaths etc., with areas under each category.

Internal road width of 6.2 meter width Drive way is proposed for internal traffic management. There will be mark on internal road for bicycle tracks, pedestrian pathways, footpaths etc.

5.5. Will there be significant increase in traffic noise & vibrations? Give details of the sources and the measures proposed for mitigation of the above.

The proposed project is a majorly temple which is categorized under residential area of noise standard. The baseline Noise level is mentioned in following table

S. No.	Test Parameter	Unit	Result	Specification /Limit (As per CPCB)	Test Method
1.	Day Time Noise Level	Leq: dB (A)	52.6	55	IS: 9989
2.	Night Time Noise Level	Leq: dB (A)	38.8	45	IS: 9989

The source of noise during operational phase will be DG sets, Honking of Vehicles. The following mitigation measures will be adopted to reduce the noise level.

- Signage will be erected to prevent unnecessary honking within the camp.
- Moreover, the effect of noise will be further minimized by plantation on the sides of internal roads, on the open spaces inside and around the periphery of whole project site.

5.6. What will be the impact of DG sets & other equipment on noise levels & vibration in & ambient air quality around the project site? Provide details.

The DG set will be provided of 2x500 & 1x 250 KVA. Source of power supply will be State Electricity Board. The DG sets will be provided with acoustic enclosure. Adequate stack heights of D.G. Sets will be provided as per the stipulated guidelines of Central Pollution Control Board (CPCB) to facilitate natural dispersion of exhaust gases as the calculation for the stack height is considering height of the building.

Impact of D.G. sets on noise & vibration and mitigation measures to be adopted in construction and operational phase:

However, the D.G. sets used during construction and operation phase enclosed in an acoustic enclosure to reduce the noise. The DG sets foundation should comprise of heavy weight inertia concrete block. The generator should be mounted on Cushy Foot mounting and the concrete block should be isolated from the adjoining floor. Thus, no vibration impacts are expected from the DG sets.

The D.G. sets will be checked for noise level every 6 months (Biannually).

The noise level of DG sets is maximum 75dB (A) (at 1.0 m distance) & the insertion loss will be maintained at minimum 25 db as per the prescribed compliance standards of the MoEF CC {Noise pollution (regulation & control) (Amendment) rule 2010}.

Impact of D.G. sets on ambient air quality and mitigation measures to be adopted:

The D.G. Set emission consist of following pollutants

1. Hydrocarbon+ NO_x
2. Carbon Monoxide (CO)
3. Particulate Matter (PM)
4. Smoke

If unchecked the emissions from D.G sets increases the concentration of above-mentioned pollutants in the atmosphere. To mitigate the polluting effects of D.G. sets following mitigation measures will be taken,

- A. Use of High-Speed Diesel as a fuel to run D.G. sets

B. Provision of stack with height as prescribed by Central Pollution Control Board.

C. Emission test of D.G. stacks every 6 months to check the concentration of pollutants.

6. AESTHETICS

6.1. Will the proposed constructions in any way result in the obstruction of a view, scenic amenity, or landscapes? Are these considerations taken into account by the proponents?

The proposed project will thus, no obstruction of view or scenic beauty or landscape is anticipated. Furthermore, the construction will be done in such a way that the organized open spaces and landscaped areas will render the plot aesthetically appealing.

6.2. Will there be any adverse impacts from new constructions on the existing structures? What are the considerations taken into account?

The site lies in the area which is designated for residential purposes. Thus, no obstruction of view or scenic beauty or landscape is anticipated. Furthermore, the construction will be done in such a way that the organized open spaces and landscaped areas will render the plot aesthetically appealing.

6.3. Whether there are any local considerations of urban form & urban design influencing the design criteria? They may be explicitly spelt out.

There is no local consideration of urban form and urban design criteria. The proposed project constructed within the designated site as per the defined in planning.

6.4. Are there any anthropological or archaeological sites or artifact nearby? State if any other significant features in the vicinity of the proposed site have been considered.

There are no such anthropological or archaeological site within 10 km radius meters of the project site.

7. SOCIO-ECONOMIC ASPECTS

7.1. Will the proposal result in any changes to the demographic structure of local population? Provide the details.

The proposed project will not make a major change in the demographic structure of local community. However, there will be influx of approximately 200 workers during peak construction period only. During the operational phase there will be population of 7875 people including residential and Visitors Population.

7.2. Give details of the existing social infrastructure around the proposed project.

The Existing social infrastructure / Environmental Sensitivity around the proposed project is mentioned in **Table 11**.

Table 11: Existing Social Infrastructure around the Project Site

List of Schools/College:	
Primary School Kaithwakia	0.17 km towards North
Delhi Public School	4.7 km towards SW
Arpa International School,	4.3 km towards East
Madhopur Chakia	
Primary School, Bahuara	0.07 km towards East
List of Hospitals:	
Govt. Hospital	0.10 km towards North
Care Hospital, Chakia	12.10 km towards East
List of Places of Worship	
Shiv Mandir	0.11 km towards East
Hanuman Mandir	1.14 km towards NE

7.3. Will the project cause adverse effects on local communities, disturbance to sacred sites or other cultural values? What are the safeguards proposed?

The proposed project will increase the cultural values of the area. This will also provide the employment & source of income due to the proposed project.

8. BUILDING MATERIALS

8.1. May involve the use of building materials with high-embodied energy. Are the construction materials produced with energy efficient processes? (Give details of energy conservation measures in the selection of building materials and their energy efficiency).

The main construction materials to be utilized in the construction of the proposed project will include cement, stone aggregate, Coarse sand/fine sand, Steel, Sandstone, Granite/Marble, Bricks, and Blocks, glass etc. Instead of regular clay, bricks, fly-ash cement bricks and laterite rock blocks available locally will be used to reduce environmental pollution at site and also to save the resources.

- Both Conventional as well as recycled construction material will be used sourced from authorized vendors/sellers.
- Low embodied energy material like ready mix concrete, fly ash bricks will be used in construction.

The embodied energy content of the material is given in **Table-12**.

Table-12: Embodied Energy Content of the Material

Primary Energy Requirement	Materials	Primary Energy Requirement (Gj/tonne)
Very High Energy	Aluminum	200-250
	Stainless steel	50-100
	Plastic	100+
	Copper	100+
	Steel	30-60
	Lead	25+
High Energy	Glass	12-25
	Cement	5-8
	Plasterboard	8-10
	Lime	3-5
Medium Energy	Clay bricks and tiles	2-7
	Gypsum Plaster Concrete	1-4
	Sand, aggregate	<0.5

Source: Manual on norms and standards for environment clearance of large construction projects, MoEF&CC.

- These construction materials will be procured from the reputed suppliers/manufacturers and thus it is expected with energy efficient processes. Most of the quality grade building material production facilities and industries now use energy efficient processes.
- All the items to be used in the proposed project as per the National Building Code-2016 specification. If the building materials with high-embodied energy are locally available, it will be used in construction.

8.2. Transport and handling of materials during construction may result in pollution, noise & public nuisance. What measures are taken to minimize the impacts?

The transport and handling of materials during construction phase has potential impacts on air and noise emissions in the vicinity. To control this, various mitigation measures shall be adopted to minimize the impacts.

Air Emissions

Dust Suppression: The most cost-effective dust suppressant applied to mitigate airborne dust is water, because of its efficiency as well as ready availability on the construction site. Water will be applied using water trucks, handheld sprays, and automatic sprinkler systems. Water spraying at the site also effectively suppresses dust generated. Results have proven that for about 80% of such active area(s), the water spray suppresses airborne dust by about >90%.

Emission Control for Construction Equipment/Vehicles: Construction equipment and heavy transport vehicles meet emission standards like Bharat Stage - V and above requirements for vehicles. The operation and maintenance of all vehicles, equipment to be deployed on site by different contractors shall be regulated and effectively monitored. The Pollution under Control (PUC) certification will be ensured for proper O&M of vehicles.

Improved Maintenance:

Recognizing that significant emission reductions can be achieved through regular equipment and vehicle maintenance; all site contractors will be directed to take necessary

steps for proper maintenance of vehicle and equipment. A monetary incentive/disincentive provision encourages contractors to comply with regular maintenance requirements. The fuel to be used in the equipment and vehicles shall be of good quality with low “Sulphur” percentage by following the norms prevailing in project area.

Reduction of on-site Construction Time:

The heavy construction activities will be confined to the daytime to avoid higher impacts during the nighttime. During daytime, there will be higher atmospheric dilution. Rapid on-site construction reduces the duration of traffic interference and therefore, reduces emissions from traffic delay. Off-site fabrication of various molded structural components, obtaining proper cut size of stone, prefabricated concrete slabs, etc. shall also enhance the quality of work environment at the construction site because other factors such as traffic congestion and emissions are then not relevant.

Noise Emissions

- The mitigation measures concerning technological control at source (of vehicles) shall meet the minimum compliance requirements for manufacturing stage. Besides these, other measures shall be of preventive nature as follows:

Restriction of Time of Construction:

- The heavy construction and transport activities will be restricted to daytime operation when the background noise levels will be high so that impacts like sleep disturbance during the nighttime are avoided.
- **Provision of Noise Barrier:**
- No extra barrier will be provided because it is within the premises of the project site.
- **Proper Maintenance of Construction Equipment/Vehicles:** Proper operation and maintenance of heavy equipment as well as transport vehicles will be ensured for lower noise emissions.
- **Occupational & Passive Protection:** Ear plugs, ear muffs, etc. will be provided to workers handling high noise equipment or stone cutting operations shall protect them from high noise exposure.

8.3. Are recycled materials used in roads and structures? State the extent of savings achieved?

Fly ash used materials would be utilized for paving work etc., if viable. Also, the construction waste (particularly the construction debris) will be used on the project site for leveling purposes. An approximate saving of 5% to 7% is proposed to be achieved.

8.4. Give details of the methods of collection, segregation& disposal of the garbage generated during the operation phases of the project.

Solid Waste during Operation Phase

Solid waste and other waste to be generated from the proposed project is mentioned in **Table-13** and the classification of solid waste generated is given in **Table-14**.

Table 13: Solid waste Generation details

S. No	Category of Solid Waste	Waste Generation Rate	Formula	Total Population	Waste Generated (kg/day)	Bio-degradable Waste (Kg/day)	Non Bio-degradable Waste (Kg/day)
1.	Residential Population of the Temple	0.3 to 0.6 kg/cap/day	Total Population*0.45	200	90	54	36
2.	Staff	0.1 to 0.3 kg/cap/day	Total Population*0.15	175	26.25	15.75	10.5
3.	Visitors population	0.3 to 0.6 kg/cap/day	Total Population*0.30	7500	2,250	1350	900
	Total			7875	2366.25 or say 2367	1420	947

Table 14: Classification of Solid Wastes and other Wastes

S. No.	Types of Solid waste and other waste	Description
1.	Food Waste (garbage)*	Wastes from the kitchen including preparation, cooking and serving of food.
2.	Rubbish*	Combustible (Primary Organic): Paper, cardboard, cartons, wood, boxes, plastics, rags, cloths, beddings, leather, rubber, grass, leaves. Non-combustibles (Primary Inorganic):

S. No.	Types of Solid waste and other waste	Description
		Metals, tin cans, metals foils, dirt, stones, bricks, ceramics, crockery, glass bottles, other metal refuses.
3.	Street Waste*	Street sweeping, dirt, leaves, catch basin dirt, animal dropping, contents of litter receptacles dead animals.
4.	Horticultural waste*	Tree trimming, leaves, waste from parks and gardens etc.
5.	General domestic waste from office and administration	Paper, General Domestic Waste etc.
6.	STP Sludge	Sludge generation after treatment of sewage in STP.

**Source: Manual on Municipal Solid Waste Management, published by Central Public Health and Environmental Engineering Organization (CPHEEO), Ministry of Urban Development, Government of India.*

S. No.	Type of waste	Quantity	Unit
1	Biodegradable waste -	1420	Kg/day
2	Non-biodegradable	947	Kg/day
3	Sludge	~50	Kg/day
4	E-waste	1	Kg/day
5	Hazardous waste	1	Lit/day

- The proposed project is expected to generate certain types of waste which would include both non-hazardous and some hazardous wastes. The non-hazardous wastes generated at the project would be municipal solid waste including Flowers, paper & cardboard wastes, food wastes, plastic wastes etc. STP sludge and other solid waste would also be generated.
- It is estimated that total quantity of municipal solid waste generated will be approx. 2367 kg/ day from the proposed project. Where the biodegradable waste will be about 60% of the waste generated and 40% will be non-biodegradable.

Collection:

The solid waste expected to be generated by the population. A door to door collection will be carried out by private vendors.

Segregation:

- The solid waste expected to be generated by the population in the proposed project can be broadly categorized into bio-degradable and non-biodegradable. These solid wastes will be collected separately by putting three types of separate bins at the source of generation. For the biodegradable waste green bins will be provided, for the recyclable waste blue bins and for the non-recyclable waste black bins will be provided.

Disposal:

- Organic waste will be stored temporarily at the site and it will be disposed at the MSW site for composting.
- Overall, it would be ensured that all waste fractions are appropriately recycled/disposed of through authorized recyclers/re-refiners/contractors. Records will be kept regarding amount and characteristics of all types of wastes.
- Paper & cardboard wastes, plastic wastes, metal wastes and other recyclable wastes will be sold to authorized contractors.
- The STP sludge will be properly collected, stored and used as manure or will be disposed through authorized agencies/or used for horticultural purposes.
- With regard to hazardous wastes, the building management staff of the proposed project will review the proposed operations and make a thorough "*applicability analysis*" of the *Hazardous Waste Rules*, to identify specific wastes, to be generated in the proposed project, that shall be categorized as hazardous wastes. The management staff would then manage hazardous waste as per the prevailing rules. The management staff of the proposed project would ensure compliance with all the conditions on a continual basis.
- Hazardous wastes shall be stored in secured places with adequate secondary containment and labelling as per the requirements of Hazardous Waste Rules.
- Appropriate records of hazardous wastes generation and disposal (as per Hazardous Waste Rules 2016) shall be maintained as per the requirements of MoEFCC's Rule.

The Solid waste management detail during operation phase is mentioned in **Figure-14**.

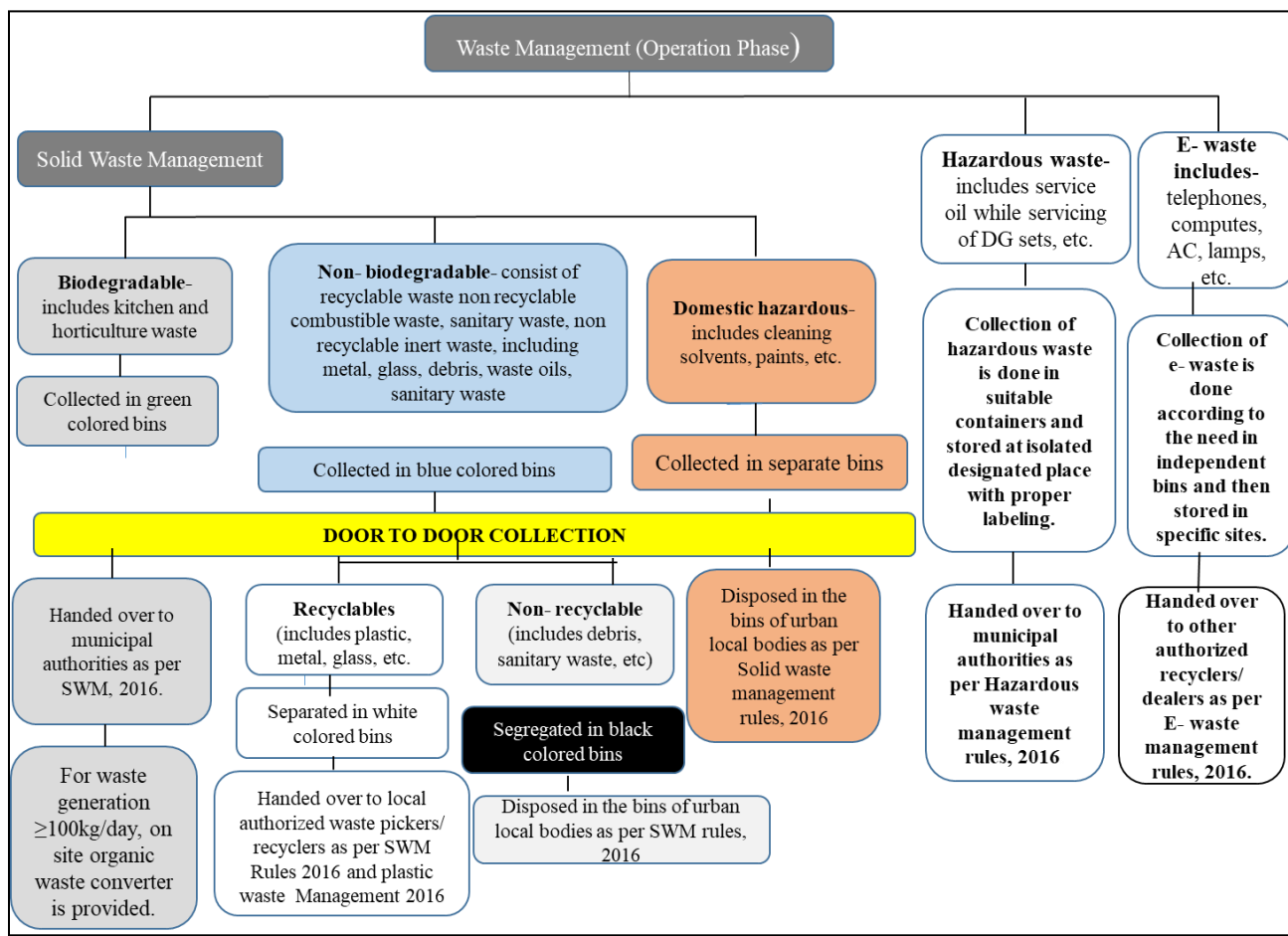


Figure-14: Solid Waste Management during Operation Phase

9. ENERGY CONSERVATION

9.1. Give details of the power requirements, source of supply, backup source etc. What is the energy consumption assumed per square foot of built-up area? How have you tried to minimize energy consumption?

Power requirement:

Total Power requirement is 1750 KVA and the source of Power will be State Electricity Department.

Power backup: The DG set will be of 2x500 & 1x250 KVA.

The DG sets will be provided with acoustic enclosure. Adequate stack heights of D.G. Sets will be provided as per the stipulated guidelines of Central Pollution Control Board (CPCB) to facilitate natural dispersion of exhaust gases.

Energy Conservation Measures:

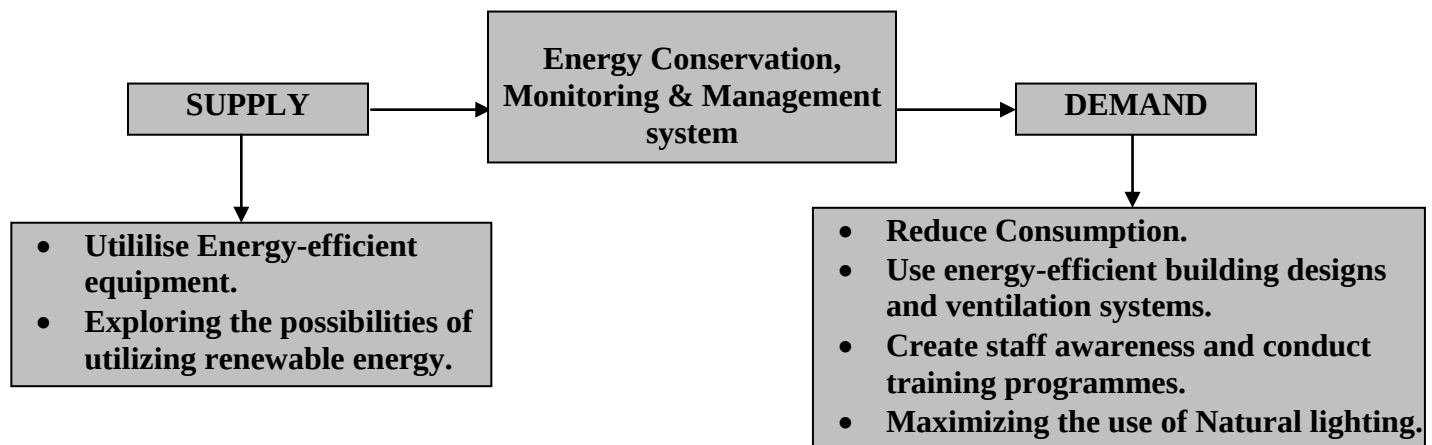
All efforts will be taken to make the building in accordance with Energy Efficiency Features of Green Building concept by using various techniques.

- LED light fittings will be installed in all areas to conserve electricity and all electrical appliances shall be of star rating and occupancy sensors.
- Solar water heaters will be installed on the roof of buildings for supply of hot water.
- PV Cell system will be installed for all street and compound lighting and is part of the power requirement.
- Roofs will be insulated with rigid polyurethane foam to reduce the heat gain through the roof
- Use of electrical fittings, fans, A/c pumps and plants with ultra-star rating to save electricity
- Rain water harvesting and provision of sewage treatment plant and re-use of waste water for flushing and gardening.
- Use of permanent, durable and local materials with low heat transmission reflective glass would ensure sustainable development.
- Use of natural cooling & ventilation system resulting in savings in HVAC system.
- Use of recycled waste water for horticulture purpose by providing STP system.
- Zero or near zero discharge from the building both solid and liquid.
- Use of waste efficient sanitary fixtures to reduce water use and use of treated effluent.
- Mineral fiber heat resistant terrace tiles with SRI (Solar Reflective Index) more than 78; Solar reflection > 0.70, on waterproof roof surface to save energy as per green building norms.
- Hermetically sealed double glass with air gap in windows to meet the Green Building norms.
- High efficiency lighting fixtures and occupancy sensors.
- Services like water supply, electrical cables etc. planned through service ducts.

The proposed project will adopt various energy conservation measures. The range of these energy efficiency measures can be broadly categorized under:

- Architectural Design Features;
- Energy saving preventive practices; and
- Behavioral change and raising awareness.

Energy conservation program will include measures taken for both energy demand as well as supply management.



The Energy Conservation efforts may consist of the following mitigation measures:

a. Architectural Design Features

- Most of the external surface of the building will be design in way to have an air gap between the wall surface and the external skin. This should reduce the transmission of heat into the building as the heat would get dissipated into the air gap to an extent. Landscaping will be carefully considered within the overall architectural concept.

b. Energy Saving Practices:

- Purchase of energy efficient appliances.
- Constant monitoring of energy consumption and defining targets for energy conservation.
- Adjusting the settings and illumination levels to ensure minimum energy used for desired comfort levels.
- Use of Light Emitting Diodes (LED) and low voltage lighting.

c. Behavioral Change for Reducing the Consumption

- Train all staff and operators for energy efficiency measures.
- Promoting staffs' awareness on energy conservation.
- Training of staffs on methods of energy conservation and to be vigilant of such opportunities.
- Turn on all lights when not in use, especially in conference rooms and turn down remaining lighting levels where ever possible.

Passive Solar Design Considerations

Following are the consideration adopted for passive solar design of the buildings in the proposed project:

- Maximum openings would be towards the north to get natural light that is not unduly heat up the interiors.
- Least opening would be provided towards southern and western walls so as to cut out the hot incident rays of the sun.
- Windows provided would be shaded adequately by designing double layer glass glazing so that no direct rays of sun can come into the building.

As an endnote, the design has been a conscious effort to make a modern building with local materials and will not use excessive amount of glass and steel.

9.2 What type of, and capacity of, power back-up to you plan to provide?

In case of power failure, for power backup DG set will be provided with 2x500 & 1x250 KVA. The DG sets will be provided with acoustic enclosure. Adequate stack height of D.G. Sets will be provided as per the stipulated guidelines of Central Pollution Control Board (CPCB) to facilitate natural dispersion of exhaust gases.

9.3. What are the characteristics of the glass you plan to use? Provide specifications of its characteristics related to both short wave and long wave radiation?

The uses of Glass will be very minimal in the temple, however the Glass panel will have maximum light transmission but low solar heat radiation. This will reduce quantity of heat

inflow into the building. Single pane glass of 0.25 inches thickness with visible transmittance up to 85%-day lighting may be used.

Wall assembly: – U Value: 0.7 W/Sqm⁰K

Outside Plaster + 230 Thick Fly Ash Wall + Inside Plaster

Roof Assembly: U Value: 0.45 0.7 W/Sqm⁰K

Internal Plaster + 150 THK RCC Slab + 50 mm Insulation + 200 Thk Brick Bat Coba+ Tile Finish

9.4. What passive solar architectural features are being used in the building? Illustrate the applications made in the proposed project.

Passive solar design in Architecture:

Solar design is the use of architectural features to replace the use of grid electricity and fossil fuel with the use of solar energy and decrease the energy needed in a home or building with insulation and efficient lighting and appliances.

Architectural features used in solar design include:

- Use of materials with high thermal masses such as walls or roofs that absorb and hold the sun's heat. Materials with high specific heat capacities, like stone, concrete, adobe or water work best.
- Insulation to reduce heat loss.
- Sunspaces such as conservatories on south-facing elevations. These collect heat which can be distributed throughout the building and reduce heat losses by creating thermal buffer.
- Insulating shutters for windows to be closed at night and on overcast days. These trap the solar heat in the building.
- Planting deciduous trees near the windows. The leaves will give shade in summer but fall in winter to let the sunlight enter the building.

9.5. Does the layout of streets & buildings maximize the potential for solar energy devices?

Have you considered the use of street lighting, emergency lighting and solar hot water systems for use in the building complex? Substantiate with details.

Yes, the streets and building are designed to maximize the potential of solar energy devices.

9.6. Is shading effectively used to reduce cooling/heating loads? What principles have been used to maximize the shading of Walls on the East and the West and the Roof? How much energy saving has been affected?

Yes. Shading has been effectively used to reduce the cooling loads. The following techniques have been adopted:

- For walls on the east and west side of the building a maximum of 10% window to wall ratio is recommend to minimize solar radiations, which further helps minimize cooling/ventilation.
- Living areas to be aligned to get maximum north south light and services areas are to be located on the western side.
- Shading is used to increase cooling effects in the building.
- There will be less numbers of openings on the west side and more numbers of openings on south side
- Projections such as balconies are provided on the south direction such that summer sun is stopped and winter sun is let in.
- Promoting resident's awareness on energy conservation.

9.7. Do the structures use energy-efficient space conditioning, lighting and mechanical systems? Provide technical details. Provide details of the transformers and motor efficiencies, lighting intensity and air-conditioning load assumptions? Are you using CFC and HCFC free chillers? Provide specifications.

Suitable energy optimization will be adopted during the calculation of the energy load of the proposed project. The space heating load will be minimized using passive solar structure, suitable building envelops materials. Use of incandescent and halogen lamps will

be avoided and energy efficient compact fluorescent lamps /LED will be used for all common area.

9.8. What are the likely effects of the building activity in altering the micro-climates? Provide a self-assessment on the likely impacts of the proposed construction on creation of heat island & inversion effects?

Heat emission from the proposed construction can be from the following sources: Heat absorbed from the paved and concrete structures, heat generated from equipment / appliances, and due to increased population in the proposed project site. However, the heat generated will not be significant and will be dissipated in the lush green and open areas provided within the project site. Hence it can be concluded that the heat island effect shall not be a concern for the concerned project.

Moreover, Green cover will be provided at site and will incorporate such design considerations that control formation of heat islands.

The buildup of indoor air contaminants is contributed by inadequate ventilation, contamination from inside and outside the building, besides microbial contamination and contamination from building fabric. The measures proposed for maintaining indoor air quality is presented in **Table 15.**

Table 15: Indoor air contaminants, Source and Health Effects

Sr. no.	Indoor air contaminant	Source	Health Effects	Measure to be considered
1.	Volatile organic compounds (VOCs)	Paints, Cleaning compounds, glues, photocopyers, "Spirit duplicators, signature machines, Tobacco smokes, dried out floor drains, cosmetics and other personal products	Nausea, Dizziness, Eye, respiratory tract, mucous membrane irritation, headache and fatigue	Adequate ventilation

Sr. no.	Indoor air contaminant	Source	Health Effects	Measure to be considered
2.	Miscellaneous inorganic gases which include ammonia, Hydrogen sulfide, sulphur dioxide	Window cleaners, acid drain cleaners, combustion products, tobacco smoked, blue print equipment	Eye, respiratory tract, mucous membrane irritation, aggravation of chronic respiratory diseases.	Adequate ventilation
3.	Synthetic fibers	Fibrous glass and mineral wool	Irritation to the eyes, skin and lungs dermatitis	Avoid use of these materials in insulation
4.	Carbon Dioxide	Unvented gas, improperly vented devices, processes or operations, which produce combustion products, human respiration.	Difficulty concentrating, drowsiness, increased Respiration rate.	Proper venting any combustion equipment.
5.	Carbon Monoxide	Fossil-fuel engine exhausts, improperly vented fossil-fuel appliances.	Dizziness, headache, nausea, cyanosis, Cardiovascular effects and death.	Adequate venting and ventilation.
6.	Nitrogen Oxides	Combustion products from gas furnaces and appliances, tobacco smoke, welding, and gas and diesel engine exhausts.	Eye, respiratory and mucous membrane irritation.	Adequate venting of combustion stacks.
7.	Ozone	Copy machines, electrostatic air cleaners, electrical arcing, and smog	Eye, respiratory tract mucous membrane irritation; aggravation of chronic respiratory diseases.	Adequate ventilation.

9.9. What are the thermal characteristics of the building envelope? (a) roof; (b) external walls; and (c) fenestration? Give details of the material used and the U-values or the R values of the individual components.

The building envelope for external walls is made of bricks, concrete and steel. The R and U values building material will be considered as per ECBC norms at the designing stage. The Thermal characteristic is provided in **Table-16** below:

Table-16: Thermal Characteristic of Building

Input Parameter	Baseline	Propose	Units
Wall material	As per ECBC 230MM AAC block		
Wall U-value	0.078	0.031	Btu/hrsqt F
Roof material	As per ECBC	150mm RCC + Brick bat coba + China Mosaic	
Roof U-value	0.046	0.072	Btu/hrsqt F
Glazing U Value	0.581	0.212	Btu/hrsqt F
SHGC	0.25	0.23	
Window Shading	No	No	

Component	Input Parameter	Base case	Proposed
	Material	As per ECBC	Auto Claved Aerated
Wall	Thickness (mm)	-	230 mm
	U-value (Btu/hrsqt F)	0.0	0.0
Roof	Material	As per ECBC	RCC + Brick Bat Coba + China Mosaic
	Thickness (mm)	-	150 mm
	U-value (Btu/hrsqt F)	0.0	
Glass	U-value (Btu/hrsqt F)	0.5	0.212
	SHGC	0.25	0.25
	Shading Coefficient	0.2	0.2

9.10.What precautions & safety measures are proposed against fire hazards? Furnish details of emergency plans.

Adequate fire protection facilities are installed including fire detectors, fire alarm and firefighting system. All fire protection facilities would be designed as per the National Building Code 2016.

Response in case of Fire

- Required response during in the event of a fire should be described in signs located in the temple.
- On sighting a fire, it should be immediately informed to the environment manager giving the exact location and type of fire in detail.
- Initiate the Emergency Response Team for fires.
- If the fire is small, engage in extinguishing the fire using the nearest fire extinguisher.
- Guide the Emergency Response Team staff to the emergency assembly point.
- The Emergency Response Team should immediately inform the nearest dispensary and security force. If required a fire tender should be summoned.
- The response team should immediately move to the point of fire and take all necessary steps to stop the fire. If the fire is not controllable and spreads then the manager in charge should inform the district authorities and call for external help.

General Instructions for Occupants in case of Fire

- Get out of buildings as quickly and as safely as possible.
- Use the stairs to escape. When evacuating, stay low to the ground.
- If possible, cover mouth with a cloth to avoid inhaling smoke and gases.
- Close doors in each room after escaping to delay the spread of the fire.
- If in a room with a closed door.
- If smoke is pouring in around bottom of the door or if it feels hot, keep the door closed
- Open a window to escape or for fresh air while awaiting rescue.
- If there is no smoke at bottom or top and the door is not hot, then open the door slowly
- If there is too much smoke or fire in the hall, slam the door shut.
- Stay out of damaged buildings.
- Check that all wiring and utilities are safe.

Firefighting system is proposed to prevent and control fire outbreaks for the project. The firefighting system is consisting of portable fire extinguishers, hose reel, wet riser, yard

hydrant, automatic sprinkler system and manual fire alarm system. The project will also provide with automatic fire detection and alarm system.

9.11.If you are using glass as wall material provides details and specifications including emissivity and thermal characteristics.

Glass panel will have maximum light transmission but low solar heat radiation. This may reduce quantity of heat inflow into the building. Single pane glass of 0.25 inches thickness with visible transmittance up to 85%-day lighting may be used.

The Single pane glass (clear/tinted) with a transmission coefficient of 'U factor' as 3.3 W/m² -°C (for clear) and 'U factor' as 3.4 W/m² -°C (for tinted) may be used for composite climate zone. The Solar heat gain coefficient (SHGC) is 0.59 (clear) and 0.42 (tinted).

9.12 What is the rate of air infiltration into the building? Provide details of how you are mitigating the effects of infiltration.

Reduced air infiltration combined with proper ventilation can not only reduce energy bills but it can also improve the quality of indoor air. Outdoor air that leaks indoor makes it difficult to maintain comfort and energy efficiency. In addition, air leakage accounts for 25-40% energy used for heating and cooling in a typical building. For this purpose the building has been designed in a compact manner, leaving ventilation shaft in between buildings for facilitating the escape of hot exhaust air.

9.13 To what extent the non-conventional energy technologies are utilized in the overall energy consumption? Provide details of the renewable energy technologies used.

- The Energy efficient lighting is done with the use of CFL and LED lamps. Additionally, solar energy is explored.
- Use of Solar energy for street lightening is explored.

10. ENVIRONMENT MANAGEMENT PLAN

10.1. The Environment Management Plan would consist of all mitigation measures for each item wise activity to be undertaken during the construction, operation and the entire life cycle to minimize adverse environmental impacts as a result of the activities of the project. It would also delineate the environmental monitoring plan for compliance of various environmental regulations. It will state the steps to be taken in case of emergency such as accidents at the site including fire.

The mitigation measures suggested for the impacts identified on the various environmental components due to the project activities are given in this section. A detailed environmental management plan will be adopted during construction and operation phase is presented in **Table-17 & Table-18** respectively to mitigate all the identified environmental impacts that are found to be significant.

Table-17: Environmental Management Plan – Construction Phase

Sl. No.	Issue	Management/Mitigate measures
1.	Safety during construction	All manpower will be provided with personal protective equipment. Working hours and working conditions, as per ILO norms, will be strictly adhered to. Adequate preventive measures to be implemented. Workers to be properly trained in on-site emergency response management.
2.	Construction water usage	Fresh groundwater shall not be used for meeting construction water requirement. Instead, treated wastewater (arranged from various sources) shall only be used for the purpose.
3.	Equipment and machinery	All equipment and machinery will conform to the relevant BIS norms, various other statutory provisions (in terms of performance, emissions, noise, etc.). A record of PUC will be maintained for all plant and machinery.
4.	Construction material	The material to be procured from existing approved sources conforming to the applicable environmental provisions and should have valid consents/permissions/ authorizations.
5.	Construction operations	Construction material will be regularly sprinkled with water to keep the exposed surface wet and preventing it from getting air borne.
6.	Material transportation and handling	The vehicles should conform to Motor Vehicles Act, 1988. Covered transportation will be preferred. Due care to be taken during unloading. Water sprinkling as and when required
7.	Parking and machinery bays	The area for parking of construction vehicles, fuel/lubricant storage area, equipment and machinery area, will be lined. All operations will be carried out in a way to prevent the contamination of ground from spillage of fuels/lubricants. Arrangement will be provided to arrest the run-off from the area and send it to septic tank.
8.	Environmental conditions	Periodic monitoring of air, water, noise, and soil quality, through an approved monitoring agency will be periodically undertaken to ensure safe environmental conditions.
9.	Labour camp	The camp will provide necessary facilities in functional and hygienic manner. The sanitation and sewage system are designed, built, and operated, such that no health hazards occur and no pollution to air, ground water, etc., takes place. Adequate toilets and sanitation facilities would be provided for labour use (with specific provision for females) and operated so that there is no health hazard.

Table-18: Environmental Management Plan –Operational phase

Sl. No.	Issue	Management/Mitigate measures
1.	Wastewater treatment and disposal	Elaborate wastewater treatment facility will be developed to ensure, the maximum capacity, the reuse of treated wastewater (the treated wastewater reuse potential is ~90% of wastewater generation). The excess treated wastewater will be disposed onto land for irrigation of plantation area.
2.	Solid waste management/Biomedical waste	Solid wastes will be appropriately segregated (at source) into recyclable, and non-compostable components. The recyclable fraction will be send directly to recyclers. Disposal of remaining waste through authorized vender of Municipal Corporation, Patna, for which agreement has been done.
3.	Equipment and machinery	All equipment and machinery will conform to the relevant BIS norms, various other statutory provisions (in terms of performance, emissions, noise, etc.)
4.	Ground water usage	To minimize the additional stress to meet the project's water requirement, appropriate ground water recharge using rain water harvesting will be implemented. The annual recharge potential is >30,000 m ³ . Compliance with the requirements of Central Ground Water Authority is to be ensured.
5.	Drainage	Adequate storm water management will be developed.
6.	Green belt development	Approximately 133662.825 m ² of horticulture and green area (as dedicated parks and also along inner periphery of the complex boundary and along pavements) will be provided within the complex.
7.	Accidents	Adequate preventive measures to be implemented for fire, electrical hazards, earthquakes, etc.
8.	Environmental conditions	Regular monitoring of air, water, noise, and soil quality, through an approved monitoring agency will be periodically undertaken.
9.	Energy conservation	Efforts will be incorporated, through expert planning, to minimize the electrical power consumption of the complex with due care to use of natural lighting, solar power, etc.
10.	Management and staffing	Dedicated environmental, health and safety department with qualified and trained team to be provided, supported by adequate budgetary allocations and training to all the staff.

Environmental Monitoring Plan:

It is proposed to monitor essential parameters for ambient air quality, ambient noise quality, ground water quality, and waste water quality both during the construction and operation phases of the project. However, the monitoring schedule for the compliance report is given in **Table-19**.

Table-19: Environmental Monitoring Schedule for Compliance

S. No	Particulars	Monitoring Frequency	Duration of Sampling	Important Monitoring Parameters
1	Ambient Air Quality Monitoring			
	Project site	Once in 6 Months	24 hr continuously except CO (8 hourly)	PM ₁₀ , PM _{2.5} , SO ₂ , NO ₂ & CO
3	Ambient Noise Level			
	Near DG set	Once in 6 Months	8 hr continuous with 1 hr interval	Noise level in dB(A)
4	Ground/Drinking Water Quality Monitoring			
	Ground Water – at project site	Once in 6 Months	Grab Sampling	Parameters specified under IS:10500, 2012
5	Soil Quality			
	At the green belt area	Twice in a year	Samples will be collected from three different depths viz., 30cm, 60cm, and 100cm below the surface	Parameter for soil quality: pH, texture, electrical conductivity, organic matter, nitrogen, phosphate, sodium, calcium, potassium and Magnesium.

Environmental Monitoring:

Various environmental protection and mitigation measures have been suggested in the previous Chapter/section for ensuring compliance with the stipulated environmental regulations and applicable standards. Also, there are specified environmental monitoring and record keeping requirements for operating facilities that the proposed Project will have to comply with. Though record keeping would be largely an in-house activity, environmental monitoring within and outside of the proposed project would be carried out through recognized environmental laboratories as per the requirements of MoEF&CC.

The purpose of environmental monitoring is to evaluate the effectiveness of implementation of EMP by periodically monitoring the important environmental parameters within the impact area, so that any potential adverse impacts are detected and timely action can be taken. In order to ensure compliance with the applicable regulatory requirements, the Project plans to conduct the following environmental monitoring activities.

Wastewater Quality Monitoring and Record Keeping

The wastewater discharges from the proposed Project will mainly comprise of domestic sewage and other wastewater discharges from drinking water points, toilets, washbasins, food court and kitchen, backwashing of filters (used in water treatment) etc.

Therefore, as per the requirements of the Water (Prevention and Control of Pollution) Act 1974, the Project proponent will apply to State Pollution Control Board for the Consent to Establish. Before starting the operation, the Project proponent will apply to State Pollution Control Board for the Consent to Operate for Wastewater Discharges and thereafter periodically renew its Consent to Operate. Subsequently, whenever there is a change in the operations, the Project will get the requisite amendments in its Consent.

The Project would maintain an inventory of all sources of wastewater and maintain records of waste water quality and quantity for the wastewater streams, as required. The Project will ensure that wastewater analysis is conducted for all regulated parameters as per State Pollution Control Board's specification or as per conditions of Consent to operate and to ensure compliance with any other specifically applicable standards. The frequency of wastewater quality monitoring would be decided in consultation with the State Pollution Control Board officials. Care will be taken to ensure that wastewater analysis is conducted at such a frequency that potential variations due to various operational factors are recorded.

Noise Level Monitoring and Record keeping

The Project would maintain an inventory of all point and non-point sources of noise emissions and identify regulated sources, specified in the State Pollution Control Board *Consent to Operate for Air Emissions*. Main source of noise would be DG sets during the construction phase, But as DG sets with acoustic enclosure has been proposed, there would be minimal chance of noise pollution. However, the Project management would conduct noise level monitoring at the specified locations within, on the fence line/boundary, and outside the Project's premises to ensure compliance with the specific standards and conditions of the *Consent to Operate*. The locations of the noise monitoring station and frequency of noise level monitoring would be decided in consultation with the State Pollution Control Board officials. The noise level monitoring would be conducted at such a frequency that potential variations due to various operational factors are recorded.

Awareness and Training

Training and human resource development is an important link for achieving sustainable operation of the facility and environmental management. For successful functioning of the project, relevant EMPs will be communicated to the residents of the project. Everyone will be made aware of importance of their various environmental responsibilities including waste segregation and storage, water and energy conservation, etc. This awareness will be provided through documents and periodic meetings. They will be informed of their responsibilities for successful operation of various environmental management schemes inside the Project premises. Relevant personnel at site will be trained for the following:

- Applicable EH&S regulations and compliance requirements for the same.
- Collection, Segregation, Storage and Disposal of solid and hazardous wastes.
- Operation and maintenance of Sewage Treatment Plant and recycling system
- Techniques for waste minimization, water conservation and energy conservation, etc.
- Functioning of the Project's Environmental Management System (EMS) including environmental monitoring, reporting and documentation needs.
- Requirements and responsibilities in case of an emergency as per emergency response plan.

Environmental Monitoring Program during Construction period

Based on the above, the following environmental monitoring program during construction activities is proposed for the Project. The monitoring program would be discussed and approved by State Pollution Control Board are given in **Table-20**.

Table-20: Proposed Monitoring Program for Construction Phase of the Project

S. No.	Type	Locations	Parameters	Period and Frequency
1.	Ambient Air Quality Monitoring	As per requirement	SO ₂ , NO ₂ , PM ₁₀ , PM _{2.5} and CO	As per State Pollution Control Board's requirements
2.	Ambient Noise Monitoring	As per requirement	Noise level L _{eq} both during day time and nighttime	As per State Pollution Control Board's requirements
3.	Water Quality Testing (Portability testing)	(i) Any operational bore well (ii) One of the Drinking Water Point	Drinking water parameters as per IS 10500:2005.	As per State Pollution Control Board's requirements
4.	Treated Wastewater Quality	Inlet and outlet of the STP	Parameters for assessing compliance with standards for recycling and horticulture use	As per State Pollution Control Board's requirements

Post-Project Environmental Monitoring Program

Based on the above, the following post-project environmental monitoring program is proposed for the Project. The monitoring program would be discussed and approved by State Pollution Control Board are given in **Table-21**.

Table-21: Proposed Monitoring Program for Operational Phase of the Project

S. No.	Type	Locations	Parameters	Period and Frequency
1.	Ambient Air Quality Monitoring	As per requirement	SO ₂ , NO ₂ , PM 10, PM2.5 and CO	As per State Pollution Control Board's requirements
2.	Ambient Noise Monitoring	As per requirement	Noise level L_{eq} both during daytime and night time	As per State Pollution Control Board's requirements
3.	Water Quality Testing (Portability testing)	Any operational borewell One of the Drinking Water Point	Drinking water parameters as per IS 10500:2012.	As per State Pollution Control Board's requirements
4.	Treated Wastewater Quality	Inlet and outlet of the STP	Parameters for assessing compliance with standards for recycling and horticulture use	As per State Pollution Control Board's requirements

Environmental Documentation

Documentation and reporting of environmental performance is an important management tool for ensuring sustainable operation of the Project. Documents/Records shall be maintained for regulatory, monitoring and operational issues. Typical documentation requirements for the "Project" are summarized in **Table-22**.

Table-22: Environmental Documentation for Operational Phase of the Project

PARAMETER	PARTICULARS
Air Emissions (incl. Noise)	• <i>Consent to Establish</i> from State Pollution Control Committee. • <i>Consent to Operate</i> for Air Emissions from State Pollution Control Committee. • Ambient Air Quality Monitoring records • Ambient Noise Monitoring Records
Water Supply	• Water Quality Monitoring records • Water Cess Returns
Wastewater Discharges	• <i>Consent to Establish</i> from State Pollution Control Committee. • <i>Consent to Operate for Wastewater Discharges</i> from State

PARAMETER	PARTICULARS
	Pollution Control Committee. • Details of quantity of wastewater discharged from various sources and discharged from the outlet of the STP for recycling/into the sewer • Operational details of STP including number of hours of operation, chemical usage, in-process wastewater quality, etc. • Wastewater Quality and Quantity Monitoring records
Waste Management	• Permission for disposal of solid wastes from concerned municipality/authority • Wastes Management Inventory including details of quantity of wastes generated on-site and mode of their disposal • Inventory of wastes stored on-site • Records of hazardous wastes stored on-site (as per rules) (if generated) • Annual Returns for hazardous wastes to State Pollution Control Board • Documentation related to off-site transportation and disposal of hazardous wastes as per rules
Environmental Statement	• Submission of Environmental Statement to State Pollution Control Board before 30th September every year
Petroleum Storage	• License from PESO for storage of HSD and other petroleum substances (based on their quantities) • Inventory of petroleum substances stored on-site both at storage and usage locations • Regular integrity testing/inspection reports for the storage tanks

Budgetary Allocations:

Table 23: Environmental Management Cost - Construction

Viraat Ramayana Mandir at Mauza: Bahuara Harbans, Kaithwalia, Siswa Narsingh, Block: Kesaria & Kalyanpur, District:-East Champaran, State: - Bihar

Sr. No.	Component	Particulars	Capital Investment (Lakhs)	Recurring Expenditure per Annum (Lakhs)
1.	Air	Dust Collector	2.5	1.25
2.	Water	Mobile STP, etc.	5.0	2.0
3.	Solid and C&D Waste and its Management	Stack yard and its management	3.0	10
4.	Occupational Health & Safety	Health medical checkup of workers, PPEs for Workers. Emergency Preparedness, Fire hydrant systems, fire extinguishers, emergency control room, OHC and HAZOP study	2.5	02
5.	Environment Monitoring & Management	Environment Monitoring as per monitoring plan	04	02
6.	Green Belt	Development and maintenance of green belt	01	03
Total (Rs.)			18	20.25

Table-24: Environmental Management Cost - Operation

Sr. No.	Component	Particulars	Capital Investment (Lakhs)	Recurring Expenditure per Annum (Lakhs)
1.	Air	Stack emission control	2.5	1.25
2.	Water	Sewage Treatment Plant (STP)	30	10.0
3.	Rain Water Harvesting	Installation of RWH System & Annual Cleaning of RWH tank	8.00	1.00
4.	Solid Waste Area and its Management	Purchase of Containers for Storage of Waste Installation of OWC	5.00 25	1.00 3
5.	Occupational Health & Safety	Health medical checkup of workers, PPEs for Workers. Emergency Preparedness, Fire hydrant systems, fire extinguishers, emergency control room, OHC and HAZOP	3.0	1.0

Viraat Ramayana Mandir at Mauza: Bahuara Harbans, Kaithwalia, Siswa Narsingh, Block: Kesaria & Kalyanpur, District:-East Champaran, State: - Bihar

Sr. No.	Component	Particulars	Capital Investment (Lakhs)	Recurring Expenditure per Annum (Lakhs)
		study		
6.	Environment Monitoring & Management	Environment Monitoring as per monitoring plan	0.00	3.0
7.	Green Belt	Development and maintenance of green belt	10	2.0
8.	Others	Energy saving devices, miscellaneous	5	1.0
Total (Rs.)			88.5	23.25