

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 500 meters) and (iii) the site (indicating levels & contours) to appropriate scales. If not available attach only conceptual plans.

Land use Pattern: The land use of the proposed project site is marked under residential zone as per Patna Master Plan 2031 and this the residential Project.

- i. The site location is shown in **Figure 1**.
- ii. The surrounding features of the proposed site within 500 is shown in **Figure 2** and
- iii. The project site indicating levels & contour is attached as **Annexure-I**.

Proposed Residential Building “**Hari Nagar Premium Vaatika**” at Mauza-Bhusaula, Danapur, Dist-Patna, Bihar by **M/s Balprada Built Pvt. Ltd.**

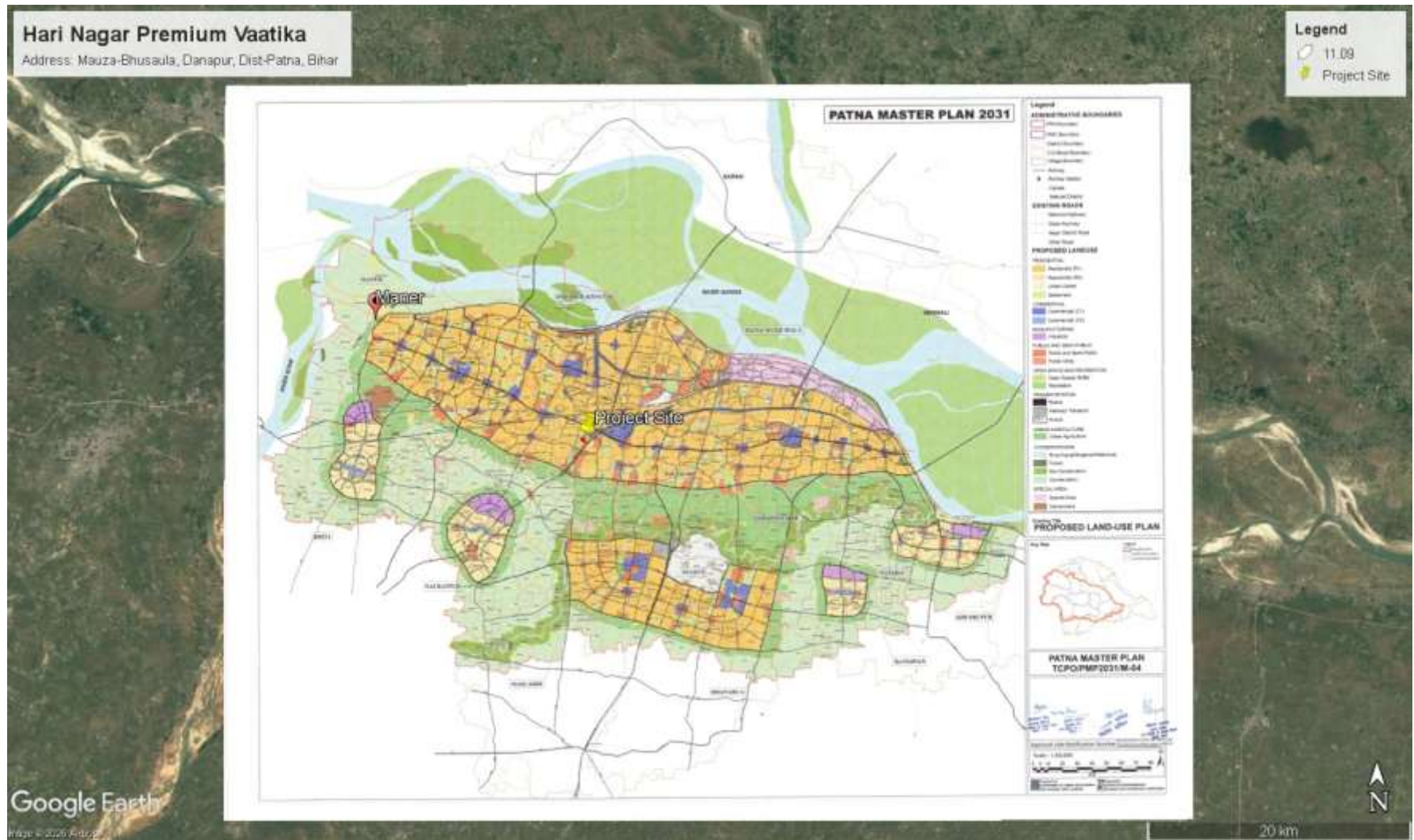


Figure 1: Site location

Proposed Residential Building “Hari Nagar Premium Vaatika” at Mauza-Bhusaula, Danapur, Dist-Patna, Bihar by M/s Balprada Built Pvt. Ltd.

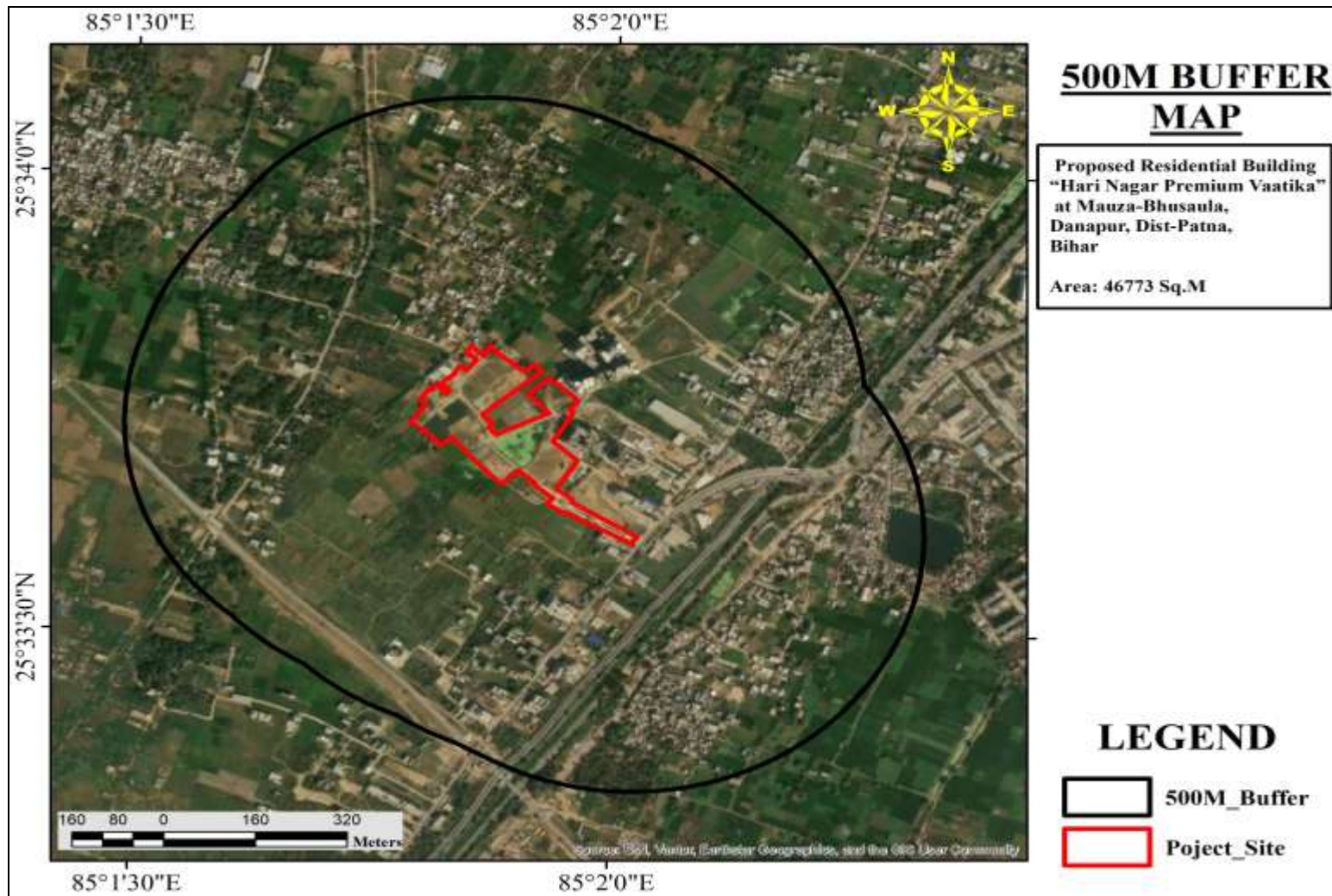


Figure 2: Surrounding features of the proposed site (within 500 meters)

Geographically, the project site is located at following mentioned site coordinates. The Pillar Coordinates map is mentioned in **Figure 3**.

Surrounding Features: The proposed project is Residential Building is well connected to different villages and towns. It is surrounded by Neora, Mainpura, and Muhammadpur Korji. The 10 km buffer map with location on Toposheet (**G45M14, G45M15, G45N2, G45N3**), in **Figure-4**.

Proposed Residential Building “Hari Nagar Premium Vaatika” at Mauza-Bhusaula, Danapur, Dist-Patna, Bihar by M/s Balprada Built Pvt. Ltd.

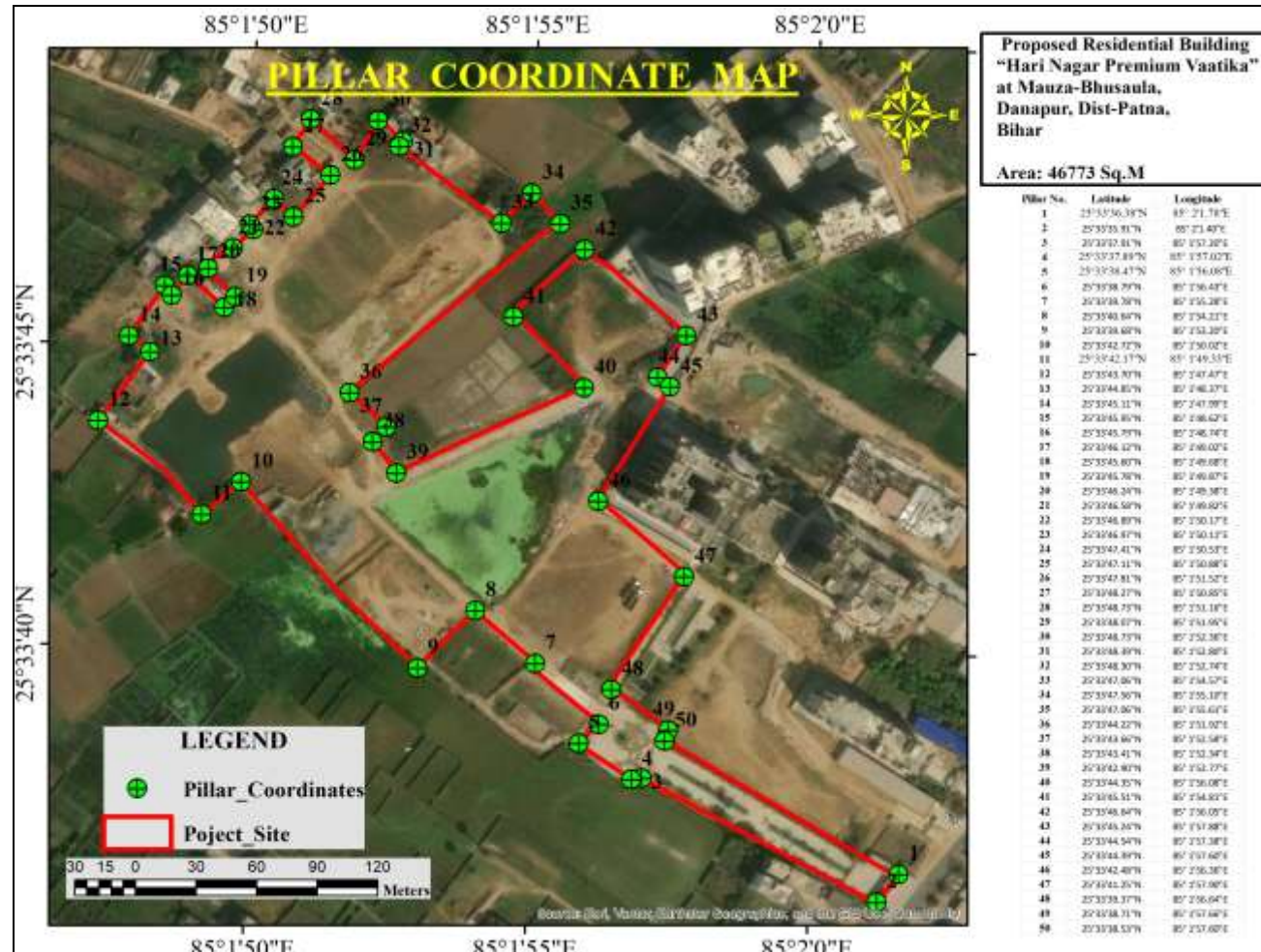


Figure 3: Project site coordinate map

Proposed Residential Building “Hari Nagar Premium Vaatika” at Mauza-Bhusaula, Danapur, Dist-Patna, Bihar by M/s Balprada Built Pvt. Ltd.

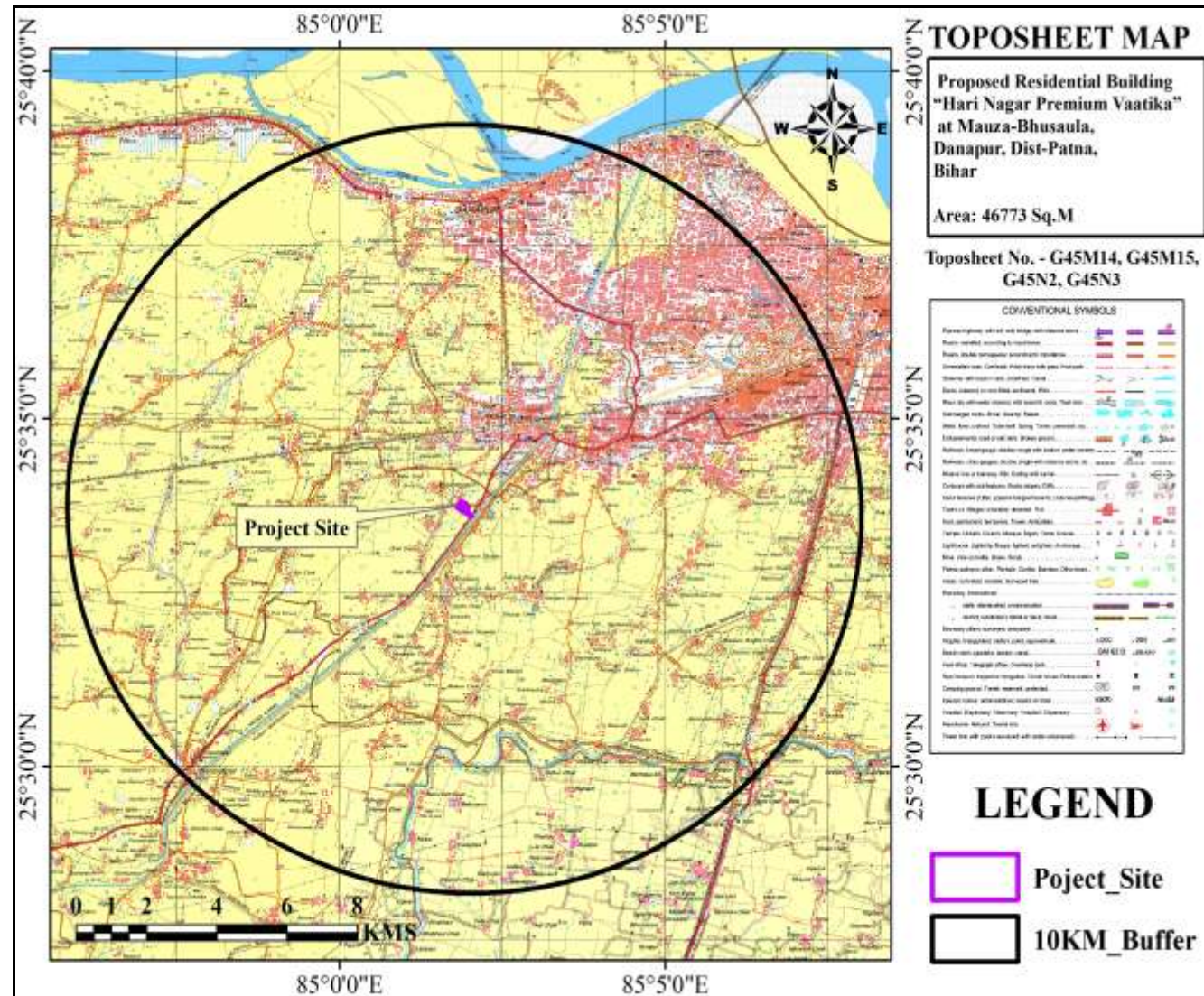


Figure-4: Topographical Map of 10 km radius

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 requirements in terms of the land area, built up area, water consumption, power requirement, connectivity, parking needs as mentioned above for the proposed project are mentioned in **Table 1** below.

Table-1: Brief description of the Project

Sr. No.	Particulars	
1.	Total Plot area	46773.35 Sqm.
2.	Permissible F.A.R	3.5
3.	Total FAR Achieved @ 3.49	163316.17 Sqm.
4.	Total FAR Achieved including LIG/EWS	187078.16 Sqm
5.	Non-FAR Built-up area i.e. Balcony, staircase etc.	17847.67 Sqm.
6.	Built-up area excluding Basement & Stilt Parking	204925.83 Sqm.
7.	Basement Parking Built-up area	39347.16 Sqm.
8.	Stilt Floor Parking Built-up Area	15615.15 Sqm.
9.	Total Built-up Area	259888.14 Sqm
10.	LIG & EWS BUA requirement.	24497.4255 Sqm.
11.	LIG & EWS Built-up Area	24972.73 Sqm.
12.	Parking Provided in Residential Building (Stilt floor + Basement)	54,962.31 Sqm.
13.	Permissible Ground Coverage @ 40%	18709.34 Sqm.
14.	Green Belt area Provided @24.86 %	11629.814 Sqm
15.	Proposed Ground Coverage @ 28.95 %	13542.22 Sqm
16.	Road Area	11562.288 Sqm
17.	Rain Water Harvesting Pits (with size)	12 (RWH Pit size= 28.86 m ³)
18.	STP Capacity	850 KLD
19.	Maximum Height of the Building (m)	Approx. 57.80 m.
20.	Power Requirement	~8350 KW
21.	Power Backup	7 DGs of (5 x 1500 KVA), (1x 1010 KVA) & (1 x 380 KVA). Total 8890 KVA.
22.	Total Water Requirement	~801 KLD

Sr. No.	Particulars		
			Fresh water –481 KLD Treated water-564 KLD Source: Ground water
23.	Waste water Generated		~705 KLD
24.	Solid Waste Generated		~3629 Kg/day
25.	Biodegradable Waste		~1452 Kg/day
26.	Non-Biodegradable Waste		~2178 Kg/day
23	Number of Blocks		Blocks:1 to 6 (11 Towers)
24	Basement		01
25.	Max. Stories		B+S+17
26.	Project Cost		350 Crores
29	Connectivity	Danapur Railway Station	Approx. 2.57 Km towards NNE.
		Goriya Dera Railway Station	Approx. 4.70 Km towards WNW.
		Bhusaula Road NH 139	Approx. 0.35 Km towards ESE. Adjacent to the Project Site.
		Dharmpur Road Yadav Lane	Approx. 0.32 Km towards WNW. Approx. 0.16 Km towards NW.
		Jay Prakash Narayan International Airport	Approx. 7.0 Km towards ENE.

The Summary of Land purchase is enclosed as **Annexure-VII**.

Site Plan is enclosed as **Annexure-II**.

Floor Plan is enclosed as **Annexure-IV**.

Section Plan is enclosed as **Annexure-III**.

Basement / Parking Plan is enclosed as **Annexure-V**.

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 surrounding of the proposed project site is vacant land and surrounded by residential buildings. Hence, this will not have negative impact and disturbance to the local ecology.

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

Soil Type: Soil is predominantly sandy loam with clay loam at places with low to medium nutrient status. It is generally alkaline with pH value ranging from 6.3 to 8.2.

Subsidence/Erosion: The project site is plain land and therefore not vulnerable to subsidence or erosion. The natural slope of the project site is towards east direction.

Seismicity:

The project site lies in Seismic Zone IV, called as ‘High Damage Risk Zone’

Project Site

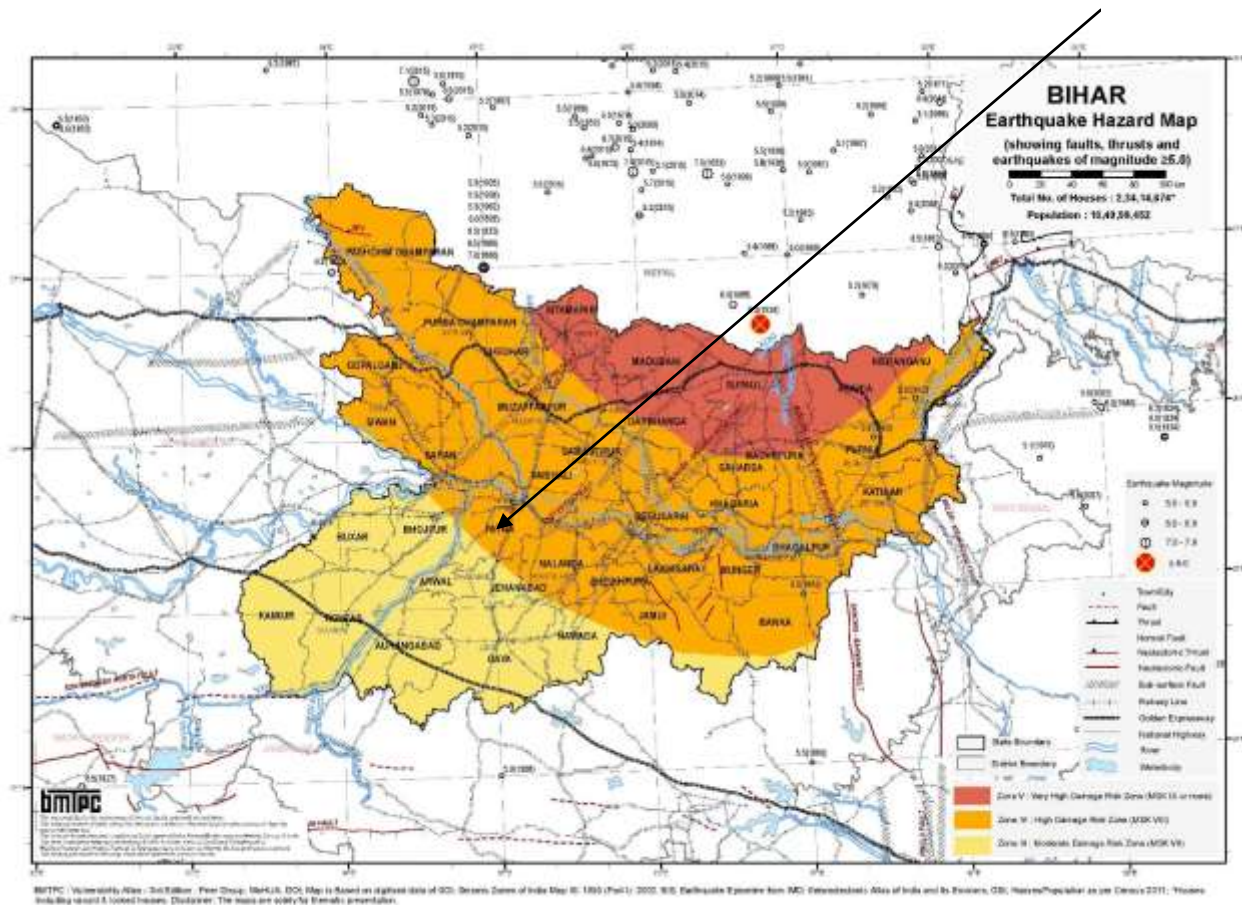


Figure 5: Map showing the Seismic Zone classification of India

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.

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.?)

During Construction phase, excavation will be carried out to provide foundations and for establishing the pillar. Approx. 40626.66 m³ soil will be excavated for basement + foundation + pillaring. This excavated soil will be properly stacked within the site under tarpaulin cover. The

filling works will be done by the excavated material and no extra material will be used. Project will not use any fill material to be brought from outside the project site.

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

Water Supply:

Approx. 21 KLD water will be required for domestic as well as for construction purpose. The source of construction water will be treated water from nearby areas / STP. Drinking water will be purchased for Domestic purpose. No use of ground water during the construction activity.

Solid Waste during Construction Phase:

C & D Waste: 50 Kg/Sqm. of Built-up area.

Source: Technology Information, Forecasting and Assessment Council's, or TIFAC's, thumb rule.

Approx. **3629 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 2026 .

Table-2 gives an estimate of the average composition of waste generated from the onsite construction activities whereas.

Table 2: 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

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 are no low-lying areas and wetlands near the project site. The Contour map of the project site is attached as **Annexure-I**. Hence, there is no need of alteration of low lying and wetlands areas.

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).

Construction debris & waste will not cause health hazard during construction activity as Segregation, Collection and disposal of Solid waste generated from the labor shelter will be disposed of as per Solid Wastes Management Rules, 2026.

Reuse:

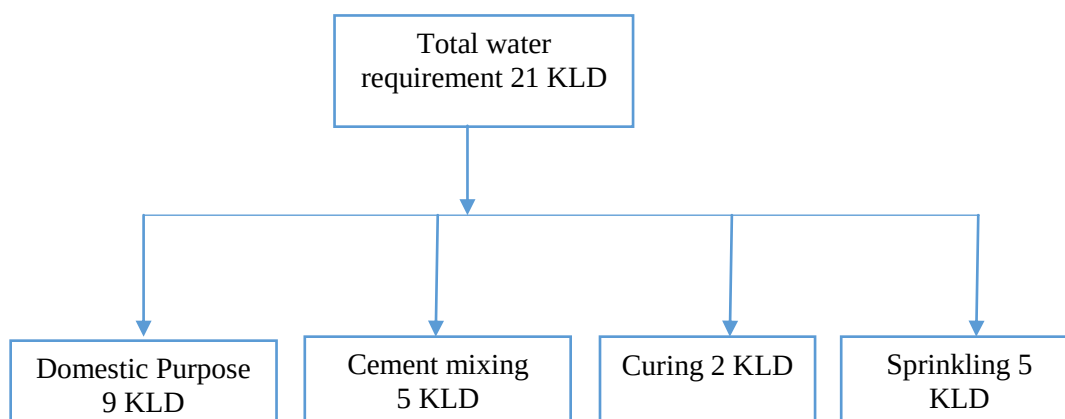
The construction waste will be used in back filling, road making and pavement. Metals, tin cans, glass will be sold to local recyclers.

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 met? State the sources & quantities and furnish a water balance statement.

During Construction Phase:

Approx. 21 KLD water will be required for domestic as well as for construction purpose. The source of construction water will be treated water from nearby areas / STP



During Operation Phase:

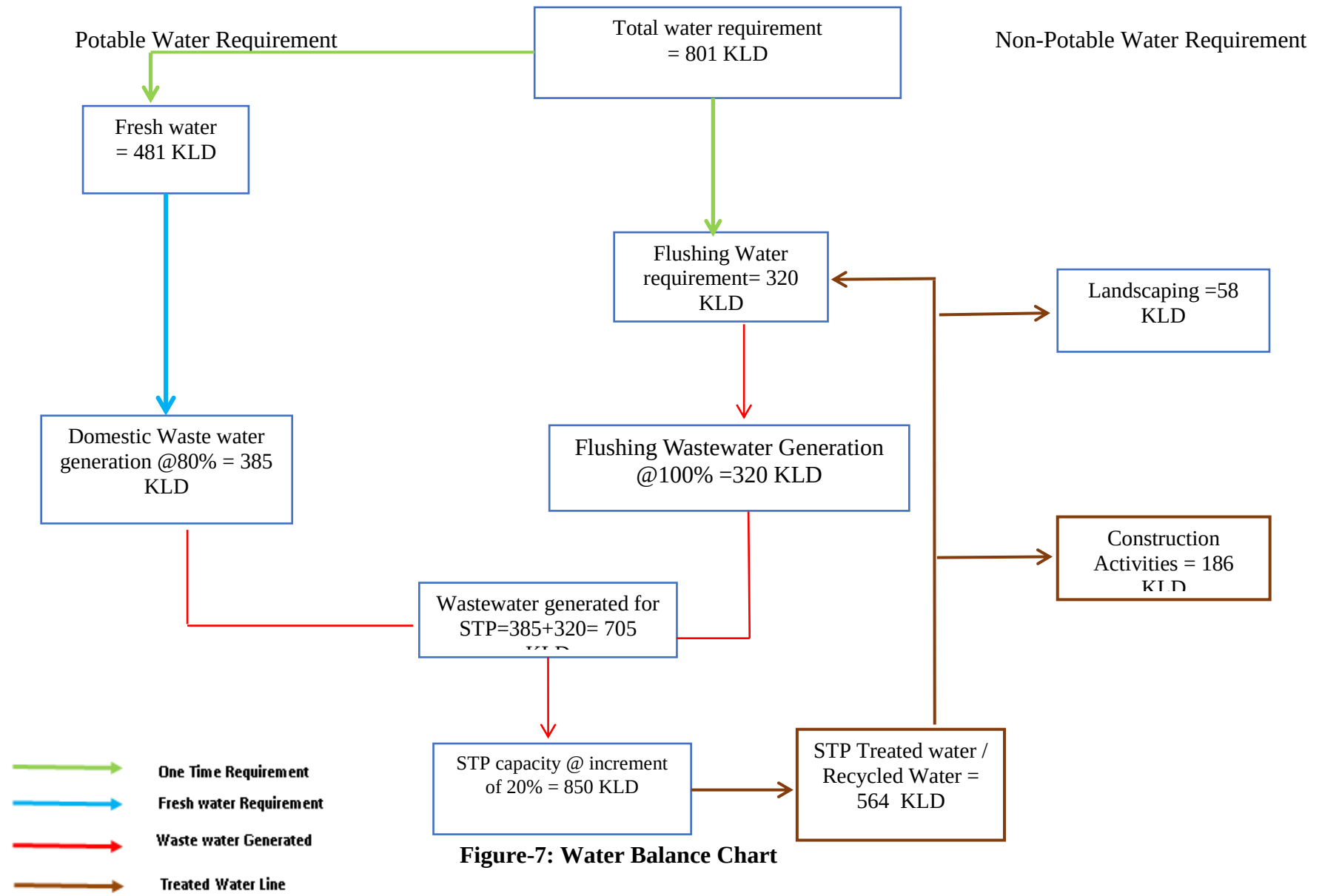
Water requirement

Water requirement during the operational phase of the proposed project of fresh water 481 KLD will be met through Ground water. The total water requirement for the proposed project has been estimated 801 KLD. This includes domestic water requirement, flushing and landscaping. The water requirement for Flushing and landscaping will be met through treated water from STP. The break-up of water requirement for the project is given in **Table-3**.

Total wastewater generated will be 705 KLD. After Treatment ~ 564 KLD will be available out of which 320 KLD will be used for Flushing, 58 KLD for Landscaping and 186 KLD for other construction activities. Water balance diagram for given in **Figure-7**.

Table 3: Details of water requirement for proposed project

S. No.	Description	Water Balance						Flushing (kld)	Total Wastewater (kld) (80% of domestic +100% Total flushing)
		No. of units / Area in Sqm	Unit Population/Per flat Population	Total Population	Per unit water consumption (lpcd)	Total water required (kld)	Fresh water required (kld)		
1	Main Dwelling Units (Residential)	1561	4 BHK: 7 Person 3 BHK: 6 Person 2 BHK: 5 Person 1 BHK: 4 Person	7890	100 (60+40)	789	473.4	315.60	694
2	Visitors (10% of the residential population)	...	...	789	15 (10+5)	11.84	7.89	3.95	10.26
	Total -I					801	481	319.55	705
	Horticulture	11629.8	5 liter/sqm of Landscape area	...		58			
	STP requirement 20% extra than waste water generated					850			
	Treated water generation @80% of waste water					562			



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

As per Ground water information booklet, Patna District, Bihar State, September 2013 a total of 31 exploratory wells have been drilled in the Patna District. The deep tube wells tapping these deeper aquifers can yield upto 300 m³/hr for a drawdown of 6 m.

- The Water requirement of construction phase will be met from Private water supplier / STP treated water supply.
- During operation phase water requirement will be met through Ground water after getting approval from CGWA.

Source: Ground water information booklet, Patna District, Bihar State, September 2013.

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 STP treated water / Private water tanker. Ground water abstraction will be done only after getting approval from CGWA. During operational phase the supplied drinking water to each dwelling unit will be as per Bureau of Indian Standards (BIS) and IS: 10500-2012.

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 for flushing and landscaping will be met through treated wastewater from STP is ~ 564 KLD.

The treated water will be reused for

- **Flushing - 320 KLD**
- **Landscaping -58 KLD**
- **Other Construction Activities – 186 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).

Operation Phase:

There will be no diversion of water from other users. Approx. 481 KLD of fresh water will be source from ground water. The water abstraction will only be done after obtaining approval from Authority.

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 ~ 705 KLD wastewater generated during operational phase will be treated in the in-house sewage treatment Plant at project site of capacity 850 KLD, which will be higher of than the waste water generated and the proposed STP shall be based on Membrane Bio Reactor (MBBR).

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	481
Wastewater to be generated from domestic use (@ 80% of domestic water requirement)	385
Water requirement for Flushing Purpose	320
Wastewater to be generated from Flushing (@ 100% of flushing requirement)	320
Total Wastewater generated	705
STP capacity 20% higher than total waste water	~850

Table 5: Characteristic of untreated and treated sewage

Parameters	Value	
	Raw sewage	Treated Sewage
pH	6.0-9.0	7.0-8.0
BOD ₃ 27°C	250-300 mg/l	Less than 10 mg/l
Suspended Solids	300-400 mg/l	Less than 25 mg/l
COD	400-600 mg/l	Less than 50 mg/l
Oil and grace	100-150 mg/l	Less than 10 mg/l

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

(i) Rainwater Collection Potential for Reuse

Rainwater harvesting is the activity of direct collection of rainwater. Collected Rainwater will be 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.

Table 6: Rainwater Harvesting Pits Calculation

Estimation of Quantum of runoff available through Rain water harvesting (within premises)				
Input Data				Reference
Catchment Area		Value		
1	Rooftop Area of Building/shed	13542.22	sq-mtr	
2	Green Belt Area	11629.814	sq-mtr	
3	Open & Paved Area	21601.316	sq-mtr	
	Total	46773.35		
Run off Coefficient, c				
	Rooftop Area of Building/shed	0.85		RWH in India, MoEF&CC, e-book 2016
	Green Belt Area	0.15		
	Paved Area	0.75		
	Open Area	0.15		
				CGWB Patna
Rainfall				
	Average Annual Rainfall	1076	mm/year	

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Dist-Patna, Bihar by **M/s Balprada Built Pvt. Ltd.**

	Hourly Peak Rainfall Intensity, I	45	mm/hour	
	Peak Time taken	15	minutes	
Total Volume of Water to be Captured on Annual Basis				$Q = A * c * I$
	Rooftop Area of Building/shed	12385.71	cu-m/year	
	Green Belt Area	1877.05	cu-m/year	
	Paved Area	17432.26	cu-m/year	
Runoff Calculation for the Peak Rainfall, Q				
	Rooftop Area of Building/shed	129.50	cu-mtr/hour	RWH in India, MoEF&CC, e-book 2016
	Green Belt Area	19.63	cu-mtr/hour	
	Paved Area	182.26	cu-mtr/hour	
	Total	331.38	cu-mtr/hour	
Annual Recharge Potential				IMD
	Recharge Potential	31695.03	cu-m/year	
	Rainy Season	June-Sep		
Design of Recharge Structure for Peak Flow				
Calculation for One Pit				
	Diameter of Pit	3.5	mtr	
	Depth of the Pit	3	mtr	
	Volume of the Pit	28.86	cu-mtr	
Number of Pits Required to store the peak discharge		11.5		
Rain water harvesting Pits provided		12		

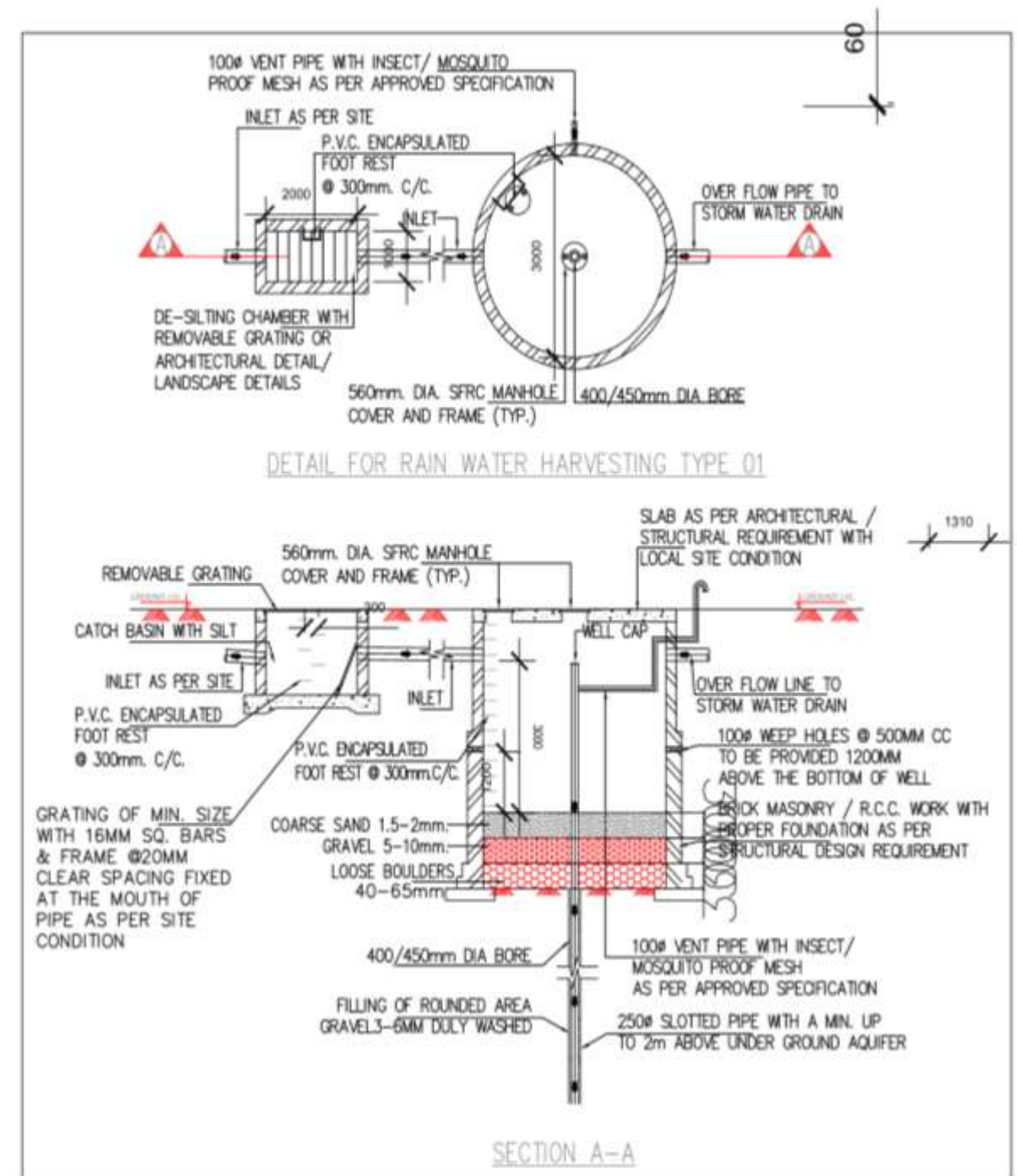


Figure 8: Rain Water Harvesting Section Plan

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?

The proposed project will not impact runoff characteristics after the post construction phase as the calculated run off of 31695.03 m³/Year will managed through well design network of storm water drainage system (**Figure-8**).

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)

- The fresh water requirement during operational phase will be ~481 KLD after getting approval from Authority.
- As per Ground water information booklet, Patna District, Bihar State, September 2013, a total of 31 exploratory wells have been drilled in the Patna District. The deep tube wells tapping these deeper aquifers can yield upto 300 m³/hr for a drawdown of 6 m.
- The minimum and maximum water levels were observed as 3.64 and 10.09 mbgl respectively during pre-monsoon season and during post-monsoon season it ranges from 1.40 to as deep as 7.12 mbgl.
- The recharge capacity of ground water from the project site is 31695.03 m³/Year as per calculation of Rain water harvesting pit and the abstraction of ground water will be undertaken only after obtaining approval from competent authority.

Source: Ground water information booklet, Patna District, Bihar State, September 2013

2.10. 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)

During construction phase, it is planned to have an underground impoundment (of effective aggregate capacity ~100 m³ to store storm water run-off from construction areas. The storage

tank will be preceded by a desilting (silt-trap) filters. The stored water will be used for construction / curing purposes during dry-weather conditions.

2.11. 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).

Most of the storm water will be managed through Rain water harvesting technology. The storm water management plan will include practices as stated in **point 2.7** to avoid the flooding of the area. The Project site indicating contour level is shown in **Annexure-I**.

2.12. 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 unsanitary conditions. Mobile toilet facilities will be used for construction workers and staff.

2.13. 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 in-house STP will be provided for collection, treatment & disposal of sewage of MBBR technology.

Volume of wastewater that will be entering STP is:

Sl. No.	Description	Water entering (KLD)
1	Total volume of domestic & flushing waste water entering into STP	705
2	STP Capacity @ 20% higher	850
3	Recycled water	564

Design basis of Treatment plant: MBR Technology

Technical Description of MBR Process:

Wastewater Treatment Scheme

The waste water generated will be treated in the Sewage Treatment Plan, and the capacity of Sewage Treatment Plant (STP) will be higher of waste water generated i.e., 850 KLD. The

proposed STP is based on **Moving Bed Bio Reactor (MBBR)**, **MBBR** is a process that combines a membrane ultra / micro filtration process and activated sludge process. The MBBR process is used in place of the secondary sedimentation tank and sand filter used for tertiary treatment in the conventional activated sludge process.

Moving Bed Bio Reactor (MBBR)

It is proposed to use activated sludge process working on the principle of extended aeration based on a Fine Bubble Diffused Aeration System. Raw Sewage will flow through a bar screen chamber to an Equalization Tank. The bar screen shall be so designed that it can be cleaned manually from outside the Tank. Two submersible solid handling pumps shall be provided in the Equalization Tank to pump the collected Raw Sewage to the Aeration Tank. An automatic level controller shall be provided in the Equalization Tank to turn the pump off at the low water level in the Tank and to start the pump automatically when water level is high.

Air will be introduced in the Equalization Tank through submerged air diffusers, to prevent the sewage from becoming septic during long retention or low load conditions. The Raw Sewage that comes into the Aeration Tank shall be aerated by using Fine Bubble Diffusers mounted in a grid at the bottom of the tank. Facility will be made to pull up the diffusers for cleaning if necessary. Air will be supplied to the diffusers by twin lobe rotary air blowers located in the plant room. The aeration system shall be designed in a way so as to achieve complete mixing of the sludge organisms with raw sewage in order to achieve a MLSS of between 3000 – 4000 in the Aeration Tank. From the aeration tank this mixed liquor passes into a Clarifier. The liquid in the clarifier tank is maintained in quiescent condition allowing the solids to settle to the bottom of the Clarifier for collection.

The accumulated solids (Activated Sludge) shall be constantly pumped back into the aeration tank by sludge recycle pumps. This return sludge undergoes further digestion in the aeration tank and also provides the active organism needed to digest the incoming raw sewage.

The Clarifier shall be provided with an overflow weir to collect the treated effluent and a scum baffle shall keep any floating matter from passing out in the final treated water. Treated water from clarifier shall over flow into a Chlorine Contact Tank where hypo chlorite solution shall be added to disinfect the treated water.

Excess sludge from the bottom of the Clarifier shall be wasted into an adjoining aerobic digester cum thickener tank. In this tank sludge shall be aerated. The air shall be shut off periodically and supernatant water will be led back into the Equalization Tank. This way the sludge shall be thickened and its volume shall be reduced. The thickened sludge will be further solidified using a centrifuge or a filter press and the solid cakes will be used as manure in horticulture.

The treated and disinfected water from the Chlorine Contact Tank will be passed through a multigrade Filter, an Activated Carbon Filter and a Softener and then stored in a Treated Sewage Water Tank.

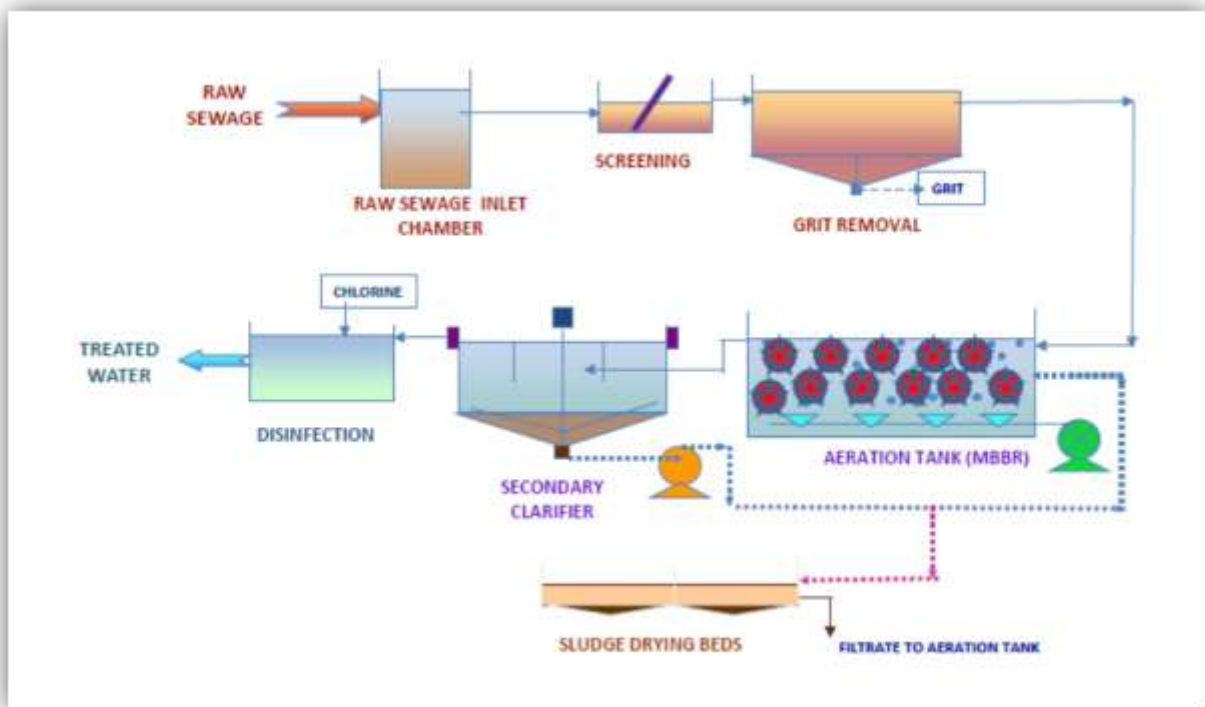


Figure 9: Schematic Diagram of MBR STP

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

Dual plumbing system that utilizes separate piping systems for freshwater and recycled wastewater. Total waste water generation is 705 KLD. The recyclable water available is 564 KLD which will be restored in the separate tank in each building and will be supplied through separate pipeline of flushing system and to landscaping.

3.0 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)

The proposed site is in a well-developed residential zone and will be used for similar purposes. The site does not support any biological life. There is nothing of special concern about local ecosystem getting disturbed on account of the proposed project.

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

No. Rather, the extensive green landscaped area with reasonable tree cover will be provided.

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 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. Total 24.86 % of the plot area will be kept as vacant land for green cover and 590 numbers of trees will be planted.

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 terrestrial and aquatic due to the proposed project.

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

No direct or indirect adverse impacts expected on the avifauna.

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

In the absence of any possibility of adverse impacts, no such mitigative measures are required.

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)

Increased traffic generation due to proposed project will not cause significant increase in atmospheric concentration of gases and will not result in heat island formation.

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.

The identification of impacts on generation of dust, smoke, odorous fumes or other hazardous gases will be covered in EIA report.

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.

There will not be any shortage of parking space in view of requirement of parking area according to Bihar Building bye law is 46769.54 sqm. Whereas the total proposed parking area provided is 54962.311 sqm. The details mentioned in following **Table 7**.

Table 7: Parking Details

DESCRIPTION		
Total Far Area Of Residential		187078.16SQM
Total Parking Required @25% Of Total BUA	25.00%	46769.54 SQM
Total Parking Area Provided In Basement (Basement A)	A	36,938.493 SQM
Total Parking Area Provided In Basement (Basement B)	C	2,408.668 SQM
Total Parking Area Provided In Stilt In Block B1		1134.986 SQM
Total Parking Area Provided In Stilt In Block B2		7294.233SQM
Total Parking Area Provided In Stilt In Block B3		2350.453SQM
Total Parking Area Provided In Stilt In Block B4		2702.93SQM
Total Parking Area Provided In Stilt In Block B5		1537.632SQM
Total Parking Area Provided In Stilt In Block B6		594.916S QM
Total Stilt Parking	B	15,615.150 SQM
Total Parking Area Provided	D = A + B + C	54,962.311 SQM

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

Project has 7 m, 7.5 m & 6 m wide road (Internal road) inside the premises. The site Plan is attached as **Annexure-III**.

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.

Yes, there will be increase in noise & vibration During Construction Phase of the proposed project.

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 construction will not obstruct a view, scenic amenity or landscape, as the site is a vacant land surrounded by residential, the land use in Master Plan of Patna 2031 in **Figure-1**. However, proper landscape plan is developed to increase the scenic beauty or aesthetic of surrounding area.

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

No

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

Local building bye-laws will be properly followed.

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.

No such sites in the surrounding.

7. SOCIO-ECONOMIC ASPECTS

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

No change in demographic pattern, at all, due to the proposed project, in fact the project will fulfill the required demand for housing needs for resident of Patna.

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

The social Infrastructure near and upto 5 km radius of the project site is mentioned below:

Table 8: Social Infrastructure near the project site

Nearest Habitation	Neora	Approx. 2.79 Km towards WNW.
	Mainpura	Approx. 1.82 Km towards WNW.
	Muhammadpur Korji	Approx. 0.74 Km towards NW.
Nearest Hospital	AIIMS Patna	Approx. 0.91 Km towards ENE.
	Dhamma Superspeciality Hospital,Phulwari Sharif,Patna	Approx. 1.22 Km towards ENE.
	Miatt Hospital	Approx. 1.35 Km towards ENE.
Nearest School & College	Nezamia College of Education	Approx. 1.32 Km towards NW.
	Silver Valley School	Approx. 1.76 Km towards NE.
	Jagat Narayan Lal College	Approx. 1.79 Km towards NE.
Places of worship	Devi Sthan Dharampur	Approx. 0.36 Km towards North.
	Bajrang Bali Temple,AIIMS, Patna	Approx. 0.87 Km towards East.
	Kali Mandir	Approx. 0.90 Km towards ENE.

Source: Google Earth & Site visit

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

No, the proposed development will not have adverse effects on local communities. There are no sacred sites of cultural value is located in the vicinity.

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 which will be utilized in the construction of the proposed project include cement, stone aggregate, Coarse sand/fine sand, Steel, Sand Stone, Granite/Marble, Bricks, and Blocks, glass etc. The embodied energy content of the material is given in **Table 9**.

Table 9: 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 that they are produced 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 will be as per the National Building Code specification.

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

Air Pollution:

The transport of construction material will be done by covered vehicles. However, following mitigation measures will be adopted to minimize the impact during construction phase

- Water spraying for dust suppression through water trucks, handheld sprays and automatic sprinkler systems.
- Emission Control for Construction Equipment / Vehicles by ensuring Pollution under Control (PUC) certification for O&M of vehicles.
- Anti-smog guns will be provided at construction site.

- Green Curtain on under construction building
- Wind breaking wall of 3-meter height

Noise Pollution:

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:

- **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. have been 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 and construction debris would be utilized for paving work etc. An approximate saving of 5% to 7% is proposed to be achieved, which will be approx. 9-12 Cr.

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 are mentioned in **Table 10** and the classification of solid waste generated is given in **Table-11**.

Table 10: Solid waste Generation details

Table : Solid waste Generation details							
S. No.	Category of Solid Waste	Waste Generation Rate	Formula	Total Population	Waste Generated	Bio-degradable	Non-biodegradable
1	Residential Refuse	0.3 to 0.6 kg/cap/day	Total Population*0.45	7890	3550.5	1420.2	2130.3
2	Visitor (10% of the residential Population)	0.1 to 0.2 kg/cap/day	Total Population*0.1	789	78.9	31.56	47.34
	Total			8679	3629	1452	2178

Table 11: 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): 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 -	~1452	Kg/day
2.	Non-biodegradable	~2178	Kg/day
3.	Sludge	~300	Kg/day
4.	E-waste	1	Kg/day
5.	Hazardous waste	1	Lit/day

Collection:

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

Segregation:

- 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 dark grey bins will be provided.

Disposal:

- Organic waste will be stored temporarily at the site and it will be composted in organic waste converter of 1500 Kg/day.
- Overall it would be ensured that all waste fractions are appropriately recycled/ disposed off 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.
- 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 (in *Form-3, Form-4, Form-9, Form-13 etc.*) shall be maintained as per the requirements of MoEF&CC Rule.

The Solid waste management details during operation phase is mentioned in **Figure-10**.

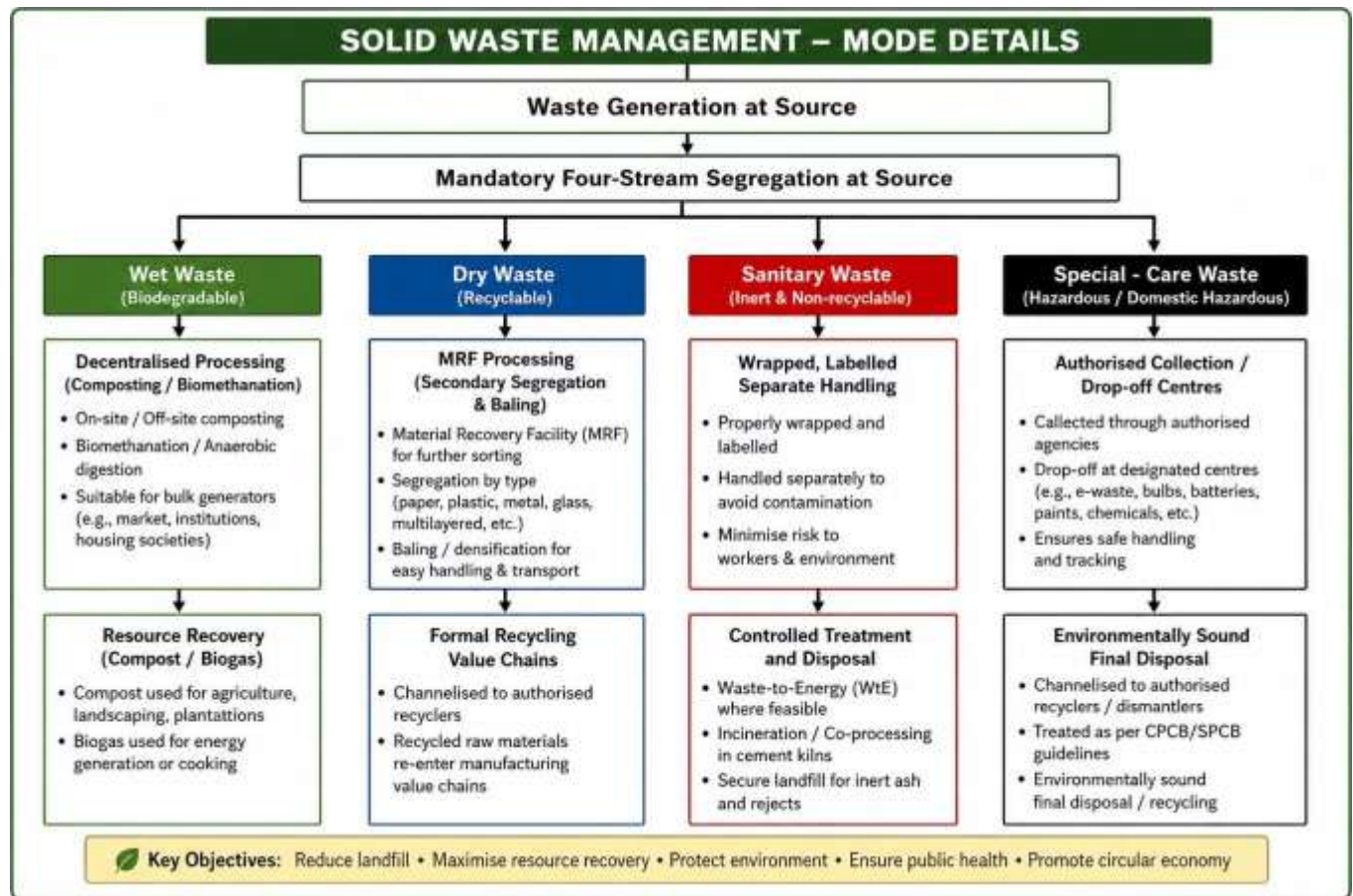


Figure 10: Solid Management during Operation Phase

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?

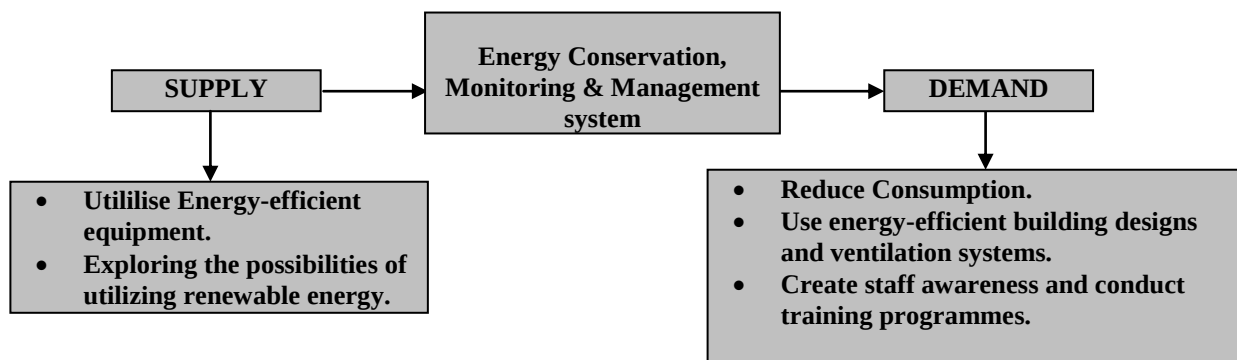
The Total Connected Load is around 8350 KW. The source of power will be supplied by Bihar State Power Distribution Corporation Limited. In case of power failure, 7 DG sets each of capacity of (5x1500 KVA, 1x1010 KVA, 1 x 380 KVA) Total 8890 KVA will be provided as power back-up. The DG sets will be of air cooled.

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.

Energy conservation through appropriate use of solar based power generation, LED, solar lighting, putting the fire pumps on terrace to reduce power rating, energy efficient motors, green-cover design, building material selection, etc.

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



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

In case of power failure, 7 DG sets each of capacity of (5 x 1500 KVA, 1 x 1010 KVA, 1 x 380 KVA) Total 8890 KVA will be provided as power back-up. The DG sets will be of air cooled 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.

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?

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.

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 are used in solar design includes:

- Large south facing windows and minimum north-facing glazing.
- Use of materials with high thermal masses such as walls or roofs that absorbs and hold the sun’s heat. Materials with high specific heat capacities, like stone, concrete, adobe or water work best.
- 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.
- 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 effected?

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 recommended 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 residents 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 envelopes materials. Use of incandescent and halogen lamps will be avoided and energy efficient compact fluorescent lamps / LED will be used for all common area. Chillers will not be used as this is a residential Project.

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 is presented in **Table 12.**

Table 12: 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, photocopiers, “Spirit duplicators, signature machines, Tobacco smokes, dried out floor drains,	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
		cosmetics and other personal products		
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.	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.
4.	Carbon Monoxide	Fossil-fuel engine exhausts, improperly vented fossil-fuel appliances.	Dizziness, headache, nausea, cyanosis, Cardiovascular effects and death.	Adequate venting and ventilation.
5.	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.

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 will be 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-13** below:

Table 13: Thermal Characteristic of Building

Sr. No.	Building Component	ECBC Case	Proposed Case
1	Wall	Assembly U-value ($U=0.4 \text{ W/m}^2\text{.K}$)	230 mm fly ash bricks plastered on both sides+ 10mm red colour clay tile on exterior side ($U=1.9 \text{ W/m}^2\text{.K}$)
2	Roof	Assembly U-value ($U=0.2 \text{ W/m}^2\text{.K}$)	150mm RCC+40 mm screed+ water proofing+ over deck 40mm puf

Sr. No.	Building Component	ECBC Case	Proposed Case
			insulation 40/45 kg cm density (U=0.86 W/m2.K)
3	Glazing	(U-value- 3 W/m2K, SHGC North- 0.5, SHGC Non-North-0.27)	Highly Efficient DGU (U-value- 1.7 W/m2.K, SHGC-0.25)
4	Lighting	Parking Spaces- 3.0 Rest of the area -9.7	Parking Spaces- 2.25 Rest of the area -7.72
5	Equipment	13 W/m ²	13 W/m ²
6	Heating Ventilation & Air Conditioning Systems	System A: Package Thermal Heat Pump (PTHP) - for Patient Rooms. System C: Variable Air Volume (VAV) – For other spaces	FCU Units: for heating and cooling AHUs: for fresh air ventilation. Water Cooled Screw Chillers (2 units of 300TR each) with COP-5.8 . Two Electric Hot Water Generators of 240 kW each. & Split AC units for Electrical and Server rooms

Other Energy Saving Details

S. No.	Requirement as per ECBC	Compliance of ECBC
1	Equipment efficiency standards	As Per ECBC/BEE
2	Lighting controls sensor	Lighting Control by Switch
3	Exterior lighting to be controlled by photo sensor times witch	Time Switch
4	Solar, wind or other Renewable Energy shall be installed to meet electricity generation equivalent to 1% of the demand load or as per the state level / local building bye-law's requirement, whichever is higher	Solar Plant will be installed to meet almost 1% of Demand load.
5	Interior lighting power density to be with in specified limits	As Per ECBC for Emergency 29.1W/M2 and for nurse station & other area 10.8 to 12.9 W/M2
6	Exterior lighting power density to be with in specified limits	As Per ECBC like Building Entrance 13 W/M2

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

All fire protection facilities would be designed as per NBC-2016

Adequate fire protection facilities will be installed including fire detectors, fire alarm and firefighting system.

Response in case of Fire

- Required response during the event of a fire should be described in signs located in the lobby.
- 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.
- The Emergency Response Team will provide immediate relief to the injured residents at the scene of incident. Any injured persons should be evacuated on priority to the dispensary or one of the nearest hospitals based on their condition.

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.

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 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.

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 will be done with the use of CFL and LED lamps. Additionally solar energy will be explored.
- Use of Solar energy for street lightening will be 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 is presented in **Table-14 & Table 15** to mitigate all the identified environmental impacts that are found to be significant.

Table-14: Environmental Management Plan – Construction Phase

Sl. No.	Issue	Management / Mitigative measures
1.	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 this purpose.
2.	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.
3.	Construction material	The material to be procured from existing approved sources conforming to the applicable environmental provisions and should have valid consents/permissions/authorizations.
4.	Construction operations	Construction material will be regularly sprinkled with water to keep the exposed surface wet and preventing it from getting air borne.
5.	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.
6.	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.
7.	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.
8.	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 labor use (with specific provision for females) and operated so that there is no health hazard.

Table-15: Environmental Management Plan –Operational phase

	Issue	Management / Mitigative 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 approx. 50% of wastewater generation). The excess treated water 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 sent directly to recyclers. Disposal of remaining waste through Municipal Corporation, Patna.
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 31695.03 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 11629.814 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 project.
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-16**.

Table 16: 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., 30 cm, 60 cm, and 100 cm below the surface	Parameter for soil quality: pH, texture, electrical conductivity, organic matter, nitrogen, phosphate, sodium, calcium, potassium and Magnesium.

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 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 Bihar State Pollution Control Board for the *Consent to Establish*. Before starting the operation, the Project proponent will apply to Bihar 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 will 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 Bihar 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 Bihar 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 Bihar State Pollution Control Board’s *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*.

Awareness and Training

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 do and entation 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 Bihar State Pollution Control Board are given in **Table 17**.

Table 17: 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	Once in a Six month.
2.	Ambient Noise Monitoring	As per requirement	Noise level L _{eq} both during day time and night time	Once in a Six month.
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.	Once in a Six month.
4.	Treated Wastewater Quality	Inlet and outlet of the STP	Parameters for assessing compliance with standards for recycling and horticulture use	Once in a Six month.

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 Bihar State Pollution Control Board are given in **Table-18**.

Table 18: 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	Once in a Six month.
2.	Ambient Noise Monitoring	As per requirement	Noise level L _{eq} both during day time and night time	Once in a Six month.
3.	Water Quality Testing (Potability testing)	(i)Any operational borewell (ii)One of the Drinking Water Point	Drinking water parameters as per IS 10500:2012.	Once in a Six month.
4.	Treated Wastewater Quality	Inlet and outlet of the STP	Parameters for assessing compliance with standards for recycling and horticulture use	Once in a Six month.

Environmental Documentation

Documentation and reporting of environmental performance is an important management tool for ensuring sustainable operation of the Project. Documentation / Records shall be maintained for regulatory, monitoring and operational issues. Typical Documentation requirements for the “Project” are summarized in **Table-19**.

Table 19: Environmental Documentation for Operational Phase of the Project

PARAMETER	PARTICULARS
Air Emissions (incl. Noise)	• <i>Consent to Establish</i> from Bihar State Pollution Control Board • <i>Consent to Operate</i> for Air Emissions from BSPCB • 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 Bihar State Pollution Control Board • <i>Consent to Operate for Wastewater Discharges</i> from BSPCB

PARAMETER	PARTICULARS
	• 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 (in <i>Form-3</i>) (if generated) • Annual Returns for hazardous wastes (in <i>Form-4</i> and <i>Form-13</i>) to Bihar State Pollution Control Board • Documentation related to off-site transportation and disposal of hazardous wastes (including <i>Form-9</i> and <i>Form-10</i>)
Environmental Statement	• Submission of Environmental Statement to BSPCB 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:

Environment management cost during construction and operation phase of the project will be detailed in the EIA report.