

FORM-LA

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 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.

Answer. The proposed project site has been already allotted for developing the Medical college & Research Institute. The site selected is almost level in topography and covers 74573.63 Sq. meters (m²). The site is located at Bishunpur Aima, Marwan, Subdivision West, Thana No. 134, District Muzaffarpur, Bihar The proposed project consist of 650 bedded Medical College & Research Centre, Recreational Facilities and Site infrastructure development work which include road, sewer line, Drainage work, parking Area, Landscaping, electrification, water supply, waste disposal system etc. as per standard. The Geo Co-ordinates of the project site are as under;

Corners	Latitude	Longitude
1	26° 7'32.45"N	85° 13'24.51"E
2	26° 7'32.19"N	85° 13'24.83"E
3	26° 7'31.75"N	85° 13'25.81"E
4	26° 7'30.52"N	85° 13'28.96"E
5	26° 7'28.09"N	85° 13'28.30"E
6	26° 7'27.83"N	85° 13'29.89"E
7	26° 7'29.94"N	85° 13'30.71"E
8	26° 7'28.87"N	85° 13'34.47"E
9	26° 7'27.84"N	85° 13'34.31"E
10	26° 7'27.38"N	85° 13'36.08"E
11	26° 7'26.90"N	85° 13'35.88"E
12	26° 7'26.70"N	85° 13'36.51"E
13	26° 7'26.33"N	85° 13'36.40"E
14	26° 7'26.51"N	85° 13'35.68"E
15	26° 7'23.64"N	85° 13'34.71"E
16	26° 7'23.52"N	85° 13'35.58"E
17	26° 7'22.96"N	85° 13'35.43"E
18	26° 7'23.10"N	85° 13'34.75"E
19	26° 7'22.06"N	85° 13'34.50"E
20	26° 7'22.13"N	85° 13'33.54"E
21	26° 7'18.20"N	85° 13'32.39"E
22	26° 7'17.89"N	85° 13'33.33"E
23	26° 7'16.90"N	85° 13'32.87"E
24	26° 7'17.25"N	85° 13'30.42"E
25	26° 7'15.79"N	85° 13'30.08"E
26	26° 7'15.99"N	85° 13'28.39"E
27	26° 7'17.27"N	85° 13'28.70"E

28	26° 7'17.33"N	85°13'28.14"E
29	26° 7'19.19"N	85°13'28.56"E
30	26° 7'19.30"N	85°13'27.86"E
31	26° 7'20.32"N	85°13'28.21"E
32	26° 7'20.76"N	85°13'26.60"E
33	26° 7'21.25"N	85°13'26.63"E
34	26° 7'21.51"N	85°13'25.39"E
35	26° 7'22.91"N	85°13'25.73"E
36	26° 7'22.97"N	85°13'26.43"E
37	26° 7'27.34"N	85°13'28.34"E
38	26° 7'27.45"N	85°13'27.70"E
39	26° 7'30.35"N	85°13'28.42"E
40	26° 7'31.33"N	85°13'25.74"E
41	26° 7'31.86"N	85°13'24.44"E
42	26° 7'32.18"N	85°13'24.16"E

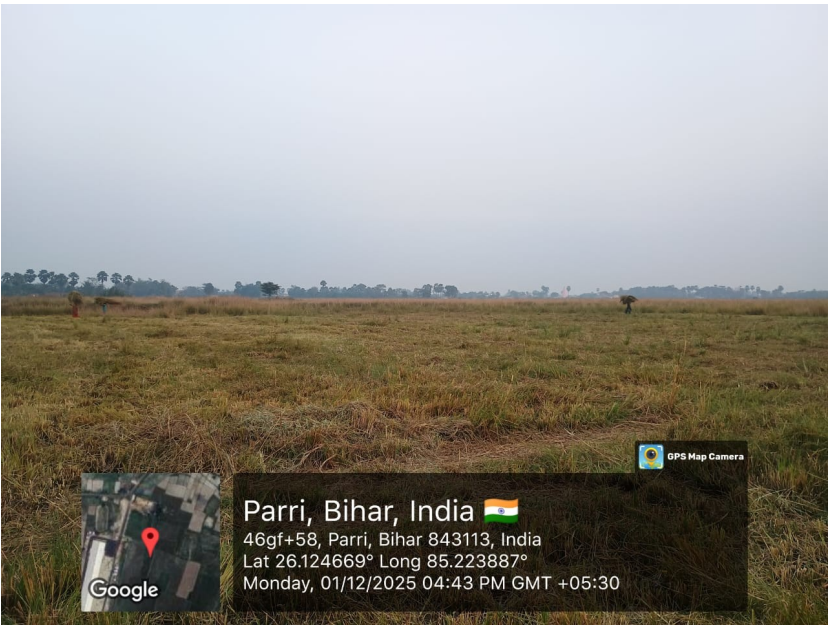
FIG. – 1 SURROUNDINGS LOCATION MAP OF 500 M. RADIUS AREA



FIG. – 2 GOOGLE EARTH IMAGERY SHOWING PROJECT LOCATION



FIG. – 3 -- SITE PHOTOGRAPHS



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 proposed project site has been already allotted for developing the Medical College & Research Centre.

Name of the Project & Location	Proposed Phular Medical College & Research Centre at Bishunpur Aima, Marwan, Subdivision West, Thana No. 134, Muzaffarpur Dist, Bihar.
Land Details	Khata Nos. 164, 17, 272, 57, 216, 88, 238, 63, , 250, 250, 222, 202, 37, 119, 52, 227, 19, 78, 52, 266, 134, 81, 230, 222, 222, 222, 230, 233, 277, 244, 130, 250, 78, 79, 101, 101, 233, 190, 231, 277, 233, 233, 244, 244, 176, 52, 119, 111, 52, 119, 126, 194, 158, 68, 289, 295, 187, 244, 217, 217, 18, 266, 272, 250, 170, 216, 109, 128, 128, 192, 11, 11, 70, 25, 161, 272, 133, 88, 89, 227, 227, 156, 227, 195, 17, 230, 167, 16, 16, 16, 16, 16, 133, 128, Khesra/Plot Nos. 1465, 1569, 1357, 1585, 1467, 1455, 1463, 1458, 1358, 1360, 1442, 1354, 1341, 1344, 1345, 1351, 1352, 1359, 1374/1841, 1374/1841, 1437, 1438, 1441, 1442, 1442, 1442, 1443, 1444, 1445, 1446, 1447, 1449, 1452, 1578, 1579, 1581, 1582, 1583, 1586, 1587, 1589, 1590, 1591, 1593, 1594, 1728, 1730, 1732, 1733, 1734, 1456, 1457, 1460, 1461, 1463/1328, 1464, 1466, 1467/1830, 1570, 1570, 1571, 1572, 1573, 1574, 1575, 1467, 1443, 1468, 1468, 1750, 1596, 1597, 1435, 1434, 1727, 1450, 1454, 1604, 1608, 1356, 1451, 1602, 1576, 1462, 1569, 1724, 1747, 1595, 1603, 1722, 1723, 1729, 1454, 1468
Project Details and Specification	Total Built-up Area: 1,25,013.80 Sq. M. Total Plot Area: 74573.63 Sq. M. (7.45 Ha. / 18.42 Acres) Permissible Far = 1.68 Proposed Ground Coverage = 24.32% No. of beds = 650 OPD= 1200 Medical College Student seats: 150 Boys/Girls Hostel: 600 Residential Quarters : 60 nos. Built-up Area Details are as under ;

BUILDING	GROUND FLOOR	1st FLOOR	2nd FLOOR	3rd FLOOR	4th FLOOR	5th FLOOR	6th FLOOR	TOTAL
	Built-up Area in Sqm.							
Hospital	7151.06	8005.95	7571.26	7571.26	7571.26	7571.26	7571.26	53013.31
Medical College	3588.80	4047.75	3050.60	3588.80	3588.80	3050.60	NA	20915.35
Nursing Staff Hostel	1563.00	1563.00	1563.00	1563.00	1563.00	1563.00	1563.00	10941.00
Girls PG Hostel	762.00	762.00	762.00	762.00	762.00	762.00	762.00	5334.00
Girls Hostel	993.22	993.22	993.22	993.22	993.22	993.22	993.22	6952.54
Dining & Sports Block	784.63	903.96	784.63	784.63	784.63	784.63	NA	4827.11

Boys Hostel - 1	558.38	558.38	558.38	558.38	558.38	558.38	558.38	3908.66
Boys Hostel – 2	558.38	558.38	558.38	558.38	558.38	558.38	558.38	3908.66
Boys PG Hostel	888.06	888.06	888.06	888.06	888.06	888.06	888.06	6216.42
Staff Quarters - 1	570.00	570.00	570.00	570.00	570.00	570.00	570.00	3990.00
Staff Quarters - 2	715.25	715.25	715.25	715.25	715.25	715.25	715.25	5006.75
TOTAL Built-up Area								1,25,013.80
Ground Coverage (24.32%)								18136.31
F.A.R. 1.68%								
Height of The Buildings : 35-40 m.								
No. of Floors : G + 6								
No. of Buildings : 11 Nos.								

Address for Communication	Khabra Urf Kiratpur Gurdash, Post-Khabra, Muzaffarpur, 843146 Bihar
Land Use as per norms	Institutional
No. of Beds	Proposed 650 No of beds
Green Area	14936.65 Sq.M. (20.03%)
Parking Provided	1,062 nos.
Total Water Requirement	Total water requirement is 704 KLD, Fresh water requirement is 355 KLD.
Fresh water Requirement	355 KLD
Source of Water	Bore well
Wastewater Generation after treatment	388 KLD
STP Capacity	500 KLD
Reuse of Treated Wastewater	340 KLD
Wastewater discharge in Sewerage System	52 KLD
Solid Waste generated	1140 Kg/day
Biodegradable Waste	~ 804 Kg/day
Non-Biodegradable Waste	~ 336 Kg/day
Bio Medical Waste	Hospital Bed: 650 Kg/day OPD BMW: 600 Kg/day Medical College : 75 Kg/Day Total: 1325 Kg/day ; will be disposed off through CBMWTF at Muzaffarpur.
Solid Waste Management	Adequate number of collection bins separate for biodegradable and non-biodegradable waste shall be provided as per The MSW Rule, 2000 . Separate colored bins will be placed for biodegradable and non-biodegradable waste. Final segregation of solid waste into biodegradable, non-biodegradable, and inert fraction will take place in centralized collection facility. The non-

	biodegradable fraction will be recycled to the maximum extent possible. The rest will be handed over to Municipality.
Rainwater Harvesting	RWH pits would be created for rainwater harvesting.
Power Requirement	1800 KW through NBPDCCL
DG Sets	4 X 125 KVA & 2 X 250 KVA will be used as power backup during power failure.
Use of Solar energy	Solar lighting for common areas and solar water heaters. Approx. 2.5% (37.5 KW) of total power requirement will be generated through solar panels.
No-development Zone	None in 500 m radius.
Eco-sensitive Zone	None in 10 Km Zone

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).

Answer The proposed development shall be carried out as per the Bihar building by-laws and its amendment, hence no negative impact is envisaged due to proposed development. The operations of the project will provide value addition to the existing infrastructure, as due development of the Medical College & Research Centre, facilities such as public transport, power supply situations; road maintenance etc shall be upgraded. The socio-economic condition of the area will also be improved by influence of direct and indirect employment for a large section of society. The employment will have positive impact thereby increasing the quality of life.

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

Answer The proposed project site is located at Bishunpur Aima, Marwan, Subdivision West, Thana No. 134, Muzaffarpur District, Bihar. The climate of the study area is characterized by a tropical monsoon climate. This region experiences distinct seasonal variations in temperature, rainfall, and humidity. Summers in Muzaffarpur can be hot, with temperatures ranging between 30°C to 44°C. The weather is typically dry and humid, with high temperatures during the day and relatively warmer nights. The heat is intensified due to the lack of significant rainfall in these months. During the monsoon season, temperatures range between 25°C to 35°C. Winters are mild, with temperatures ranging from 8°C to 25°C. It can get cooler in the early mornings and late evenings, but overall the climate is pleasant. The study area is located in Seismic Zone IV of India, according to the seismic zoning map provided by the Bureau of Indian Standards (BIS).

1.5. Will the proposal involve alteration of natural drainage systems?

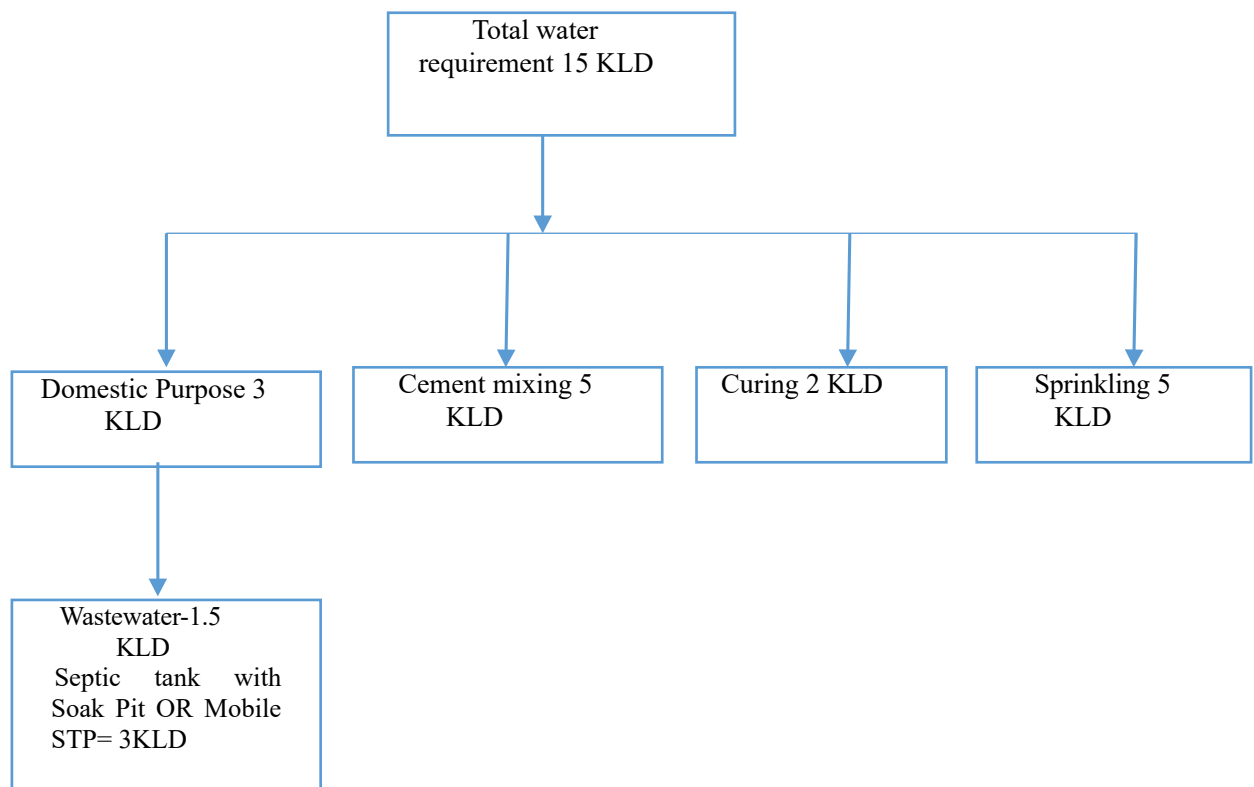
Answer The proposed project would not affect the natural drainage system as wastewater will be treated and reused.

1.6. What are the quantities of earthwork involved in the construction activity-cutting, filling, reclamation etc.

Answer There is no deep excavation or major earthwork involved in construction activity, as there is no construction.

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

Answer Approx. 15 KLD water will be required for domestic as well as for construction purpose. The source of construction water will be ground water or Water Tankers. Drinking water will be purchased for Domestic purpose. NOC will be obtained before abstraction of ground water.



1.8. Will the low lying areas & wetlands get altered?

Answer Not Applicable, as there is no low lying wetland areas within 500 m. radius of project area.

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).

Answer The solid waste generated during development phase shall mainly consist of soil mixed with aggregate, Cement mortar residue and wood waste, cardboards and masonry.

Soil mixed with aggregate/ debris will be utilized for filling of area under floors and for filling up of other low lying areas coming under alignment of roads/open spaces. Wood waste and other material will be sold. As such there shall be no affect on health of the people working on the project or living in the nearby areas.

2.0 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.**

Answer During Construction Phase:

Water requirement during the Construction phase will be met by private water tanker / ground water. It is estimated that water demand during the construction phase is approx. 15KLD which will be used in domestic as well as construction purpose.

During Operation Phase:

Water requirement during the operational phase of the proposed project of fresh water 355 KLD will be met through Ground water. This will be withdrawn only after getting permission of CGWB. The total water requirement for the proposed project has been estimated 704 KLD. This includes domestic water requirement, flushing, landscaping, Construction Activity. The water requirement for Flushing and landscaping, will be met through treated water from STP/ETP. The break-up of water requirement for the project is given in Table-1.

Total wastewater generated will be 431 KLD. After Treatment ~349 KLD water will be used for Flushing and Horticulture, and other Construction activity. Water balance diagram is given in Figure-4.

Table 1: Details of water requirement for project

S.No.	Category	Population	Per Capita Requirement in Ltrs. As per NBC 2016		Actual Water Requirement in Ltrs.		Total Water Requirement in Ltrs.	Water Requirement in KLD
			Domestic	Flushing	Domestic	Flushing		
A.	Patient (650 beds Proposed)	650	300	150	195000	97500	292500	292.5
B.	Attendant with Patient	650	90	45	58500	29250	87750	87.75
C.	OPD Visitors	1200	10	5	12000	6000	18000	18
D.	Hospital Staff	100	30	15	3000	1500	4500	4.5
E.	Kitchen & Pantry	50	25	10	1250	500	1750	1.75
G.	Medical College (150 Seats per year)	150	25	20	3750	3000	6750	6.75
H.	Medical College Staff	50	25	20	1250	1000	2250	2.25
I.	Medical College hostel (600 Nos. i.e. 150 seats * 4 year)	600	90	45	54000	27000	81000	81
J.	Lab & Pathology	---	---	---	5000	---	5000	5
K.	Residential Quarters	224	90	45	20160	10080	30240	30.24
L.	Visitors	33	10	5	330	165	495	0.495
Total Water Requirement					354240	175995	525235	530.235
1.	Water requirement for Domestic Use, Lab & Pathology							355
2.	Flushing Water Requirement (STP Treated Water)							176
3.	Greenbelt and Landscape Area/ Development (STP Treated Water) 14936 Sq.m @ 4 Ltr./Sqm. i.e. 59744 Ltrs.							60
4.	HVAC Cooling (STP Treated Water), 100 Ltr./ hr (24) i.e. 2400 Ltrs.							10
5.	D.G. Sets Cooling (STP Treated Water), 1600 Kw @ 1 Ltr./Kw/hr. i.e. 1600							3
6.	Fire Fighting							100
	Grand Total (1+2+3+4+5+6)							704
	Fresh Ground Water							355
	Treated Water Recycling and Reuse							349

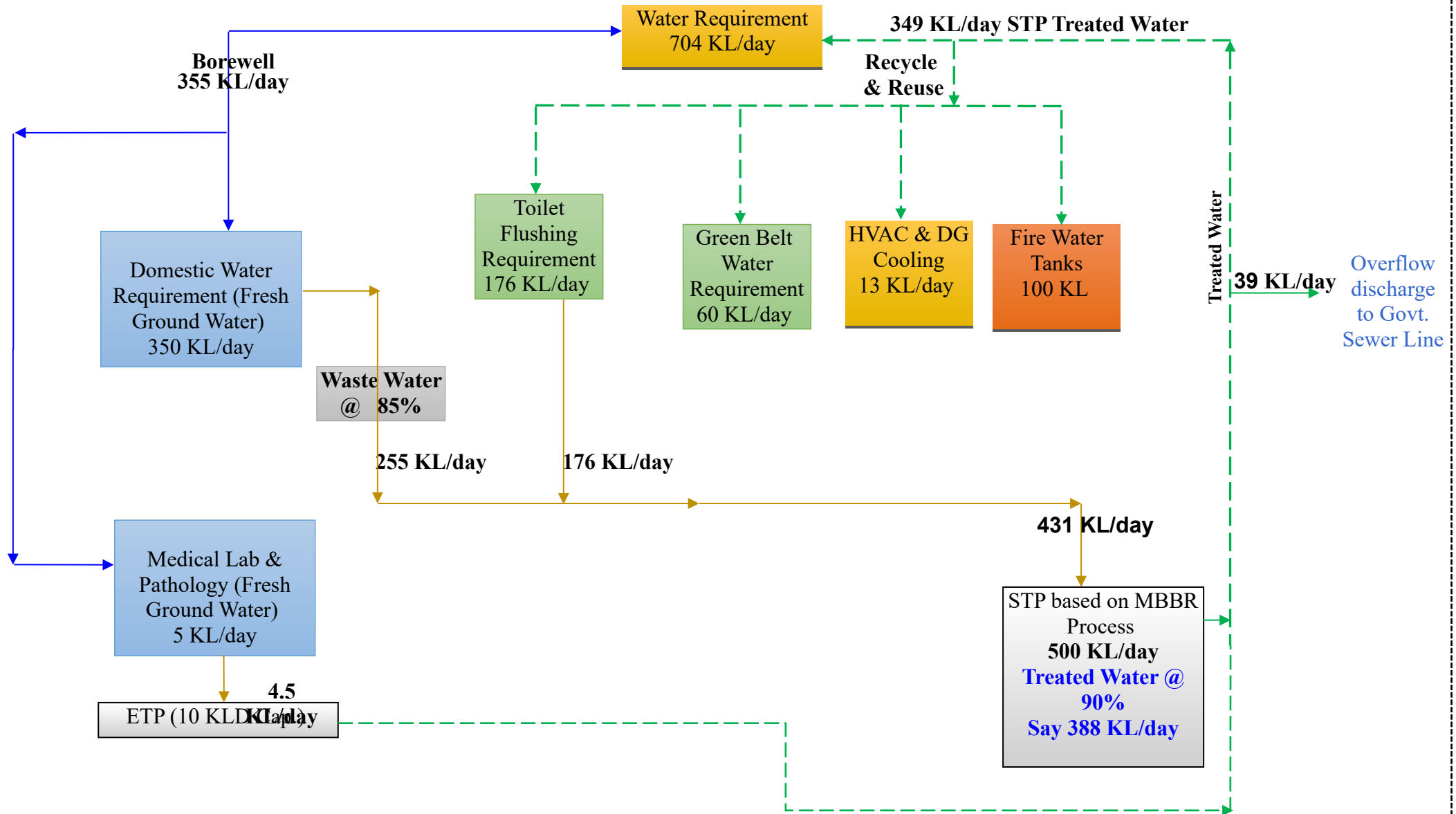


Figure 4: Water Balance Chart

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

Answer The demand shall be 704 KL/day out of which 349KL/day will be recycled. Bore well will provide the availability of 355 KL/day. After treatment / recycled of water, the net fresh water requirement for domestic use will be 355 KL/day. The Ground water sources will be tapped if required.

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)

Answer The Ground water sources will be tapped if required. (Ground Water Clearance is applied from CGWA).

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)

Answer: Treated water (388 KLD) will be generated which will be treated reused & disposed.

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)

Answer: There will be no diversion of water from other source/users.

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)

Answer The project will treat the sewage and it will not lead to incremental pollution load.

During the operation, from the Medical College & Research Centre it is estimated that about 431 KLD wastewater will be generated, which will be treated in the Effluent Treatment Plant (ETP), Sewage treatment plant (STP). The ETP/STP has been designed with primary and secondary treatment units. The treated wastewater will be reused for horticulture purpose. Further, to avoid malfunctioning of STP, regular maintenance check will be carried out by the project proponent staff. Thus, no impact on the incremental pollution- load is envisaged-from the wastewater generated from the proposed project.

Table: Characteristics of Wastewater and Treated Water

Parameter	Untreated Wastewater Characteristics	Treated Wastewater Characteristics
pH	6.5 — 7.5	5.5 – 9.0
BOD 3 day, 27 °C	300 — 400 mg/l	< 10.0 mg/l.
Total Suspended Solids	200 — 300 mg/l	< 20.0 mg/l.
COD	600 — 800 mg/l	< 50.0 mg/l.
Total Nitrogen	50 – 60 mg/l	< 10.0 mg/l.
Total Phosphorus	5 – 10 mg/l.	< 1.0 mg/l.
Faecal Coliform	< 5000	< 230 per 100 ml.

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

Answer The project within the project premises. The proposed rainwater will be recharged to the ground water level. 10 Nos. of recharge pits will be provided in the proposed project.

In general the rainwater from terraces and other-elevated open areas shall be collected through Rainwater down "take pipes and connected to catch basins. The Rain water from hard courts and landscaped area shall be collected by catch basins through a RCC pipe network/or open drains with gratings and connected to the storm water manholes/channels in the complex. The collected water from the catch basins will be diverted to rain water harvesting pits. Provision shall be made for Rain Water Harvesting as required by the Codes.

The rain water harvesting pits will contain circular RCC retention tanks of 2.5 m radius. It will be fitted with RCC lids and will be provided with separate inlet and outlet (overflow) pipes. The base of the retention tank will be filled with coarser sand of 1.5-2 mm dia, gravel of 5-10mm dia and finally by boulders of 5-15 mm dia laid one

This provides a natural filtration to the incoming rain water. A 153 dia PVC pipe with 1.55 slots at the bottom is provided for percolation.

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?

Answer The vacant land of the proposed area will be converted into a hospital & academic Building where ~20 % of the land will be used for greenbelt development and remaining will be used for building construction and road connectivity. So, the rainfall over these hardscape areas will be channelized and sent to the ground water recharge pits. It is calculated that 31218.88 m³/Year of run off will be discharged which will be managed through well design network of storm water drainage system.

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)

Answer - The demand shall be 704 KL/day out of which 388 KL/day will be recycled. After treatment / recycled of water, the net fresh water requirement for domestic use will be 355 KL/day. The Ground water sources will be tapped if required.

The impacts on water availability in the region are assessed based on future water demand and the net availability of ground water resources in the area. The bore wells already exist in the area.

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

Answer No major runoff is expected. High rise boundary wall with temporarily laid storm water drains will prevent runoff to avoid Pollution of land and aquifers.

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)

Answer Most of the storm water collected on site will be harvested for ground water recharge. It shall be ensured that it is free from contaminations before recharge to the ground.

A well laid drainage system in the complex will prevent the flooding of the area. Contamination of storm water is possible from the following sources

- Silt from soil erosion in gardens
- Spillage of sludge from drain

As detailed "Storm Water Management Plan" will be developed, this has considered the above sources. The run off from landscaped, roof top and complexes would be used for recharging the deep strata from which groundwater is to be extracted in the proposed site. The design of pits would be done taking into consideration retention time for the run-off water in the harvesting pit.

The plan will incorporate best management practices which will include following:

- Regular inspection and clearing of storm drains.
- Cover waste storage areas.
- Avoid application of pesticides and herbicides before wet season
- Secondary containment any dykes in fuel/ oil storage facilities
- Conducting routine inspections to ensure cleanliness
- Preparation of spill response plan, particularly for fuel and oil storage areas.
- Provision of slit traps in storm water drains

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

Answer No, such unsanitary conditions will raise at the construction site as mobile toilet facilities will be used for construction workers and staff. Waste collection bins will be installed on site and near labor colony so that waste can be collected wisely and disposed as per norms. Regular information dissemination and inspection will take place by the construction team in labor colony and there working zone regarding personnel hygiene.

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)

Answer The proposed project has sewage treatment plant; therefore, management of sewage is safe upto maximum possible extent.

It is proposed to connect all the soil and waste pipelines from the toilets, kitchen, pantries, and internal toilets will be connected to a basement and then led out to sewage treatment plant. The Effluent treatment plant and sewage treatment plant will have capacities of 30 KLD and 500 KLD capacities respectively and will incorporate of primary, secondary and tertiary treatment facility. The compact secondary treatment unit incorporates of Rotating Bio-Reactors.

Raw wastewater is delivered at a steady rate through a self-cleaning membrane sieve to trap solids larger than 5 microns. Intercepted solid are purged into a chamber of chamber containing highly active biomass, in which intercepted solids are metabolized anaerobically. The second unit in sequence is a Rotating Bio-disc Contractor (RBC) In the RBC the residual organic matter comes into intimate contact with the large area of bio-film residing on the disk. The pack of disks is gently rotated in tank upto 40% submergence at a very low speed (about 2-5 RPM). As the film grows in thickness it sloughs off and a new film takes place. Bio-film thickness adjusts itself according to the incoming organic load and is self-sustaining.

The treated water from the sewage treatment plant will be reused for Landscape/horticultural purpose. It is estimated that about 431 KLD of sewage will be generated during the peak discharge period. It is also estimated that about 355 KLD of treated water will be generated, which will be completely consumed for reuse in Landscape/horticultural purpose and at construction work. No discharge form the premises will take place to the sewer.

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

Answer Treated effluent will be completely reused for Landscape/ horticulture purpose and construction works. Dual plumbing system is proposed for separate collection of soil water (from toilets) and gray water (from kitchen/ bathrooms).

3.0 VEGETATION

3.1. Is there any threat of the project to the biodiversity?

Answer The project site is in an urban area there is no Eco sensitive zone in surrounding of the project area. There are few trees at the project site which will be relocated within the project site or its surrounding.

3.2. Will the construction involve extensive clearing or modification of vegetation?

Answer The proposed site is an open land earmarked for construction of Medical College & Research Centre and possesses no tree hence there shall not be any cutting of tree. Moreover activities related project will be confined to the designated site so no cutting of tree even in the project influenced area is-envisaged.

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?)

Answer The proposed project land is a vacant land with no trees. As per norms it is proposed to undertake suitable greenbelt planning while developing the Medical College & Research Centre project's greenbelt development. Approx. 20 % of the plot area is planned for greenbelt development. The details of trees to be planted in greenbelt development is mentioned in Table 2.

Table 2: List of Trees to be planted in Project Site

S. No.	Scientific Name	Family	Common Name	Hindi Name
1	<i>Azadirachta indica</i>	Meliaceae	Indian Lilac	Neem
2	<i>Alstonia scholaris</i>	Apocynaceae	Blackboard Tree	Chitvan
3	<i>Cocos nucifera</i>	Arecaceae	Coconut Palm	Nariyal
4	<i>Cassia fistula</i>	Fabaceae	Golden Shower Tree	Amaltas
5	<i>Delonix regia</i>	Fabaceae	Royal Poinciana	Gulmohar
6	<i>Ficus benghalensis</i>	Moraceae	Banyan Fig	Bargad
7	<i>Ficus virens</i>	Moraceae	White Fig	Pakhad
8	<i>Ficus racemosa</i>	Moraceae	Cluster Fig	Gular
9	<i>Mangifera indica</i>	Anacardiaceae	Mango Tree	Aam
10	<i>Monoon longifolium</i>	Annonaceae	False Ashoka	Ashoka
11	<i>Psidium guajava</i>	Myrtaceae	Guava Tree	Amrud
12	<i>Saraca asoca</i>	Fabaceae	Ashoka Tree (Sacred)	Ashok
13	<i>Syzygium cumini</i>	Myrtaceae	Java Plum	Jamun
14	<i>Dalbergia sissoo</i>	Fabaceae	Indian Rosewood	Shisham
15	<i>Butea monosperma</i>	Fabaceae	Flame of the Forest	Palash
16	<i>Terminalia arjuna</i>	Combretaceae	Arjun Tree	Arjun
17	<i>Tectona grandis</i>	Lamiaceae	Teak	Sagwan

4.0 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.

Answer No

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

Answer Air, noise and visual disturbance may be generated during the site development that can affect the behavior of fauna especially birds, butterflies etc. of the adjacent habitats. However, as alternative habitats are available in near by areas and resulting impact on the existing ecology would be suitably compensated and mitigated adopting

comprehensive EMP. Hence the potential impacts to fauna groups from this source are ranked minor.

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

Answer There is no such water body found in the study area.

5.0 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)

Answer It has not been anticipated.

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.

Answer Since, it is a proposed medical college Project. D.G. sets as per the requirements of State / Central Pollution Control Board shall be installed / maintained. The construction activities are likely to generate dust due to vehicular movement, minor excavation; Sprinkling of water on the roads shall be practiced during construction. The debris and unutilized construction material and earth from the construction site shall be removed immediately to low lying areas so that no nuisance dust is generated due to wind.

The impacts on ambient air quality including noise levels are being minimum as a result of the following measures:

Provision shall be made for sprinkling of water on the roads used for transportation of materials within the Project Site for dust suppression.

- + Arrangements shall be made for sprinkling of water at the construction site.
- + The debris and unutilized construction material and earth from the construction site shall be removed immediately to low lying areas earmarked by Pollution control board so that no nuisance dust is generated due to the wind.
- + It shall be ensured that vehicles which are employed by the Developer or Contractor ply with PUC Certificates.
- + There are few labour camps set up by contractors as most labourers belong to near by areas due to which no fuel burning takes place for cooking and other activities.
- + Generator shall be installed/ maintained by the Contractor at the site shall meet the guidelines as laid down by Central Pollution Control Board.
- + Construction Activities shall not be allowed at night.

- + The mitigation measures shall include regular maintenance of machinery and provision of personnel protective equipments/ aids to workers.
- + The noise generation level will be confined within the surrounding areas of construction site and is unlikely to have any impact, as there are no inhabitants around. As such any construction activity will generate only minimum impact on existing residential population.

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.

Answer The Proponent is making arrangement for dedicated parking within its own complex open area.

Additional traffic in the area is a matter of concern to the local people. This effect would be prominent during construction as well as operation phase. Probability of inconvenience faced due to the frequency of truck movement during construction phase would be negligible compared to traffic on the main road.

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

Answer The movement pattern like internal roads, pedestrian pathways, etc are as per the NBC (National Building Codes) guidelines and duly approved by the Authority.

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.

Answer The proposed project is to have sufficiently wide roads with Green Belt on the boundary of the project which will mitigate the effect of increased noise level. No heavy vehicles/machinery is expected in the complex so the vibration level is not likely to be increased. The complex have sufficient area for parking of vehicles of occupants as well as visitors so no traffic congestion is expected which may cause greater noise and vibration.

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

Answer There is no generation of high noise level as all D.G. sets are silence type with inbuilt canopy and no high noise generating machines will be used. All D.G. sets shall be installed / maintained as the guidelines of CPCB/MoEF.

No other equipment which may generate high noise levels or cause vibrations is expected to be installed in the proposed complex.

6.0 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?

Answer The proposed construction will not obstruct a view, scenic amenity or landscape as the site is a vacant land surrounded by Medical College & Research Centre.

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

Answer Since the entire project influenced area will be developed as per the Master Plan. So, there will be no adverse impacts .The overall impact will be positive.

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

Answer The proposed project site has been already allotted for developing the Medical College & Research Centre. The specifications as per different departments of Building deptt, pollution board, Authority are being followed for various Developmental Works; and shall follow the Building Bye laws and Architectural Controls as laid down by collectroate.

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

Answer There is no anthropological or archaeological sites or monuments on the project land or near the project site. So, no significant adverse impacts of this kind shall be there.

7.0 SOCIO-ECONOMIC ASPECTS

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

Answer The Constructional phase activities will have insignificant negative impact on the socio-economics and demography. It shall, however, have positive impacts in terms providing employment during the development/construction phase.

Establishment of Medical College & Research Centre leads to socio- economic changes. The bulk of labour force requirement will be unskilled/ Semi skilled. People from the surrounding villages are being benefited as they get employment during development/construction phase. In order to prevent the degradation of physical and aesthetic environment; proper sanitation facility and other basic facilities like drinking water supply and sewerage will be provided to the workers. Demographic profile of the area will undergo significant changes during the operation stage of the project. There are no person residing on project plot, therefore there will be significant positive impact on the overall socio-economic pattern of the area in terms of improvement in health, availability of hygienic drinking water. Further several infrastructural facilities will improve/upgrade in this area by establishment of this complex.

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

Answer **Education:** The study area has adequate facility of education; there are several primary and secondary schools located in the area. The educational facilities are provided in stages i.e. pre-primary, primary, middle, secondary, senior secondary and university level. Pre-primary and primary educations are mainly the responsibility of the local bodies. Middle, secondary and senior secondary education is primarily looked after by Directorate of Education, Government of Bihar. Apart from this a number of private organizations are also engaged in imparting education at all levels of schooling. The key areas of concern in this regard include the poor levels of sanitation (especially garbage disposal), dismal condition of internal roads and footpaths, and a very low level of Police (including Traffic Police).

Social infrastructure: The sub-city has been planned for an environment of convenience which contains essential facilities and services at different levels namely health, education, hotel, safety and security, cultural, and communication etc. The key areas of concern in this regard include the poor levels of sanitation (especially garbage disposal), dismal condition of internal roads and footpaths, and a very low level of Police (including Traffic Police) presence.

Banks: The Study Area is having branches and ATMs of all major nationalized as well as privatized banks.

Post-Office: Postal cum telegraph facility is also available. Post office facility is available. Courier system is also highly developed.

Telecommunication: Telecommunication facility in the study area is adequate; electronic telephone exchange is working in the study area, mobile facility is also available.

Road & Transportation System: The project area is having high road density. It is connected by a network of state and roads to the neighboring states. Connecting Roads are NH 722 at a distance of 7.2 Km. East.

Hospitals: Health and Family Welfare Department, Govt. of Bihar plays a significant role and is committed to provide health care facilities to the people of Muzaffarpur District and it does so through a network of existing primary,

secondary and tertiary Hospitals, dispensaries/ health centres, school health clinics, polyclinics, mobile health clinics; by implementation of various state and national programmes under medical and public health sector for prevention and eradication of various diseases.

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

Answer The project will not cause any adverse effect on local communities, other cultural values or disturbance to sacred sites. Rather being a Research facilities it would facilitate the local population by giving better place for Medical treatments. The project of Medical College & Research Centre will be constructed within the designated site as per the defined building by-laws.

Impact on Historical, Archeological and Architectural Sites:

There is no historical or archeological monument of significance within the project and hence no impact in this regard is anticipated.

8.0 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)

Answer With modern design and construction systems being adopted, the quantum of building material has been reduced and optimized. The major Green Sustainable materials materials required for construction of the proposed project will be steel, cement, bricks, metal, flooring tiles/stones, sanitary and hardware items, electrical fittings etc. All the items to be used in the proposed project will be as per the national building code specification. If the building materials with high-embodied energy are locally available, it will 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?

Answer No large scale construction machinery shall be involved as the land is plain and leveled and Developer shall be undertaking activities only as in Road Work, piling etc, Water Supply Work, Streetlights and Landscaping and Horticulture works. The following points are being taken into consideration to minimize the adverse impacts due to transport and handling of materials.

All vehicles which will use for transportation of material and other works shall allow to the complex with PUC certificates only. Vehicles would be of closed body to avoid spread of dust from loose materials. The vehicles which bring stone dust and sand etc. would ensure that these materials are properly wetted during transportation to avoid dust generation.

Provisions shall be made for sprinkling of water on the road sides used for transportation of materials for the Project Site; and speed of vehicle will be restricted to 15 Kms/hr.

The noise generated during the construction phase will be due to the movement of construction equipment and machines. The impact will be short term and reversible in nature and will be eliminated once the activity is completed. Further it is planned to take care of impact of Noise. Green Belts are provided that separate various roads from the Complex, to reduce the noise levels. As such any construction activities will generate only a minimum impact on nearby residential population. The following additional measures shall be taken to minimize Noise Levels:

- All D.G. Sets shall have acoustic enclosures for sound pollution control
- Construction Activities shall not be allowed at Night.
- The mitigation measures shall include regular maintenance of machinery and provision of personnel protective equipments to workers.

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

Answer All waste concretes and other waste of bricks, stone and aggregate etc. are being utilized in making of roads and filling waste.

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

Answer Once the Complex is completely occupied the Proposed project at 100% occupancy is expected to generate about 1010 Kg/per day of solid waste. The waste will be segregated in three parts.

- Paper, Wood packing, Card Board, Polythene etc.
- Peeling and waste of Vegetables- Fruits and other such type of products.
- Leftover Food.

All these shall be disposed as per the standards norms. Adequate number of collection bins separate for biodegradable and non-biodegradable waste shall be provided as per The MSW Rule, 2000. Separate coloured bins will be placed for biodegradable and non- biodegradable waste. Final segregation of solid waste into biodegradable, non-biodegradable, and inert fraction will take place in centralized shaded collection facility at the south-western corner of the Hospitals. The non-biodegradable fraction consisting primarily of tin, glass, plastics, cardboard, paper will be recycled to the maximum extent possible. The rest will be handed over to MCD.

Out of this solid waste, approx, 15% will be Bio-medical waste. Thus appropriate measures will be undertaken to segregate, handle and manage the bio-medical waste management. The bio-medical waste generated will be disposed separately as per existing CPCB norms.

9.0 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?

Answer The total power requirement at the full occupation capacity of the project will be about 1000 KW Sanctioned. The power shall be supplied by the BSEB.

The project shall have provision for D.G. sets as standby arrangement. The project existing to install 4 X 125 KVA & 2 X 250 KVA Sets for standby power supply to the Hospitals, which is approximately 80-100% of the peak demand load. As per CPCB guidelines, these DG sets shall be silent sets housed in CPCB approved acoustic enclosures, so as to control the noise pollution to 75 db at 1 m distance.

For minimizing energy consumption, energy saving appliances / fittings and solar water heater etc. shall be used.

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

Answer The project existing to install 4 X 125 KVA & 2 X 250 KVA DG sets for standby power supply to the Hospitals, which is approximately 80-100% of the peak demand load. As per CPCB guidelines, these DG sets shall be silent sets housed in CPCB approved acoustic enclosures, so as to control the noise pollution to 75 db at 1 m distance.

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?

Answer It will be provided as per the standard norms.

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

Answer Building design and envelope has been optimized through selection of appropriate wall and roof construction and through adoption of solar passive measures after studying the sun path/ solar angle to provide shading devices for windows and roof which would reduce energy demand. Louvers and sunshades will be used around windows in order to protect from direct glare of sunlight. Roofs will be painted with reflective, aluminum-based paints with solar reflectance ranging from 0.3-0.6. This will effectively reduce the heat load of the building envelope.

There are few large windows which are being protected by balcony covers and chajjas to cut down heat transfer in buildings. All rooms and corridors have very good natural lighting & cross ventilation thereby will require less of artificial lighting and lead to energy conservation.

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.

Answer During planning stage care has been taken to plan the complex in such a way that there is maximum use of solar energy. As given above the residents shall be encouraged to use solar energy for water heating and energy saving fittings and appliances etc.

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?

Answer There are few large windows which are being protected by balcony covers and chajjas to cut down heat transfer in buildings. All rooms and corridors have very good natural lighting & cross ventilation thereby will require less of artificial lighting and lead to energy conservation.

Louvers and sunshades will be used around windows in order to protect from direct glare of sunlight. Reflective glass will be used which transmit little heat inside (as per specifications provided in 9.3). Roofs will be painted with reflective, aluminum-based paints with solar reflectance ranging from 0.3-0.6. This will effectively reduce the heat load of the building envelope.

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, chillers? Provide specifications.

Answer Yes

Suitable energy optimization will be adopted during the calculation of energy load of the proposed project. Proper energy efficient HVAC system will be installed in the critical area only. The space heating load will be minimized using passive solar structures and suitable building envelope material. The air infiltration will be minimized through closing unnecessary apertures and maintaining proper fenestration as per NBC specifications. Compact fluorescent lamps (CFL) will be used in place of incandescent and halogen lamps in all common areas and basement parking. The lighting in the basement car park has been designed to operate through timers to achieve 33%, 66% and 100% illuminations to suit the occupation of the premises. CFC and HCFC free Chillers & refrigerators will be used

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?

Answer Construction activities alter the micro climate to certain extent. It affects flora and fauna to some extent, changes ground water regime, generates pollution. Green belt development and landscaping with trees planted along side the roads and in other open areas will mitigate the effects of heat island effect and pollution. Green belt development and landscape gardens help to reduce the impact of inversion during winters. Extensive landscaping, tree plantation and creation of large green areas will lead to improvement of microclimate.

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.

Answer Terrace roof provided with insulation/turfing, walls are brick wall offering insulation and fenestration protected by overhangs.

The R- values for concrete range from 0.78-1.25 K.m².W⁻¹, that for steel range from 1.07-1.25 K.m².W⁻¹, and for bricks approx. 0.87 K.m².W⁻¹.

For fenestration, aluminum panels with glass panes will be used, which have R values ranging between approx.0.004 - 0.005 K.m².W⁻¹ for aluminum, and 1.075-1.25 K.m².W⁻¹ for glass panes.

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

Answer The Construction shall follow all guidelines as per National Building Code of India. To deal with any incident of Fire, Fire extinguishers, water storage tank for fire fighting, Hose Reels, Exit Signs Board, fire alarm system shall be provided in each block of the complex and all provisions will be approved by Chief Fire Officer of Govt. of Bihar building by laws and will be provided with adequate arrangement to overcome fuel hazards to the satisfaction of Authority.

The first aid fire fighting equipments shall be provided on all floor including basements, lift rooms in accordance **With IS: 2217-1982**. Each floor will be provided with fire hydrants, 2 sets of fire hose reels, and type A/B/C and CO2 Fire Extinguishers. The resident maintenance staff will be rendered training in the fire safety, do's and don'ts and actions during the emergency situations. Work responsibility during such emergency will be well defined and the responsibility to act will solely lie with the concerned individual. At a fire call, the resident maintenance staffs at shift and the security guard will react immediately. After the identification of the location, source and degree of fire primary fire fighting system will be brought online. If the fire is of electrical origin the MCB./ ELCB of the concerned line will be tripped to cut down supply.

The complex will be made innately fire protected by using sprinklers at critical nodes in the basements, as per Bye Law for Fire Protection. The Hospitals complex shall be equipped with manually operated electrical fire alarm system with two call boxes located at each floor. The location of the call boxes shall be designed a view to ensure that one or the other call box shall be readily accessible to all occupants of the floor without having to travel more than 22.5m. The call boxes shall be of the 'break-glass' type without any moving parts, where the call is transmitted automatically to the control room without any other action on the part of the person operating the call box.

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

Answer It will be provided as per norms.

Glass with a low-emissivity coating applied to it in order to control heat transfer through windows will be used. Windows manufactured with low-E coatings reduce energy loss by as much as 30-50%. The low-emissivity coating reduces the infrared radiation from a warm pane of glass to a cooler pane, thereby lowering the U-factor of the window. Different types of low-E coatings have been designed to allow for high solar gain, moderate solar gain, or low solar gain. Low emissivity coated/ tinted glass with integral dual sealed thermally broken spacer bar to create thermally efficient double-glazing units. The Society Unique design of the spacer and the material used reduces the hot or cold temperatures from transferring to the inside. Typical Thermal conductivity (U-values) will range between 1.2 -1.4 W-m²-K, compared to 1.5 -1.7 W-m²-K range for normal glass.

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

Answer Reduced air infiltration combined with proper ventilation can not only reduce energy bills due to HVAC 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% of the energy used for heating and cooling in a typical home. For this purpose the building has been designed in a compact manner, and the fenestration has been designed in a leak-proof way, with suitable gaskets. Ducting through the building, where applicable, will be designed following the international standard so as to leave back minimal infiltration points.

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

Answer As mentioned above it is proposed to encourage the residents of the complex to use solar water heater, solar heating appliances and CFL will be extensively used. It is also proposed to install solar cell powered street lights in the complex in phase manner. All these measures will help in reducing energy consumption.

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-3** to mitigate all the identified environmental impacts that are found to be significant.

Table-3: Environmental Management Plan – Construction Phase and Operational phase

Construction phase

	Issue	Management / Mitigative 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.

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.

Operation phase

	Issue	Management / Mitigative measures
1.	Wastewater treatment and disposal	Elaborate wastewater treatment facility will be developed to ensure, to the maximum capacity, the reuse of treated wastewater (The treated wastewater reuse potential is ~60% 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. For Biodegradable waste Organic waste Converter (OWC) will be installed. The recyclable fraction will be sent directly to recyclers.
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 32218.88 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	More than 14936.65 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-4**.

Table-4: 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)	PM10, PM2.5, SO2, NO2& CO
2	Ambient Noise Level			
	Near DG set	Once in 6 Months	8 hr continuous with 1 hr interval	Noise level in dB(A)
3	Ground/Drinking Water Quality Monitoring			
	Ground Water – at project site	Once in 6 Months	Grab Sampling	Parameters specified under IS:10500, 2012
4	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, 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 MoEFCC.

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'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. 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 Staffs & Doctors 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-5**.

Table-5: 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 Leqboth during daytime and nighttime	As per State Pollution Control Board's requirements
3.	Water Quality Testing (Portability testing)	(i) Any operational bore well (ii) One of 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-6**.

Table-6: Proposed Monitoring Program for Operational Phase of the Project

S. No.	Type	Locations	Parameters	Period Frequency and
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 Leq 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	As per State Pollution Control Board's requirements
4.	Treated Wastewater Quality	Inlet and outlet of the STP	Parameters for assessing compliance 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-7. Environmental Management Cost during construction and operation is presented in Table 8 and Table 9.

Table-7: Environmental Documentation for Operational Phase of the Project

PARAMETER	PARTICULARS
Air Emissions (incl. Noise)	• Consent to Establish from State Pollution Control Committee. • Consent to Operate 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 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

Table-8: Environmental Management Cost during Construction

Sr. No.	Component	Particulars	Capital Investment (Lakhs)	Recurring Expenditure per Annum (Lakhs)
1.	Air	Anti-smog Gun,	10.0	2.0
2.	Water	Mobile STP, etc.	10.0	2.0
3.	Solid and C&D Waste and its Management	Storage yard and its management	10.0	3.0
4.	Environment Monitoring & Management	Environment Monitoring as per monitoring plan ➤ Construction of wind breaking wall Green Curtains on under construction building	5.0	2.0
5.	Green Belt	Development and maintenance of green belt	5.0	3.0
Total (Rs.)			40.0	12.0

Table-9: Environmental Management Cost during Operation

Sr. No.	Component	Particulars	Capital Investment (Lakhs)	Recurring Expenditure per Annum (Lakhs)
1.	Air	Stack emission control	25.0	3.0
2.	Water	Sewage Treatment Plant (STP) & ETP	150.0	2.0
3.	Rain Water Harvesting	Installation of RWH System & Annual Cleaning of RWH tank	50.0	7.0
4.	Solid waste Area and its Management	Purchase of Containers for Storage of Waste & OWC of 400 kg/day	40.0	10.0
5.	Environment Monitoring & Management	Environment Monitoring as per monitoring plan	0.00	5.0
6.	Green Belt	Development and maintenance of green belt	15.0	5.0
7.	Others	Energy saving devices, (solar & LED) miscellaneous Electrical Vehicle charging point	50.0 10.0	15.0 3.0
Total (Rs.)			340.0	50.0