ADDITIONAL DETAILS SOUGHT WITH RESPECT TO ENVIRONMENT CLEARANCE

(IA/DL/MIS/111236/2019; F.No. 21-64/2019-IA-III)

For

Expansion of Satyawadi Raja Harish Chandra Govt. Hospital

At

Sector – 7A, Narela, New Delhi

DEVELOPED BY

Public Works Department (Health) Govt. Of NCT, Delhi

POINTWISE REPLY TO OBSERVATIONS WITH RESPECT TO (Expansion of Satyawadi Raja Harish Chandra Government Hospital at Sector-7A, Narela, New Delhi, M/s Public Works Department (Health) Govt. of NCT, Delhi)

Observation-1 Revised Form1/Form-1A and Conceptual Plan

Revised Form1/Form1A and Conceptual Plan is attached

Annexure 1- Revised Form I, Form IA and conceptual Plan

Observation-2 Source of Existing Water Supply with necessary permissions

The source of existing water supply is DJB, Existing water supply bill is attached as annexure.

Annexure 2 – Water bill

Observation-3 Details of Flora and Fauna in the study area

Details regarding flora and fauna of the study area are given in conceptual plan, please refer Annexure-1

Observation-4 Details of the tree to be cut/Transplant.

Details of trees to be cut/transplant are as follow.

Particulars	Details
Net Plot area	36,630 m^2
Landscape area Proposed	10,191.8 m^2(27.82% of Plot Area)
Total Existing Tree on site	398
Trees to be Transplant	89
Tree Retained at site	309
Compensatory Trees	**89*10= 980**

Tree cutting permission is attached as annexure.

Observation- Details of the authorized vendor along with agreement collecting the bio medical waste from the existing hospital

For the bio medical waste collection, management and transportation, SMS water grace BMW (P) Ltd. shall be responsible. The relevant document in this regard is attached as annexure.

Annexure 4- Office order regarding BMW Waste management

Observation-6 Details of area/space provide for STP and solid waste management as per applicable rules/norms with proper justification that the area/space provide is adequate as per the technology proposed.

The project will adopt a systematic approach for solid waste collection and disposal. Solid waste generated from the project will be collected properly and will be managed as per MSW Rules, 2000 amended in 2016.

Details of area/space provide for STP and solid waste management as per applicable rules/norms is attached as annexure.

Annexure 5- Site plan showing location and area distribution

Observation-7 Details of CER Plan including activities, fund allocation, area/entity to be benefitted year wise.

Corporate Environment Responsibility Plan is attached as annexure.

Annexure 6- CER Plan

ENVIRONMENT CLEARANCE APPLICATION

[FORM I]

FOR

EXPANSION OF SATYAWADI RAJA HARISH CHANDRA GOVERNMENT HOSPITAL

AT

SECTOR-A7,NARELA,NEW DELHI

DEVELOPED BY

PUBLIC WORKS DEPARTMENT (HEALTH)

GOVT.OF NCT DELHI

Contents

FORM I

Appendix I
(See Paragraph-6)

I. Basic information

S.No.	Items	Details
1.	Name of the project/s	Expansion of Satyawadi Raja Harish Chandra Government Hospital by Public works Department (Health) Govt. of NCT Delhi
2.	S. No. in the schedule	Sr. No. 8 (a) [Schedule 8 : Building/Construction projects/Area Development Projects and Townships, of EIA Notification 2006]
3.	Proposed capacity/area/length/tonnage to be handled/command area/lease area/number of wells to be drilled	Plot Area –36,630 m^2 Proposed Built Up Area- 73,285.55m^2
4.	New/Expansion/Modernization	Expansion
5.	Existing Capacity/Area etc.	
6.	Category of Project i.e. 'A' or 'B'	As per the EIA Notification 2006, Project falls under Category B
7.	Does it attract the general condition? If yes, please specify.	No
8.	Does it attract the specific condition? If yes, please specify.	No
9.	Location	
	Plot/Survey/Khasra No.	Sector-A7, Narela, New Delhi
	Village	
	Tehsil	
	District	
	State	

10.	Nearest railway station/airport along with distance in kms.	**Nearest Railway Station:** Narela Railway station – 1.84 km **Nearest Airport:** Indira Gandhi International Airport – 31.50 km **(Source of information:- Google Earth Pro)**
11.	Nearest Town, city, District Headquarters along with distance in kms.	Project site is near to urban Narela which is approx. 5 km from the site.
12.	Village Panchayats, ZillaParishad, Municipal Corporation, Local body (complete postal addresses with telephone nos. to be given)	North Delhi Municipal Corporation North Zone.
13.	Name of applicant	G.S. Kohli
14.	Registered Address	Executive Engineer Health Maintenance Division, Dr. B.S.A. Hospital Complex, Sector –A1, Rohini, Delhi - 110085
15.	Address for correspondence : Name Designation (Owner/Partner/CEO) Address Pin Code Telephone No. Fax No. E-mail	 G.S. Kohli Executive Engineer Health Maintenance Division, Dr. B.S.A. Hospital Complex, Sector –A1, Rohini, Delhi - 110085 eepwddelhihmdn@gmail.com
16.	Details of Alternative Sites examined, if any. Location of these sites should be shown on a toposheet.	No
17.	Interlinked Projects	No
18.	Whether separate application of interlinked project has been submitted?	No
19.	If yes, date of submission	-
20.	If No, reason	-

21.	Whether the proposal involves approval/ clearance under: if yes, details of the same and their status to be given. (a)The forest (Conservation) act, 1980? (b) The wildlife (Protection) act, 1972? (C) The C.R.Z Notification, 1991?	Proposal involves approval/ clearance under : (a)The forest (Conservation) act, 1980: NA (b) The wildlife (Protection) act, 1972: NA (C) The C.R.Z Notification, 1991:NA
22.	Whether there is any Government Order/Policy relevant/relating to the site?	The following Govt. Orders / Policies are to be followed to the project :- • National Building Code (NBC) of India for construction of building 2016. • Unified Building Bye Laws Delhi 2016 • Bureau of Energy Efficiency • Rules & Regulations issued by Airports Authority of India • Water Pollution (Prevention & Control) Act, 1974 • Air Pollution (Prevention & Control) Act, 1981 • Environment Protection Act, 1986 • Municipal Solid Waste Rules, 2016 • Hazardous Waste Management & Handling Rules,2008 • Biomedical Waste Management & Handling Rules,2016 • EIA Notification, 2006 • Manual on norms and standards for environment clearance of large construction projects issued by MoEF.
23.	Forest land involved (hectares)	No

24.	Whether there is any litigation pending against the project and /or land in which the project is propose to be set up? (a) Name of the Court (b) Case No. (c) Orders/directions of the Court, if any and its relevance with the proposed project.	No

II. Activity

1) Construction, operation or decommissioning of the Project involving actions, which will cause physical changes in the locality (topography, land use, changes in water bodies, etc.)

S.No.	Information/Checklist	Yes/No	Details thereof (with approximate quantities /rates, wherever possible) with source of information data
1.1	Permanent or temporary change in land use, land cover or topography including increase in intensity of land use (with respect to local land use plan)	**No**	Land was allotted for construction of Hospital Building by DDA. The expansion area of the site does not have any constructed structure So, No Permanent or temporary change in land use, land cover or topography including increase in intensity of land use.
1.2	Clearance of existing land, vegetation and buildings?	**Yes**	As the expansion of the site is being planned, So clearance of existing vegetation will take place, Clearance of vegetation will take place after obtain proper permission.
1.3	Creation of new land uses?	**No**	There will be no creation of new land will occur as the site is already marked for Medical facility for Public by Delhi Development authority.
1.4	Pre-construction investigations e.g. bore houses, soil testing?	**Yes**	Geo technical investigation has been done to find the suitability of soil for providing for adequate foundations for the proposed structure.
1.5	Construction works?	**Yes**	All construction activities of area will be confined within the project premises; there will be no physical changes outside the project boundary.

			Construction of building will be done systematically, with economy of materials and with due care on environmental protection.
1.6	Demolition works?	**No**	The project site has no pre-existing structures in area So demolition is not required.
1.7	Temporary sites used for construction works or housing of construction workers?	**Yes**	All the construction activity including stocking of raw materials will be confined within the project site only. Inside the proposed site, a small area will be utilized temporarily for construction of sheds for the labor. Local labors from nearby area will be hired. Sanitation facilities will be developed at site.
1.8	Above ground buildings, structures or earthworks including linear structures, cut and fill or excavations	**Yes**	Excavation will be carried out for foundation of building and basement. The total excavated quantity of earth material for site area will be approx. 31,933.89m^3. The excavated soil will be re used in backfilling and other area development activities.
1.9	Underground works including mining or tunnelling?	**No**	No underground works including mining/ tunnelling is required except excavation of earth.
1.10	Reclamation works?	**No**	No reclamation work required.
1.11	Dredging?	**No**	No dredging required.
1.12	Offshore structures?	**No**	No offshore structures required.
1.13	Production and manufacturing processes?	**No**	No production/manufacturing process involved as it is building construction project.
1.14	Facilities for storage of goods or materials?	**Yes**	During construction stage, the following raw material handling methods are being adopted: • Cement shall be separately stored under cover in bales

			• Sand & aggregates shall be stacked neatly under tarpaulin cover • Bricks and steel shall be laid in open • Finishing materials like tiles, sanitary fixtures, etc shall be stored in closed rooms. Material storage yard has been storage of construction materials.
1.15	Facilities for treatment or disposal of solid waste or liquid effluents?	**Yes**	**<u>Solid Waste:</u>** The solid waste generated from the project will be in the form of: **Construction Waste**: Left over cement and mortars, cement concrete blocks, aggregate, sand and other inorganic material will be recycled and reused as granular sub-base (GSB) layer of pavement. Earth rendered surplus from the excavation will be utilized in the embankment works. **Operational Phase**: The solid waste generated from expansion project will be mainly hospital, and domestic in nature and the quantity of the waste from expansion will be 1,874.30 kg/day. Solid wastes generated will be segregated into Bio-Medical waste, biodegradable (waste vegetables and foods etc.) and non-biodegradable (papers, cartons, thermocol, plastics, glass etc.) components and collected in separate bins. The biodegradable organic wastes will be treated inside the premises. Recyclable and non-recyclable wastes will be disposed

			through Govt. approved agency. **<u>Liquid effluents:</u>** During construction phase, sewage will be treated and disposed through septic tanks with soak pits. However during operational stage, in house ETP and STP shall be placed inside premises to treat wastewater from the site, The treated sewage will be reused for toilet flushing, cooling and horticulture. Dewatered/dried sludge generated from the STP plant will be used as manure for green belt development.
1.16	Facilities for long term housing of operational workers?	**No**	Local labourers will be hired from nearby areas during construction phase. So, there will be no need to create permanent facilities for long-term housing of operational workers.
1.17	New road, rail or sea traffic during construction or operation?	**No**	Project site is adjacent to the artery road (Sector-A1, Sector-A7 Road). Only internal roads; paths will be developed for vehicular movements for transportation of construction material during construction phase whereas internal tracks and paths will be developed for traffic circulation (to avoid any congestion) during operational phase.
1.18	New road, rail, air waterborne or other transport infrastructure including new or altered routes and stations, ports, airports etc?	**No**	Project site is adjacent to the artery road (Sector-A1, Sector-A7 Road). And near to Samaypur badli metro station.
1.19	Closure or diversion of existing transport routes or infrastructure leading to	**No**	Since the site has good connectivity to sector road. Site has low traffic density; there will be no need for diversion or

	changes in traffic movements?		closure of existing traffic routes.
1.20	New or diverted transmission lines or pipelines?	**No**	There will not be any new/diverted transmission lines or pipelines around the hospital facility.
1.21	Impoundment, damming, culverting, realignment or other changes to the hydrology of watercourses or aquifers?	**No**	No impoundment, damming, culverting, realignment or other changes to the hydrology of surface watercourses is proposed.
1.22	Stream crossings?	**No**	There are no streams running across the site.
1.23	Abstraction or transfers of water form ground or surface waters?	**Yes**	**Construction Phase :** During the construction phase the water requirement (approx. 2,022.97 ML) will be met from Private water or treated water from nearby CSTP. No ground water will be extracted. Hence, there will be no impacts on ground water environment during construction phase. **Operational Phase :** Total water requirement for hospital shall be approx. 537 KLD. The fresh water will be obtained from water supply department of DJB. Detail of water requirements for various uses is given conceptual plan. Efficient dual flushing fixtures will be provided for conservation of fresh water.
1.24	Changes in water bodies or the land surface affecting drainage or run-off?	**Yes**	Runoff will increase due to increased paved surface. However, increased runoff will be managed by well-designed rainwater harvesting system and storm water management plan.
1.25	Transport of personnel or materials for construction, operation or decommissioning?	**Yes**	During the construction phase, about 15-20 trucks are estimated per week. Adequate parking space within the project site for loading and unloading of materials will be provided.

			Adequate parking space (641ECS) will be provided in operational phase.
1.26	Long-term dismantling or decommissioning or restoration works?	**No**	No Long term dismantling or decommissioning or restoration works will be involved.
1.27	Ongoing activity during decommissioning which could have an impact on the environment?	**No**	None
1.28	Influx of people to an area in either temporarily or permanently?	**No**	Local laborers from nearby area will be employed during the construction phase. In the operation phase, most of the expected occupants will be from the surrounding areas. Hence, the project will lead to a redistribution of occupants within the city. Thus, no significant influx of people is envisaged.
1.29	Introduction of alien species?	No	The landscaping will be carried out with mainly local species with a few ornamental varieties of flora that are well suited to the local conditions like Bottle Palm*(Hyophorbelagenicaulis)and*Ashoka (*Saraca asoca) etc.*
1.30	Loss of native species or genetic diversity?	No	There will be no significant impact on the native species or genetic diversity.
1.31	Any other actions?	No	Not Applicable.

2) Use of Natural resources for construction or operation of the Project (such as land, water, materials or energy, especially any resources which are non-renewable or in short supply):

S. No.	**Information/checklist confirmation**	**Yes/No**	**Details thereof (with approximate quantities/rates, wherever possible) with source of information data**
2.1	Land especially undeveloped or agricultural land (ha)	**No**	No undeveloped or agricultural land is present.
2.2	Water (expected source & competing users) unit: KLD	**Yes**	During construction phase approx.2, 022.97 ML amount of water will be

			required which will be provided by Private tanker supplier. During operation phase, water supply will be provided through Municipal/DJB. Total water requirement for the proposed area is 537 KLD
2.3	Minerals (MT)	**Yes**	Minerals such as sand and aggregates will be required during the construction phase.
2.4	Construction material – stone, aggregates, sand / soil (expected source – MT)	**Yes**	All materials for construction will be arranged through select suppliers.
2.5	Forests and timber (source – MT)	**Yes**	All material forests and timber will be provided by selected suppliers. However steel frames etc shall be used to minimize the use of timber.
2.6	Energy including electricity and fuels (source, competing users) Unit: fuel (MT), energy (MW)	**Yes**	The power shall be supplied by BSES Delhi. The total connected load for 4,656 KW. Power shall be supplied by transformers of total 2000 capacity (2*1000 kVA)Transformers (Existing) + 3*1600 KVA Transformers-(2W+1S) New proposed In case of power failure, DG sets of total capacity of 4,030 KVA (3*1500 kVA)will be provided as power back-up for building
2.7	Any other natural resources (use appropriate standard units)	**No**	Not Applicable

3) Use , storage, transport, handling or production of substances or materials, which could be harmful to human health or the environment or raise concerns about actual or perceived risks to human health.

S. No.	**Information/checklist confirmation**	**Yes/No**	**Details thereof (with approximate quantities/rates, wherever possible) with source of information data**
3.1	Use of substances or materials, which are hazardous (as per	**Yes**	Diesel for DG sets will be stored in drums in earmarked locations. It shall

	MSIHC rules) to human health or the environment (flora, fauna, and water supplies)		also be handled as per The Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 and Material Safety Data Sheet.
3.2	Changes in occurrence of disease or affect disease vectors (e.g. insect or water borne diseases)	**No**	Suitable drainage and waste management measures (with frequent spray of insecticides etc.) will be adopted in both the construction and operational phase such that there will be no stagnation of water or accumulation of waste. This will effectively restrict the reproduction and growth of disease vectors.
3.3	Affect the welfare of people e.g. by changing living conditions?	**Yes**	This is hospital project availed by Govt. of NCT Delhi for the public service.
3.4	Vulnerable groups of people who could be affected by the project e.g. hospital patients, children, the elderly etc.	**No**	Impacts of this type are not expected as it is hospital project.
3.5	Any other causes	**No**	Not Applicable

4) Production of solid wastes during construction or operation or decommissioning (MT/month)

S. No.	**Information/Checklist confirmation**	**Yes/No**	**Details thereof (with approximate quantities/rates, wherever possible) with source of information data**
4.1	Spoil, overburden or mine wastes	**No**	No such spoil, overburden or mine wastes will be generated.
4.2	Municipal waste (domestic and or commercial wastes)	**Yes**	

For the Proposed facility

Category	Counts (heads)	Waste Generated (kg/day)
Patient	432 @ 1.5 kg/day	648
Regular staff • **Doctors/Administrative Staff/Nurses/Ward Boys/ Attendants/ Housekeeping &Engineering Staff**	1,728 @ 0.25 kg/day	432
OPD	1,728@ 0.15 kg/day	259.2
Visitors	3,564@0.15kg/day	534.6
Landscape waste (2.51 acre)	@0.2 kg/acre	0.502
Total Waste Generated		**1,874.30kg/day**

The quantum of waste generated in India is estimated to be 1-2 kg per bed per day in a hospital

According to WHO 85% of hospital waste is non-hazardous, 10%infective and remaining 5% non-infective but hazardous.

Total hospital waste generation	648kg/day
Non-hazardous in Nature	approx. 550.8kg/day
Infectious in Nature	approx. 64.8kg/day
Non-Infectious but hazardous in nature	approx.32.4 kg/day
Total Municipal Waste generation	1,226.3 kg/day
Biodegradable waste	approx. 735.78 kg/day
Non-Bio degradable waste	approx. 367.89 kg/day
Inert waste	approx. 122.63 kg/day

4.3	Hazardous wastes (as per Hazardous Waste Management Rules)	**Yes**	The hazardous wastes along with other wastes in the project will be used oil from DG sets, which is classified as per The Hazardous Waste Category 5.1 as per The Hazardous Wastes (Management & Handling) Rules, 1989. Used oil from DG sets will be stored in HDPE drums in isolated covered facility. This used oil will be sold to authorized recyclers. Suitable care will be taken so that spills/leaks of used oil from storage are avoided.

4.4	Other industrial process wastes	**No**	Not applicable
4.5	Surplus product	**No**	Not applicable
4.6	Sewage sludge or other sludge from effluent treatment	**Yes**	Sludge generated from the STP plant will be dried and later will be used as manure for green belt development.
4.7	Construction or demolition wastes	**Yes**	The construction waste will consist of excess earth and construction debris along with cement bags, steel in bits and pieces, insulating and packaging materials etc. Recyclable waste construction materials will be sold to recyclers. Unusable and excess construction debris will be disposed at designated places in tune with the local norms.
4.8	Redundant machinery or equipment	**No**	Redundant machinery will not be generated.
4.9	Contaminated soils or other materials	**No**	Contaminated soils or other materials will not be generated.
4.10	Agricultural wastes	**Yes**	Landscape wastes of 1.018 kg/day will be generated.
4.11	Other solid wastes	**No**	No other solids will be produced.

5) Release of pollutants or any hazardous, toxic or noxious substances to air (Kg/hr).

S. No.	**Information/Checklist confirmation**	**Yes/No**	**Details thereof (with approximate quantities/rates, wherever possible) with source of information data**
5.1	Emissions from combustion of fossil fuels from stationary or mobile sources	**Yes**	The project does not envisage any major air pollution sources except operation of DG sets during power failure and vehicular traffic.
5.2	Emissions from production processes	**No**	No production processes involved. Hence, there will be no such emissions.
5.3	Emissions from materials handling including storage or transport	**Yes**	Small quantities of fugitive emissions are envisaged during transport and

			handling of construction materials. Such emissions will be temporary and controlled by the use of sprinkling and other viable techniques like covering of loose material.
5.4	Emissions from construction activities including plant and equipment	**Yes**	This will be restricted to the construction phase and the construction site only.
5.5	Dust or odours from handling of materials including construction materials, sewage and waste	**Yes**	Dust is anticipated during loading and unloading of construction material and excavation of upper earth surface. These will however be temporary in nature, which will be controlled by providing water sprinklers. Tarpaulin cover will be provided on stored loose materials to reduce the dust emission.
5.6	Emissions from incineration of waste	**No**	No incineration of wastes is proposed.
5.7	Emissions from burning of waste in open air (e.g. slash materials, construction debris)	**No**	Open burning of biomass/other material will be prohibited on site.
5.8	Emissions from any other sources	**No**	Not Applicable

6) Generation of Noise and Vibration, and Emissions of Light and Heat:

S. No.	**Information/Checklist confirmation**	**Yes/ No**	**Details thereof (with approximate quantities/ rates, wherever possible) with source of information data**
6.1	From operation of equipment e.g. engines, ventilation plant, crushers	**Yes**	Source of noise in the operational phase will be from backup DG sets (which will be in operation only during power failure) and pumps & motors. All the machinery will be of highest standard of reputed make and will comply with standard i.e. The DG set room will be provided with acoustic enclosure to have minimum 25 dB (A) insertion loss or for meeting the ambient noise standard whichever is on higher side as per E (P) Act, GSR 371 (E) and its

			amendments. Therefore, no significant impact due to operation of machinery is anticipated.
6.2	From industrial or similar processes	**No**	No industrial processes will be carried out in the Hospital project.
6.3	From construction or demolition	**Yes**	Due to various construction activities, there will be short-term noise impacts in the immediate vicinity of the project site. The construction activities will include the following noise generating activities: • Concreting, mixing & operation of DG sets. • Construction plant and heavy vehicle movement.
6.4	From blasting or piling	**No**	No blasting or mechanized piling will be done.
6.5	From construction or operational traffic	**Yes**	Some noise will be generated from vehicular movement in the construction and operational phase but that will be mitigated with green belt.
6.6	From lighting or cooling systems	**No**	No significant noise impact will result from lighting or cooling systems.
6.7	From any other sources	**No**	Not Applicable

7) Risk Risks of contamination of land or water from releases of pollutants into the ground or into sewers, surface waters, groundwater, coastal waters or the sea:

S.No.	**Information/Checklist confirmation**	**Yes/No**	**Details thereof (with approximate quantities/rates, wherever possible) with source of information data**
7.1	From handling, storage, use or spillage of hazardous materials	**No**	The used oil from DG sets will be carefully stored in HDPE drums at isolated storage, and periodically sold to authorized recyclers. All precautions will be taken to avoid spillage from storage as per The Hazardous Wastes (Management & Handling) Rules, 1989.

7.2	From discharge of sewage or other effluents to water or the land (expected mode and place of Discharge)	**No**	There will be no risk to the water or land from the wastewater discharge from the site because no raw wastewater shall be discharge, All the sewage coming from the site shall be treated in house STP of capacities, 300 KLD based on MBBR technology, ETP of 80 KLD, After proper treatment, surplus treated water shall be discharge , if any
7.3	By deposition of pollutants emitted to air into the land or into water	**No**	The DG Sets will be provided with stacks of adequate height. Hence dispersion will be achieved and avoid deposition of pollutants in significant concentrations at any single location.
7.4	From any other sources	**No**	Not Applicable
7.5	Is there a risk of long term buildup of pollutants in the environment from these sources?	**No**	Not Applicable

8) Risk of accidents during construction or operation of the Project, which could affect human health or the environment.

S.No.	**Information/Checklist confirmation**	**Yes/No**	**Details thereof (with approximate quantities/rates, wherever possible) with source of information data**
8.1	From explosions, spillages, fires, etc. from storage, handling, use or production of hazardous substances	**Yes**	To deal with any fire related accident, firefighting facility of single handed hydrant valve, long hose reel, and portable fire extinguisher shall be provided.
8.2	From any other causes	**No**	Not Applicable
8.3	Could the project be affected by natural disasters causing environmental damage? (E.g. floods, earthquakes, landslides, cloudburst etc.)	**No**	The project falls under seismic active Zone IV indicating high damage risk zone. The buildings will be designed as earthquake resistant and comply with the required IS specifications.

9) Factors which should be considered (such as consequential development) which could lead to environmental effects or the potential for cumulative impacts with other existing or planned activities in the locality

S.No.	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
9.1	Lead to development of supporting. utilities, ancillary development or development stimulated by the project which could have impact on the environment e.g.: • Supporting infrastructure (roads, power supply, waste or waste water treatment, etc.) • Housing development • Extractive industries • Supply industries • Other	**Yes** **Yes** **No** **No** **No** **Yes**	Appropriate infrastructure like roads, power supply, waste management and waste water treatment will be developed within the project site. - A medical facility is being provided and will be given to the people.
9.2	Lead to after-use of the site, which could have an impact on the environment.	**No**	Not Anticipated
9.3	Set a precedent for later developments	**Yes**	The project will provide good health facilities to the people and better life style and will set an example for later developments in the areas.
9.4	Have cumulative effects due to proximity to other existing or planned projects with similar effects	**No**	Not Applicable

III. Environmental Sensitivity

S.No.	Areas	Name/ Identity	Aerial distance (within 15 km) Proposed project location boundary

1.	Areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value	None	No areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value falls within 15 km from project boundary
2.	Areas which are important or sensitive for ecological reasons - Wetlands, watercourses or other water bodies, coastal zone, biospheres, mountains, forests	Yamuna River Nazafgarh drain	10.21Km 2.82Km
3.	Areas used by protected, important or sensitive species of flora or fauna for breeding, nesting, foraging, resting, over wintering, migration	None	No such areas present within 15 km from project boundary
4.	Inland, coastal, marine or underground waters	Ground water	Groundwater present at approx. 12-14 mbgl
5.	State, National boundaries	Delhi-HR State	Approx. 6.13 km from the project site
6.	Routes or facilities used by the public for access to recreation or other tourist, pilgrim areas	Alipur Road Bawana Road NH-1 Grand trunk Road	Nearby to the site in
7.	Defense installations	None	There are no such areas.
8.	Densely populated or built-up area	Anadan Prabat	20.64 km
9.	Areas occupied by sensitive man-made land uses *(hospitals, schools, places of worship, community facilities)*	Lala Hans Raj Gupta ITI Kasturi Ram College of	1.91km 1.20Km

		Higher Education HMR Institute of Technology and Management	4.70Km
10.	Areas containing important, high quality or scarce resources. *(ground water resources, surface resources, forestry, agriculture, fisheries, tourism, minerals)*	Nazafgarh drain	2.82km from the site-
11.	Areas already subjected to pollution or environmental damage. *(those where existing legal environmental standards are exceeded)*	None	
12.	Areas susceptible to natural hazard which could cause the project to present environmental problems (*earthquakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions*)	Earthquakes	The site falls under the zone IV as per the Seismic Zone Map of India. Adequate measures will be taken during the construction of the proposed project.

IV. Terms of Reference for EIA studies

Not applicable for 8(a) Schedule of Building Construction Projects.

ENVIRONMENT CLEARANCE APPLICATION

[FORM IA]

FOR

EXPANSION OF SATYAWADI RAJA HARISH CHANDRAGOVERNMENT HOSPITAL

AT

SECTOR-A7,NARELA,NEW DELHI

DEVELOPED BY

PUBLIC WORKS DEPARTMENT (HEALTH)
GOVT. OF NCT DELHI

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FORM I A

APPENDIX II
(See Paragraph -6)

Checklist 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

(Attach panoramic view of the project site and the vicinity)

1.1. Will the existing land use get significantly altered from the project that is 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 are 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.

- No. The Project site is an expansion on the vacant part of the plot. It is anticipated that the construction activities at the site area will not have an adverse effect on the land use activities in the project area.
- This site is being proposed for medical facilities and the site is allotted for hospital project by DDA. The development of green belt and other landscaping will enhance the visual aesthetics of the area.
- This project is being developed by Public works Department (Health) Govt. of NCT Delhi. The geographical co-ordinates of the site are 28°50'25.97"N and 77°6'11.84"E

- This project is located at Sector-A7, Narela, New Delhi.
- Satyawadi Raja Harish Chandra Hospital (SRHC) is (200 Existing + 432 Proposed) 632 bedded hospital. Government of PWD proposed to expand the existing Satyawadi Raja Harish Chandra Hospital at Narela, Delhi into a hospital with modifications / re-modeling as per the specific needs and proposed for developing an ultra-modern as a dedicated facility for integrated care of cancer patients in the region. Also Proposed is to provide a 200 bedded maternity and trauma facility as required.

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.

- Land Area: Site is having plot area of 36,630$m^{2.}$
- Built UP Area Details are given in Table 1.

Table 1 : Area Details

S.No.	Particulars	Existing Area (m^2)	Expansion Area (m^2)	Total Area (m^2)
1.	Plot Area			36,630 (9.05 acres)
2.	Permissible Plot Area for Hospital (H)			26,630
3.	Permissible area for Residence (R)			10,000
4.	**Total permissible Ground Coverage**			**20,146.5**
5.	Permissible Ground Coverage for Hospital (@40% of PA)			14,652
6.	Additional Permissible GC for MLCP (@5% of PA)			1,831.5
7.	Additional permissible GC for Atrium of hospital (@10%of PA)			3,663.00
8.	Permissible FAR (ROW 24 mtrs & above) @ 2.5			91,575
	Permissible FAR for Residential area (25%)			22893.75
9.	Proposed Ground Coverage for Hospital (@ 9.96 % of PA(H))	6,331.01 -	2,792.96	**9,123.97**

10.	Proposed Ground coverage for Residential (@5.76% of PA(R)) -Quarters (Type-I-V) -Hostel -Servant Quarter -Garage	1,320.31 628.976 474.9 191.28 25.15	- - - - 	1,320.31
11.	Proposed FAR for Hospital (@52.19% of PA(H))	**34,001.58**	**13,795.23**	**47,796.81**
12.	Proposed FAR for Residential -Quarters(Type I-V) -Hostel -Servant Quarter -Garage	**10,463.04** 6345.248 3746.7262 381.92 25.15	-	**10,463.04**
13.	**Built Up Area**	**39,593.91**	**33,691.64**	**73,285.55**
14.	Service area (Free of FAR)	5,592.33	3,246.41	**8,838.74**
15.	Internal Road Area			3,760
16.	Open Area (hospital)			27,506.03
17.	MLCP Area		16,650	**16,650**
18.	Landscape Area (@ 27.82% of PA)			10,191.8
19.	Maximum Height of the Building(Hospital)	B+G+7 (23.95mtrs)	B+G+8 (33.45mtrs)	**33.45mtrs**

- **Water Consumption**

Construction Phase: During the construction phase the water requirement (approx. 2,022.97 ML) will be met from Private water. No ground water will be extracted. Hence, there will be no impacts on ground water environment during construction phase.

Operational Phase: Total water requirement for hospital Project Expansion) is 537 KLD. The fresh water will be obtained from water supply department of DJB. The daily water requirement calculation is given below in

Total Water Requirement during Operational Phase for the Proposed Area

Sl. No.	Description	Population/Area in (m^2)/other details	Unit water Consumption (LPCD)	Total Water Requirement(KLD)
a)	**Main Uses**			
	IPD (Patient, Attendants, Visitors and Staff)	432	450	194.4
	OPD	1728	15	25.92 say 26
	Clinical water	20 liters/bed	20 liters/bed	21.6 say 22
	Laundry(432 beds)	@3.5 kg/bed	@ 25lt/kg/day	37.8 say 39
	Water consumption for main uses			**281.4 say 281**
b)	Other Uses			
	Landscaping	10,191.8	3ltrs/m^2	30.57 say 31
	HVAC	2,000 TR	10lt/hr/TR	200
	DG cooling	3*1500 kVA	0.9l/kVA/hr	24.3
	Total Water Demand			**536.7 say 537 KLD**

Wastewater calculation with respect to ETP

S. No.	Description	Quantity (KLD)
01	**Fresh and flushing water requirement includes:** • IPD& OPD for proposed facility (@5% of total IPD& OPD water requirement) • Laundry-432 beds • Clinical activities	72 11 39 22
02	Wastewater going to ETP @ 80% of (72 KLD)	**57.6 say 58 KLD**
03	**ETP Capacity Proposed**	**80 KLD**

Wastewater calculation with respect to STP

S.No.	Description	Quantity (KLD)
1	Fresh water requirement for uses except- (5% IPD,OPD ,laundry and clinical) @ 70% of (281–72 = 209 KLD)	146 KLD
2	Flushing water requirement for uses except- (5% IPD,OPD and laundry,) @ 30% of (281 – 72 = 209 KLD)	63 KLD
3	Wastewater Generation @ (80% of Freshwater + 100% of Flushing)	179.8 say 180 KLD

4	Blow down water from HVAC cooling (@30%)	60 KLD
	TOTAL WASTE WATER GENERATION [3+4]	**240 KLD**
	STP CAPACITY PROPOSED	**288 say 300 KLD**

Summary of Water available for Reuse and Recycle

S.No.	Description	Quantity (KLD)
A)	**Recycled Water Available @ 80% of Waste Generated**	**238.4 say 238 KLD**
B)	**Recycled Water Required**	**318KLD**
01	For Flushing Purposes	63 KLD
02	For Landscape	31 KLD
03	HVAC cooling	200 KLD
04	DG cooling	24KLD
	Make up water required [B-A]	80 KLD

- **Power Requirement**:

The power shall be supplied by BSES Delhi. The total connected load. Power shall be supplied by transformers of total 4,656KW Electric sub -station consisting of 2*1,000 KVA Transformers (Existing) + 3*1600 KVA Transformers- (2W+1S) New proposed (On load Tap Changer) shall be provided with. Provision of Main LT panels, Isolator panels and capacitor panels besides HT XLPE cables & 4 panels HT board.

- **D.G. set details:**
- In case of power failure, DG sets of total capacity of 4,030 KVA (3*1500 kVA) will be provided as power back-up for building.
- The DG sets will be provided with acoustic enclosure. Adequate stack heights of D.G. Sets will be provided as per the stipulated guidelines of Central Pollution Control Board (CPCB) to facilitate natural dispersion of exhaust gases as the calculation for the stack height is given below considering height of the building.

- **Parking Facility**

Adequate parking (641ECS) provision will be kept for vehicles parking in the Project site. Besides this, internal road of sufficient width within the project will facilitate smooth traffic movement.

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 and disturbance to the local ecology).

- The project being a well-planned activity will result in organized open spaces and green areas. About 10,191.8m^2 (@27.82% of PA) of the area is earmarked for landscaping. The project will have an overall positive impact on the existing land use and will not cause any disturbance to the local ecology. Proposed activity shall have no impact on surroundings.

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

- There shall be no land disturbance resulting in erosion, subsidence and instability. The soil type is sandy clay and the project area possesses fairly plain terrain, the contour survey of the site is carried out. The project will develop proper green and paved area which will not cause soil erosion and subsidence. The site falls under the zone IV as per the Indian standard seismic map of India and indicating moderate damage risk zone. The project will be earthquake resistant taking into account the latest provisions of Indian Standards Codes.
- The detailed soil analysis is attached.

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

- The project does not intersect any natural drainage route. No perennial or non-perennial drainage system is found to exist in the project area or being obstructed by the project. The surroundings comprise an urbanized stretch. Well planned

storm water drainage has been designed to take care of internal storm water drainage. Thus, no impact on the natural drainage system is anticipated.

Annexure 1 : Storm Water management/RWH Plan

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 of area, some amount of excavation material will be carried out in order to provide foundation of basement. This excavated soil will be properly stacked within the site under tarpaulin cover and will be reused for backfilling purpose, road construction etc. The top soil will be preserved separately and will be used for landscaping purpose the earthwork shall include soil excavation and cutting. Approx. 31,933.895m^3 of the earth will be moved. The cut and fill material in the project site is nearly at par and hence the need for movement of soil to and from the site is not anticipated.

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

- **Water Supply During Construction Phase:**

During the construction phase the water requirement (approx. 2,022.97 ML) will be met from Private water. No ground water will be extracted. Hence, there will be no impacts on ground water environment during construction phase.

- **Sewage Generation and Disposal During Construction Phase**

The quantity of sewage generation during the construction phase will be approx. 5.4 KLD. Thus the sewage will be treated by providing small septic tanks, soak trenches and sulabhshauchalaya type mobile toilets.

- **Waste Handling During Construction Phase:**

The solid waste expected to be generated during the construction phase will comprise of excavated materials, used bags, bricks, concrete, MS rods, tiles, wood etc. The following steps are proposed to be followed for the management solid waste:

- Construction yards are proposed for storage of construction materials.
- The excavated material such as topsoil and stones will be stacked for reuse during later stages of construction.
- Excavated top soil will be stored in temporary constructed soil bank and will be reused for landscaping during operational phase of the site.
- Remaining soil shall be utilized for refilling / road work / rising of site level at locations/ selling to outside agency for construction of roads etc. Construction waste management is shown in Figure 1

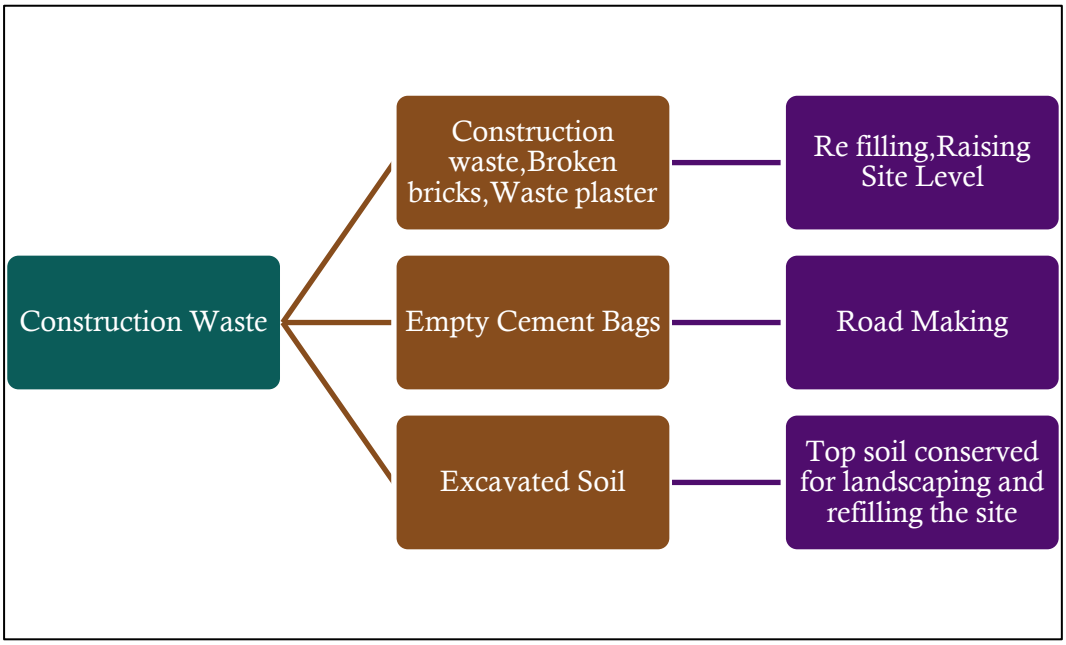

Figure 1: Solid Waste Management for Construction Phase

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

- No. The site area is a flat land and the surroundings are characterized by an urbanized stretch. No low lying areas or wetlands are found in the region.

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).

- No health hazards are expected during the construction phase. The laborers will be provided with face masks to minimize dust inhalation.
- A significant portion of the construction waste and wood scrap generated will be used on the site. The remaining waste will be transported to a government approved dumping site.
- The quantity of domestic waste generated will be very little, as mostly local laborers will be employed. However, the wastes generated will be collected and disposed by an authorized agency.

2. Water Environment

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

- **Water Requirement and its break up for various use:**

Total water requirement for hospital Project (Existing + Proposed) is 537 KLD. The fresh water will be obtained from water supply department of DJB. Detail of water requirements for various uses is given in below table. Efficient dual flushing fixtures will be provided for conservation of fresh water. The daily water requirement calculation is given below.

Table 2: Calculation for Daily Water Demand

Sl. No.	Description	Population/Area in (m^2)/other details	Unit water Consumption (LPCD)	Total Water Requirement(KLD)
a)	**Main Uses**			
	IPD (Patient, Attendants, Visitors and Staff)	432	450	194.4
	OPD	1728	15	25.92 say 26
	Clinical water	20 liters/bed	20 liters/bed	21.6 say 22
	Laundry(432 beds)	@3.5 kg/bed	@ 25lt/kg/day	37.8 say 39
	Water consumption for main uses			**281.4 say 281**
b)	Other Uses			
	Landscaping	10,191.8	3ltrs/m^2	30.57 say 31
	HVAC	2,000 TR	10lt/hr/TR	200
	DG cooling	3*1500 kVA	0.9l/kVA/hr	24.3
	Total Water Demand			**536.7 say 537 KLD**

Wastewater calculation with respect to ETP

S. No.	Description	Quantity (KLD)
01	**Fresh and flushing water requirement includes:** • IPD& OPD for proposed facility (@5% of total IPD& OPD water requirement) • Laundry-432 beds • Clinical activities	72 11 39 22
02	Wastewater going to ETP @ 80% of (72 KLD)	**57.6 say 58 KLD**
03	**ETP Capacity Proposed**	**80 KLD**

Wastewater calculation with respect to STP

S.No.	Description	Quantity (KLD)
1	Fresh water requirement for uses except- (5% IPD,OPD ,laundry and clinical) @ 70% of (281–72 = 209 KLD)	146 KLD
2	Flushing water requirement for uses except- (5% IPD,OPD and laundry,) @ 30% of (281 – 72 = 209 KLD)	63 KLD
3	Wastewater Generation @ (80% of Freshwater + 100% of Flushing)	179.8 say 180 KLD
4	Blow down water from HVAC cooling (@30%)	60 KLD

	TOTAL WASTE WATER GENERATION [3+4]	**240 KLD**
	STP CAPACITY PROPOSED	**288 say 300 KLD**

Total quantity of wastewater generation will likely to be 300 KLD (bi furcation shown in table above). The generated sewage will be collected and treated in the in-house Sewage treatment plant of capacities, 240 KLD, 300 KLD and ETP of 80 KLD capacity. The treated wastewater will be used for HVAC Cooling, flushing and gardening. Water Balance diagram are shown below

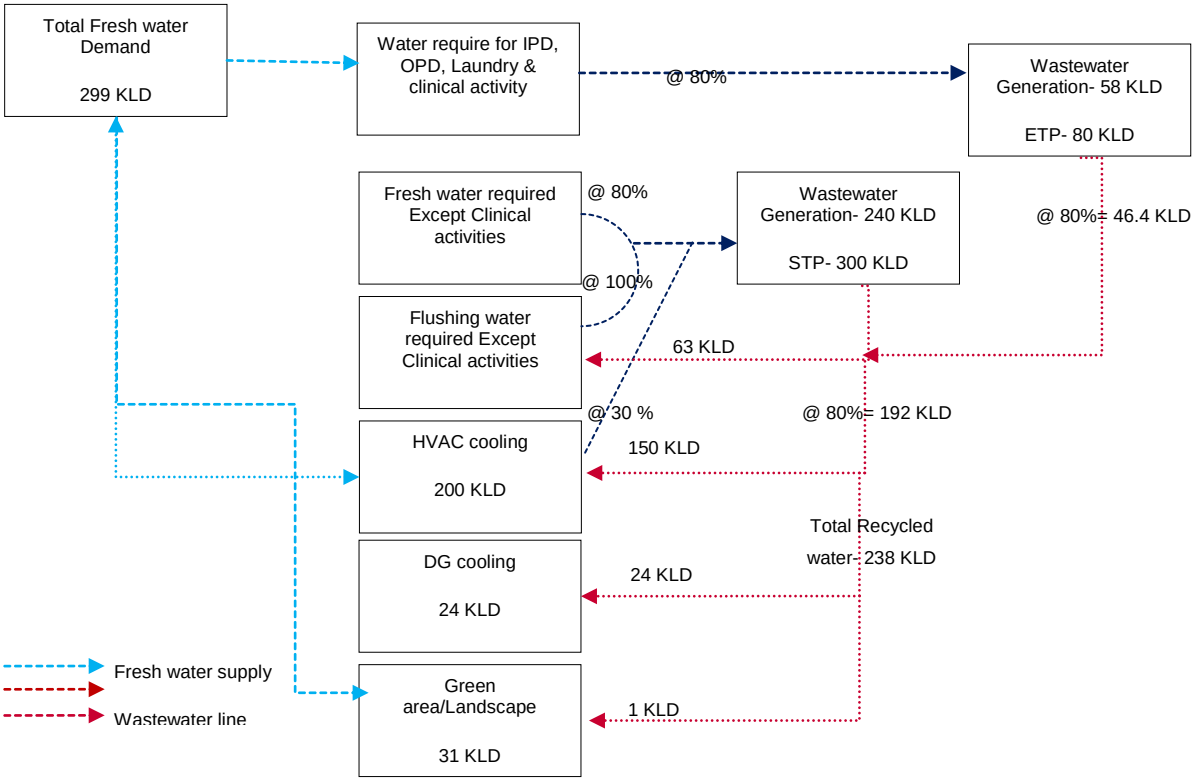

Figure 2: Water Balance diagram during non-monsoon season

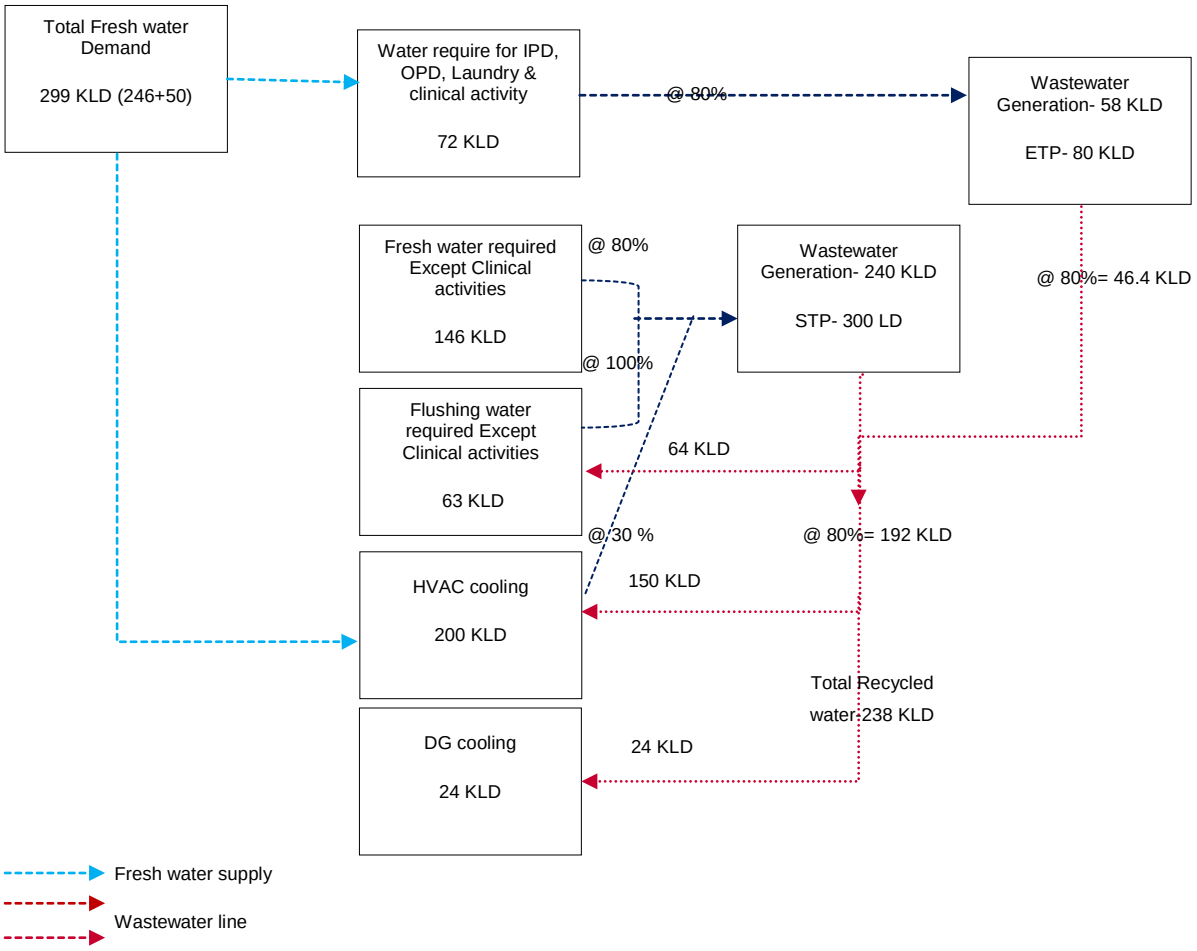

Figure 3: Water balance diagram during monsoon season

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

There will be municipal supply/ground water for the Hospital Project and it is a dependable source of water.

1.3 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).

If the water supply source is not municipal, in that case water quality characteristics are mentioned in baseline data.

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

Quantity of domestic sewage generated during operational phase shall be 240 KLD, However the effluent generate from Clinical activity and laundry shall be approx. 58KLD Thus the domestic sewage will be treated through sewage treatment plant of300 KLD and Effluent shall be treated in ETP of 80 KLD capacity. The treated sewage will be re used for flushing (63KLD) greenbelt development (1KLD) and for HVAC (150 KLD) and for DG cooling (24 KLD).

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

No, there will not be any diversion of water from other users. Rise in water demand is a local phenomenon but the project would only involve spatial shifting of water demand within a region.

1.5 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.

Quantity of domestic sewage generated during operational phase shall be 240 KLD, However the effluent generate from Clinical activity and laundry shall be approx. 58 KLD Thus the domestic sewage will be treated through sewage treatment plant of 300 KLD and Effluent shall be treated in ETP of 80 KLD capacity. The treated sewage will be re used for flushing (63 KLD) greenbelt development (1 KLD) and for HVAC (150 KLD) and for DG cooling (24 KLD).

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

Rain water harvesting pits will be constructed all around the compound wall to collect rain water. Excess storm water will be allowed to drain into the external storm drain.

Rain water harvesting pits will be constructed all around the compound wall to collect rain water. Excess storm water will be allowed to drain into the external storm drain.

Rain water harvesting has been catered to and designed as per the guideline of CGWA. Annual average rainfall is 611 mm. The recharge well of 3mtr dia. and 3mtr depths will be constructed for recharging the water. The bottom of the recharge structure will be kept 5 m above this level. At the bottom of the recharge pit, a filter media is provided to avoid choking of the recharge bore.

The pit will be filled with rounded gravel 5 to 10 mm size. The sectional detail of the proposed rain water recharge pit is provided.

The path ways around the harvesting lines will be graded to facilitate drainage into trenches proposed around the compound. Recharge wells/pits are envisaged along the path of the storm water drains for rain water recharging& surplus water from the recharge wells/pits shall be diverted to the storm water drainage network.

The collected storm water will be allowed to percolate to the sub-soil by suitably designed percolation pits. The pits will be designed based on the soils percolation capability. The subsoil water table is high in these areas and however harvesting pits with bores will be provided.

Percolation pits of suitable numbers will be provided for recharge of ground water potential. A total of 9 rain water harvesting pits will be constructed. The quantity of storm water load for the proposed construction project is given below.

Table 3-Calculation for Storm water load

S. No.	Type of Surface	Catchment's Area (sq. mtrs)	Run off Coff.	Peak rainfall intensity (in m)	Rain water harvesting potential (in m^3/hr)
	Building				
1.	G.C. Area	9,123.97	0.8	0.035	255.47
2.	Paved area	17,314.23	0.7	0.035	424.19
3.	Green area	10,191.8	0.1	0.035	35.67
Total Storm water load calculated					715.33
	Considering 15 mins retention period				178.83
	Taking the effective volume of rainwater harvesting pit (3 mtrs dia, 3 mtrs depth.)				21.19
	Rainwater harvesting pits required				8.43
	However, total no. of rainwater harvesting				**9 (1pit/Acre)**

Volume of a single Recharge pit = π r2h = 3.14 × 1.5 × 1.5 × 3 = 21.19 m3
Rainwater Harvesting Pits calculated = 178.83/21.19 = 8.43 say 9
Total No. of rainwater harvesting pits proposed = 4

Total No. of rainwater harvesting pits Existing = 5

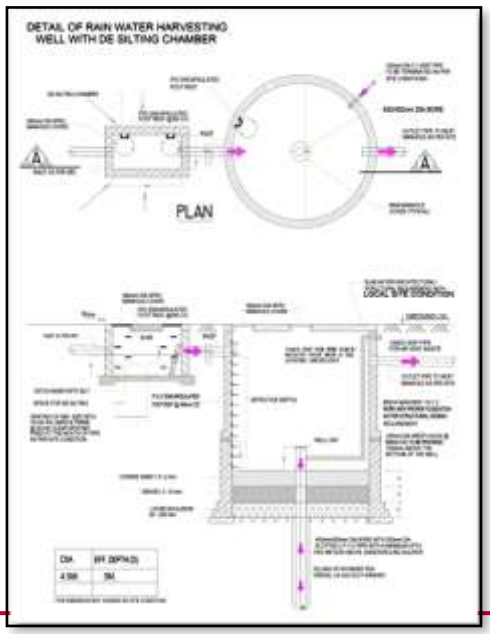

Figure 4: Section Detail of De silting chamber and RWH Pit

1.7 What would be the impact of the land use changes occurring due to the 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 project will include paved areas and thus the runoff from the plot is expected to increase due to reduced infiltration. However, the increased runoff will not cause flooding or water logging as a well-designed storm water drainage will be provided. The runoff will finally be collected into rainwater harvesting pits for groundwater recharging. The quality of the runoff is expected to improve due to paved areas.

1.8 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)

During the operational phase water demand will be fulfilled from municipal water supply. No adverse impact is expected on this account as extensive rainwater harvesting will be implemented across the project site. To reduce the freshwater demand and hence the groundwater stress, treated wastewater will be used for landscaping, HVAC cooling, flushing.

1.9 What precautions/ measures have been proposed to check the surface run-off, as well as uncontrolled flow of water into any water body?

The following management measures are suggested to protect the water quality are:

- Avoid excavation during monsoon season.
- Care would be taken to avoid soil erosion.

- Community toilets shall be constructed on the site during construction phase and the wastewater will be channelized to the septic tank in order to prevent wastewater from entering the water bodies.
- Any area with loose debris/soil within the site shall be fully planted by local plant species.
- To prevent surface and ground water contamination by oil/grease, leak proof containers would be used for storage and transportation of oil/grease. The floors of oil/grease handling area would be kept effectively impervious.
- Collection and settling in the storm water, prohibition of equipment wash downs, and prevention of soil loss and toxic release from the construction site will be adhered to minimize water pollution.

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

Most of the storm water produced on site will be harvested for ground water recharge. Thus proper management of this resource is a must to ensure that it is free of contamination. A detailed Storm Water Management Plan will be developed which will consider the sources of storm water. The plan will incorporate best management practices which will include the following:

- Regular inspection and cleaning of storm drains.
- Installation of clarifiers or Oil/Water separators/traps system of adequate capacity around parking areas and garages as per requirement.
- Avoid application of pesticides and herbicides before wet season.
- Conducting routine inspections to ensure cleanliness.
- Preparation of spill response plans, particularly for fuel and oil storage areas. Provision of silt traps in storm water drains.

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

- No, mostly local laborers will be employed during the construction phase and thus negligible quantities of wastes will be generated. Mobile toilets will be provided and the wastewater generated will be collected in septic tanks.

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

- **Construction Phase**

The quantity of sewage generation during the construction phase will be approx. 5.4 KLD. Thus the sewage will be treated by providing small septic tanks, soak trenches and sulabhshauchalaya type mobile toilets.

- **Operational Phase**

  Quantity of domestic sewage generated during operational phase shall be 240 KLD, However the effluent generate from Clinical activity and laundry shall be approx. 58 KLD Thus the domestic sewage will be treated through sewage treatment plant of 300 KLD and Effluent shall be treated in ETP of 80 KLD capacity. The treated sewage will be re used for flushing (63 KLD) greenbelt development (1 KLD) and for HVAC (150KLD) and for DG cooling (24 KLD).

- **Give Details of dual plumbing system if treated waste used for flushing of toilets or any other use.**

Dual plumbing system that utilizes separate piping systems for freshwater and recycled wastewater will be adopted for the project. Treated water from the on-site STP is estimated at 300 KLD. The recycled water system shall utilize this treated wastewater and serve for non-contact uses such as flushing, horticulture, HVAC cooling etc.

2 Vegetation

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

No ecologically sensitive area falls within the project site. Hence, no ecological/biological threat has been anticipated.

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

- No. The project does not support any significant vegetation. It is proposed to develop a multilayered peripheral greenbelt of native plant species to enhance the aesthetic value of the region and also provide an excellent habitat for various faunal groups. There is Evergreen tall and ornamental trees have been proposed to be planted inside the premises.

2.3 What is the measure 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?).

- Total green area measures 10191.8m2 (27.82% of Plot Area)
- A diverse variety of indigenous evergreen and ornamental trees would be planted. Total numbers of trees to be cut/transplant are 89 and new trees proposed are 480.
- The plant species will be selected on the basis of Urban Standard Plantation norms and CPCB guidelines.
- Landscape Details are given in table below. Landscape Plan is attached.

Annexure 2: Landscape Plan

Table 4 : Landscape Area Details

Particulars	Details
Net Plot area	36,630 m^2

Landscape area Proposed	10,191.8 m^2(27.82% of Plot Area)
As Per MoEF Guidelines	One tree per 80 m2 of total area out of which minimum 50 % to be in the category of evergreen trees.
Trees Required	36,630/80= 457.87Trees
Total Existing Tree on site	398
Trees to be Transplant	89
Tree to be Retained	309
Compensatory Trees	**89*10= 980**

3 Fauna

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

No. The existing land use around the site is urban and does not provide a habitat for wild species. The multilayered peripheral greenbelt will provide an excellent habitat for the native fauna.

3.2 Are there any direct or indirect impacts on the avifauna of the area? Provide details

The project will not have any direct or indirect impacts on the avifauna of the area. However, planting of fruit bearing trees in the proposed greenbelt will be an attraction to the local bird population.

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

Not applicable

4 Air Environment

4.1 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 construction).

Ambient air monitoring is carried out at the project site. During the post construction phase, cars, scooter/motorcycle will be owned by the residents of Hospital. Vehicular

emissions will be major source of air pollution in addition to DG set. Quantum and dispersion of pollutants form vehicular emission will depend upon the following:

- Volume of traffic on the roads,
- Meteorological conditions.
- Emission sources from D.G. Sets.
- From vehicular emissions, PM, NO_2 and CO is pollutants of primary concern. The dispersion of vehicular emissions would be confined within 100 m from the road and concentration will decrease with the increase in distance from road. It is anticipated that the contribution of vehicular emissions in ambient air quality will be marginal but well within the stipulated National Ambient. At higher wind speed dispersion will be faster.
- **Mitigation Measures:** The Hospital Project will develop a green belt inside the premises of the project site and along the internal road, which will work as barrier for the movement of pollutants and help in pollution control.

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

- Dispersion modeling of pollutants from DG sets using ISCST3 software, resultant GLC for various airs is carried out
- In case of power failure, DG sets of total capacity of 4,030 KVA (3*1500 kVA) will be provided as power back-up for building.
- The DG sets will be provided with acoustic enclosure.

  The DG sets will be equipped with acoustic enclosure to minimize noise generation and adequate stack height for proper dispersion. This will cause emissions of PM, S_{O2}, N_{O2} and CO. However, the D.G. Sets will be operational only during power failure and low sulphur diesel will be used. Adequate stack heights of D.G. Sets will be provided as per the stipulated guidelines of Central Pollution Control Board (CPCB) to facilitate natural dispersion of exhaust gases as given below considering height of the building:

4.3 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 and exit to the project site.

No, there will be no shortage in parking space after coming up this project as adequate provision will be made for car/vehicle parking at the project site. There shall also be adequate parking provisions for visitors so as not to disturb the traffic and allow smooth movement at the site

Proposed project will be consists of basement, Multilevel and open parking. The parking space criteria and area requirement provided are summarized below tables. Parking details are designed as per Delhi Building Bye Laws. Parking Plan is attached.

Annexure 3: Parking Plans

Table 5 : **Parking Required for Existing area**

For Hospital Building (Existing)	
Parking required as per the old norms of MPD 2001	0.67 ECS/100 m^2 of FAR
Parking required (Hospital)	0.67/100 × 26,396.72 = 176.86 ECS
Total Parking Required (A)	**176.86 say 177 ECS**
For Residential Building (Existing)	
Parking required as per the old norms of MPD 2001	1.33 ECS/100 m^2 of FAR
Parking required (Residences)	1.33/100 ×10,428.94=138.70 ECS
Total Parking Required (Residences)	138.70 say 139 ECS
Total Parking Required	**177+139 = 316ECS**

Parking Proposed (Expansion)

For Hospital Building	
Proposed area in open	903.91 m^2
Parking required for 1 ECS in open area	16 m^2
Parking Proposed (surface)	**56.49*3 =169 ECS**
Parking area in MLCP	16,650m^2
Parking required for 1 ECS in MLCP	16 m^2

Parking Proposed in MLCP	**472ECS**
Total ECS Proposed	**(169+472) 641 ECS**

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

Internal roads of sufficient width, footpaths/pedestrian pathways have been well planned for the project.

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

No significant impact of noise has been anticipated within and outside of the project site due to provision of wide roads for smooth flow of traffic and greenbelt along the roads. Noise, due to the traffic, within site, will result in a marginal increase in the noise levels because noise control measures shall be provided in vehicles & DG sets as mentioned below, which will cause slight increase in noise level.

4.6 What will be the impact of D.G. sets and other equipment on noise levels and vibration in ambient air quality around the project site? Provide details.

During operation, vehicular movement and operation of DG sets are the major sources of noise pollution. But both these activities- DG set and vehicular movement will not have any significant impact on the people residing in the area. Since DG set will not be operational continuously and moreover it will be placed away from residential settlements and will be enclosed with suitable enclosures, hence no or minimal impact will be anticipated. It is envisaged that the movement of the motor vehicles will be restricted to designated carriageways only.

Impacts on Air Quality due to DG Sets:

- Impacts on ambient air during operation phase would be due to emissions from the stacks attached to backup DG sets only during grid power failure.

Mitigation Measures for Impacts of DG Sets on Ambient Air Quality:

- Back up DG sets will comply with the applicable emission norms.
- Adequate stack height for DG sets will be provided as per norms.
- Back up DG sets will be used only during power failure.
- Monitoring of emissions from DG sets and ambient air quality will be carried out as per norms.

Noise Control Measures for DG sets:

- DG sets will be installed in the basement to minimize the impact on ambient noise.
- DG room will be provided with acoustic lining / treatment to insure 25 dB (A) insertion loss as per the regulations.
- Adequate exhaust mufflers will be provided as per norms to limit the noise.

5 Aesthetics

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

The site lies in an urbanized settlement and is well planned. Thus, no obstruction of view or scenic beauty or landscape is anticipated. Furthermore, the construction will be planned in such a way that the organized open spaces and landscaped areas will render the plot aesthetically appealing

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

No impacts anticipated.

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

The project will strictly follow the Area Building Regulation of NBC. All norms on Ground Coverage, FAR, Height, Setbacks, Fire Safety Requirements, Structural Design and other parameters will be strictly adhered to.

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

No anthropological or archaeological sites or artifacts are found near the site area.

6 Socio-Economic Aspect

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

No such changes anticipated.

Construction phase: Since local labourers will be engaged during construction phase, alteration to the existing demographic profile of the area is not anticipated.

Operation phase: The changing demography in the area is another impact that needs attention. The project will mainly lead to spatial redistribution of local population and hence no considerable influx of population is envisaged owing to the project.

6.2 Give details of the existing social infrastructure around the project.

The area around the project is surrounded by local land area. Areas occupied by sensitive man-made land uses like schools, places of worship, community facilities including the good infrastructure facilities.

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

Construction phase: There are no religious sites or archeological monuments of historical significance in or near the project site. Hence, no adverse impact in this regard is anticipated. Rather, this phase will generate jobs that relate to unskilled, semi-skilled as well as skilled labour category. Few supervisory positions will also open up, for which local candidates will be considered based on merit.

Operation phase: The project will provide state-of-the-art medical facility in the area, thereby improving the quality of life.

7 Building Material

7.1 This 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)

For the purpose of paved path, sun dried pavers will be used instead of baked pavers as they are manufactured through energy efficient processes.

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

Mitigation Measures for Air Pollution during Construction Stage:

- Construction materials will be suitably covered with tarpaulin cover etc during transportation.
- Water sprinkling shall be done on haul roads where dust generation is anticipated.
- Raw material storage and handling yard will be enclosed from all sides.
- To minimize the occupational health hazard, proper personal protective gears i.e. mask shall be provided to the workers working in the dust prone areas.

Mitigation Measures for Noise Pollution during Construction Stage:

- Administrative as well as engineering control of noise will be implemented.
- Isolation of noise generation sources and temporal differentiation of noise generating activities will ensure minimum noise at receiver's end.
- To prevent any occupational hazard, earmuff / earplug shall be given to the workers working around construction plant & machinery emitting high noise levels.
- Use of such plant or machinery shall not be allowed during night time. Careful planning of machinery operation and scheduling of operations shall be done to minimise such impact.

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

Yes, Recycled materials will be bought from outside sources and will be used as fillers in base and sub-base of the carriageway, footpaths pavements or pedestrian way, as needed.

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

Following arrangements will be made at the site in accordance to Municipal Solid Wastes (Management and Handling) Rules, 2000 and amended Rules; 2008 and as per BMW rules 1989.

Collection and Segregation of waste

Bio-Medical Waste

- Collection of bio medical waste will be done as per the bio Medical waste (Management and Handling) rules 1998.
- General health-care waste will be collected the stream of domestic refuse for disposal.
- Sharps will be collected together, regardless of whether or not they are contaminated. Containers will be puncture-proof (usually made of metal or high-density plastic) and fitted with covers.
- Highly infectious waste will be, whenever possible, be sterilized immediately by autoclaving. It therefore needs to be packaged in bags that are compatible with the proposed treatment process: red bags, suitable for autoclaving, are recommended.

- Small amounts of chemical or pharmaceutical waste will be collected together with infectious waste.
- Waste will be collected and stored in colour coded bins.

For Domestic Waste

- A door to door collection system will be provided for collection of domestic waste in colored bins from every unit.
- The local vendors will be hired to provide separate colored bins for dry recyclables and Bio-Degradable waste.
- For waste collection, adequate number of colored bins (Green and Blue & dark grey bins– separate for Bio-degradable and Non Bio-degradable) are proposed to be provided at the strategic locations of the area.
- Litter bin will also be provided in open areas like parks etc.

Treatment of Waste

Hospital Waste

- Autoclaving
- Bleaching

Domestic Waste

Bio degradable Waste

- Bio-degradable waste will be subjected to Organic Waste Converter and the compost/resultant will be used as manure.
- STP sludge is proposed to be used for horticultural purposes as manure.
- Horticultural Waste is proposed to be composted and will be used for gardening purposes.
- Recyclable Waste
- The cropped grass will be spread on the green area. It will act as manure after decomposition.
- Recyclable wastes like paper, plastic, metals etc. will be sold off to recyclables.

Disposal

Recyclable and non-recyclable wastes will be disposed through Govt. approved agency. Hence, the Municipal Solid Waste Management hospital waste management will be conducted as per the guidelines of Municipal Solid Wastes (Management and Handling) Rules, 2000 and amended Rules, 2008 and Bio-Medical Waste Management and Handling Rules 1989.A Solid waste management Scheme is depicted in the following figure.

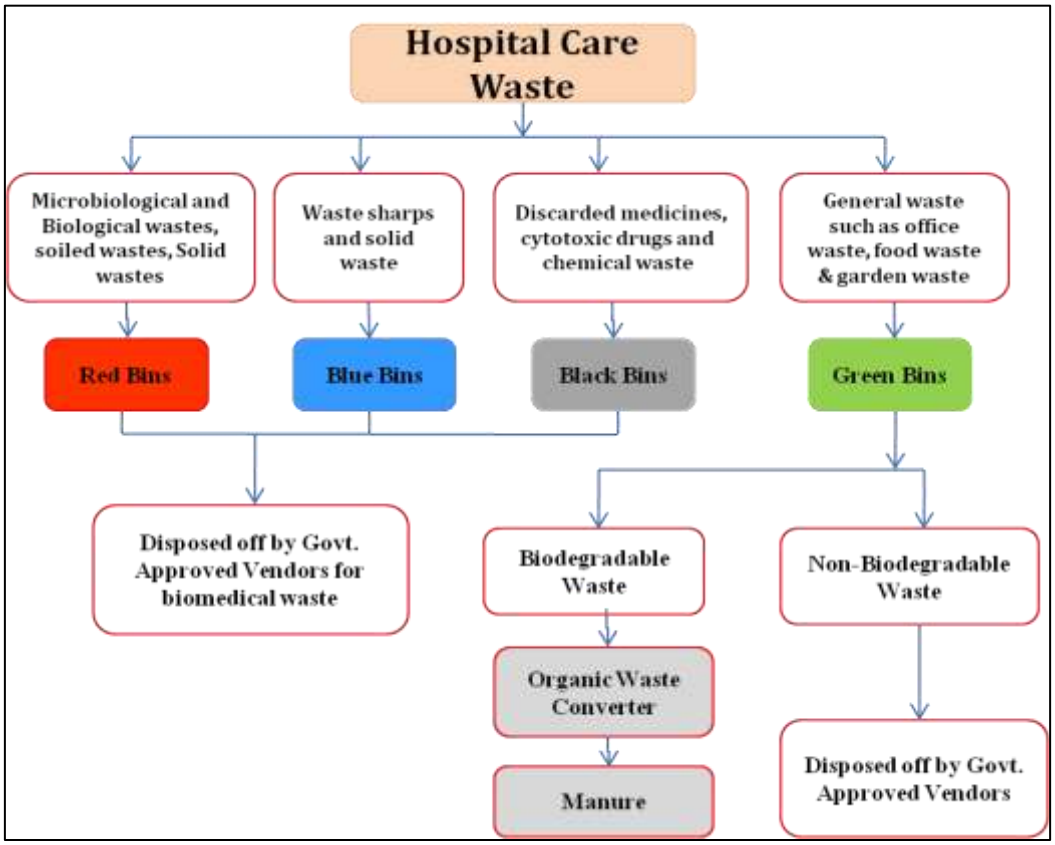

Figure 5: Solid Waste Management Scheme-Hospital Waste (Operation Phase)

8 Energy Conservation

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

Power Details

The power shall be supplied by BSES Delhi. The total connected load 4,656KWElectric sub -station consisting of 2*1,000 KVA Transformers (Existing) + 3*1600 KVA Transformers- (2W+1S) new proposed.

D.G. set details

In case of power failure, DG sets of total capacity of 4,030 KVA (3*1500 kVA) will be provided as power back-up for building.

The DG sets will be provided with acoustic enclosure.

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

Effective measures have been incorporated to minimize the energy consumption in following manners:

- Solar street lights. Solar blinkers. Roof top SPV (Solar Photo voltaic) systems with or without grid interaction.
- All external lighting shall be BEE star rated. All internal lighting shall be BEE star rated and solar lit,
- All common spaces including street lights (where there is no use of light for reading purposes), shall be of "LED".
- Solar street light controllers will be used for automatic dusk to dawn operation of street lights.
- Traffic light, blinkers, direction signage, based on LEDs shall be powered by solar.
- A minimum of 20% hot water requirement shall be met by solar water heating systems. Integration of automated system to operate electrical equipment as per load requirement to save energy

8.2 What type and capacity of power backup do you plan to provide?

The power shall be supplied by BSES Delhi. Power shall be supplied by transformers of total load4,656KWElectric sub -station consisting of 2*1,000 KVA Transformers (Existing) + 3*1600 KVA Transformers- (2W+1S) new proposed. Power shall be

D.G. set details

In case of power failure, DG sets of total capacity of 4,030 KVA (3*1500 kVA) will be provided as power back-up for building.

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

8.3 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?

Specification of glass to be used in hospital block -Colored tinted float glass 6mm thick substrate with reflective soft coating on face
2, + 12mm Air gap + 6mm Heat Strengthened clear Glass of approved make having properties as visible Light transmittance (VLT) of 25 to 35 %, Light reflection internal 10 to 15%, light reflection external 10 to 20 %, shading coefficient (0.25- 0.28) and U value of 3.0 to 3.3 W/m2 degree K etc.

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

Passive solar design refers to use of the sun's energy for the heating and cooling of living spaces. Pergolas, projections, façade elements, metal louvers will be provided for sun shading to reduce the heat influx into the building and thus reduce the air conditioning loads

8.5 Does the layout of street & building 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.

Layout of buildings has been done as per the sun path analysis so that the design cuts off direct radiations of critical hours which are specific to the orientation. Solar energy will be harnessed to meet various energy requirements of the project such as:

- Solar street lights.
- Solar blinkers.

8.6 Is the shading effectively used to reduce cooling/heating lands? 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?

Plantation along periphery and at suitable location is planned to provide shade to roads and building envelope. East and west façade has been suitably modified to reduce heat gain. Passive solar architectural measures have been adopted and provided shading devices for windows which would effectively reduce heating up of building envelope.

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

Yes. The walls and rooms will be insulated such that air conditioning load is reduced. Well-designed building structures will allow natural light to enter. Measures prescribed in Energy Conservation Building Code 2007 will be adopted to reduce the heat influx by walls, roofs and openings. Only prescribed quality of glasses will be used.

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

Heat emissions from the proposed construction may be from the following sources:

- Heat absorbed from the paved and concrete structures
- Heat generated from equipment/appliances
- Heat increase due to population increase in the housing project.

However, the heat generated will not be significant and will be dissipated in the greens and open areas provided within the project area.

8.9 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 value or the R values of the individual components.

Since the project building envelope for external walls will be made of bricks and structures of concrete and steel. 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

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

Firefighting measures shall be adopted as per the guidelines of NBC. External yard hydrants installed around all buildings in the complex and galvanized steel fire hose boxes/cabinet (weather proof). All external yard hydrants shall be at one meter height from finished ground level as per NBC at a distance of 45 m along the road. External fire hydrants shall be located such that no portion of any building is more than 45 m from a hydrant and the external hydrants are not vulnerable to mechanical or vehicular damage.

Fire hydrant system will be provided within the buildings, fire escape staircases and refuge areas will be provided and the building structures will be planned as per NBC. In addition, 10 kg fire extinguishers will be provided for class A, B, and C fires. CO_2 extinguishers will also be provided.

Precaution & Mitigation Methods to Prevent Disasters:

(Fire Hazard)

- Fire safety would be taken into account and would follow all the safety norms and regulations as per the NBC and other related Indian Standards.
- All electrical cables would be underground and sophisticated modern electrical distribution system to reduce risk of fire.

- Special firefighting equipment's like Automatic Fire Detection and alarm system, automatic Sprinkler System etc. would be installed as per the NBC standards.
- Risk assessment with onsite disaster management plan will be specified to fire, smoke and other emergency conditions.

Fire Fighting Plan and Evacuation Plan are attached.

Annexure 4: Fire Fighting Plan

Annexure 5 : Evacuation Plan

8.11 If you are using glass as wall materials, provide details and specifications including emissivity and thermal characteristics.

The project being Hospital Project and will not involve use of glass as wall material. All fenestration with U-factors, SHGC, or visible light transmittance determined, certified and labeled in accordance ISO 15099 shall be adopted.

8.12 What is the rate of air infiltration in to the building? Provide details of how you are mitigating the effects of infiltration.

Air tight construction is proposed with provision of sealants & flashing wherever required. However leakage will be restricted within the limits specified in ECBC 2007.

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

Solar energy will be variedly used as:

- Solar street lights and solar blinkers.
- Green CFLs will be used in buildings to minimize the energy consumption.
- Green area is provided along with tree plantation which will result in natural air cooling and will reduce the load on conventional energy sources.

9 Environment Management Plan

The Environment Management Plan (EMP) would consist of all mitigation measures for each component of the environment due to the activities increased during the construction, operation and the entire life cycle to minimize adverse environmental impacts resulting from 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 sites including fire, Electrical etc. The detailed EMP for the project is given below.

9.1. Purpose of EMP

The Environment Management Plan (EMP) is a site specific plan developed to ensure that the project is implemented in an environmental sustainable manner where all contractors and subcontractors, including consultants, understand the potential environmental risks arising from the project and take appropriate actions to properly manage that risk. EMP also ensures that the project implementation is carried out in accordance with the design by taking appropriate mitigation actions to reduce adverse environmental impacts during its life cycle. The plan outlines existing and potential problems that may adversely impact the environment and recommends corrective measures where required. Also, the plan outlines roles and responsibility of the key personnel and contractors who will be in-charge of the responsibilities to manage the project site.

- EMP prepares in accordance with rules and requirements of the MoEF and CPCB/ SPCB
- To ensure that the component of facility are operated in accordance with the design
- A process that confirms proper operation through supervision and monitoring
- A system that addresses public complaints during construction and operation of the facilities and
- A plan that ensures remedial measures is implemented immediately.

The key benefits of the EMP are that it offers means of managing its environmental performance thereby allowing it to contribute to improved environmental quality. The other benefits include cost control and improved relations with the stakeholders.

9.2. Major Elements of EMP

- Commitment & Policy: The management will strive to provide and implement the Environmental Management Plan that incorporates all issues related to air, water, land and noise.
- Planning: This includes identification of environmental impacts, legal requirements and setting environmental objectives.
- Implementation: This comprises of resources available to the developers, accountability of contractors, training of operational staff associated with environmental control facilities and documentation of measures to be taken.
- Measurement & Evaluation: This includes monitoring, counteractive actions and record keeping.

An Environmental Management Plan (EMP) will be required to mitigate the predicted adverse environmental impacts during construction and operation phase of the project and these are discussed in later subsections.

9.3. EMP for Air Environment

Construction Phase

To mitigate the impacts of PM during the construction phase of the project, the following measures are recommended for implementation:

- A dust control plan
- Procedural changes to construction activities

Dust Control Plan

The most cost-effective dust suppressant is water because water is easily available on construction site. Water can be applied using water trucks, handled sprayers and automatic sprinkler systems. Furthermore, incoming loads could be covered to avoid loss of material in transport, especially if material is transported off-site.

Procedural Changes to Construction Activities

Idle time reduction: Construction equipment is commonly left idle while the operators are on break or waiting for the completion of another task. Emission from idle equipment tends to be high, since catalytic converters cools down, thus reducing the efficiency of hydrocarbon and carbon monoxide oxidation. Existing idle control technologies comprises of power saving mode, which automatically off the engine at preset time and reduces emissions, without intervention from the operators.

Improved Maintenance: Significant emission reductions can be achieved through regular equipment maintenance. Contractors will be asked to provide maintenance records for their fleet as part of the contract bid, and at regular intervals throughout the life of the contract. Incentive provisions will be established to encourage contractors to comply with regular maintenance requirements.

Reduction of On-Site Construction Time: Rapid on-site construction would reduce the duration of traffic interference and therefore, will reduce emissions from traffic delay.

Operation Phase

To mitigate the impacts of pollutants from DG set and vehicular traffic during the operational phase of the project, following measures are recommended for implementation:

1. DG set emission control measures
2. Vehicular emission controls and alternatives
3. Greenbelt development

1. Diesel Generator Set Emission Control Measures

Adequate stack height will be maintained to disperse the air pollutants generated from the operation of DG set to dilute the pollutants concentration within the immediate vicinity. Hence no additional emission control measures have been suggested.

2. Vehicle Emission Controls and Alternatives

- During construction, vehicles will be properly maintained to reduce emission. As it is a residential Hospital, vehicles will be generally having "PUC" certificate.
- Footpaths and Pedestrian ways: Adequate footpaths and pedestrian ways would be provided at the site to encourage non-polluting methods of transportation.

3. Greenbelt Development

Increased vegetation in the form of greenbelt is one of the preferred methods to mitigate air and noise pollution. Plants serve as a sink for pollutants, act as a barrier to break the wind speed as well as allow the dust and other particulates to settle on the leaves. It also helps to reduce the noise level at large extent. The following table indicates various species of the greenbelt that can be used to act as a barrier.

9.4. EMP For Noise Environment

Construction Phase

To mitigate the impacts of noise from construction equipment during the construction phase on the site, **the following measures are recommended for implementation.**

1. **Time of Operation:** Noisy construction equipment would not be allowed to use at night time.
2. **Job Rotation and Hearing Protection:** Workers employed in high noise areas will be employed on shift basis. Hearing protection such as earplugs/muffs will be provided to those working very close to the noise generating machinery.

Operation Phase

To mitigate the impacts of noise from diesel generator set during operational phase, **the following measures are recommended**:

1. **Adoption of Noise emission control technologies**
2. **Greenbelt development**

1. **Noise Emission Control Technologies**

- The DG set room will be provided with acoustic enclosure to have minimum 25 dB (A) insertion loss or for meeting the ambient noise standard whichever is on higher side as per E (P) Act, GSR 371 (E) and its amendments.
- It would be ensured that the manufacturer provides acoustic enclosure as an integral part along with the diesel generators set. Further, enclosure of the services area with 4 m high wall will reduce noise levels and ensure that noise is at a permissible limit for resident of the site and surrounding receptors.

2. **Greenbelt Development**

Total green area measures 10,191.8 m^2 (27.82 % of Plot Area) is being proposed. A diverse variety of indigenous evergreen and ornamental trees would be planted. The plant species will be selected on the basis of Urban Standard Plantation norms and CPCB guidelines.

9.5. EMP For Water Environment

Construction Phase

To prevent degradation and to maintain the quality of the water source, adequate control measures have been proposed. To check the surface run-off as well as uncontrolled flow of water into any water body check dams with silt basins are proposed. **The following management measures are suggested to protect the water source being polluted during the construction phase:**

1. Avoid excavation during monsoon season. Care would be taken to avoid soil erosion
2. Common toilets will be constructed on site during construction phase and the wastewater would be channelized to the septic tanks in order to prevent enter into the water bodies
3. Any area with loose debris within the site shall be planted. To prevent surface and ground water contamination by oil and grease, leak-proof containers would be used for storage and transportation of oil and grease. The floors of oil and grease handling area would be kept effectively impervious. Any wash off from the oil and grease handling area or workshop shall be drained through imperious drains
4. Collection and settling of storm water, prohibition of equipment wash downs and prevention of soil loss and toxic release from the construction site are necessary measure to be taken to minimize water pollution
5. All stacking and loading area will be provided with proper garland drains, equipped with baffles, to prevent run off from the site, to enter into any water body.

Operation Phase

In the operation phase of the project, water conservation and development measures will be taken, including all possible potential for rain water harvesting. **Following measures will be adopted:**

1. Water source development.
2. Minimizing water consumption.
3. Promoting reuse of water after treatment and development of closed loop systems for different water streams.

1. Water Source Development

Water source development shall be practiced by installation of scientifically designed Rain Water Harvesting system. Rainwater harvesting promotes self-sufficiency and fosters an appreciation for water as a resource.

2. Minimizing Water Consumption

Consumption of fresh water will be minimized by combination of water saving devices and other domestic water conservation measures. Further, to ensure ongoing water conservation, an awareness program will be introduced for the residents. The following section discusses the specific measures, **which shall be implemented:**

1) **Domestic and Commercial Usage**
   - Use of water efficient plumbing fixtures (ultra-low flow toilets, low flow sinks, water efficient dishwashers and washing machines). Water efficient plumbing fixtures uses less water with no marked reduction in quality and service
   - Leak detection and repair techniques.
   - Sweep with a broom and pan where possible, rather than hose down for external areas. Meter water usage: Implies measurement and verification methods.
   - Monitoring of water uses is a precursor for management.
2) **Horticulture**
   - Drip irrigation system shall be used for the lawns and other green area. Drip irrigation can save 15-40% of the water, compared with other watering techniques.
   - Plants with similar water requirements shall be grouped on common zones to match precipitation heads and emitters.
   - Use of low-angle sprinklers for lawn areas.
   - Select controllers with adjustable watering schedules and moisture sensors to account for seasonal variations and calibrate them during commissioning.
   - Place 3 to 5 inches of mulch on planting beds to minimize evaporation.

3. Promoting Reuse of Water after Treatment and Development of Closed Loop Systems

To promote reuse of wastewater and development of closed loop system for wastewater segregation, two wastewater schemes are suggested, namely:

1) Storm Water Harvest
2) Wastewater recycling

Storm water harvest as discussed in earlier, will be utilized for artificial recharge of ground water sources; and wastewater will be reused on site after treatment.

Treated wastewater will be used for landscaping, flushing, DG set cooling and recreational purpose. Following section discuss the scheme of wastewater treatment.

1) Storm Water Management

Most of the storm water produced on site will be harvested for ground water recharge. Thus proper management of this resource is a must to ensure that it is free from contamination.

Contamination of Storm Water is possible from the following sources:

- Diesel and oil spills in the diesel power generator and fuel storage area
- Waste spills in the solid / hazardous waste storage area
- Oil spills and leaks in vehicle parking lots
- Silts from soil erosion in gardens
- Spillage of sludge from sludge drying area of sewage treatment plant cum ETP

A detailed storm water management plan will be developed which will consider the possible impacts from above sources. The plan will incorporate best management practices which will include following:

- Regular inspection and cleaning of storm drains
- Clarifiers or oil/separators will be installed in all the parking areas. Oil / grease separators installed around parking areas and garages will be sized according to peak flow guidelines. Both clarifiers and oil/water separators will be periodically pumped in order to keep discharges within limits
- Covered waste storage areas
- Avoid application of pesticides and herbicides before wet season
- Secondary containment and dykes in fuel/oil storage facilities
- Conducting routine inspection to ensure cleanliness
- Provision of slit traps in storm water drains
- Good housekeeping in the above areas

2) Wastewater Treatment Scheme

Well-designed STP and ETP shall be installed for wastewater treatment

9.6. EMP for Land Environment

Construction Phase

The waste generated from construction activity includes construction debris, biomass from land clearing activities, waste from the temporary make shift tents for the labors and hazardous waste. Following section discuss the management of each type of waste. Besides waste generation, management of the topsoil is an important area for which management measures are required.

1) Construction Debris

Construction debris is bulky and heavy and re-utilization and recycling is an important strategy for management of such waste. As concrete and masonry constitute the majority of waste generated, recycling of this waste by conversion to aggregate can offer benefits of reduced landfill space and reduced extraction of raw material for new construction activity. This is particularly applicable to the project site as the construction is to be completed in a phased manner.

Mixed debris with high gypsum, plaster, shall not be used as fill, as they are highly susceptible to contamination.

Metal scrap from structural steel, piping, concrete reinforcement and sheet metal work shall be removed from the site by construction contractors. A significant portion of wood scrap will be reused on site. Recyclable wastes such as plastics, glass fiber insulation, roofing etc. shall be sold to recyclers.

Construction sites are sources of many toxic substances such as paints, solvents wood preservatives, pesticides, adhesives and sealants. Hazardous waste generated during construction phase shall be stored in sealed containers and disposed of as per The Hazardous Wastes (Management & Handling) Rules, 1989.

Some management practices to be developed are:

- Herbicides and pesticide will not be over applied (small-scale applications) and not applied prior to rain.
- Paintbrushes and equipment for water and oil based paints shall be cleaned within a contained area and will not be allowed to contaminate site soils, water courses or drainage systems
- Provision of adequate hazardous waste storage facilities. Hazardous waste collection containers will be located as per safety norms and designated hazardous waste storage areas will be away from storm drains or watercourses
- Segregation of potentially hazardous waste from non-hazardous construction site debris

- Well labeled all hazardous waste containers with the waste being stored and the date of generation
- Instruct employees and subcontractors in identification of hazardous and solid waste
- Wastes generated from temporary make shift labor tents will mainly comprise of household domestic waste, which will be managed by the contractor of the site. The sullage generated will be channelized to the septic tank.
- **Top Soil Management: To** minimize disruption of soil and for conservation of top soil, the contractor shall keep the top soil cover separately and stockpile it. After the construction activity is over, top soil will be utilized for landscaping activity.

Other measures, which would be followed to prevent soil erosion and contamination include:

- Maximize use of organic fertilizer for landscaping and green belt development
- To prevent soil contamination by oil/grease, leaf proof containers would be used for storage and transportation of oil/grease and wash off from the oil/grease handling area shall be drained through impervious drains and treated appropriately before disposal
- Removal of as little vegetation as possible during the development and re-vegetation of bare areas after the project.
- Working in a small area at a point of time (phase wise construction)
- Construction of erosion prevention troughs/berms.

Operational Phase

The philosophy of solid waste management at the proposed complex will be to encouraging the four R's of waste i.e. **R**eduction, **R**euse, **R**ecycling and **R**ecovery (materials & energy). Regular public awareness meetings will be conducted to involve the residents in the proper segregation and storage techniques. The Environmental Management Plan for the solid waste focuses on three major components during the life cycle of the waste management system i.e., collection and transportation, treatment or disposal and closure and post-closure care of treatment/disposal facility.

1) **Collection and Transportation**

- During the collection stage, the solid waste of the project will be segregated into biodegradable waste and non-biodegradable. Biodegradable waste and non-biodegradable waste will be collected in separate bins. Biodegradable waste will be treated in the project premises by organic waste converter. The recyclable wastes will be sent off to recyclables. Proper guidelines for segregation, collection and storage will be prepared as per MSW Rules, 2000 and amended Rules, 2008.
- To minimize littering and odor, waste will be stored in well-designed containers/ bins that will be located at strategic locations to minimize disturbance in traffic flow
- Care would be taken such that the collection vehicles are well maintained and generate minimum noise and emissions. During transportation of the waste, it will be covered to avoid littering.

2) Disposal

With regards to the disposal/treatment of waste, the management will take the services of the authorized agency for waste management and disposal of the same on the project site during its operational phase.

9.7. EMP for Ecological Environment

Construction activity changes the natural environment. The project requires the implementation of following choices exclusively or in combination.

Construction Stage

- Restriction of construction activities to defined project areas, which are ecologically sensitive
- Restrictions on location of temporary labor tents and offices for project staff near the project area to avoid human induced secondary additional impacts on the flora and fauna species
- Cutting, uprooting, coppicing of trees or small trees if present in and around the project site for cooking, burning or heating purposes by the labors will be prohibited and suitable alternatives for this purpose will be made

- Along with the construction work, the peripheral green belt would be developed with suggested native plant species, as they will grow to a full-fledged covered at the time of completion.

Operation Stage

Improvement of the current ecology of the project site will entail the following measures:

1) Plantation and Landscaping
2) Green Belt Development
3) Park and Avenue Plantation

The section below summarizes the techniques to be applied to achieve the above objectives:

1) Plantation and landscaping

Selection of the plant species would be done on the basis of their adaptability to the existing geographical conditions and the vegetation composition of the forest type of the region earlier found or currently observed.

2) Green Belt Development Plan

The plantation matrix adopted for the green belt development includes pit of 0.3m × 0.3m size with a spacing of 2 m x 2 m. In addition, earth filling and manure may also be required for the proper nutritional balance and nourishment of the sapling. It is also recommended that the plantation has to be taken up randomly and the landscaping aspects could be taken into consideration.

Multi-layered plantation comprising of medium height trees (7 m to 10 m) and shrubs (5 m height) are proposed for the green belt. In addition creepers will be planted along the boundary wall to enhance its insulation capacity.

Selection of Plant Species for Green Belt Development

The selection of plant species for the development depends on various factors such as climate, elevation and soil. The plants would exhibit the following desirable characteristics in order to be selected for plantation

- The species should be fast growing and providing optimum penetrability
- The species should be wind-firm and deep rooted
- The species should form a dense canopy
- As far as possible, the species should be indigenous and locally available
- Species tolerance to air pollutants like SO_2 and NO_2 should be preferred

- The species should be permeable to help create air turbulence and mixing within the belt
- There should be no large gaps for the air to spill through
- Trees with high foliage density, leaves with larger leaf area and hairy on both the surfaces
- Ability to withstand conditions like inundation and drought
- Soil improving plants (Nitrogen fixing rapidly decomposable leaf litter)
- Attractive appearance with good flowering and fruit bearing
- Bird and insect attracting tree species
- Sustainable green cover with minimal maintenance.

3) Parks and Avenue Plantation

3).1. Parks and gardens maintained for recreational and ornamental purposes will not only improve the quality of existing ecology at the project site but also will improve the aesthetic value.

3).2. Avenue Plantation

- Trees with colonial canopy with attractive flowering
- Trees with branching at 7 feet and above
- Trees with medium spreading branches to avoid obstruction to the traffic
- Fruit trees to be avoided because children may obstruct traffic and general movement of public

9.8. EMP For Socio-Economic Environment

The social management plan has been designed to take proactive steps and adopt best practices, which are sensitive to the socio-cultural setting of the region. The Social Management Plan for Hospital Project focuses on the following components:

Income Generation Opportunity during Construction and Operation Phase

The project would provide employment opportunity during construction and operation phase. There would also be a wide economic impact in terms of generating opportunities for secondary occupation within and around the complex.

The main principles considered for employment and income generation opportunities are out lined below:

- Employment strategy will provide for preferential employment of local people

- Conditions of employment would address issues like minimum wages and medical care for the workers.
- Contractors would be required to abide to employment priority towards locals and abide by the labor laws regarding standards on employee terms and conditions.

Improved Working Environment for Employees

The project would provide safe and improved working conditions for the workers employed at the facility during construction and operation phase. With the proposed ambience and facilities provided, the complex will provide a new experience in living and recreations. **Following measures would be taken to improve the working environment of the area:**

- Less use of chemicals and biological agents with hazard potential
- Developing a proper interface between the work and the human resource through a system of skill improvement
- Provision of facilities for nature care and recreation e.g. indoor games facilities
- Measures to reduce the incidence of work related injuries, fatalities and diseases
- Maintenance and beautifications of the complex and the surrounding roads

9.9. EMP For Energy Conservation

Energy conservation program will be implemented through measures taken both on energy demand and supply.

Energy conservation will be one of the main focus during the complex planning and operation stages. The conservation efforts would consist of the following:

1) **Architectural design**
   - Maximum utilization of solar light will be done.
   - Maximize the use of natural lighting through design.
   - The orientation of the buildings will be done in such a way that maximum daylight is available.
   - The green areas will be spaced, so that a significant reduction in the temperature can take place.
2) **Energy Saving Practices**

- Energy efficient lamps will be provided within the complex.
- Constant monitoring of energy consumption and defining targets for energy conservation.
- Adjusting the settings and illumination levels to ensure minimum energy used for desired comfort levels.

3) Behavioral Change on Consumption

- Promoting resident awareness on energy conservation
- Training staff on methods of energy conservation and to be vigilant to such opportunities.

9.10. Environmental Management System and Monitoring Plan

For the effective and consistent functioning of the proposed complex, an Environmental Management system (EMS) would be established at the site. The EMS would include the following:

1) An Environmental management cell.
2) Environmental Monitoring.
3) Personnel Training.
4) Regular Environmental audits and Correction measures.
5) Documentation – standards operation procedures Environmental Management Plan and other records.

1) An Environmental management cell.

Apart from having an Environmental Management Plan, it is also proposed to have a permanent organizational set up charged with the task of ensuring its effective implementation of mitigation measures and to conduct environmental monitoring. The major duties and responsibilities of Environmental Management Cell shall be as given below:

- To implement the environmental management plan.
- To assure regulatory compliance with all relevant rules and regulations.
- To ensure regular operation and maintenance of pollution control devices.
- To minimize environmental impact of operations as by strict adherence to the EMP.
- To initiate environmental monitoring as per approved schedule.

- Review and interpretation of monitored results and corrective measures in case monitored results are above the specified limit.
- Maintain documentation of good environmental practices and applicable environmental laws for a ready reference.
- Maintain environmental related records.
- Coordination with regulatory agencies, external consultants, monitoring laboratories.
- Maintenance of log of public complaints and the action taken.

Hierarchical Structure of Environmental Management Cell

Normal activities of the EMP cell would be supervised by a dedicated person who will report to the site manager/coordinator of the Hospital. The hierarchical structure of suggested Environmental Management Cell is given in following Figure

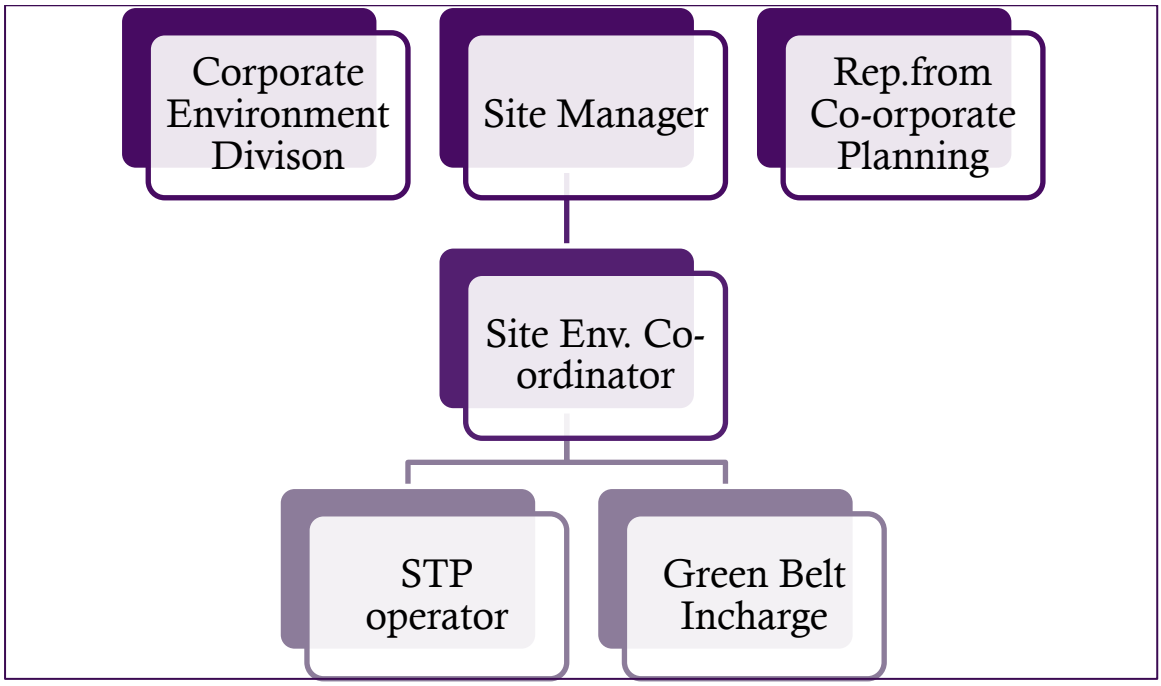

Figure 6: Environment Management Cell

2) Environmental Monitoring

The purpose of environmental monitoring is to evaluate the effectiveness of implementation of Environmental Management Plan (EMP) by periodic monitoring. The important environmental parameters within the impact area are selected so that any

adverse effects are detected and time action can be taken. The project proponent will monitor ambient air Quality, Ground Water Quality and Quantity, and Soil Quality in accordance with an approved monitoring schedule.

Table 6: Suggested Monitoring Programme

S. No.	Type	Locations	Parameters	Period and Frequency
1.	Ambient Air Quality	Project Site	Criteria Pollutants: SO_2, NO_2, $PM_{2.5}$, PM_{10},CO	Once in a six months.
2.	Groundwater (Portability testing)	Project site	Drinking water parameters as per IS 10500.	Once in a six months.
3.	Ambient Noise	Project site	dB (A) levels	Once in a six months.
4.	Fresh water quality	Municipal Supply	As per IS 10500 potable water standards	Once in a six months.
5.	Soil quality	Project site	Organic matter, C.H., N, Alkalinity, Acidity, heavy metals and trace metal, Alkalinity, Acidity.	Once in a six months.
6.	Waste Characterization	Residential	Physical and Chemical composition	Daily Basis.
7.	Treated water	Outlet of STP	BOD, MPN, coliform count, etc.	Daily Basis.

3) Awareness and Training

Training and human resource development is an important link to achieve sustainable operation of the facility and environment management. For successful functioning of the project, relevant EMP would be communicated to: Residents and Contractors
Residents must be made aware of the importance of waste segregation and disposal, water and energy conservation. The awareness can be provided by periodic Integrated Society meetings. They would be informed of their duties.

4) Environment Audit and Corrective Action Plan

To assess whether the implemented EMP is adequate, periodic environmental audits will be conducted by the project proponent's Environmental division. These audits will be followed by Correction Action Plan (CAP) to correct various issues identified during the audits.

Environment Clearance Application

[CONCEPTUAL PLAN]

FOR

EXPANSION OF SATYAWADI RAJA HARISH CHANDRA GOVERNMENT HOSPITAL

AT

SECTOR-7A,NARELA, NEWDELHI

DEVELOPED BY

PUBLIC WORKS DEPARTMENT (HEALTH) GOVT. OF NCT, DELHI

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Introduction

General

- As per the EIA Notification 2006, All the building construction projects/Area Development projects and Township Projects comes under schedule 8.All the projects which have built up area ≥20000 m2 and <1, 50,000 m^2 they come under schedule 8 (a).
- Total Built up area of the proposed hospital Project is 73,285.55 m^2. Which comes under schedule 8 (a) of listed schedules to Notification and has to obtain the Environment Clearance from SEIAA/MoEf&CC.

Brief About Project

- Satyawadi Raja Harish Chandra (SRHC) Government hospital is (200 Existing + 432 Proposed) 632 bedded hospital.
- Government of PWD proposed to expand the existing Satyawadi Raja Harish Chandra Hospital at Narela, Delhi into a hospital with modifications / re-modelling as per the specific needs and proposed for developing an ultra-modern Hospital as a dedicated facility for integrated care of cancer patients in the region. Also Proposed is to provide a 200 bedded maternity and trauma facility as required.
- New Construction of a Maternity and Trauma at the location of the existing sub-station block along with a Screening OPD at the physically available parking land within the premises of already existing and running facility of SRHC hospital.
- The existing buildings were constructed and also became operational prior to the publication of EIA Notification 2006. Therefore, the existing buildings did not attract applicability of to obtain Environmental Clearance from SEIAA/MoEf&CC and no environmental clearance was issued to PWD department. Accordingly, the issuance of certified monitoring report by Regional

Director of MoEf&CC is not applicable for the existing buildings. However, Consent to operate and occupational certificate for the existing building has been obtained from the concerned authorities.

Site Surroundings and Connectivity

Location

SRHC Government Hospital located at Sector-A7, Narela in North-West district of Delhi. The proposed site is connected to all the transport facilities. It is surrounded by areas Sector-A1, Sector-A10, Ravidas nagar, Narela Mandi, within 2 km of the area.
The geo graphical co-ordinates of site are given in table 1.

Table 1: Co-ordinates of the Site

Points	Latitude	Longitude
Centre of The plot	28°50'25.97"N	77°6'11.84"E
Corner-1	28°50'24.79"N	77°6'17.79"E
Corner-2	28°50'26.74"N	77°6'17.36"E
Corner-3	28°50'99.85"N	77°6'14.01"E
Corner-4	28°50'27.58"N	77°6'7.25"E
Corner-5	28°50'22.21"N	77°6'9.58"E

Figure 1-Project Location

Project site is adjacent to the sector-A1, Sector-A7. Site surroundings and Connectivity details of the project are given in below table. Site surroundings and site connectivity is shown in below table

Table 2 : Site Surroundings and Connectivity

S.No.	Particulars	Name	Distance (approx.)
1.	Nearest Railway Station	• Narela Railway station • Holami kalan Railway Station • Rathdhana Railway Station	1.84Km 4.25 km 8.23Km
2.	Nearest Airport	• IGI international Airport	31.50 km
3.	Nearest Populated Area	• Narela • Pana Mamurpur • Bankner Village • DSIDC Industrial Area	1.83 km 1.64Km 2.67Km 1.18Km
4.	Metro station	• Samaypur Badli	10.89Km
5.	State Boundary	• Delhi-HR State Boundary	6.13 km
6.	Nearest Roads	• Alipur Road • Bawana Road • NH-1 • Grand trunk Road	1.18Km 1.41Km 2.51Km 2.37Km
7.	Nearest School	• Lala Hans Raj Gupta ITI • Kasturi Ram College of Higher Eduction • HMR Institute of Technology and Management	1.91km 1.20Km 4.70Km
8.	Water body	• Yamuna River • Nazafgarh Drain	10.71km 2.82Km
9.	Forest	• Central Ridge Reserve Forest • Okhla Bird Sanctuary	25.10 km 32.18km

(Source: Google Earth Pro)

Google map and topographical map showing site and surroundings within 500 mtrs, 10 km and 15 km are attached.

Annexure 1- Google map showing site and surroundings within 500 mtrs
Annexure 2-Toposheet map showing site and surroundings within 10 and 15 km

Salient features of the Site

The salient features of the hospital project are as follow.

Table 3 : Salient Features

S.No.	Description	Proposed
1.	Plot Area	36,630 m²
2.	Proposed Built Up Area (Existing + Expansion)	73285.55m²(Existing-42,348.16 m^2 , Expansion - 35,828.65 m^2)
3.	Number of Beds	Total- 632 beds 200 (Existing) + 432(Proposed)
4.	Maximum Height	33.45 mtrs
5.	Maximum No. of Floors	B+G+8
6.	Cost of Project	Approx.Rs.204.35Crores
7.	Expected Population (Existing + Expansion)	12,672
8.	Total Water Requirement	537 KLD
9.	No. of RWH Proposed	9
10.	Parking Proposed	641 ECS
11.	Solid Waste Generation	1,874.30 kg/day [proposed]
12.	**Power Source & Requirement**	**Source-BSES 5,820 kVA**

Area Details

Site is having plot area of 36,630 m² (9.05 Acres).The existing hospital building having residential as well as hospital block. The existing building is having 200 bed facilities and new 432 beds are being proposed. Construction of a new Maternity Block at the site of existing sub-station and Screening OPD at the physically available parking land. The blocks C& D are already constructed with stronger foundation to take two additional floor load at a later stage. Total built up of existing + expansion area is 73285.55m^2
Area details are given in below table.

Table 4: Detailed area Statement

S.No.	Particulars	Existing Area (m^2)	Expansion Area (m^2)	Total Area (m^2)
1.	Plot Area			36,630 (9.05 acres)

2.	Permissible Plot Area for Hospital (H)			26,630
3.	Permissible area for Residence (R)			10,000
4.	**Total permissible Ground Coverage**			**20,146.5**
5.	Permissible Ground Coverage for Hospital (@40% of PA)			14,652
6.	Additional Permissible GC for MLCP (@5% of PA)			1,831.5
7.	Additional permissible GC for Atrium of hospital (@10%of PA)			3,663.00
8.	Permissible FAR (ROW 24 mtrs & above) @ 2.5			91,575
9.	Permissible FAR for Residential area (25%)			22893.75
10.	Proposed Ground Coverage for Hospital (@ 9.96 % of PA(H))	6,331.01 -	2,792.96	**9,123.97**
11.	Proposed Ground coverage for Residential (@5.76% of PA(R)) -Quarters (Type-I-V) -Hostel -Servant Quarter -Garage	1,320.31 628.976 474.9 191.28 25.15	- - - - -	1,320.31
12.	Proposed FAR for Hospital (@52.19% of PA(H))	**34,001.58**	**13,795.23**	**47,796.81**
13.	Proposed FAR for Residential -Quarters(Type I-V) -Hostel -Servant Quarter -Garage	**10,463.04** 6345.248 3746.7262 381.92 25.15	-	**10,463.04**
14.	**Built Up Area**	**39593.91**	**33,691.64**	**73,285.55**
15.	Service area (Free of FAR)	5,592.33	3,246.41	**8,838.74**
16.	Internal Road Area			3,760
17.	Open Area (hospital)			27,506.03
18.	MLCP Area	-	16,650	16,650
19.	Landscape Area (@ 27.82% of PA)			10,191.8
20.	Maximum Height of the Building(Hospital)	B+G+7 (23.95mtrs)	B+G+8 (33.45mtrs)	**33.45mtrs**

The site layout is attached.

Annexure 3 : Site Layout Plan

COVER AREA DETAILS

A) Existing Blocks

Table 5: Ground coverage & FAR Details for the Existing area+ proposed area

Floors	**FAR Area only (service area) (m2)**	FAR Area (m2) Proposed
Basement	1805.75	4213.43
Gr. Floor	1278.64	6058.10
First Floor	654.67	5897.28
Second Floor	651.75	5551.68
Third Floor	468.82	5734.61
Fourth Floor	422.52	4903.08
Fifth Floor	310.19	1643.40
Total Area	**5592.33**	**34001.5**

B) Proposed Block

Table 6-Ground coverage & FAR Details for the proposed block

Floors	**FAR area only (service area) (m2)**	FAR Area (m2) Proposed
Basement	424.05	1399.40
Gr. Floor	446.19	1341.04
First Floor	537.80	1213.75
Second Floor	304.73	1298.24
Third Floor	304.73	1298.24
Fourth Floor	189.20	1420.62
Fifth Floor	232.29	1387.52
Sixth Floor	116.95	1517.51
Seventh Floor	130.64	1485.14
Eighth Floor	201.79	1433.78
Terrace Floor	358.04	
Total Area	**3246.41**	**13795.23**

Population Density

During the Construction Phase

The total manpower requirement during construction phase of the expansion area will be an approximate 120-150 person which includes workmen, labourers, supervisors, engineers, architect and manager.

During Operational Phase

The total population of the project (Existing + Expansion) shall be approx. 12,672 persons that include residents; staff as well as Visitor population .The detailed population breakup including Staff members as well as visitors is given in the .

Table 7.

Table 7 : Population Break Up

S.N.	Particulars	Existing	Expansion	Total Population
A)	**Hospital Blocks**			
1.	No. of Beds (Patients)	200	432	632
2.	Staff	500	1728	2,228
3.	OPD	1170	1728	2898
4.	Visitors	**2340**	**3,564**	**5904**
	Sub- Total (A)			**11,662**
B)	**Residential Block**			
1.	Residents (96 D.U.)	480		
2.	Visitors (@10% of Population)	530		
	Sub-Total (B)	**1010**		**1010**
	Total Population (A + B)			**12,672**

Land Details

Land has been allotted for the construction of Hospital Building.

Topography

There are no significant physiographic features seen at the project site or the surroundings. The entire area is monotonously flat. The project area possesses plain terrain. Highest elevation levels is 213 mtrs & the lowest levels is 211 mtrs.

Water Requirement and Source

Construction Phase

The water requirement during the construction phase comprises of (i) fresh water for labourers, (ii) construction water.

It is estimated approx. 6.75 KLD (for 150 workers) of fresh water will be required for drinking purpose which will be imported in form of bottled cans from the local fresh water supplier during the days of construction.

It is envisaged that the embodied water of the major building materials together worked out to be 25.604 Kl/Sq m while the water consumed during the actual construction is 2 Kl/Sq m. Hence, the total embodied water during construction shall be approx. 2,022.97ML (27.604 Kl/ Sq. mof built area,). The water requirement shall be met via treated/fresh water supply.

(Source:- Assessment of water resource consumption in building construction in India,S. Bardhan, Dept. of Architecture, Jadavpur University, India)

Operational Phase

There will be a dual plumbing system for use of water for different applications thus saving on the high quality water. Installation of dual plumbing for using recycled water will save the potable water from authorized water agency. There will be two pipe lines, one supplying freshwater for drinking, cooking etc. And other for supply of recycled water for flushing, landscape irrigation, etc. this will result in saving of fresh water demand and life of existing sewerage will be improved. Other water conservation measure shall also be adopted to conserve water. The fresh water will be obtained from water supply department of DJB. Detail of water requirements for various uses is given in below table. Efficient dual flushing fixtures will be provided for conservation of fresh water. Storage structures in form of underground/overhead tanks will be constructed within the project site for storage of water. Storage shall be provided for one day requirement. Detailed water consumption at the site is given in table below. Existing total water demand is 390KLD.

Table 8-water conservation measure

Measures	Type
Water Conservation Fixtures	Dual plumbing cisterns, Dual flushing system, low flow taps, low flow urinals, sensor-based taps, low faucet taps, low flow showers, tap aerators, auto control valves and pressure reducing devices
Monetary Measures	Metering (flow water) and pricing of water
Leakage Prevention	Timely detection of leakages in pipeline & tanks
Wastage Prevention	Alarms for filling of tank
Storm water harvesting	Storm water collection and recharging system. Recharge pits to be provided for recharging collected rain water to ground.

Table 9: Total Water Requirement during Operational Phase for the Proposed Area

Sl. No.	Description	Population/Area in (m^2)/other details	Unit water Consumption (LPCD)	Total Water Requirement(KLD)
a)	**Main Uses**			
	IPD (Patient, Attendants, Visitors and Staff)	432	450	194.4
	OPD	1728	15	25.92 say 26
	Clinical water	20 liters/bed	20 liters/bed	21.6 say 22
	Laundry(432 beds)	@3.5 kg/bed	@ 25lt/kg/day	37.8 say 39
	Water consumption for main uses			**281.4 say 281**
b)	Other Uses			
	Landscaping	10,191.8	3ltrs/m^2	30.57 say 31
	HVAC	2,000 TR	10lt/hr/TR	200
	DG cooling	3*1500 kVA	0.9l/kVA/hr	24.3
	Total Water Demand			**536.7 say 537 KLD**

Table 10- Wastewater calculation with respect to ETP

S. No.	Description	Quantity (KLD)
01	**Fresh and flushing water requirement includes:** • IPD& OPD for proposed facility (@5% of total IPD& OPD water requirement) • Laundry-432 beds • Clinical activities	72 11 39 22
02	Wastewater going to ETP @ 80% of (72 KLD)	**57.6 say 58 KLD**
03	**ETP Capacity Proposed**	**80 KLD**

Table 11- Wastewater calculation with respect to STP

S.No.	Description	Quantity (KLD)
1	Fresh water requirement for uses except- (5% IPD,OPD ,laundry and clinical) @ 70% of (281–72 = 209 KLD)	146 KLD
2	Flushing water requirement for uses except- (5% IPD,OPD and laundry,) @ 30% of (281 – 72 = 209 KLD)	63 KLD
3	Wastewater Generation @ (80% of Freshwater + 100% of Flushing)	179.8 say 180 KLD
4	Blow down water from HVAC cooling (@30%)	60 KLD

	TOTAL WASTE WATER GENERATION [3+4]	**240 KLD**
	STP CAPACITY PROPOSED	**288 say 300 KLD**

Table 12- Summary of Water available for Reuse and Recycle

S.No.	Description	Quantity (KLD)
A)	**Recycled Water Available @ 80% of Waste Generated**	**238.4 say 238 KLD**
B)	**Recycled Water Required**	**318KLD**
01	For Flushing Purposes	63 KLD
02	For Landscape	31 KLD
03	HVAC cooling	200 KLD
04	DG cooling	24KLD
	Make up water required [B-A]	80 KLD

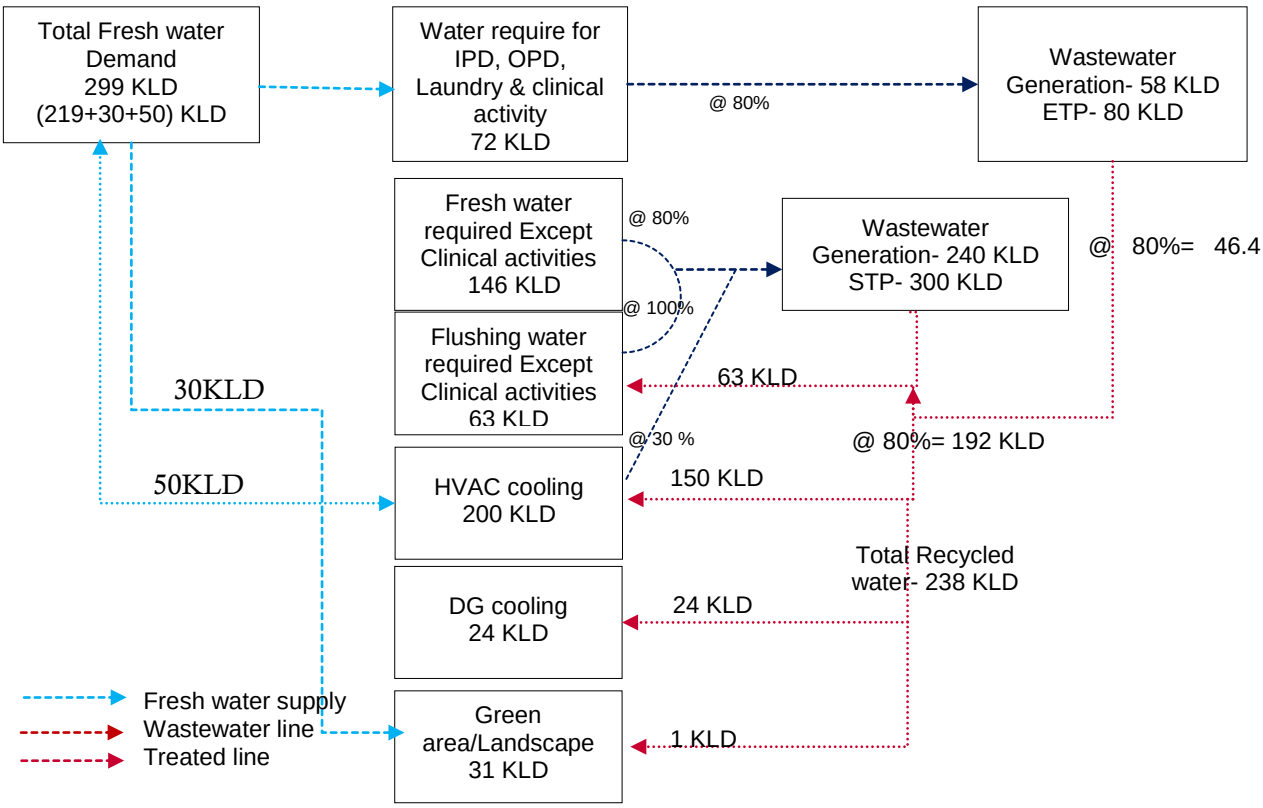


Figure 2- Water balance diagram during non-monsoon season

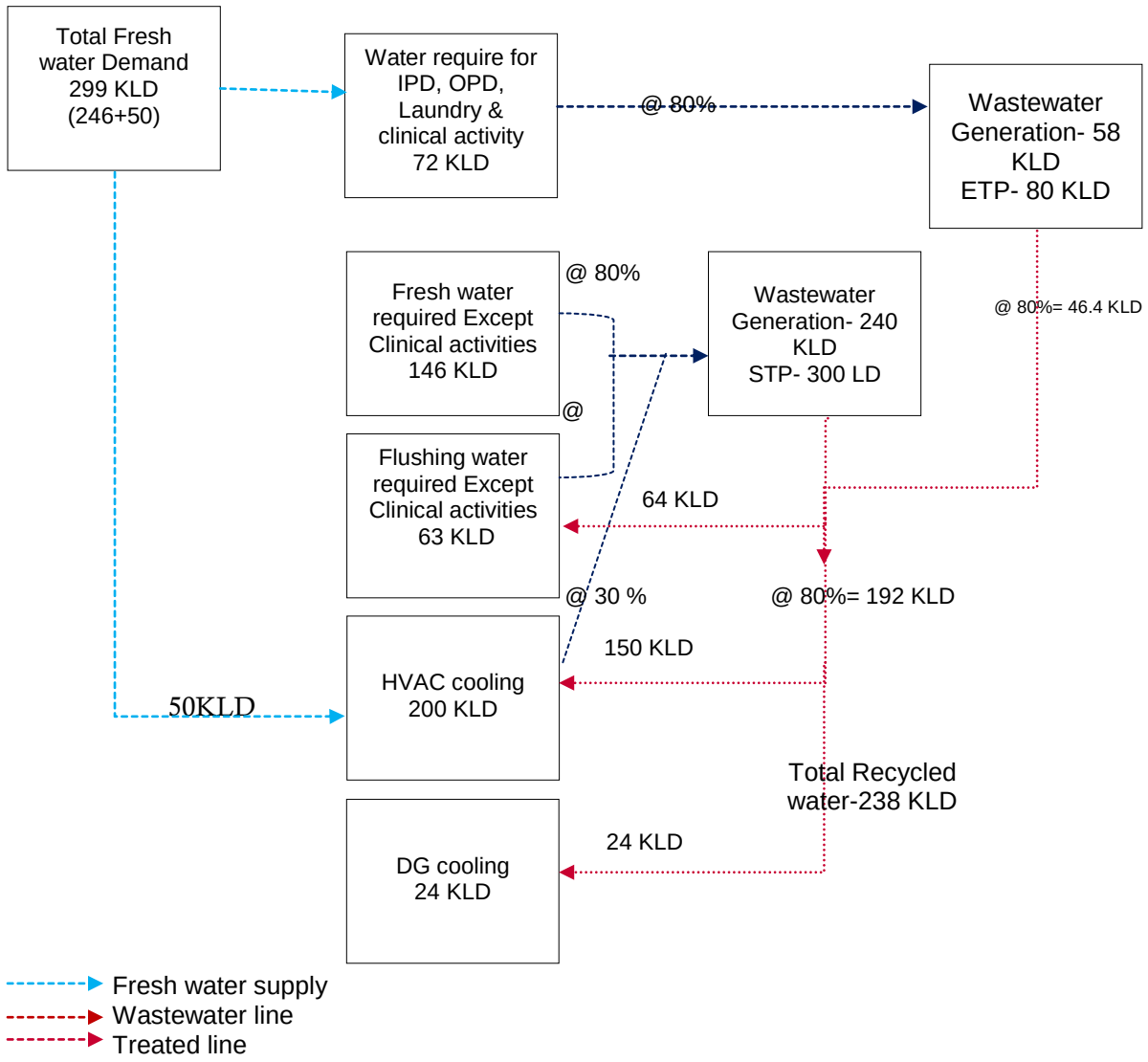


Figure 3- Water balance diagram during monsoon season

Sewage Generation and Disposal

During Construction Phase

The quantity of sewage generation during the construction phase will be approx. 5.4 KLD. Thus the sewage will be treated by providing small septic tanks, soak trenches and sulabh shauchalaya type mobile toilets.

During Operational Phase

Quantity of domestic sewage generated during operational phase shall be 240 KLD, However the effluent generates from Clinical activity and laundry shall be approx. 58 KLD Thus the domestic sewage will be treated through sewage treatment plant of 300 KLD and Effluent shall be treated in ETP of 80 KLD capacity. The treated sewage will be re used for flushing (63 KLD) greenbelt development (1 KLD) and for HVAC (150 KLD) and for DG cooling (24 KLD).

Sewage and Effluent Treatment Technology

Membrane Bio Reactor (MBR)

The MBR is a suspended growth-activated sludge system that utilizes micro porous membranes for solid/liquid separation instead of secondary clarifiers.

An external sewage network shall collect the sewage from all units, and flow by gravity to the proposed sewage treatment plant.

Following are the benefits of providing the Sewage Treatment Plant in the present circumstances:

- Reduced net daily water requirements, source for Horticultural purposes by utilization of the recoverable waste water.
- Reduced dependence on the public utilities for water supply and sewerage systems.
- Sludge generated from the Sewage Treatment Plant shall be rich in organic content and an excellent fertilizer for horticultural purposes.

The STP is being proposed with state-of-the-art membrane separation technology called as Membrane Bio-Reactor (MBR) which can produce very good quality with highest possible bacterial reduction without adding any chemicals. MBR (Membrane Bio Reactor) is the latest technology in wastewater treatment. MBR has many advantages such as higher quality of treated water, smaller space for installation and easier operation compared to conventional activated sludge process.

Designed to produce high quality treated water from wastewater the Membrane Bio Reactor (MBR) is among the latest technologies in biological treatment.

The characteristic of the MBR process is the use of revolutionary submerged polymeric hollow fibre membranes in the biological process water tank, so as to produce high quality permeate from domestic sewage, primary and secondary waste water, cooling tower blow down etc. The MBR is also ideal for retrofitting/augmenting capacity/quality of existing wastewater plants.

The hollow fibers are combined into bundles and wound around a carrier cartridge, which gives the membranes the required strength and allows for high-pressure air scour for cleaning. The MBR can handle very high sludge concentrations in the aeration tank because of which the size of the aeration tank reduces four to five folds. As the membrane acts as a fine filter, it does not require any further treatment using sand filters, activated carbon filters, etc. The MBR is available in standard and customized modules.

Process Description

Figure below shows the principle of the filtration for the flat sheet type submerged membrane. Activated sludge in the aeration tank is clearly removed by the flat sheet type submerged membrane. The membrane module consists of housing, aeration diffuser; permeate water manifold and membrane elements. The membrane element consisting of flat sheet membranes sandwiching a support panel is set up vertically. Feed water including activated sludge is filtrated by flat sheet membranes with pore size of 0.1 micron meter. The air bubbles supplied from the bottom of the membrane elements continuously scour off cake of activated sludge accumulated on the membrane surface. This is continuous filtration operation. The air bubbles are also used for the biological reaction to decompose organic substances included in the raw sewage.

MBR Module

The material of the membrane is PVDF (Poly vinylidene fluoride). PVDF is fluorine polymer, which has high stability for chemicals and good physical strength. The form of membrane is fibre reinforced flat sheet membrane. The membrane has small and uniform pore size. Therefore, the rejection property of this membrane is excellent. Almost all particles with sizes more than 0.1 micron meter can be removed effectively using this membrane.

Operation

Sewage from main drain line is collected through gravity pipes into a screen chamber. This manually cleaned screen is provided to remove floating and big size particles, which may choke the pumps and pipe lines.

Screened sewage is then passed through equalization tank to homogenize the sewage quality and also even out flow fluctuations and feed sewage of uniform quality at constant rate to subsequent treatment units. Air mixing is also provided to mix the contents of the equalization tank. A coarse bubble aeration grid is provided to distribute air uniformly at the base of the equalization tank.

After above treatment, raw sewage is fed into aeration basin.

In aeration tank, MLSS (mixed liquor suspended solids) in the range of 12000 to 15000 mg/l are maintained. The high amount of bacteria gives better and complete removal of

organic matter from the raw sewage in relatively small area. Oxygen required for the bacteria is supplied through the blower. The air is used both for scouring of membranes and supplying oxygen to bacteria.

The filtration is carried out by the suction pump directly sucking permeates water. The permeate water produced is clear and devoid of bacteria and viruses to the minimum levels.

As the membranes are continuously under operation, they are polluted with organic or inorganic substances. Hence, chemical cleaning is carried out once in two to three months for removing substances polluting and clogging the membranes. Normal cleaners used are sodium hypo chloride and citric acid.

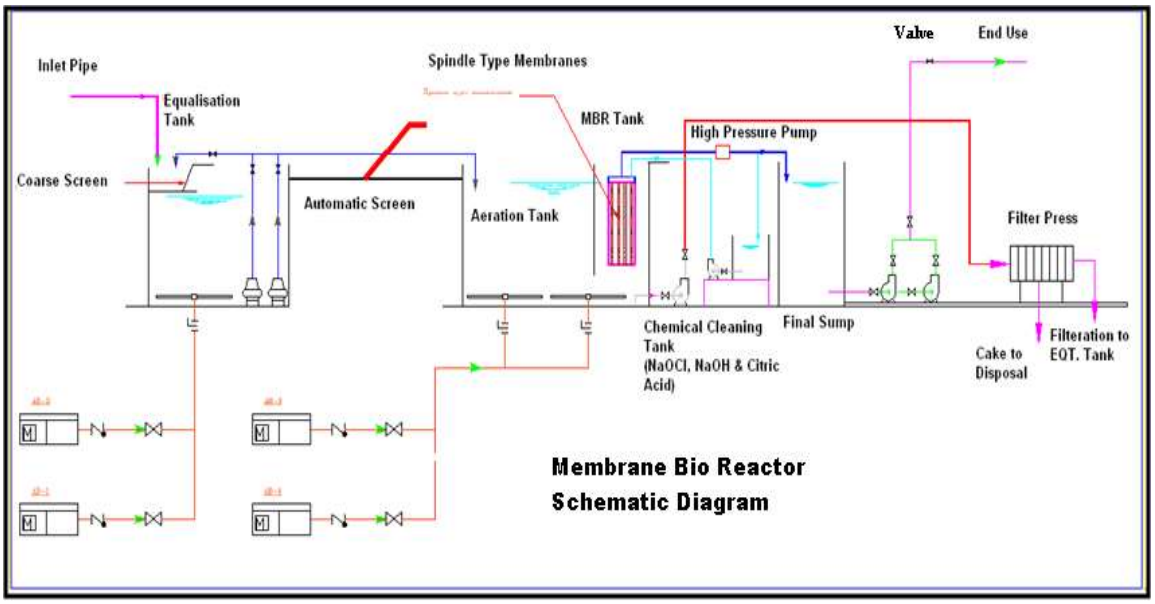


Figure 6: Schematic Diagram of MBR Technology STP

Sewer System

The alignment and slope of the sewer line will follow the road network, drains or natural ground surface and will be connected to the trunk sewers. The discharge point will be a treatment plant, a pumping station, a water course or an intercepting sewer. Pumping stations would be provided at places where the natural slope of the terrain is insufficient to permit gravity flow or the cost of excavation is uneconomical to do the same.

Table 13-Wastewater Details

Particulars	Quantity	
Daily load	240 KLD	
Duration of flow to STP	24 Hours	
Temperature	32^0 C	
	Inlet	Outlet (Treated Wastewater)

pH	6.0 – 8.5	6.0-8.5
S.S. (mg/l)	200-450	Less than 20 mg/l
BOD5 27^0 C (mg/l)	250-400	Less than 10 mg/l
COD (mg/l)	600-800	Less than 30 mg/l
Oil & grease ABS (mg/l)	Up to 20 mg/l	Less than 05 mg/l
E. coli	$>10^6$ MPN	$< 10^3$ MPN

Preventive measures to Avoid Leaching

Treated sewage from Sewage Treatment Plant will be conveyed to Treated Sewage Tank through pipelines. All the joints from piping system will be checked periodically and carrying treated wastewater pipes will be laid in conduits wherever road crossings are expected. Thus no leaching of treated sewage into nearby water courses shall take place. Supervisors will be employed for overall operation & maintenance of water supply, waste water treatment and other utility services

Effluent treatment technology

The main objective of Effluent Treatment Plant (ETP) is to remove as much of the suspended solids and organic matter as possible before the waste water is discharged back to the environment. When untreated wastewater mixes with groundwater it can create significant health risks by causing serious infectious diseases to people who have suppressed immune systems.

1. Preliminary Stage: This stage is also called as pre-treatment which is the most essential treatment process in most of the ETP. It involves bar screens which comes in variety of shapes and sizes to remove large sized suspended solids like paper, plastics, metals, debris, rags and many such from incoming raw wastewater/sewage. If these materials are not removed then they may cause serious damage to plant equipment's. When wastewater enters into grit chamber, it slows down the flow of water and thereby removes sand, grit, sand stones and this process is called as sedimentation.

2. Primary Stage: It uses physical and chemical methods to improve the quality of the wastewater which was not achieved in previous stage. When wastewater enters to sedimentation tank or primary clarifiers, heavier solid particles settle to the bottom of the tank and lighter particles will float up and will be skimmed off from top of the surface using a process called skimming and thereby removing 60-65% of total suspended solids from liquid wastewater. This stage may use grit chamber to remove grit. The settled solid

is known as primary sludge which will send to sludge digester for further processing. Now partially clarified water flows on to the next stage.

3. Secondary Stage: This is the stage which can remove about 80-90% of organic matter by using a process called biological treatment methods. Most of the hospital ETP uses "activated sludge process" in which liquid wastewater enters into aeration tank where wastewater mixes with air to encourage the growth of microbes and hence breakdown of organic matter takes place. When aerated water enters into secondary clarifier, floatable matter will be removed and heavier matter settles to bottom which is called as "active sludge" or secondary effluent. Part of the sludge which still contains microbes will be re-circulated back to aeration tank to increase the rate of organic matter decomposition. The left over microorganisms are handled separately in next stage called disinfection.

4. Tertiary stage: This is the final stage which is also known as disinfection stage. This stage removes any residual suspended solids and other materials which were not removed in previous stages. The effectiveness depends on the quality of the water being treated. The major objective of disinfection is to reduce number of microorganisms in the waste water to be disposed into the natural environment. Disinfection technologies consist of ozone, chlorine, and Ultraviolet (UV) rays to eliminate toxic chemicals that exist in the wastewater. This stage removes nitrogen, phosphorous and other toxic contaminants.

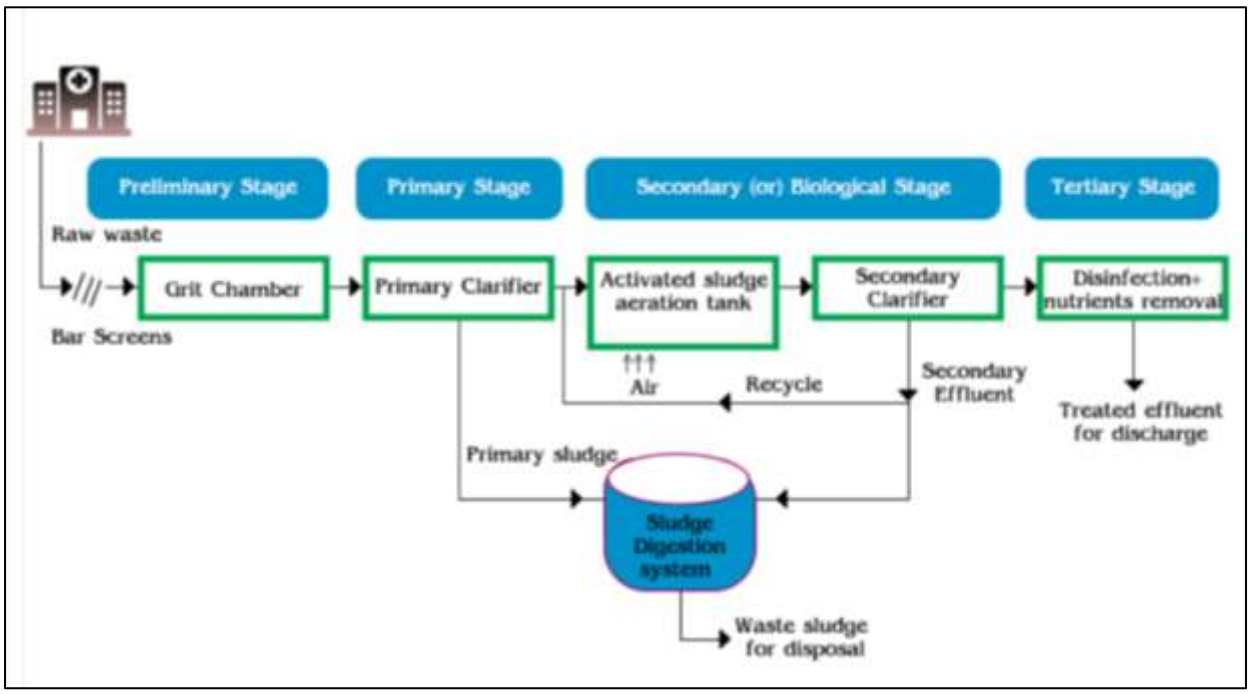


Figure 7-Conventional treatment process in ETP

Rainwater Harvesting and Storm Water Drain

A rainwater harvesting system comprises components of various stages -transporting rainwater through pipes or drains, filtration, and recharging the ground water through tanks. Percolation pits will be constructed for ground water recharge.

Runoff from the first spell of rain carries a relatively large amount of pollutants from the air and catchments surface so the system will be provided with a filtration pit consisting of layers of sand, gravel and pebbles of relevant sizes to remove impurities from the collected rainwater.

Need for Rainwater Harvesting

Surface water is inadequate to meet the daily demand and we have to depend on ground water.

- Due to rapid urbanization, infiltration of rain water into the sub-soil has decreased drastically and recharging of ground water has diminished.
- Rainwater harvesting prevents the flooding of low-lying areas in the site.

Rainwater Harvesting Network

Rain water harvesting pits will be constructed all around the compound wall to collect rain water. Excess storm water will be allowed to drain into the external storm drain.

Rain water harvesting has been catered to and designed as per the guideline of CGWA. Annual average rainfall is 611 mm. The recharge well of 3mtr dia. and 3mtr depths will

be constructed for recharging the water. The bottom of the recharge structure will be kept 5 m above this level. At the bottom of the recharge pit, a filter media is provided to avoid choking of the recharge bore.

The pit will be filled with rounded gravel 5 to 10 mm size. The sectional detail of the proposed rain water recharge pit is provided.

The path ways around the harvesting lines will be graded to facilitate drainage into trenches proposed around the compound. Recharge wells/pits are envisaged along the path of the storm water drains for rain water recharging& surplus water from the recharge wells/pits shall be diverted to the storm water drainage network.

The collected storm water will be allowed to percolate to the sub-soil by suitably designed percolation pits. The pits will be designed based on the soils percolation capability. The subsoil water table is high in these areas and however harvesting pits with bores will be provided.

Percolation pits of suitable numbers will be provided for recharge of ground water potential. A total of 9 rain water harvesting pits will be constructed. The quantity of storm water load for the proposed construction project is given below.

Table 14-Calculation for Storm water load

S. No.	Type of Surface	Catchment's Area (sq. mtrs)	Run off Coff.	Peak rainfall intensity (in m)	Rain water harvesting potential (in m^3/hr)
	Building				
1.	G.C. Area	9,123.97	0.8	0.035	255.47
2.	Paved area	17,314.23	0.7	0.035	424.19
3.	Green area	10,191.8	0.1	0.035	35.67
Total Storm water load calculated					715.33
	Considering 15 mins retention period				178.83
	Taking the effective volume of rainwater harvesting pit (3 mtrs di, 3 mtrs depth.)				21.19
	Rainwater harvesting pits required				8.43
	However, total no. of rainwater harvesting				**9 (1pit/Acre)**
	Total no. Of proposed pits				**4**
	Total no. Of Existing pits				**5**

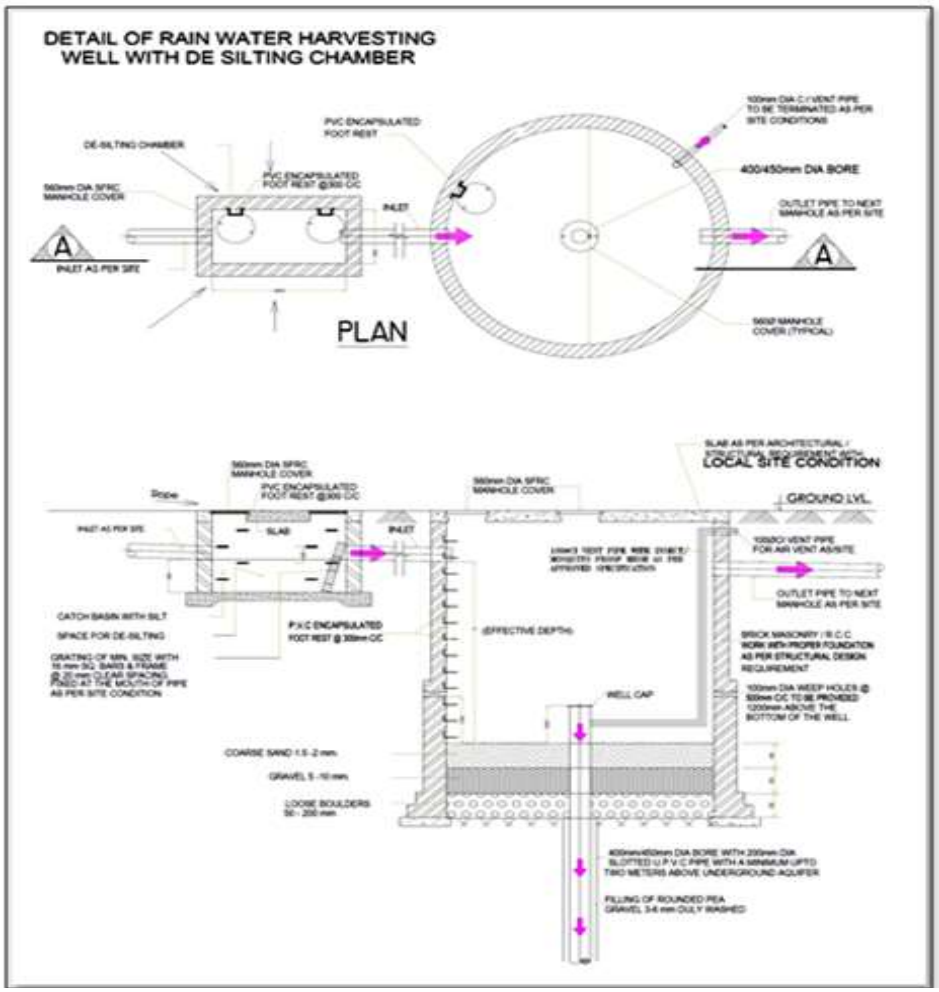


Figure8: Section details of -Rainwater Harvesting Pit

Parking Details

Adequate provision will be made for car/vehicle parking at the project site. There shall also be adequate parking provisions for visitors so as not to disturb the traffic and allow smooth movement at the site.

Proposed project will be consists of open parking as well as stack parking. The parking space criteria and area requirement provided are summarized in the below tables. Parking details are designed as per Delhi Building Bye Laws.

Table 15- Parking Required for Existing area

For Hospital Building (Existing)	
Parking required as per the old norms of MPD 2001	0.67 ECS/100 m^2 of FAR
Parking required (Hospital)	0.67/100 × 26,396.72 = 176.86 ECS

Total Parking Required (A)	**176.86 say 177 ECS**
For Residential Building (Existing)	
Parking required as per the old norms of MPD 2001	1.33 ECS/100 m^2 of FAR
Parking required (Residences)	1.33/100 ×10,428.94=138.70 ECS
Total Parking Required (Residences)	138.70 say 139 ECS
Total Parking Required	**177+139 = 316ECS**

Table 17-Parking Proposed (Expansion)

For Hospital Building	
Proposed area in open	903.91 m^2
Parking required for 1 ECS in open area	16 m^2
Parking Proposed (surface)	**(903.91/16@3 =169 ECS)**
Parking area in MLCP	16,650m^2
Parking required for 1 ECS in MLCP	16 m^2
Parking Proposed in MLCP	**472 ECS**
Total ECS Proposed	**(169+472 = 641 ECS)**

Power Details

The power shall be supplied by BSES Delhi. Power shall be supplied by transformers of total load 4,656KW Electric sub -station consisting of 2*1,000 KVA Transformers (Existing) + 3*1600 KVA Transformers- (2W+1S) New proposed (On load Tap Changer) shall be provided with. Provision of Main LT panels, Isolator panels and capacitor panels besides HT XLPE cables & 4 panels HT board.

D.G. set details

In case of power failure, DG sets of total capacity of 4,030 KVA (3*1500 kVA) will be provided as power back-up for building.

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

Solid Waste Generation, Collection, Transportation and Disposal

During Construction Phase

The solid waste expected to be generated during the construction phase will comprise the construction and demolition waste, C& D waste has two major components. Major components includes Cement concrete, Bricks, Cement plaster, Steel (From RCC, door/window frames, roofing support, railings of staircases etc., rubbles, stone (marble, granite, sand stone),Timber/wood (especially demolition of old buildings).

Minor components-Conduits (iron, plastics), Pipes (GI, iron, plastic), electrical fixtures (copper/ aluminium wiring, wooden baton, switches, wire insulation), panels (wooden, laminated), others (glazed tiles, glass panes)

Construction waste is bulky and heavy and is mostly unsuitable for disposal by thermal or biological process such as incineration or composting. In India, when old buildings are demolished the major demolition waste is soil, sand and gravel accounting for bricks (26%) & masonry (32%), Concretes (28%), metal (6%), wood (3%) others (5%). Bricks, tiles, woods and iron metal are sold for reuse / recycling (BMTPC). Excavations, concrete, masonry and wood together constitute over 90% of all C & D waste.

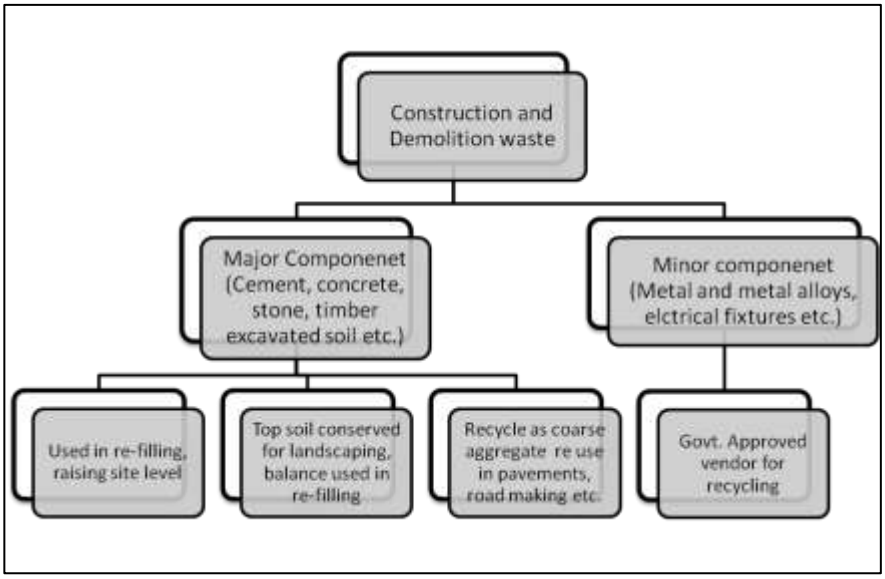
Area Chart Of Existing Building To Be Demolish	
S.NO.	AREA m²
ESS	520.45
Pump House	67.92
Store Room	74.68
Total	662.95

The following steps are proposed to be followed for the management solid waste:

- Construction yards are proposed for storage of construction materials.
- The excavated material such as topsoil and stones will be stacked for reuse during later stages of construction.

- Excavated top soil will be stored in temporary constructed soil bank and will be reused for landscaping during operational phase of the project.
- Remaining soil shall be utilized for refilling / road work / rising of site level at locations/ selling to outside agency for construction of roads etc.
- C& D waste shall be stored and transported to Govt. approved recycling plant and disposal site for further treatment and disposal**, if required.**

Figure 9: Solid Waste Management for Construction Phase



During Operational Phase

The project will adopt a systematic approach for solid waste collection and disposal. Solid waste generated from the project will be collected properly and will be managed as per MSW Rules, 2000 amended in 2016.

The domestic solid waste will be generated by the Visitors, Patients and staffs pertain to the two categories, Bio-degradable and Non-biodegradable. These solid wastes will be collected separately by putting separate bins at the source of generation. For the biodegradable waste yellow bins will be provided, for the recyclable waste black bins and for the non-recyclable waste red bins will be provided.

It is estimated that maximum solid waste generation from the proposed facility shall be approx. 1,874.30kg/day; Following are the solid waste generation rate has been considered as is given in table below.

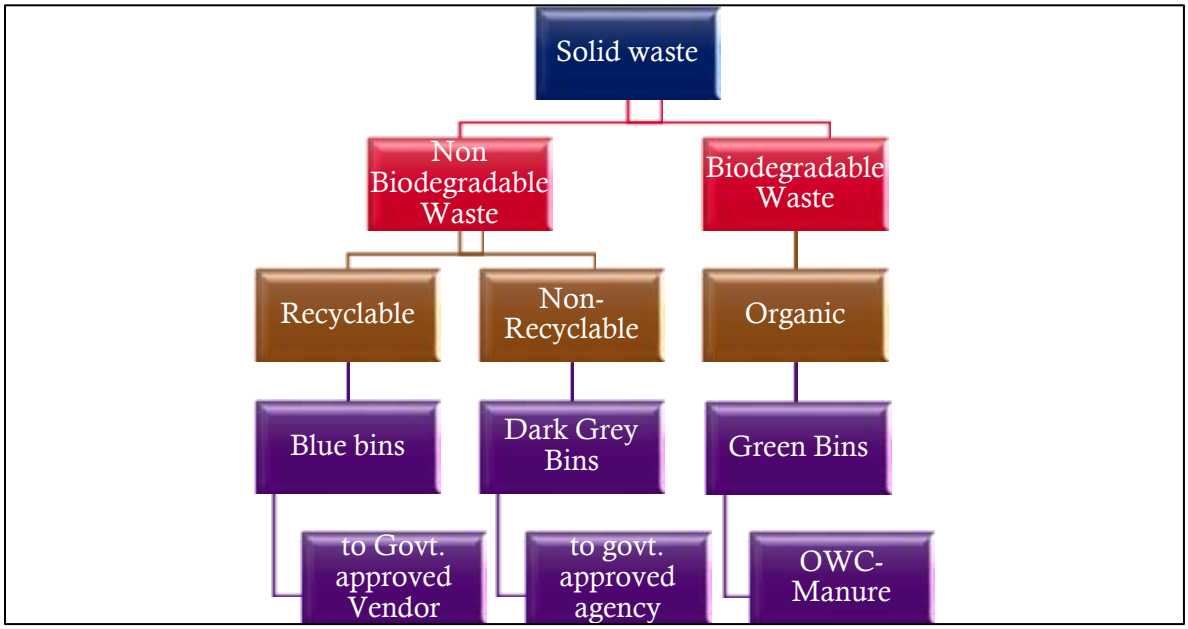


Figure10: Solid Waste Management Scheme-domestic phase

Table18: Calculation of Solid Waste Generation (Proposed facility)

Category	Counts (heads)	Waste Generated (kg/day)
Patient	432 @ 1.5 kg/day	648
Regular staff • **Doctors/Administrative Staff/Nurses/Ward Boys/ Attendants/ Housekeeping &Engineering Staff**	1,728 @ 0.25 kg/day	432
OPD	1,728@ 0.15 kg/day	259.2
Visitors	3,564@0.15kg/day	534.6
Landscape waste (2.51 acre)	@0.2 kg/acre	0.502
Total Waste Generated		**1,874.30kg/day**

The quantum of waste generated in India is estimated to be 1-2 kg per bed per day in a hospital
According to WHO 85% of hospital waste is non-hazardous, 10%infective and remaining 5% non-infective but hazardous.

Total hospital waste generation	648kg/day
Non-hazardous in Nature	approx. 550.8kg/day
Infectious in Nature	approx. 64.8kg/day
Non-Infectious but hazardous in nature	approx.32.4 kg/day

Total Municipal Waste generation	1,226.3 kg/day
Biodegradable waste	approx. 735.78 kg/day
Non-Bio degradable waste	approx. 367.89 kg/day
Inert waste	approx. 122.63 kg/day

Bio-Medical Waste

Collection and Segregation of bio medical waste

- Collection of bio medical waste will be done as per the bio Medical waste (Management and Handling) rules 2016.
- General health-care waste will be collected the stream of domestic refuse for disposal.
- Sharps will be collected together, regardless of whether or not they are contaminated. Containers will be puncture-proof (usually made of metal or high-density plastic) and fitted with covers.
- Highly infectious waste will be, whenever possible, be sterilized immediately by autoclaving. It therefore needs to be packaged in bags that are compatible with the proposed treatment process: red bags, suitable for autoclaving, are recommended.
- Small amounts of chemical or pharmaceutical waste will be collected together with infectious waste.
- Waste will be collected and stored in colour coded bins.

Treatment of Waste

Treatment options for bio medical waste are

Here are mainly five technology options available for the treatment of bio-medical waste. They can be grouped as follows.

- Chemical processes
- Thermal processes
- Mechanical processes
- Irradiation processes
- Biological processes

Chemical Process

These processes use chemicals that act as disinfectants. Sodium hypochlorite, dissolved chlorine dioxide, per acetic acid, hydrogen peroxide, dry inorganic chemical and ozone are examples of such chemicals.

Thermal processes

These processes utilise heat to disinfect. Depending on the temperature they operate, like

- Autoclaving is a low heat thermal process and it uses steam for disinfection of waste.
- Microwaving is a process which disinfects the waste by moist heat and steam generated by microwave energy.

Mechanical processes

- These processes are used to change the physical form or characteristics of the waste either to facilitate waste handling or to process the waste in conjunction with other treatment steps. The two primary mechanical processes are
- Compaction - used to reduce the volume of the waste
- Shredding - used to destroy plastic and paper waste to prevent their reuse. Only the disinfected waste can be used in a shredder.

Irradiation processes

In these processes, wastes are exposed to ultraviolet or ionizing radiation in an enclosed chamber. These systems require post shredding to render the waste unrecognizable.

Biological processes Biological enzymes are used for treating medical waste. It is claimed that biological reactions will not only decontaminate the waste but also cause the destruction.

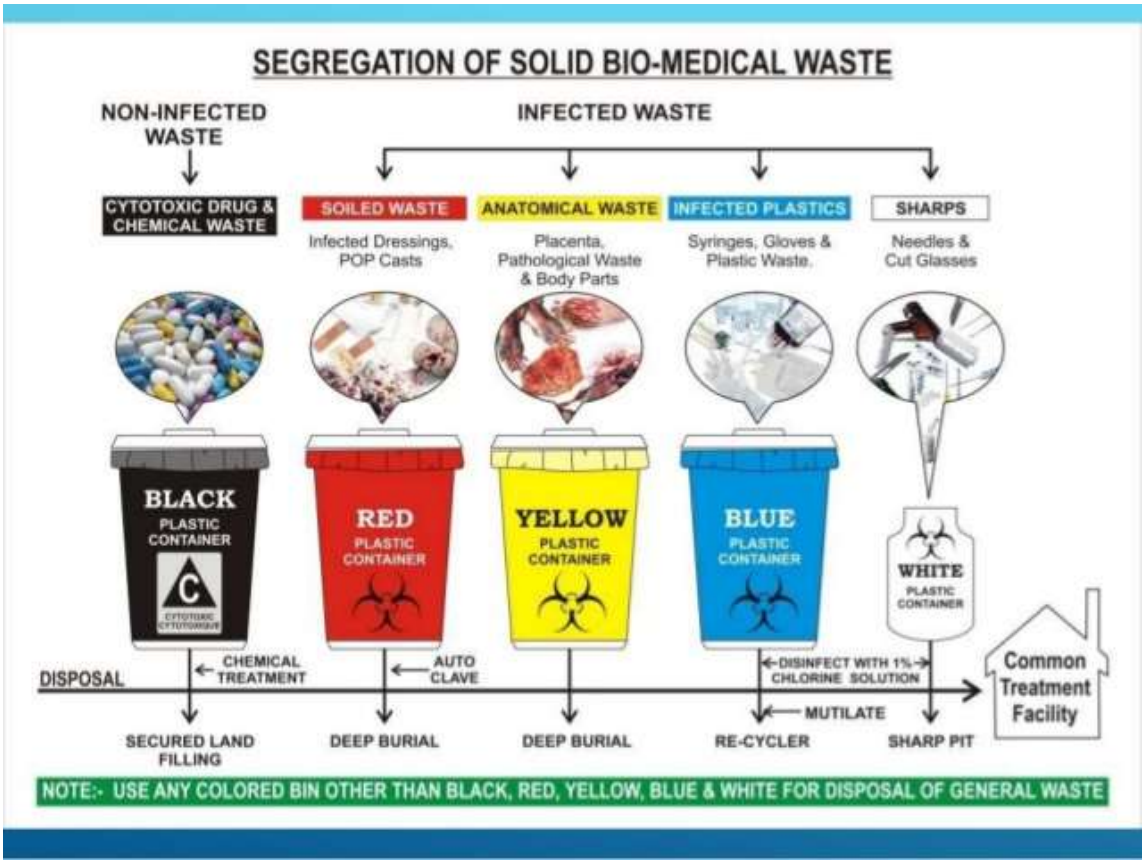


Figure 11- Bio medical waste management

Domestic Waste

Collection and Segregation of Waste

A door to door collection system will be provided for collection of domestic waste in colored bins from residential units.

The local vendors will be hired to provide separate colored bins for dry recyclables and Bio-Degradable waste.

For waste collection, adequate number of colored bins (Green and Blue & dark grey bins– separate for Bio-degradable and Non-Bio-degradable) are Expansion of to be provided at the strategic locations of the area.

Litter bin will also be provided in open areas like parks etc.

Treatment of Waste

Bio-Degradable wastes

Bio-degradable waste will be subjected to Organic Waste Converter and the compost/resultant will be used as manure.

STP sludge is Expansion of to be used for horticultural purposes as manure.

Horticultural Waste is Expansion of to be composted and will be used for gardening purposes.

Recyclable wastes

Grass Recycling – The cropped grass will be spread on the green area. It will act as manure after decomposition.

Recyclable wastes like paper, plastic, metals etc. will be sold off to recyclables.

Disposal

Recyclable and non-recyclable wastes will be disposed through Govt. approved agency. Hence, the Municipal Solid Waste Management will be conducted as per the guidelines of Municipal Solid Wastes (Management and Handling) Rules, 2016. A Solid waste management Scheme is depicted in the following figure.

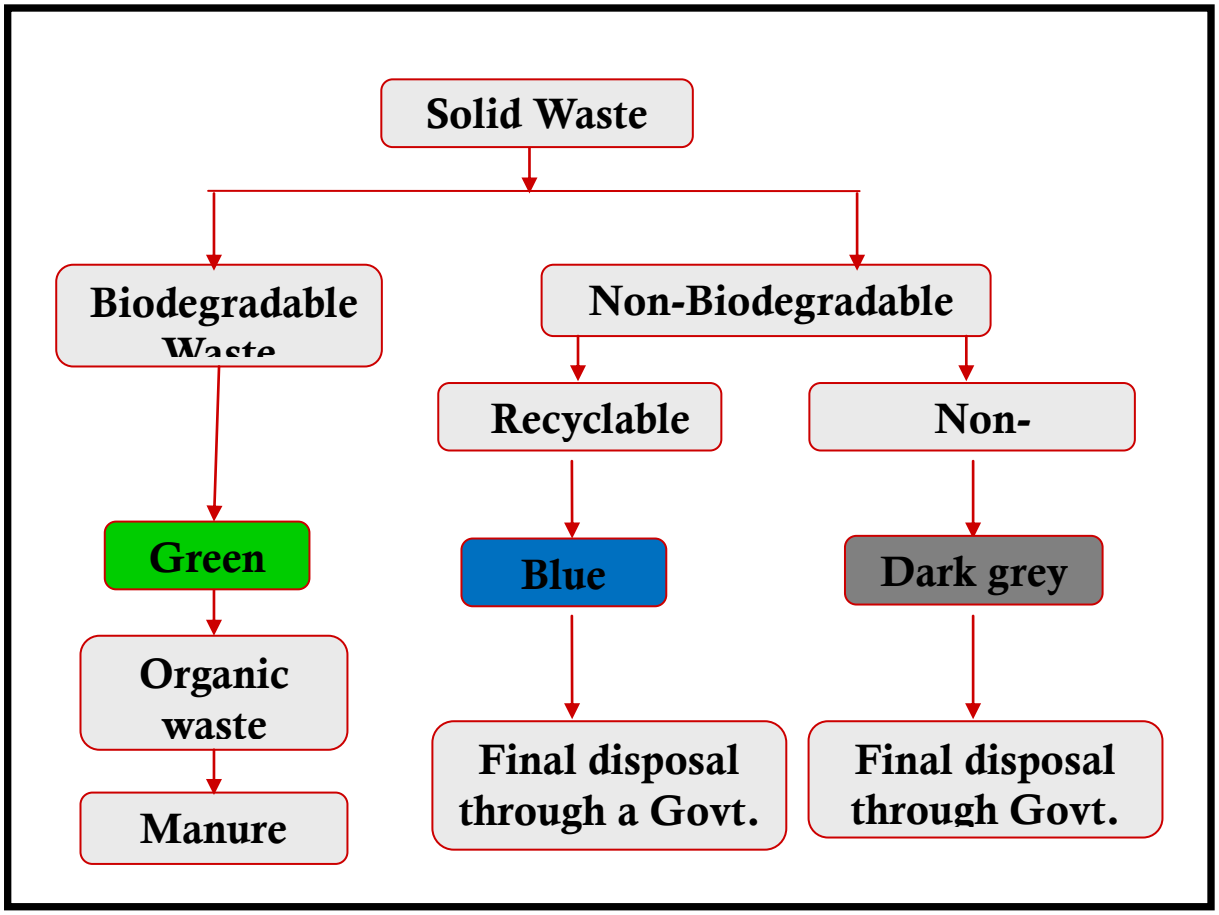


Figure 12- Solid Waste Management Scheme – (Operation Phase)

Organic Waste Converter

A waste converter is a machine used for the treatment and recycling of solid and liquid refuse material. A converter is a self-contained system capable of performing the following functions: pasteurization of organic waste; sterilization of pathogenic or biohazard waste; grinding and pulverization of refuse into unrecognizable output; trash compaction; dehydration.

Figure 43: Organic Waste Converter

Benefits of organic waste converter:

1. Large quantity of solid waste is converted to fertilizer in a very short period
2. Fertilizers can be sold as compost to farmers, or used for gardening
3. Machine requires less space and the efficiency is high
4. Manpower and maintenance is very less
5. This is one of the latest techniques of managing solid waste.

Landscape Details

- Total green area measures 10,191.8 m^2(27.82% of Plot Area)
- A diverse variety of indigenous evergreen and ornamental trees would be planted. As the project site for construction consists of trees, herbs and shrubs it will require cutting of trees for construction purpose. Total numbers of trees to be cut/transplant are 89.
- A combination of evergreen and ornamental, palms, shrubs and ground covers planted along the sides of the road and in open space and set back area within the complex layout. Landscaping is an important element in altering the microclimate of the place. Proper landscaping reduces direct sun from striking the buildings and heating up building surfaces, prevents reflected.
- The plant species will be selected on the basis of Urban Standard Plantation norms and CPCB guidelines.
- Landscape Details are given in Annexure 4-Landscape Plan

Table18: Landscape Area Details

Particulars	Details
Net Plot area	36,630 m^2
Landscape area Proposed	10,191.8 m^2(27.82% of Plot Area)
As Per MoEF Guidelines	One tree per 80 m2 of total area out of which minimum 50 % to be in the category of evergreen trees.
Trees Required	36,630/80= 457.87Trees
Total Existing Tree on site	398
Trees to be Transplant	89
Tree to be Retained	309
Compensatory Trees	**89*10= 980**

Table 19: List of Trees

S.NO.	S.N.	C.N.	E/D	CSA (m^2)	LA (m^2)	CS	S/T
1.	*Acacia catechu*	Sonkhairi	E	108.42	109.98	Oblong	T
2.	*Acacia leuco-phloea*	Haribaval	D	8281.4	132.52	Oblong	T
3.	*Acacia meransii*	Blackwattl	E	0	0	Spreading	T
4.	*Acacia nilotica*	Arabic tree	E	8293.74	135.70	Spreading	T
5.	*Achras sapota*	Sapota	E	309.021	108.02	Spreading	T
6.	*Adenanthera pavonina*	Manjadi	D	0	0	Spreading	T

7.	*Aegle marmelos*	Beal tree	E	26547.19	57.72	Oblong	T
8.	*Ailanthus excelsa*	Mahal	D	152481.2	167.47	Round	T
9.	*Albizia procera*	White siris	D	28471.26	286.74	Round/Ob	T
10.	*Alstonia scholaris*	Shaitan wood	E	241680.5	52.31	Round	T
11.	*Azadirachta indica*	Neem tree	E	300445.3	83.89	Spreading	T
12.	*Bambusa arundinacia*	Bans	D	0	0	Oblong	T
13.	*Bauhinia purpuurea*	Kanchan	D	109.8	69.46	Oblong	T
14.	*Bougainvillea spectabilis*	Bougainvil e	E	939.25	33.15	Oblong	T
15.	*Butea monospermalamk*	Khakharo	D	38592.1	448.6	Oblong/ Ovoid	T
16.	*Calotropis procera*	Swallow wort	E	87.7	50.06	Oblong/ Round	T
17.	*Citrus aurantium*	Nebu	E	494.9	20.23	Round/Ob	T
18.	*Citrus limon*	Bara nebu	E	583.72	18.55	Oblong	T
19.	*Clerodendrum infortunatum*	Bhant	E	854	47.9	Round	T
20.	*Cordia dichotoma*	Bahubara	E	0	0	Round/Ob	T
21.	*Dalbergia latifolia*	Black woo	SD	21723.2	187.9	Round	T
22.	*Durantarepens*	-	D	60.47	62.7	Spreading	T
23.	*Emblica officinalis*	Gooseberr	D	17381.2	140.64	Oblong	T
24.	*Ficus benghalensis*	Banyan tre	E	236493.6	119.10	Spreading	T
25.	*Ficus glomerata*	Dumur	D	218769.8	47.28	Spreading	T
26.	*Gardenia resinifera*	Dikamali	D	572.36	61.17	Oblong	T
27.	*Guazma ulmifolia*	San	E	30279.8	85.21	Ro/SP	T
28.	*Hamelia patens*	Scarlet bus	E	824.06	47.2	Round	T
29.	*Ixora arborea*	-	E	57.04	54.2	Oblong	T
30.	*Ixora undulata*	-	E	0	0	Oblong	T
31.	*Juniperus communis*	juniper	E	0	0	Round/Ob	S
32.	*Kigelia africana*	Sausage T	E	58432.21	267.6	Round/Ob	T
33.	*Lagertroemia parviflora*	Phurush	D	67051.42	84.12	Round/Ob	T
34.	*Madhuca longifolia*	Mahwa	D	30463.7	86.96	Round/Ob	T
35.	*Mallotus philippenbsis*	Kamala	E	30497.8	58.3	Round/Ob	T
36.	*Mangifera indica*	Maavu	E	69004.67	85.27	Round/Ob	T
37.	*Milletia peguensis*	-	E	42311.52	167.2	Round	T

38.	*Nerium indicum*	Pink oleander	E	5747.63	32.62	Oblong	T
39.	*Nyctanhus Arbor-tristis*	Beng	D	546.3	88.1	Oblong	T
40.	*Ouginia oojeinensis*	Tinis	D	0	0	-	T
41.	*Peltophorum pterocarpun*	Copper po tree	E	231045.3	370.7	Oblong	T
42.	*Pithecellobi- Um ducle*	Manila tamarind	E	2564.75	182.6	Oblong	T
43.	*Polyalthia longifolia*	Devdaru	E	10976.62	55.06	Conical or Rounded	S
44.	*Populus deltoides*	Caroline poplar	D	0	0	Oblong	S
45.	*Prosopis chi-lensis*	Mesquite	E	7950.68	51.05	Spreading	T
46.	*Prosopis tamarugo*	-	E	0	0	Spreading	T
47.	*Ricinus communis*	The castor	E	942.56	243.5	Oblong	T
48.	*Sapipum Sebierum*	Makhan T	E	43789.24	110.6	Oblong	T
49.	*Spondias pinnata*	Bemg	D	25587.31	130.64	Round	T
50.	*Syzygium cumini*	Black & plum	E	112143.2	77.82	Oblong	T
51.	*Tamarindus indica*	Anbli	E	276839.5	128.60	Spreading	T
52.	*Terminalia arjuna*	Arjun	D	719999.2	60.06	Oblong	T
53.	*Terminalia bellerica*	Beng bha-irah	D	82813.9	63.20	Oblong	T
54.	*Terminalia chebula*	Chebulic myrobalan	D	82314.16	60.60	Round	T
55.	*Trema orientalis*	Charcoal tree	E	425734.1	65.7	Round	T
56.	*Ulmus wallichiana*	Brari	E	0	0	Round	T
57.	*Zizyphus mauritiana*	I.jujube	E	2638.17	24.08	Round	T

List of construction material

List of building materials being used at site:

1. Coarse sand
2. Fine sand
3. Stone aggregate
4. Stone for masonry work
5. Cement
6. Reinforcement steel

7. Pipe scaffolding (cup lock system)
8. Bricks
9. ACC Blocks
10. Crazy (white marble) in grey cement P.V.C. conduit
11. MDS, MCBs
12. PVC overhead water tanks
13. 2 1/2" thick red colour paver tiles
14. PPR (ISI marked)
15. PVC waste water lines
16. S.W. sewer line up to main sewer
17. PVC rain water down take

Stainless steel sink in kitchen

कार्यालय– कार्यपालक अभियन्ता (स्वास्थ्य) अनुरक्षण
स्वास्थ्य अनुरक्षण मण्डल (उत्तरी) लोक निर्माण विभाग (दि०स०)
डॉ० बी०एस०ए० अस्पताल परिसर, सैक्टर–6, रोहिणी, दिल्ली–110085
Phone : 011-27933260, 011-27050898
E-mail: eepwddelhihmdn@gmail.com

संख्या 23(SRHC)/स्वा०अनु०मं०(उ०)/लो.नि.वि./2019–20/83-E दि० 24/05/2019

To,

The Tree Officer
West Forest Davison, is at Mandir Marg,
Delhi.

Subject: Permission application for Transplat of trees for Satyawadi Raja Harish Chandra Hospital, Narela, Delhi

Ref: No.F.Nov.-17/WFD/COT/2017-18/3529 dated: - 18/9/2017

Dear Sir,

With Reference to subjected we incorporate all observation issued by Dy. Conservator of Forests on Dated (7/7/2017) Satyawadi Raja Harish Chandra Hospital, Narela, Delhi.

Please find below reply for point as received in reference to subjected letter.

REPLY TO,

Point (4) ii) - Tree numbering mark with black paint over yellow rectangular base be painted (with oil paint).

Point (5) - List of felling tree with numbered along with felling tree photograph attached.

Point (13) i) – Name and area of the site compensatory attached.

Point (13) ii) – Map of vacant area identified for compensatory plantation along with geo-coordinate attached.

It is therefore requested that kindly grant the permission of felling trees as mentioned at the earliest.

We further request you for a timely approval for the request above.

Encl:

1. Form 'B' of Sub Rule (1) of Rule 4.
2. Affidavit along with Form 'B'.
3. Indemnity Bond.
4. Tree List to be cut and to be saved.
5. Felling tree photograph with numbered.
6. Drawings

कार्यपालक अभियन्ता (सि0)
स्वास्थ्य अनुरक्षण मण्डल (उत्तर)
लो०नि०वि०, डॉ० बी०एस०ए० अस्पताल,
सैक्टर–6, रोहिणी, दिल्ली

Letter, SRHCH File

OFFICE OF THE DY. CONSERVATOR OF FORESTS (WEST) DELHI
Dy. No. 2454
Date 24-5-19

By Speed Post

GOVT. OF NCT OF DELHI
DIRECTORATE OF HEALTH SERVICES
PUBLIC HEALTH WING-III
SWASTHYA SEWA NIDESHALAYA BHAWAN
F-17 KARKARDOOMA, HELHI- 110032 (Ph: 22304362)

No. F(555)/16693/116/DHS/BMW/2009 Dated:

To

Asst. General Manager,
SMS Water Grace BMW (P) Ltd.
405, 4th Floor, 32-33, Kusal Bazar, Nehru Place, Delhi-19

Sub: Identified list of Hospitals/Dispensaries for free lifting, collection Transportation, Treatment and Disposal of Bio-Medical Waste-Demarcation thereof.

Sir,

Kindly refer your letter Ref SMS-WGPL/DHS/ND/BMW/CTO/0012 dated 18th April, 2011 on the above mentioned subject. A list of Identified hospitals of GNCTD (Total 20)along with the dispensaries of West, South-West, North-West districts, School Health Clinics & Seed PUHC and all Health Centres is enclosed for providing free lifting/Collection, Transportation & Treatment, of BMW. The number of health facility may increase in future which shall be communicated subsequently.

For Further coordination you are required to contact Medical Supdts /Nodal Officer of concerned Hospitals and CDMOs of respective district. This will be effective w.e.f. 1st May 2011.

Yours faithfully

(Dr. N.V. Kamat)
Director Health Services

Enclosure: As above

F.(555)/16693/116/DHS/BMW/2009/2883-89

Copy to:

1. Secretary (H&FW),Delhi Secretariat, N. Delhi-02.
2. MSs of Hospitals
3. CDMOs
4. M/s Synergy Waste Management (P) Ltd, Near Composite Plant Okhla Mathura Road, Delhi.

(Dr. N.V. Kamat)
Director Health Services

List of Hospitals for free Lifting, Transportation & Treatment for SMS Water Grace BMW (P) LTD

1. Acharya Bhikshu Hospital, Moti Nagar, New Delhi.
2. ILBS Vasantkunj, New Delhi.
3. Attar Sain Jain Hospital, Lawrence Road, New Delhi-34.
4. Dr.Baba Saheb Ambedkar Hospital, Rohini, New Delhi-85
5. Babu Jagjivan Ram Memorial Hospital Jehangirpuri, New Delhi-41
6. Bhagwan Mahavir Hospital, Pitampura New Delhi-34.
7. Central Jail Hospital , Tihar, New Delhi-64.
8. Deen Dayal Upadhyay Hospital, Hari Nagar, New Delhi
9. Dr. N.C. Joshi Memorial Hospital, Karol Bagh, New Delhi-55
10. Dada Dev Maternity & Child Hospital, Nasirpur, Delhi-45
11. ISM, A&U Tibbia College, Karol Bagh, N.Delhi-55.
12. Guru Govind Singh Govt. Hospital, Raghuvir Nagar Delhi.
13. Maharishi Valmiki Hospital, Pooth Khurd, N. Delhi.
14. Sardar Vallabhai Patel Hospital, Patel Nagar New Delhi.
15. Rao Tula Ram Memorial Hospital, Jaffarpur, N.Delhi.
16. Sanjay Gandhi Memorial Hospital, Mangolpuri, N.Delhi.
17. Satyawadi Raja Harish Chandra Hospital, Narela, N.Delhi.
18. Super Speciality Hospital, Janakpuri.
19. School Health Clinics & Special referal Centres of School HealthScheme (14) List enclosed.
20. All Dispensaries, Seed PUHC and Health Centres of West, South-West and North-West Districts.
21. B.R. Sur Homepathy Hospital Nanak Pura, N.Delhi

PROPOSED SITE

PRODUCED BY AN AUTODESK STUDENT VERSION

PRODUCED BY AN AUTODESK STUDENT VERSION

कार्यालय– कार्यपालक अभियन्ता (स्वास्थ्य) अनुरक्षण
स्वास्थ्य अनुरक्षण मण्डल (उत्तरी) लोक निर्माण विभाग (दि0स0)
डॉ० बी०एस०ए० अस्पताल परिसर, सैक्टर–6, रोहिणी, दिल्ली–110085
Phone : 011-27933260, 011-27050898
E-mail: eepwddelhihmdn@gmail.com

संख्या 23(SRHC)/स्वा0अनु0मं0(उ0)/लो.नि.वि./2019–20/ दि0 10/12/2019

CORPORATE ENVIRONMENT RESPONSIBILITY

Corporate Environment Responsibility (CER) is a concept that suggests that it is the responsibility of the corporations/companies/departments operating within society to contribute towards economic, social and environmental development that creates positive impact on society at large.

Sustainable development has many important facets/components like social, economic, environmental, etc. and these components are closely interrelated and mutually reinforcing. The general structure of EIA document, prescribes inter-alia public consultation, social impact assessment and R&R action plan besides environment management plan (EMP). The Corporate Environmental Responsibility incorporates the infrastructure creation for drinking water supply, sanitation, health, education, skill development, roads, cross drains, electrification including solar power, solid waste management facilities, scientific support and awareness to local farmers to increase yield of crop and fodder, rain water harvesting, soil moisture conservation works, avenue plantation, plantation in community areas, etc.

On 1st may 2018, the Ministry of Environment, Forest & Climate change issued an Office

Memorandum F. No. 22-65/2017-IA III to suggest a common principal for affixing the corporate environmental responsibility for Greenfield as well as Brownfield projects. It also involves the projects which are not governed by Section 135 of the Companies Act, 2013 or yet to make any net profit.

As per Ministry of Environment, Forest & Climate change Office Memorandum F. No. 22-65/2017-IA III dated 1st may 2018 the maximum percentage of fund allocation for CER is prescribed as follows.

S. No.	Capital Investment / Additional Capital Investment (In Rs.)	Greenfield Project- % of Capital Investment	Brownfield Project- % of Additional Capital Investment
I	II	III	IV
1.	≤ 100 crores	2.0%	1.0%
2.	> 100 crores to ≤ 500 crores	1.5%	0.75%
3.	> 500 crores to ≤ 1000 crores	1.0%	0.50%
4.	> 1000 crores to ≤ 10000 crores	0.5%	0.25%
5.	> 10000 crores	0.25%	0.125%

Source: MoEF & CC OM F. No. 22-65/2017-IA. III, dated 1st may 2018

The **Expansion of Satyawadi Raja Harish Chandra Government Hospital** at Sector-7A, Narela, New Delhi will be developed by **Public Works Department (PWD)**. This is Brownfield project and has total project is Rs. 204.35 Crores, Based on the nature and the cost of the project as mention in OM issued by MoEF&CC , CER cost would be Rs. 1.53/- (0.75 % of Project cost i.e. Rs. 204.35 Crores). The Department (Delhi Development Authority) proposes a budget of about Rs. 1.53 Crore to fulfil its corporate environmental responsibility (CER).

The activities proposed under CER shall be worked out based on social and environment need assessment. The important CER Programme includes following.

I. Tree plantation drive
II. Drinking water facilities
III. Installation of solar lights in village common areas
IV. Solid waste management facilities (Provision of waste bins)
V. Construction of Public toilets under total sanitation campaign

I. ***Tree Plantation Drive:*** Plantation drive on land that has not recently been used to grow plants and trees will protect soil and environment and for this department will allocate Rs. 0.38Cr/- (25 % of CER fund).

II. ***Drinking water facilities:*** Water is a precious resource. Drinking water has always been on top of the priority list of social consumption items, so department will allocate Rs. 0.15Cr/- (10 % of CER Fund) for rooftop rainwater harvesting, treating the catchment and building a community water tank in nearby village areas.

III. ***Installation of solar lights in village common areas:*** The sectors are having regular lights while the villages are in dark during night. This creates a divide among the society. The illumination of village circle will be carried out through providing standalone solar lights in the project villages. Department will dedicate Rs. 0.46Cr./- (30 % of CER Fund) for this facility.

IV. ***Solid waste management facilities (Provision of waste bins for villager):*** The solid waste management is the one of the concerning issue of environment; the sectors are being managed by the authority However villages sometimes get neglected. The proponent proposes to install the waste management bins and will conduct environment awareness workshops in nearby villages in consultation with panchayat and will award Rs. 0.23Cr./- (15 % of CER Fund)

V. ***Construction of Public toilets under Total Sanitation Campaign***: The TSC programme aims at improving the general quality of life in rural areas by achieving Open Defecation Free status. Financial Assistance is provided for construction of Individual Household Latrines to Below Poverty Line families, School & Anganwadi toilets, Women's Sanitary Complexes and for carrying out Information Education and Communication activities for generating awareness about sanitation. So Department will also be part of this flagship programme and will dedicate Rs. 0.31 Cr/- (20 % of CER Fund) in this programme.

All the facilities shall be provided to the nearby villages as mentioned below.

- Kurenai Village
- Tikri Khurd Village
- Bankner Village
- Sayadpur Village
- Singhola Village
- Ravidass Nagar