Redevelopment of GPRA Colony

ASTPL/EC/DL/180218

Srinivaspuri, South Delhi, Delhi

Plot Area:- 2,95,987.34 **Sqm**

Built up Area: 9,57,991.35 **Sqm**

Project Activity -8(b) Category -B

Form-I, IA, CP and Proposed Terms of Refrence

Proposed Monitoring Period	1 March to 31 May 2018

PROJECT PROPONENT

CENTRAL PUBLIC WORKS DEPARTMENT

Name of Consultant & NABET Accreditation No

Aplinka Solutions & Technologies Pvt. Ltd. | www.aplinka.in
Corp. Office : A-48, Ground Floor, Sector-64, Noida – 201301
NABET Accreditation No: NABET/EIA/1619/SA/0068

Name of Laboratory & Accreditation Details

Noida Testing Laboratories | www.noidalabs.com
Address : GT-20, Sector-117, Noida, Gautam Budh Nagar Noida – 201301 NABL Accreditation Certificate No: TC-6814

MoEF&CC Gazette Dated & No

31st Aug 2017 - S.O. 2836(E)

FORM-I

I. BASIC INFORMATION

S. No.	Items	Details
1.	Name of the Project	Redevelopment of GPRA Colony
2.	S. no. of the schedule	8 (b)
3.	Proposed capacity/acre/length/tonnage to be handled/command area / lease area/number of wells to be drilled	1. Plot Area: 2,95,987.34 sq. m 2. Builtup area: 9,57,991.35 sq. m.
4.	New/Expansion/Modernization	New (Redevelopment)
5.	Existing Capacity/Area etc.	Existing Built Up Area : 1,13,248.8 sq. m.
6.	Category of Project i.e. 'A' or 'B'	Category B under schedule 8(b) as per EIA Notification 2006.
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 (i) Plot/Survey/Khasra No. (ii) Village (iii) Tehsil (iv) District (v) State	 Srinivaspuri Kalkaji South Delhi Delhi
10.	Nearest railway station/airport along with distance in km	• Hazrat Nizamuddin Railway Station (2.50 km towards North direction) • Safdarjung Airport (4.50 km towards NW direction)
11.	Nearest Town, City, District Headquarters along with distance in km	Saket, South Delhi District,Approx 6 km towards NE
12.	Village Panchayat, ZillaParishad, Municipal Corporation, Local Body (completes postal address and telephone nos. to be given)	South Delhi Municipal Corporation 780, Major Somnath Marg, Sector 9, R.K. Puram, New Delhi, Delhi 110022 Contact no. : 011-23227358
13.	Name of the Applicant	Central Public Works Department
14.	Registered Address	E- Wing, NirmanBhawan, New Delhi
15.	Address for correspondence Name Designation (Owner/Partner/CEO) Address Pin Code E-mail	 Mr. Akhelesh Kumar Executive Engineer E- Wing, Nirman Bhawan, New Delhi 110011 cpwd22@gmail.com

	Telephone No. Fax No.	011-27060741 011-23060742
16.	Details of alternative Sites examined, if any Location of these sites should be shown on a Toposheet.	No alternative site was examined. The project lies in the Zone F, Residential Area as per the Land Use Plan of MPD – 2021. The land has been allotted by Land &Development Office, Govt. of NCT of Delhi. This project requires redevelopment of Shrinivaspuri; hence no alternative site was examined,
17.	Interlinked Projects	No
18.	Whether separate application of interlinked project has been submitted?	Not applicable
19.	If yes, date of submission	Not applicable
20.	If no, reason	Not applicable
21.	Whether the proposal involves approval / clearance under: if yes, details of the same & their status to be given. (i) TheForest (Conservation) Act, 1980 (ii) The Wildlife (Protection) Act, 1972 (iii) The C.R.Z. Notification, 1991	No Not Applicable Not Applicable Not Applicable
22.	Whether there is any Government Order / Policy relevant / relating to the site?	Order from High Court of Delhi Case number:- W.P.(C) 6680/2018 & CM. Nos. 25413/2018, 25414/2018,29017/2018,29680/2018,32847/2018, 35288/2018, 36251/2018 and 40931/2018
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? (i) Name of the court (ii) Case No. (iii) Orders/ directions of Court, if any and its relevance with the proposed project.	 High Court of Delhi W.P.(C) 6680/2018 & CM. Nos. 25413/2018, 25414/2018,29017/2018,29680/2018,32847/2018, 35288/2018, 36251/2018 and 40931/2018 The High Court Order dated 03.10.2018, it has been stated that the project "should be permitted to approach appropriate statuary authority for necessary approvals of the revised proposals, which shall be considered by the said authorities

		in accordance with law."

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 confirmation	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	The project lies in the Zone F, Residential Area as per the Land Use Plan of MPD – 2021. The land has been allotted by Land and Development Office, Govt. of NCT, New Delhi and will be redeveloped for residential purpose. The total area of the project is 2,95,987.34 sq. m out of which 1,56,918.71 sq. m (approx. 53% of plot area) will be developed as green area. Development will be done in phase wise manner.
1.2	Clearance of existing land, vegetation and buildings?	Yes	It is a redevelopment project. Currently, the Residential Colony consists of Type I, Type II and Type III residential building and other Social Infrastructure such as Shops, Markets, Schools, Health Centers, Temples etc. These buildings/structures are to be demolished and in place of it; Residential buildings of Type II, Type III, Type IV, Type V and Type VI are proposed to be constructed along with other social Infrastructure. Only one temple of Built up Area 2,680 sq. m from the existing building will be retained. Currently, there are 2,763 trees present on the site out of 1,239 trees will be transplanted within the project site and the remaining tree will be merged with the proposed landscape. The main trees species found at the project site are Mulberry; Amaltas; Siris; Kaner; Mango; Mehndhi; Alstonia; Papdi; Peepal; Jamun; Bakaian; Jungle Jelebi; Shehtut; Ashok; Moringa; Reinta; Bargad; Neem; Anar; Kikar; Guava; Bael; Eucalyptus; Katal; Lemon; Siris; Kassod; Pilkhan; Khirni; Sagwan; Harsingar; Gular; Peech /Aadu; Lily Flower; Kadipatta; Bottal palm; Champa; Beliaphool; Kadipatta; Sheesham; Babul; Godly;

			Cheed and Semal. The redevelopment of GPRA Colony requires the clearance of the existing residential buildings along with the other social infrastructure which accounts for the built up area of approx. 1,13,248.8 sqm.
1.3	Creation of new land uses?	No	The project lies in the Zone F, Residential Area as per the Land Use Plan of MPD – 2021. The land has been allotted by Land & Development Office, Govt. of NCT of Delhi and will be redeveloped for residential purpose.
1.4	Pre-construction investigations e.g. bore houses, soil testing?	Yes	Pre-construction investigations such as hydro-geological investigation shall be carried out.
1.5	Construction works?	Yes	Redevelopment of GPRA colony includes demolition of existing buildings and construction of new buildings as per the modern amenities. The project envisages 9,57,991.35 sq. m. of built up area comprising Residential and Non Residential Buildings such as shop/market, school, health centre, office block and other buildings. During construction phase, temporary labour hutments will be constructed for workers.
1.6	Demolition works?	Yes	The project involves demolition of existing buildings. The project consists of Type I, Type II and Type III residential building and other Social Infrastructure. These buildings with the existing cumulative built up area aprox. 1,13,248.8 sqm will be demolished and in place of it; Residential buildings of Type II, Type III, Type IV, Type V and Type VI are proposed along with other social Infrastructure. Only one temple of built up area 2680 sq. m from the existing building will be retained.
1.7	Temporary sites used for construction works or housing of construction workers?	Yes	Temporary hutments will be provided for construction workers during construction phase.
1.8	Above ground buildings, structures or earthworks including linear structures, cut and fill or excavations	Yes	The project involves the redevelopment of Residential Colony; and the excavation will be carried out for laying foundation and basement.
1.9	Underground works including mining or tunneling?	No	This project is meant for the redevelopment of GPRA Colony, Srinivaspuri and no underground work such as mining/tunneling is required.

1.10	Reclamation works?	No	No reclamation work is involved.
1.11	Dredging?	No	Not Applicable
1.12	Offshore structures?	No	Not Applicable
1.13	Production and manufacturing processes?	No	There will be no production or manufacturing process involved. The project involves demolition of existing buildings; and construction of commercial and residential facilities.
1.14	Facilities for storage of goods or materials?	Yes	During construction phase, temporary storage room/ yards will be constructed for storage of construction material.
1.15	Facilities for treatment or disposal of solid waste or liquid effluents?	Yes	During construction phase, septic tanks and waste collecting bins will be provided for disposal of liquid and solid wastes respectively. During Operation phase, there is provision of Sewage Treatment Plant of total capacity 2800 KLD which will be installed, for treatment of liquid effluents. Treated effluent will be reused within the project premises to the maximum extent and the surplus will be used in nearby parks and other construction activities. Separate colour bins will be provided for collection of different type of wastes and will be disposed off through authorized vendor and composting, as applicable under Solid Waste Management Rules' 2018.
1.16	Facilities for long term housing of operational worker	No	Labour hutments will be provided only for construction phase. There will be no facility for long term housing of operational worker.
1.17	New road, rail or sea traffic during construction or operation?	No	The project site is located at a close distance of approx. 40 m from NH-2. No new road outside the project is proposed as part of the project. However, internal roads will be developed for smooth traffic circulation. Hazrat Nizamuddin Railway Station is approx. 2.5 km away from the project site. No new rail network is proposed. Road traffic is likely to be impacted during construction and operation phases of project; No change in rail and sea traffic is anticipated.
1.18	New road, rail, air waterborne or other transport infrastructure including new or altered routes	No	New road, rail, air waterborne or other transport infrastructure including new or altered routes and stations, ports, airports etc

	and stations, ports, airports etc?		are not proposed in the project.
1.19	Closure or diversion of existing transport routes or infrastructure leading to changes in traffic movements?	No	No closure or diversion of existing transport routes or infrastructure leading to changes in traffic movements is proposed in the project.
1.20	New or diverted transmission lines or pipelines?	No	No new or diverted transmission lines or pipelines are proposed.
1.21	Impoundment, damming, culverting, realignment or other changes to the hydrology of watercourses or aquifers.	No	There will not be any impoundment, damming, culverting, realignment or other changes likely to affect the hydrology of watercourses or aquifers.
1.22	Stream crossings?	No	There is no stream crossing in the vicinity of project area.
1.23	Abstraction or transfers of water form ground or surface waters?	No	No abstraction or transfer of water form ground or surface waters is proposed. Fresh water requirement will be supplied by Delhi Jal Board.
1.24	Changes in water bodies or the land surface affecting drainage or runoff?	No	In redevelopment of GPRA colony, adequate measures will be provided so that there will not be any changes in water bodies or the land surface affecting drainage or runoff.
1.25	Transport of personnel or materials for construction, operation or decommissioning?	Yes	Transport of personnel or materials for construction, operation will be by trucks, cars etc. during both construction and operation phases.
1.26	Long-term dismantling or decommissioning or restoration works?	No	The project doesn't involve long-term dismantling or decommissioning or restoration works.
1.27	Ongoing activity during decommissioning which could have an impact on the environment?	No	No decommissioning is proposed in the project.
1.28	Influx of people to an area in either temporarily or permanently?	Yes	There will be influx of people during construction phase. Approximately 500 workers will be employed during construction phase. They will be employed largely from local areas. During operation phase, 41,354 population including residents, staff and visitors is estimated to occupy the Colony.
1.29	Introduction of alien species?	No	There will not be any introduction of alien species. Only native plant species will be used for landscaping.
1.30	Loss of native species or genetic diversity?	Yes	The project site is on old urban habitat, involving trees; shrubs and herbs that are

			common to the Delhi. Currently, there are 2,763 trees present on the site out of 1,239 trees will be transplanted within the project site and the remaining tree will be merged with the proposed landscape. Tree cutting is not involved in the project. The main trees species found at the project site are Mulberry; Amaltas; Siris; Kaner; Mango; Mehndhi; Alstonia; Papdi; Peepal; Jamun; Bakaian; Jungle Jelebi; Shehtut; Ashok; Moringa; Reinta; Bargad; Neem; Anar; Kikar; Guava; Bael; Eucalyptus; Katal; Lemon; Siris; Kassod; Pilkhan; Khirni; Sagwan; Harsingar; Gular; Peech /Aadu; Lily Flower; Kadipatta; Bottal palm; Champa; Beliaphool; Kadipatta; Sheesham; Babul; Godly; Cheed and Semal.
1.31	Any other actions?	No	No

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	The project lies in the Residential Area as per the Land Use Plan of MPD-2021. The project involves the redevelopment of the existing GPRA Colony on a plot area 2,95,987.34 sq. m.
2.2	Water (expected source &competing users) unit: KLD	Yes	During the construction phase, it is estimated approx**. 20 KLD** of fresh water will be required for drinking purpose which will be procured from the local drinking water supplier during construction. The total water requirement during operation phase will be approx. 2861 KLD which includes the fresh water requirement of 1930 KLD and treated water requirement of 1865 KLD for flushing and horticulture. Fresh water requirement will be supplied by Delhi Jal Board.
2.3	Minerals (MT)	Yes	Sand and stone aggregates will be used as Construction material.
2.4	Construction material-stone, aggregates, sand/ soil (expected	Yes	Conventional construction material will be used. Energy efficient building materials will be used

	source-MT)		as specified in the Energy Conservation Building Code. The major materials used for the construction of the project shall be steel, cement, bricks, metal, flooring tiles/stones, sanitary and hardware items, electrical fittings and water etc. Steel and cement will be procured from authorized vendors. Sand & aggregate will be procured from local material suppliers.
2.5	Forests and timber (source–MT)	Yes	Timber will be required for doors and windows and will be purchased from local market.
2.6	Energy including electricity and fuels (source, competing users) Unit: fuel (MT), energy (MW)	Yes	The maximum demand load for the proposed project will be 27,849 KW for which 5 DG sets of 500 kVA capacity each will be installed as a power back up. Only low Sulphur diesel will be used for running the DG sets
2.7	Any other natural resources (use appropriate standard units)	No	No

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 MSIHC rules) to human health or the environment (flora, fauna, and water supplies)	No	The project involves redevelopment of GPRA Colony in which storage of hazardous chemicals (as per MSIHC rules) not will be required, except low sulphur diesel to run the D.G. sets.
3.2	Changes in occurrence of disease or affect disease vectors (e.g. insect or water borne diseases)	No	The project is the redevelopment of the GPRA Colony. With good housekeeping, no adverse impact is envisaged on disease profile of the region.
3.3	Affect the welfare of people e.g. by changing living conditions?	Yes	Redevelopment of GPRA Colony will create mass level employment thereby, improving the overall living index of the masses.
3.4	Vulnerable groups of people who could be affected by the project e.g. hospital patients, children, the elderly etc,	Yes	The redevelopment of the GPRA Colony involves the demolition of the existing infrastructure which may have adverse impact on the vulnerable groups but the effect will be

			temporary. However, the demolition work will be carried out after the site barricading with GI sheets of 10 m height; to minimize the impact on the vulnerable groups.
3.5	Any other cause	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)withsourceof information data
4.1	Spoil, overburden or mine wastes.	No	No spoil, overburden, or mine wastes will be generated from the proposed project. Approx. 3,20,000 cubic meter of soil will be excavated for laying down foundation and basement; the excavated soil will be reused in backfilling and landscape development within the project site, to the extent feasible.
4.2	Municipal waste (domestic and or commercial wastes)	Yes	The solid waste generated from the project shall be mainly domestic waste and estimated quantity of the municipal waste shall be approx. **16,546.48** kg per day. The municipal solid wastes will be managed as per the provision of Solid Waste Management Rules 2016.
4.3	Hazardous wastes (as per Hazardous Waste Management Rules)	Yes	The hazardous waste generated from the Residential Colony such as waste oil will be managed as per the provisions of Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 and will be managed by authorized vendors with prior agreement.
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 Sewage Treatment Plant will be rich in organic content and used as an excellent fertilizer for horticultural purposes.
4.7	Construction or demolition wastes	Yes	Construction waste generation will be limited to the construction phase only and will be limited to project site only. These will be reused for backfilling and road construction within the site after manual segregation. Unusable and excess construction debris will be disposed off the Facility Center at Burari for managing the construction and demolition waste as per the provisions of the Construction & Demolition Waste Rules, 2016

4.8	Redundant machinery or equipment	No	No Redundant machinery or equipment is involved.
4.9	Contaminated soils or other materials	No	Soil contaminated with hazardous waste will be treated as hazardous waste. However, all precautions will be taken to ensure that the soil does not get contaminated during construction or operation phase.
4.10	Agricultural wastes	Yes	Approx. 7.756 kg/day of horticultural wastes
4.11	Other solid waste	Yes	As it is a GPRA colony therefore, the onsite generated quantum of E waste will be very low. E-wastes which will be generated from the project will be handled as per the E-waste (Management) Rules, 2016 and amended in 2018.

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	Transportation of goods during construction phase and DG set operation will lead to air pollution. Management measures are proposed to mitigate the impacts. The operation of project does not envisage any major air pollutant generating sources except D.G. sets and vehicular movement. The DG sets will be a source of air emission during the operation phase in case of power failure. Stacks of adequate height will be provided (as per the CPCB norms) to disperse the pollutants generated from D.G Sets. The pollution from the vehicular movement will be controlled by regular maintenance vehicles. Local native plants used in tree plantation all around the project site and road sides will also reduce the impact of pollution.
5.2	Emissions from production processes	No	There is no production process involved in the redevelopment of the GPRA Colony.
5.3	Emissions from materials handling including storage or transport	Yes	There will be emissions from material handling, transportation and storage. Measures will be taken as per the proposed Environment Management Plan such as covering of construction material during transportation and storage, water sprinkler etc.

5.4	Emissions from construction activities including plant and equipment	Yes	There will be dust emission from construction activities. However, it is proposed to be mitigated by following best building construction practices such as providing dust screens, regular water sprinkling etc.
5.5	Dust or odors from handling of materials including construction materials, sewage and waste	Yes	Dust is likely to be generated during construction. Water sprinkler and tarpaulin covers will be provided over stored loose, raw material to reduce dust emission. On site sanitation facilities will be provided for construction workers during construction phase. Hence, no foul odour is envisaged.
5.6	Emissions from incineration of wastes	No	No incineration of wastes is proposed.
5.7	Emissions from burning of waste in open air (e.g. slash materials, construction debris)	No	No burning of waste is proposed.
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	The machinery which will be used for construction will be of high standard and will adhere to international standard. These standards take care of noise pollution / vibration and also air emissions. Hence, impacts due to construction machinery are envisaged to be insignificant. The construction activities will be restricted to daytime only. Sources of noise in the operational phase will be D.G. sets and vehicular movements. D.G. sets will be enclosed in acoustic enclosures. The D.G. Sets will be used during power failure only and will generate noise level below 25 dB (A).
6.2	From industrial or similar processes	No	No industrial processes are involved in the redevelopment of project.
6.3	From construction or demolition	Yes	Due to the various construction and demolition 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:

			Excavation activities, Concreting and mixing, Construction plant, Heavy vehicle movement and Operation of D.G. set.
6.4	From blasting or piling	No	No blasting is proposed and piling will be done in way that does not emanate noise pollution.
6.5	From construction or operational traffic	Yes	Some noise will be generated from vehicular movement in the construction and operational phase. The site shall be enclosed in the GI sheet barricades during the construction phase to reduce the impact of construction noise outside the project site. Tree plantation all around the project site and road sides in the operation phase will reduce the impact of the air and noise pollution.
6.6	From lighting or cooling systems	Yes	Machineries and equipment for lightening and cooling system having acoustic enclosure will be used to control noise pollution.
6.7	From any other sources	No	Not applicable

7. 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	Yes	The used oil from D.G Set will be carefully stored in HDPE drums at isolated storage and periodically sold to authorized recyclers. All precaution will be taken to avoid spillage from storage as per the Hazardous and Other Wastes (Management & Transboundary Movement) Rules 2016.
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 discharge of untreated sewage on land or into water bodies. During construction phase, sewage will be collected in septic tanks. During operation phase, sewage will be treated in the proposed STPs of total 2861 KLD capacity (phase wise installation). Treated sewage from STP will be reused in flushing and landscaping and the surplus will be used in nearby parks and other construction activities.
7.3	By deposition of pollutants emitted to air into the land or into water	Yes	Minor air emissions will be there due to increased vehicular movement and occasional use of D.G. sets for which effective measures will be taken like adequate greenbelt development and use of low

			sulphur diesel in D.G. sets etc.
7.4	From any other sources	No	No any other sources are involved except the mentioned above.
7.5	Is there a risk of long term buildup of pollutants in the environment from thesesources?	No	There is no risk of long term buildup of pollutants in the environment.

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	No	The project does not involve major hazardous construction activity. Hence chances of explosions, spillages, fires etc. are minimal. During construction, suitable personal protective equipment will be provided to all construction workers as required under the health & safety norms. Awareness & Training about safety norms will be provided to all the supervisors and construction workers involved in construction activities. No major hazardous waste will be stored within project site. The project consists of non-hazardous units. Hence, chances of chemical hazards and accidents are minimal. Suitable firefighting measures will be provided for an emergency situation.
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 proposed project lies outside any flood zone. It lies in zone IV of BIS seismic zone classification. Accordingly, the project has been designed accordingly. The project site lies in the plains and bears no chance of landslide.

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	Yes	The project comprises the redevelopment of the GPRA

	supporting utilities, ancillary development or development stimulated by the project which could have impact on the environment e.g.		Colony which is likely to develop supporting services and infrastructure in and around the area.
	a) Supporting infrastructure (roads, power supply, waste or waste water treatment, etc.)	Yes	The project is as per the landuse of MPD-2021. Hence, its water and power requirement has already been accounted for in the regional planning. The project shall manage the wastes and wastewater generated within the site.
	b) Housing development	Yes	The redevelopment of residential colony will give a boost for housing development in the region.
	c) Extractive industries	No	There will be no extractive industries.
	d) Supply industries	No	Not Applicable
	e) Other	No	Not applicable
9.2	Lead to after-use of the site, which could have an impact on the environment	Yes	The redevelopment of residential colony will lead a planned development and will have a positive impact on the environment.
9.3	Set a precedent for later developments	No	Not applicable
9.4	Have cumulative effects due to proximity to the existing or planned projects with similar effects.	Yes	The redevelopment of residential colony lies in Srinivaspuri where many other projects of similar nature exist. A better-planned and executed project has to yield better result individually. The old buildings are in dilapidated conditions and the need of hour is planning of a new habitat, keeping the increased demand for urban housing requirement. However, a traffic study will be carried out to assess the traffic impact of the proposed project on existing status.

III. ENVIRONMENTAL SENSITIVITY

S.No	Areas	Name / Identity	Aerial distance (within 15 kms.) Proposed Project Location Boundary
1	Areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value	Jahanpanah City Forest Okhla Bird Sanctuary AsolaBhati Wildlife Sanctuary Central Ridge Reserve Forest Northern Ridge Reserved Forest Rajokari Protected Forest GarhiMendu PF	3.0 Km SW 3.5 Km E 6.5 Km S 7.6 Km NW 12.0 Km N 12.5 Km SW 13.7 Km N
2	Areas which are important	Yamuna River	2.6 Km NNE

S.No	Areas	Name / Identity	Aerial distance (within 15 kms.) Proposed Project Location Boundary
	or sensitive for ecological reasons - Wetlands, watercourses or other water bodies, coastal zone, biospheres, mountains, forests	Jahanpanah City Forest Okhla Bird Sanctuary AsolaBhati Wildlife Sanctuary Central Ridge Reserve Forest Northern Ridge Reserved Forest Rajokari Protected Forest GarhiMendu PF	3.0 Km SW 3.5 Km E 6.5 Km S 7.6 Km NW 12.0 Km N 12.5 Km SW 13.7 Km N
3	Areas used by protected, important or sensitive species of flora or fauna for breeding, nesting, foraging, resting, over wintering, migration	Yamuna River Jahanpanah City Forest Okhla Bird Sanctuary AsolaBhati Wildlife Sanctuary Central Ridge Reserve Forest Northern Ridge Reserved Forest Rajokari Protected Forest GarhiMendu PF	2.6 Km NNE 3.0 Km SW 3.5 Km E 6.5 Km S 7.6 Km NW 12.0 Km N 12.5 Km SW 13.7 Km N
4	Inland, coastal, marine or underground waters	Yamuna River Nazafgarhnala	2.6 KM NNE 14 Km N
5	State, National boundaries	Delhi-Uttar Pradesh Border	3.7 Km ; E
6	Routes or facilities used by the public for access to recreation or other tourist, pilgrim areas	National Highway-2 National Highway-24 Hazarat Nizamuddin Railway Station	0.4Km; NE 3.3 Km; N 2.5 Km; N
7	Defense installations	Delhi Cantonment	10.4 Km NW
8	Densely populated or built-up area	Delhi	0 KM
9	Areas occupied by sensitive man-made land uses *(hospitals, schools, places of worship, community facilities)*	Gurudwara (Yadgaar Baba Banda Singh Bhahadur), Sriniwaspuri Arya Samaj Mandir Radha Krishana Temple Nurses Residential Complex, Sriniwaspuri Indian Oil Petrol Pump, Sriniwaspuri Cambridge School, Sriniwaspuri Leprosy Society	0.27 Km E 0.32 Km E 0.49 Km S 0.2 Km W 0.6 Km W 0.2 Km W 0.2 Km W
10	Areas containing important, high quality or scarce resources *(ground water resources, surface resources, forestry, agriculture, fisheries, tourism, minerals)*	Yamuna River Jahanpanah City Forest Okhla Bird Sanctuary AsolaBhati Wildlife Sanctuary Central Ridge Reserve Forest Northern Ridge Reserved Forest Rajokari Protected Forest GarhiMendu PF	2.6 Km NNE 3.0 Km SW 3.5 Km E 6.5 Km S 7.6 Km NW 12.0 Km N 12.5 Km SW 13.7 Km N
11	Areas already subjected to	Okhla Industrial Area	3.5 Km SE

S.No	Areas	Name / Identity	Aerial distance (within 15 kms.) Proposed Project Location Boundary
	pollution or Environmental damage. *(those where existing legal environmental standards are exceeded)*	Naraina Industrial Area	13.0 KM NW
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*)	The area falls under zone-IV for seismicity and earthquakes; the project area is not susceptible to flooding; landslide or erosion.	None

IV. Proposed Terms of Reference: Applicable. The draft proposed TOR are detailed below;

Introduction (Site & Surroundings)

A brief description of the project, nature, size, location and connectivity by road/ rail of the project including land description /plot/ survey/Khasra Nos. Village, Tehsil, District, State and extent of the land.

A contour survey plan showing the project site and its surroundings with physical features and topographical details, such as landuse, contours and drainage pattern, along with photographs of the site from all four sides would be included in background information.

Baseline Environmental Data:-

Baseline data of existing situation including description of terrain, slopes and elevation. Baseline data on flora and fauna based on field survey clearly indicating the details of site and surroundings.

The meteorological data consisting of climatic conditions, wind pattern, wind speeds, history of cyclones, wind direction, rainfall, temperature and humidity in the study area.

The baseline data on ground water, present quality and the utility, depth of ground water table etc.

Details of Ambient Air Quality (AAQ) based on the many other factors such as, background pollution levels, other sources of pollution, weather and proximity of residential areas. Examine the soil quality of the site and surroundings.

Water, Waste Water & Rain Water

Examine in detail the proposed site with reference to impact on infrastructure covering water supply storm water drainage, sewerage, power, etc.

Explore all possibilitiesforsourcesofwaterduringconstructionphaseandoperation phase.

Explore possibilities of using treated water from STP for construction purposes.

The disposal scheme of treated from the proposed project plans will be made to maximize recycling of water.

Preparation of water audit and water balance chart.

Rainwater harvesting plan shall be prepared taking into account meteorological, soil&ground water characteristics.

Rain water harvesting scheme would be developed as per the CGWB guidelines.

Solid Waste, Hazardous Waste & E-Waste Management

Details on types of waste which are generated like construction waste, demolition waste and municipal solid waste, hazardous waste.

Odour mitigation plan from solid waste processing area will be described. Arrangements for hazardous waste management will be described.

Conservation of Natural Resources

Identification of locally available construction material and its use.Explore the possibilities of using flyash in the project.

Green Area Development Plan

Provision of green cover as a measure for mitigation of dust and noise and buffer between habitation and proposed project will be made.

Energy Conservation Measures & Renewable Energy

Application of renewable energy/alternate energy such as solar will be described including solar water heating &lighting.

ApplicabilityofvariousprovisionsandnormsofEnergyConservationBuildingCode (ECBC) code will be explored in building design, maintenance & performance.

Environment Management Plan

Details regarding the precautionary measures to be taken during transportation of the construction material. Green Area development plan with thick green belt of adequate width with all around the project site. The identification of species/plants based on the botanical studies. The details on estimated cost of development of the project, environmental costs.

The details for construction and operation phases both for Environmental Management Plan and Environmental Monitoring Plan with parameters and cost. Information on Administrative and technical setup for management of environment.

Disaster Management Plan

The details of activities associated with construction and operations such as Occupational hazards due to exposure. Fire and/or explosion, Leakage of flammable material, Release of toxic material etc.

Environmental Corporate Responsibility

Details of Environmental Corporate Responsibilities (ECR).The generic structure of the EIA report shall be as per the guideline as prescribed in Appendix III of the Gazette Notification of the Ministry of Environment and Forests, Govt.of India dated 14thSeptember 2006.

The generic structure of the EIA will be as described in below table:

S. No.	EIA Structure	Contents
1	Introduction	• Purpose of the report • Identification of project & project proponent • Brief description of nature, size, location of the project and its importance to the country, region • Scope of the study–details of regulatory scoping carried out
2	Project Description	Condensed description of those aspects of the project (based on project feasibility study), likely to cause environmental effects. Details will be provided to give clear picture of the following: • Type of project

		• Need for the project • Location (maps showing general location, specific location, project boundary & project site layout) • Size or magnitude of operation (incl. Associated activities required by or for the project • Proposed schedule for approval and implementation • Technology and process description • Project description. Including drawings showing project layout, components of project etc. Schematic representations of the feasibility drawings which give • Information important for EIA purpose • Description of mitigation measures incorporated into the project to meet environmental standards, environmental operating conditions, or other EIA requirements (as required by the scope) • Assessment of New & untested technology for the risk of technological failure
3	Description of the Environment	• Studyareatobewithin10 km of the project site, period– non monsoon • Parameters of Monitoring: Ambient Air Quality, Ambient Noise Level, Ground Water Quality, Surface Water Quality, Soil Quality
4	Anticipated Environmental Impacts &Mitigation Measures	• Details of Investigated Environmental impacts due to project location, possible accidents, project design, project construction, regular operations, final decommissioning or rehabilitation of a completed project. • Measures for minimizing and / or Mitigation measures offsetting adverse impacts identified • Irreversible and Irretrievable commitments of environmental components. • Assessment of significance of impacts (Criteria for determining significance, Assigning significance)
5	Environmental Monitoring Program	• Technical aspects of monitoring the effectiveness of mitigation measures (incl. Measurement methodologies, • frequency, location, data analysis, reporting schedules, emergency procedures, detailed budget & procurement schedules)
6	Additional Studies	• Risk assessment
7	Project Benefits	• Improvements in the physical infrastructure • Improvements in the social infrastructure

		• Employment potential –skilled; semi-skilled and unskilled • Other tangible benefits
8	EMP	• Description of the administrative aspects of ensuring that mitigative measures are implemented and their effectiveness. • monitored, after approval of the EIA
9	Summary & Conclusion	• Overall justification for implementation of the project Explanation of how, adverse effects have been mitigated.
10	Disclosure of Consultants engaged	• The names of the Consultants engaged with their brief resume and nature of Consultancy rendered

I hereby give an undertaking that the data and information given in the application and enclosures are true to the best of my knowledge and belief and I am aware that if any part of the data and information submitted is found to be false or misleading at any stage, the project will be rejected and clearance given, if any to the project will be revoked at our risk and cost.

Date: 26.07.2018
Place: New Delhi

Akhelesh Kumar
Executive Engineer
CPWD

Note:

1. The projects involving clearance under Coastal Regulation Zone Notification, 1991 shall submit with the application a C.R.Z map duly demarcated by one of the authorized agencies, showing the project activities, w.r.t C.R.Z (at the stage of TOR) and the recommendations of the State Coastal Zone Management Authority (at the stage of EC). Simultaneous action shall also be taken to obtain the requisite clearance under the provisions of the CRZ notifications, 1991 for the activities to be located in the CRZ.
2. The Projects to be located within 10km of the National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals, the project proponent shall submit the map duly authenticated by Chief wildlife Warden showing these features vis-a-vis the project location and the recommendations or comments of the Chief Wildlife Warden thereon (at the stage of EC).
3. All correspondence with Ministry of Environment & Forests including submission of application for the TOR/Environment Clearance, subsequent clarifications, as may be required from time to time, participation in the EAC/SEAC Meeting on behalf of the project proponent shall be made by the authorized signatory only. The authorized signatory should also submit a document in support of his claim of being an authorized signatory for the specific project.

APPENDIX II
FORM-1 A

(Only for construction projects listed under item 8 of the Schedule)

CHECK LIST OF ENVIRONMENTAL IMPACTS

(Project proponents are required to provide full information and wherever necessary attach explanatory notes with the Form and submit along with proposed Environmental Management Plan & Monitoring Programme).

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 not consistent with the surroundings? (Proposed land use must conform to the approved Master Plan / Development Plan of the area. Change of land use if any and the statutory approval from the competent authority 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.

Central Public Works Department (Redevelopment Project Division-II) has planned for the Redevelopment of GPRA Srinivaspuri measuring 73.14 acres of land at Srinivaspuri, New Delhi. Earlier, the Residential Colony consists of Type I, Type II and Type III residential building and other Social Infrastructure. These buildings are to be demolished and in place of it; Residential buildings of Type II, Type III, Type IV, Type V and Type VI are proposed along with other social Infrastructure. Only one temple of BUA 2680 sq. m from the existing building will be retained. The ground coverage, FAR and the built up area of the project after redevelopment will be 80,177.63 m^2, 6,42,738.74 m^2 and 9,57,991.35 m^2 respectively.

The site location is shown below in **Figure 1** while the 500 mtrs radius buffer map is attached as **Annexure-I**

Fig 1 : Location of the Project Site

Site Location: The proposed site is connected through Ring Road. The site is at an approx. distance of 400m from NH-2. The nearest airport is Safdarjung, 4.50 km away and Hazrat Nizamuddin Railway Station is 2.5 km away. The coordinates for location of the project are shown in **Table 1.**

Table 1: Latitude and Longitude of the Project Site

Pillar No	Latitude	Longitude
1	28°34'6.319"N	77°15'25.206"E
2	28°34'4.174"N	77°15'22.076"E
3	28°33'54.698"N	77°15'9.76"E
4	28°33'51.684"N	77°15'5.616"E

Source: Secondary data (Desktop Analysis)

Surrounding Features: The surrounding features of the project site are presented in **Table 2.**

Table 2: Surrounding Features of the Project Site

S. No.	Features Within project site	
1.	Boys Govt Senior Secondary School	
2.	Delhi Jal Board Officer – 3 No.	
3.	Bharat Sevashram,Delhi Headquarters	
4.	Police Station, South-West Zone, Sriniwaspuri	
5.	L Market, T Market and I Market	
6.	Delhi Public Library, Sriniwaspuri	
7.	Post Office Sriniwaspuri	
8.	Savera Foundation	
9.	SevaSadan	
10.	MCD Primary Model School	
11.	BaraatGhar (Community Centre), Sriniwaspuri	
12.	Govt Maternity Centre, Sriniwaspuri	
13.	CGHS Dispensary, Sriniwaspuri	
14.	Girls Sr. Secondary School	
Features Outside the project site		
S. No.	**Details of sensitive receptors**	**Distance and Direction**
1.	RadhaKrishana Temple	Approx. 49 Meter South
2.	Arya SamajMandir	Approx. 32 Meter East
3.	Gurudwara (Yadgaar Baba Banda Singh Bhahadur), Sri Niwas Puri	Approx. 27 Meter East
4.	Nurses Residential Complex, Sriniwaspuri	Approx. 20 meter West
5.	Indian Oil Petrol Pump, Sriniwaspuri	Approx. 60 meter West
6.	Cambridge School, Sriniwaspuri	Approx. 17 meter West
7.	Leprosy Society	Approx. 15 Meter West
8.	HazratNizamuddin Railway Station	Approx. 2.5 km towards North
9.	Safdarjung Airport	Approx. 4.50 km towards NW
10.	NH2	Approx. 0.40 km East
11.	Moolchand Metro Station	Approx 1.70 km towards West
12.	Yamuna River	Approx. 2.6 Km towards NNE

Desktop Study: Wikimapia& Google Earth

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

The total plot area of the project is **2,95,987.34 m²**. The FAR of the project after re-development will be **6,42,738.74 m²**; while the total built-up area of the project will be **9,57,991.35 m²**. The detailed area statement is show in **Table 3** while the details of the blocks are shown in **Table 4.**

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Table 3 : Area Statement

S. No.	Particulars	Existing (A) (in m²)	Demolition (B) (in m²)	Proposed (C) (in m²)	Total ((A-B)+C) (in m²)
1	Plot Area	2,95,987.34			
2	Permissible Ground Coverage (@33.3% of the net plot area)	98563.78			
3	Achieved Ground Coverage	53,210.27 (17.9% of Plot Area)	52,540.27 (17.7% of Plot area)	79,507.63 (26.86% of Plot Area)	80,177.63 (27.09 % of plot area)
4	Open Area (1-3)	2,42,777.07	2,43,447.07	2,16,479.71	2,15,809.71
5	Green Area Achieved	1,56,918.71			
6	Surface Parking Area	48,208			
7	Area under Road pavements	10,683			
7	Permissible FAR (@3 of the plot area)	88796.202			
8	Achieved FAR	91,942.55 (31.06 of plot Area)	89,262.55 (30.15 of Plot Area)	6,40,058.74 (2.16 of plot Area)	6,42,738.74 (2.17 of Plot Area)
9	Non FAR	21,306.25	21,306.25	3,15,252.61	3,15,252.61
10	Built Up Area (8+9)	1,13,248.8	1,10,568.8	9,55,311.35	9,57,991.35

Table 4: Tower wise details of FAR &Built Up Area

S. NO.	BUILDING NAME	TOWER	FAR (sq. m)				BUA (sq. m)			
			Existing (A) (in m²)	Demolition (B) (in m²)	Proposed (C) (in m²)	Total((A-B)+C) (in m²)	Existing (A) (in m²)	Demolition (B) (in m²)	Proposed (C) (in m²)	Total (A-B+C) (in m²)
A. RESIDENTIAL BUILDINGS										
1	TYPE I		22032	22032	0	0	30099.6	30099.6	0	0
2	TYPE II	T1 – T11	34020	34020	120614.20	120614.20	43432.2	43432.2	135230.84	135230.84
3	TYPE III	T12 – T22	1393.75	1393.75	135032.36	135032.36	1705	1705	147175.13	147175.13
4	TYPE IV	T23 – T36	0	0	210022.75	210022.75	0	0	232241.45	232241.45
5	TYPE V	T37 – T40	0	0	83344	83344.00	0	0	89747.8	89747.8
6	TYPE VI	T41 – T42	0	0	55675	55675.00	0	0	56023.5	56023.5
7	SCHOOL I		0	0	7466.34	7466.34	0	0	9109.74	9109.74

S. NO.	BUILDING NAME	TOWER	FAR (sq. m)				BUA (sq. m)			
			Existing (A) (in m^2)	Demolition (B) (in m^2)	Proposed (C) (in m^2)	Total((A-B)+C) (in m^2)	Existing (A) (in m^2)	Demolition (B) (in m^2)	Proposed (C) (in m^2)	Total (A-B+C) (in m^2)
8	SCHOOL II		0	0	4810.87	4810.87	0	0	4810.87	4810.87
9	SCHOOL III & IV		0	0	5059.84	5059.84	0	0	6788.1	6788.1
10	SHOPPING I		0	0	3320.24	3320.24	0	0	3904.7	3904.7
11	(SHOPPING , POST OFFICE , LIBRARY, DISPENSARY AND MATERNITY)		0	0	8616.27	8616.27	0	0	11240.25	11240.25
12	SHOPPING III COMPLEX		0	0	4976.69	4976.69	0	0	5812.64	5812.64
15	POLICE STATION		0	0	1120.18	1120.18	0	0	1212.66	1212.66
16	SHOPS/ MARKETS		2880	2880	0	0.00	3200	3200	0	0
17	SCHOOL		17632.8	17632.8	0	0.00	19592	19592	0	0
18	HEALTH CENTER		2479.5	2479.5	0	0.00	2755	2755	0	0
19	OTHER BUILDINGS (OFFICE, LIBRARY, NGO, COMMUNITY CENTER ETC.)		8644.5	8644.5	0	0.00	9605	9605	0	0
20	RELIGIOUS BUILDINGS		2860	180	0	2680.00	2860	180	0	2680
Total			**91942.55**	**89262.55**	**64005.74**	**64273.74**	**113248.8**	**11056.8**	**70329.68**	**70597.68**
C.	BASEMENT AREA (Non FAR)						72778.67			
D.	PODIUM AREA (Non FAR)						179235			
TOTAL BUILT UP AREA							**9,57,991.35**			

Water Requirement:

Existing Phase: For the existing facility, the total water requirement is approx.. 800 KLD while the wastewater generation is in tune of approx. 700 KLD.

Construction Phase: The water requirement during the construction phase comprises mainly of two parts i.e. fresh water for labourers and treated water for building constructions. It is estimated approx**. 20KLD** 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.

Approx. **50 KLD** of water will be required for construction purpose of the building. The treated water requirement will be met by the treated water from the nearby CSTP, which will be brought by the private water tank.

Operation Phase: It is estimated that the total water demand during the operation phase will be **2861 KLD.** The fresh water requirement for residential population, staff and visitors is envisaged to be **1930 KLD**, whereas the treated water requirement is approx. **931 KLD** which includes water requirement for flushing and horticulture. Source of water supply will be Delhi Jal Board.

Power Requirements:

The maximum demand load for the proposed project will be 27,849 KW. DG sets of suitable capacity will be installed for power back up in the project. The DG sets will be equipped with acoustic enclosure to minimize noise generation and adequate stack height for proper dispersion. The power requirements during operation Phase are given in **Table 5.**

Table-5: Power Requirement for Operation Phase

Parameters	Operation Phase
Power requirement	27849 KW
Supply by	BSES Rajdhani Power Limited
Back-up power supply	5 nos. of DG sets of capacity 500 kVA each

Parking Requirements:

Adequate provision for car parking will be made at the project site. The parking required and the parking proposed is shown in **Table 6 & Table 7.**

Table 6: Parking Requirement

As per MPD-2021 Norms	
Residential Facilities	2 ECS/100 m^2 of FAR
	= 6,42,738.74 /100= 6,427 ECS

Table 7: Parking Provided

Parking Proposed			
	Basis	**Density**	**No. of ECS**
Open Parking	48,208 sqm	@ 23 sq. m. /ECS	2096
Podium Parking	1,79,235 sqm	@ 28sq. m./ ECS	6401
Basement Parking	72,778.67 sqm	@ 32 sq. m. / ECS	2274
Total Car Parking			**10,771**

Connectivity and Community Facility Requirement: Community facilities like hospitals, school, place of worship, etc. are existingin the vicinity of the project site. The project site is connected through Ring Road and is approx 400 m towards East from NH-2.

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

The proposed project is redevelopment of GPRA Colony in Srinivaspuri. . Currently, there are 2,763 trees present on the site out of 1,239 trees will be transplanted within the project site and the remaining tree will be merged with the proposed landscape. The main trees species found at the project site are Mulberry; Amaltas; Siris; Kaner; Mango; Mehndhi; Alstonia; Papdi; Peepal; Jamun; Bakaian; Jungle Jelebi; Shehtut; Ashok; Moringa; Reinta; Bargad; Neem; Anar; Kikar; Guava; Bael; Eucalyptus; Katal; Lemon; Siris; Kassod; Pilkhan; Khirni; Sagwan; Harsingar; Gular; Peech /Aadu; Lily Flower; Kadipatta; Bottal palm; Champa; Beliaphool; Kadipatta; Sheesham; Babul; Godly; Cheed and Semal.
Additionally, plantation will be carried out extensively to improve the green cover of the site. The project lies in the Zone F, Residential Area as per the Land Use Plan of MPD – 2021. The project will get its supply of water and power from the local authorities and not exert any pressure on the groundwater resources of the study area. Thus, no negative impact is anticipated on the existing facilities such as open spaces & community facilities. The proposed green area development over 1,56,918.71 sq. mts expected to improve the aesthetics of the area. Plantation will be done on both sides of roads as well as along the periphery of the plot area.

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

The proposed activity will not affect any significant land disturbance resulting in soil erosion, subsidence and instability. The area is not susceptible to erosion. The estimated quantity of excavated earth material will be utilized at the site for leveling, backfilling and green area development, as far as feasible
Land/soil environment may be affected due to activities like site preparation, excavation, material handling & storage etc. during construction phase. However, these impacts will be temporary and confined within the site. Proper drainage system shall be provided to deal with the storm water in case of rain.

Soil type: A quantitative assessment of the particle size distribution of the soil was made by wet sieve analysis and sedimentation analysis using hydrometer, as per procedures laid down is IS: 2720 Part IV. The particle sizes were designated according to the scale given in IS: 1498 and the soil type in the area is found to be loam.

The project site is located in high seismic risk (Zone IV) area as per national standards.

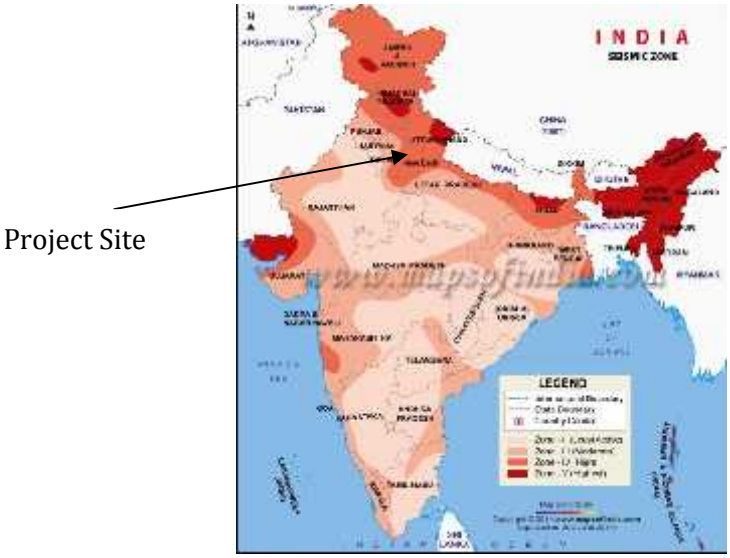


Figure 2: Seismic map of India

(Source : maps of India)

Flood Plain: There is no flood plain near the project site.

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

As per the contour plan, the area can be categorized as a plain land as it is having relative relief of less than 5 meter. There are no streams passing through the project site. Storm water management is proposed along with rain water harvesting to recharge the groundwater.

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?)

The total excavated earth quantity is estimated to be approximately 3,20,000 cubic meters. Excavation will be carried out for foundation & basement work. The total excavated earth material will be reused for the purpose of back-filling & leveling of low lying areas and developing landscape to the extent feasible.

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

Existing Phase: For the existing facility, the total water requirement is approx. 800 KLD while the wastewater generation is in tune of approx. 700 KLD.

Construction Phase: The water requirement during the construction phase comprises mainly of two parts i.e. fresh water for labourers and treated water for building constructions. It is estimated approx**. 20KLD** 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.
Approx. **50 KLD** of water will be required for construction purpose of the building. The treated water requirement will be met by the treated water from the nearby CSTP, which will be brought by the private water tank.

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 of 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.
- Remaining soil shall be utilized for refilling / road work / rising of site level at locations etc.

Conclusively, it can be stated that impacts may be confined to small area (mainly to project site) and for short duration. Proposed mitigation plan suggests maximum re-use of construction waste on site, removal of non-reusable waste from the site and its proper disposal, which would reduce the impact significantly.

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

There is no low lying area & wetlands present in the vicinity of the project site. Hence no impact is anticipated.

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

Labor hutments with basic amenities toilets, waste bins and bathing facility, first aid etc and mobile toilets at the construction site will be provided during construction phase. No other waste will be generated, during the construction phase, which can cause health hazard. The surplus earth and the fertile topsoil will be used for landscaping. Construction debris will be collected and stored at earmarked place and disposed regularly.

2. WATER ENVIRONMENT

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

Existing Phase: For the existing facility, the total water requirement is approx.. 800 KLD while the wastewater generation is in tune of approx. 700 KLD.

Construction Phase: The water requirement during the construction phase comprises mainly of two parts i.e. fresh water for labourers and treated water for building constructions. It is estimated approx**. 20KLD** 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.

Approx.**50 KLD** of water will be required for construction purpose of the building. The treated water requirement will be met by the treated water from the nearby CSTP, which will be brought by the private water tank.

Operation Phase: It is estimated that the total water demand during the operation phase will be **2861 KLD.** The fresh water requirement for residential population, staff and visitors is envisaged to be **1930 KLD**, whereas the treated water requirement is approx. **931 KLD** which includes water requirement for flushing and horticulture. Source of water supply will be Delhi Jal Board. Detailed Water requirement is given in **Table 8.**

Table 8: Water Calculation

Sr. No.	Particular	Occupancy / Population	Area in Sqm	Water Demand per capita	Fresh Water	Treated Water	Total Water Demand	Wastewater generation
1	Residential Population	28850		86	1875.25	605.85	2481.10	2106.05
2	Visitors population	10122		15	37.07	114.75	151.83	144.41
3	Staff Population	2382		30	17.45	54.02	71.47	67.98
4	Landscape Area		156918.71	1 ltrs/sqm/day	0.00	156.92	156.92	
5	Total				**1929.78**	**931.54**	**2861.31**	**2318.44**
	Say				**1930**	**931**	**2861**	**2318**

Source:(i) Manual on norms and standards for environment clearance of large construction projects, Ministry of Environment and Forests, Government of India (iii) National Building Code of India, 2005,

The water balance diagram during the non-rainy is shown below in Figure 3:

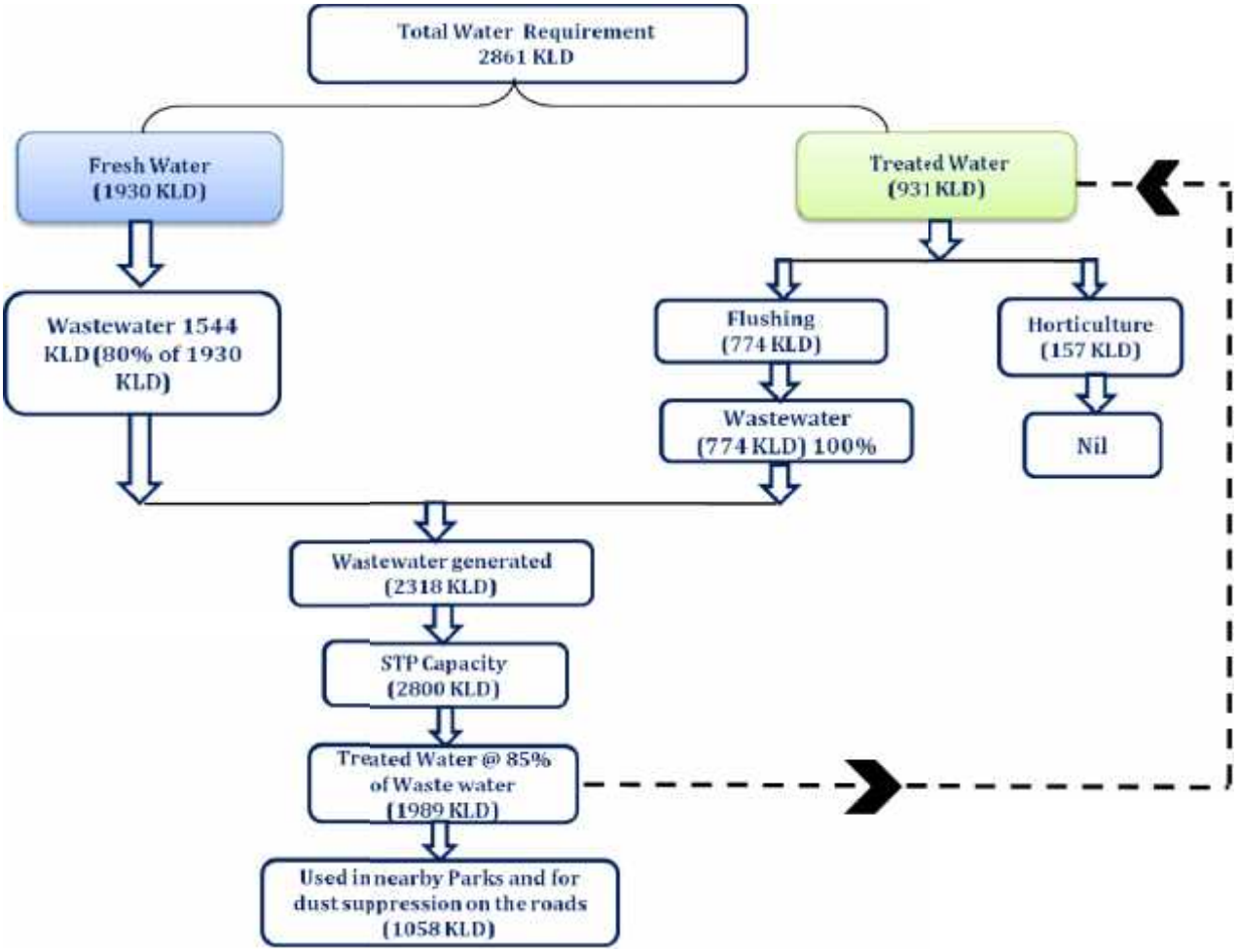


Figure 3: Water Balance Diagram (Non-rainy Season)

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

The total water requirement of the project will be 2861 KLD during the non-rainy season. The fresh water required will be 1930 KLD which will be supplied by Delhi Jal Board and the treated water will be 931 KLD. It is expected that approximately 1989 KLD of treated water will be recovered from the STP of total capacity 2800 KLD which will be installed in phase wise manner. During non-rainy season; STP treated water will be reused in flushing (774 KLD) and horticulture (157 KLD).Surplus water will be used in nearby parks or other construction activities.

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

The water will be supplied by Delhi Jal Board. The data from the secondary source will conform to the parameters well within the permissible limits and water can be used for drinking and domestic purposes. The detailed characteristics of the water will be discussed in the Environmental Impact Assessment report.

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

Details of Dual Plumbing: - Dual plumbing system will be proposed for use of treated wastewater from STP for different non-contact applications, thus saving on the fresh water resources. This will reduce the demand of potable water from authorized agency. There will be two pipe lines, one supplying freshwater for drinking, cooking etc. And other for supply of recycled water for flushing and landscape.

It is expected that the project will generate approx. 2318 KLD of wastewater which will be treated in the STP of total capacity 2800 KLD. Thereby, 931 KLD of wastewater will be available for use flushing and landscaping.

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

No, there will be no diversion of water from other users. Rise in water demand is a local phenomenon. Therefore, the resources required for the project are already factored in the regional development plan.

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

Approximately, 2318 KLD (80% fresh + 100% flushing) of sewage will be generated during the operational phase from domestic use. This sewage generated will be treated in well-designed sewage treatment plant. The composition of waste water characteristic is shown in **Table 9& 10.**

Table 9:Composition of Waste Water Characteristic

S. No.	Parameter	Quality of Inlet Wastewater
1	pH	6.5 – 8.5
2	BOD_5	Upto 500 mg/L
3	COD	Upto 750 mg/L
4	Suspended Solids	Upto 250 mg/L
5	Oil & Grease	Upto50 mg/L

Table -10: Desired Quality of Treated Water after Ultra Filtration

S. No.	Parameter	Quality of Outlet Wastewater
1	pH	6.0 – 8.5
2	BOD_5	Less than 5 mg/L
3	COD	Less than 20 mg/L
4	Suspended Solids	Less than 50 mg/L
5	Oil & Grease	below the detectable limit

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

The rainwater harvesting will help in raising the ground water table. As such, the Ground water extraction is not envisaged for this project.

The rainwater harvesting through recharge pit process will be used for the recharge of the water at the project site. The quantity of annual harvested rainfall at the project site at present is 1,08,032.14 cum. Annual rainfall has been considered as 0.79 mm for designing of rainwater harvesting pit. 70 recharge pits of diameter 4 m and effective depth 3.5 m are being proposed.

Mesh will be provided at the roof so that leaves or any other solid waste/debris will be prevented from entering the pit. Rainwater from roofs will be taken to collection/desilting chambers located on ground. These collection chambers are interconnected to the filter pit through pipes. The filter pit will be circular in shape and will be back-filled with graded material, boulder at the bottom, gravel in the middle and sand at the top. The final disposal of storm / rain water shall be in multiple recharge / rain harvesting pits to recharge the ground water. The water collected will be used for replenishing the ground water aquifers and creating surface storages for utilization in non-rainy season (**Table 11**).

Table 11: Annual Recharge Potential (After Construction)

S. No.	Description	Coefficient	Area (m^2)	Average annual rainfall (m)	Quantity (cum/year)
1	Roof top	0.8	80,177.63	0.79	50,672.26
2	Paved	0.7	58,891.00	0.79	32,566.72
3	Green	0.2	156,918.71	0.79	24,793.16
Annual Recharge Capacity					**1,08,032.14**

STORM WATER DRAINAGE

A detailed "Storm Water Management" has been proposed to develop. This will incorporate the following management practices which will include:

- Regular inspection and cleaning of storm drains.
- Clarifiers or oil/water separators shall be installed in all the parking areas.
- Cover waste storage areas.
- Avoid application of pesticides and herbicides before wet season.
- Secondary containment and dykes in fuel/oil storage facilities
- Conducting routine inspections to ensure cleanliness
- Preparation of spill response plans, particularly for fuel and oil storage areas.
- Provision of slit traps in storm water drain

RAINWATER HARVESTING PITS

The calculations of rain water harvesting pits are shown in **Table 12.**

Table 12: Storm Water Load & Rain Water Harvesting Pits Calculations

Type of Area	Area(m^2)	Coefficient of run-off	Peak rainfall intensity during one hour of rainfall (in m)	Rain water harvesting potential/hour (in m^3/hr)
Roof-top area	80,177.63	0.8	0.09	5,772.79
Paved Area	58,891.00	0.7	0.09	3,710.13
Green Area	1,56,918.71	0.2	0.09	2,824.54

Total	12,307.46
Total storm water load on the site with per hour retention is = 12,307.46 m³/hr	
Considering 15 minutes retention time, total storm water load	12,307.46 x (15/60) =3076.86 cum
Taking the diameter and effective depth as 4.5 m and 3 m respectively, Volume of a single pit = 3.14 x 2 x 2 x 3.5	43.96
Hence no. of pits required in approx = Total storm water load considering 15 minutes retention time / Volume of a RWH pit	69.99 ~ 70 pits

In view of the above requirement 70 numbers of Rainwater Harvesting pits are proposed in the project. These pits are connected with the rooftop and all the water collected in the rooftop is being diverted to these Rainwater Harvesting pits.

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

No adverse impacts are envisaged due to the project on the runoff characteristics of the area as adequate arrangements will be made to trap the rainwater and suitable storm water drainage system will be provided. During the post-construction phase, runoff from the project shall not be allowed to stand or enter into the roadside or nearby drain. Suitable garlanding drain as per the existing contours of the plot will be developed. No problem of flooding and water logging is envisaged as excess run-off will be drained to ground water.

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

The project will develop rainwater-harvesting infrastructure. Rainwater Harvesting is proposed for recharging the groundwater level at the site which envisaged increasing water level over the years. Further ground water will not be used during construction phase rather it will be supplied by the CSTP treated water from private tankers. Hence, the project will have a positive impact on groundwater resource of the region. In operation phase Delhi Jal Board will be source of Water supply.

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

To prevent degradation and maintain the quality of the water source, adequate control measure has been proposed to check the surface run-off. Following management measures are being suggested to protect the water quality for the further construction phase: -

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

- The storm water disposal system for the proposed project shall be self-sufficient to avoid any collection/ stagnation and flooding of water. Optimal harvesting will be done within the site.

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

The storm water disposal system for the proposed project shall be self-sufficient to avoid any collection/stagnation and flooding of water. Maximum harvesting will be done within the site.
A detailed "Storm Water Management Plan" will be developed. The plan will incorporate best management practices which will include following:

- Regular inspection and cleaning of storm drains.
- Clarifiers or oil/water separators shall be installed in all the parking areas.
- Cover waste storage areas.
- Avoid application of pesticides and herbicides before wet season.
- Secondary containment and dykes in fuel/oil storage facilities
- Conducting routine inspections to ensure cleanliness
- Preparation of spill response plans, particularly for fuel and oil storage areas.
- Provision of stilt traps in storm water drain

A total of 70 pits are proposed for groundwater recharge.

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

Labour hutments will be provided for housing of construction labours. All the basic needs will be provided along with rest shelters, wash place, mobile toilets. Mobile toilets with septic tank facility will be provided to treat the wastewater generated during construction phase. The environmental management of labour hutments will be looked after by the safety, health and environmental division.

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

During operation, 2318 KLD of wastewater will be generated, which will be treated in the sewage treatment plant of total capacity 2800 KLD which will be installed in phase wise manner. It is expected that approximately 1989 KLD of treated water will be recovered from the STP. During non-rainy season; STP treated water will be reused in flushing (774 KLD) and horticulture (157 KLD). Details of the quantities of wastewater generation, treatment capacities with technology & facilities for recycling and disposal are given in **Table 13.**

Table 13: Sewage Quantity, Treatment, Reuse& Disposal

Parameters	Details
Quantity of sewage	2318 KLD
Collection of sewage	An external sewage network shall collect the sewage from all units, and flow by gravity to the proposed sewage treatment plant.
Treatment of sewage	Sewage will be treated up to the tertiary level in a Sewage Treatment Plant (STP) of capacity 2800 KLD which will be installed in phase wise manner
Reuse/recycle and Disposal of treated sewage	During normal operations treated sewage will be recycled and reused for flushing, green area development

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

Dual plumbing system for use of treated wastewater is proposed. The treated wastewater will be used for different applications thus reducing fresh water demand. There will be two pipe line systems, one supplying freshwater for drinking, cooking etc. and other for supply of recycled wastewater for flushing and landscape.

3. VEGETATION

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

There are trees, shrubs and herbs on the project site. Currently, there are 2,763 trees present on the site out of 1,239 trees will be transplanted within the project site and the remaining tree will be merged with the proposed landscape. The main trees species found at the project site are Mulberry; Amaltas; Siris; Kaner; Mango; Mehndhi; Alstonia; Papdi; Peepal; Jamun; Bakaian; Jungle Jelebi; Shehtut; Ashok; Moringa; Reinta; Bargad; Neem; Anar; Kikar; Guava; Bael; Eucalyptus; Katal; Lemon; Siris; Kassod; Pilkhan; Khirni; Sagwan; Harsingar; Gular; Peech /Aadu; Lily Flower; Kadipatta; Bottal palm; Champa; Beliaphool; Kadipatta; Sheesham; Babul; Godly; Cheed and Semal.
No threatened, rare, endangered or endemic species were observed during the site visits in the core zone. Likewise, it is anticipated that the project doesn't pose any threat to the existing biodiversity in the area.

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

There are trees, shrubs and herbs on the project site. Currently, there are 2,763 trees present on the site out of 1,239 trees will be transplanted within the project site and the remaining tree will be merged with the proposed landscape.
No threatened, rare, endangered or endemic species were observed during the site visits in the core zone. Likewise, it is anticipated that the project doesn't pose any threat to the existing biodiversity in the area.

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

Extensive plantation and green area development over an area of 1,56,918.71 sq. m is proposed. It is ensured that the indigenous/ local plants will be planted all around the periphery of the project area and along the roadsides; as per the Guidelines for the development of Greenbelt by CPCB. Currently, there are 2,763 trees present on the site out of 1,239 trees will be transplanted within the project site and the remaining tree will be merged with the proposed landscape. The following plant species are proposed for the green belt development (**Table 14& 15).**

Table 14: Trees for Greenbelt Development

S.No.	Binomial Name	Common Name	Height (Meters)	Flowering Season
1	*Acacia auriculiformisA.cunn*	Australian Wattle	16m	June-Jan
2	*Acacia nilotica (Linn) Willd.*	Indian Gum-Arabic-tree	8m	Aug-jan.
3	*Anonasquamosa Linn.*	Custard apple	10m	March -July extended upto sept.
4	*Anonareticulata Linn.*	Bullock's Heart	10m	June.
5	*Cassia pumilaLamk*	Yellow Cassia	10-12m	
6	*Cassia siameaLamk*	Iron wood tree	10-12m	Aug - May
7	*Citrus aurantium Linn*		5m	Sept - Nov
8	*DalbergiasisooRoxb*	Sissoo	10m	March-April-June
9	*Derris indica (Lam.) Bennett.*	Pongam-Oil Tree, Karanj	10m	April - June
10	*Eucalyptus hybrid*	Mysore gum	20m	Feb. -April, Oct.- Dec.

Source: Guidelines for developing greenbelt- CPCB-2007

Table 15 :Shrubs for Green Belt Development

S.No.	Binomial Name	Common Name	Height (Meters)	Flowering Season
1	*Bougainvillea spectabilisWilld*	Bougainvillea	8m	Through the year
2	*Clerodendruminfortunatum Linn (auct), Wight*	Bhant	3-4m	Oct-Jan
3	*Hamelia patens Jacq*	Scarlet bush	3m	Oct.- Jan
4	*Lawsoniainermis Linn*	Henna	5m	April -July
5	*Murrayapaniculata Linn*		5m	June - Oct.
6	*Neriumindicum Mill*	Pink oleander	5m	Throughout the year
7	*Ricinuscommunis Linn*	The castor	6m	Sept - Oct
8	*Tabernaemonatanadivaricata Linn*		3m	Through the Year
9	*Tecomastans Linn.*		5m	Feb -April
10	*Thevetiaperuviana (Pers.)Merrill.*	Yellow oleander	6m	

Source: Guidelines for developing greenbelt- CPCB-2007

4. Fauna

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

No displacement of fauna is envisaged due to the proposed project. The project site is free of nesting, roosting, foraging habitat of wild animals further there is no proposal of creation of any barrier for terrestrial or aquatic fauna, hence it can be inferred that the proposed project is not going to disturb the movement of fauna.

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

No displacement of fauna is envisaged due to the proposed project. The project site is free of nesting, roosting, foraging habitat of wild animals. The study area is in an already urbanized area. Hence, it will not pose any barrier for terrestrial or aquatic fauna. Hence, it can be inferred that the development of project is not going to disturb the movement of fauna. There may be some impact on the avian fauna of the study area during construction phase; however, this is proposed to be mitigated by adopting waste management practices, controlling noise pollution and providing bird friendly lightening in the operation phase.

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

There are no fishes in the study area and/ or migration corridors in the study area. Hence, no such direct or indirect impact is envisaged. Likewise, no mitigation measures are prescribed.

5. AIR ENVIRONMENT

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

The baseline study of the ambient air quality will be carried out after the TOR approval. There will be only two emission sources i.e. D.G sets; in case of power failure and vehicular movement. Air pollution modeling will be carried out in the EIA study to assess the incremental pollution owing to the proposed project.
DG Sets will be provided with adequate stack height as per the CPCB guidelines to minimize the impact due to DG sets.
The impact of the increase in traffic due to the proposed project will also be assessed during the EIA study.

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

There will be generation of dust, smoke and fumes from burning of fuel in D.G. sets, vehicles, and operation of construction machines/equipment. Construction activities also lead to emission of

NO_2, SO_2 and PM. The impact on the ambient air quality during construction phase is temporary and reversible in nature (for short duration) and will be restricted to only a small area. During operation phase, D.G. set will have adequate stack height. There will also be development of green-area and maintenance of vehicles, to mitigate air pollution from the project.

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

Adequate provision for car parking will be made at the project site. The parking proposed is shown in **Table 16.**

Table 16: Parking Provided

Parking Proposed			
	Basis	**Density**	**No. of ECS**
Open Parking	48,208 sqm	@ 23 sq. m. /ECS	2096
Podium Parking	1,79,235 sqm	@ 28sq. m./ ECS	6401
Basement Parking	72,778.67 sqm	@ 32 sq. m. / ECS	2274
Total Car Parking			**10,771**

Transport Infrastructure:

The proposed site is connected through Ring Road. The site is at an approx. distance of 400 m from NH-2. The nearest airport is Safdarjung, 4.50 km away and Hazrat Nizamuddin Railway Station is 2.5 km away. Adequate measures have been proposed to manage the traffic within and outside the site. There will be separate entrance and exit for the proposed project to segregate the incoming and outgoing traffic. The vehicular traffic will move around the periphery of the project without disturbing the landscaped areas and organized open spaces. Internal roads of suitable width will be provided for traffic along with this.

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

In the circulation plan of the project, there will be separate entry and exit points for systematic control of the vehicular movement within the project. Wide internal road will be provided for the smooth traffic movement. The project has roads running on the periphery at all sides that will facilitate the movement of traffic. Internal roads, footpaths, ramps with suitable width will also be provided. Adequate lighting arrangement will be provided covering all corners.

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

There will be an increase in the traffic noise owing to the project. However, honking will be discouraged inside the project site. The traffic movement will be in daytime during the construction phase. Proposed plantation shall also work as sound barriers and minimize noise pollution.

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

DG Sets will be used as power back-up during construction phase. So, D.G. set will be the main source of air and noise pollution. Gaseous pollutants like NO_2, $SO_2$and PM shall be generated from activities like burning of fuel through D.G. sets. HSD will be used with low sulphur.
During operation, since D.G. Sets will not be operational continuously and moreover it will be within suitable enclosures, no or minimal impact may is anticipated. The movement of the motor vehicles will be restricted to designated roads only.

Impacts on Air Quality
Impacts on ambient air quality during operation due to emissions from the stacks attached to standby D.G. sets is likely to be insignificant as they will be operated only during power failures. However suitable mitigation measures will be adopted.

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

- D.G. sets will comply with the applicable as per emission norms.
- Adequate stack height for D.G. sets will be provided as per C.P.C.B. norms.
- During operation stage, monitoring of emissions from D.G. sets and ambient air quality will be carried out as per norms.

6. AESTHETICS

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

The project site does not have any scenic amenity or landscaping in its surroundings. So, there is no possibility of obstruction of above-mentioned conditions. Moreover, the approval of the architectural plan of the building will be taken from local development authority.
The proposed project itself is planned with provisions of landscaping and green area development. This will enhance the aesthetic beauty of the area.

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

It is a redevelopment project. Residential Colony consists of Type I, Type II and Type III residential building and other Social Infrastructure such as Shops, Markets, Schools, Health Centers, Temples etc. These buildings/structures are to be demolished and in place of it; Residential buildings of Type II, Type III, Type IV, Type V and Type VI are proposed to be constructed along with other social Infrastructure. Only one temple of Built up Area 2,680 sq. m from the existing building will be retained.

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

New Delhi is one of the well-developed places in India with the best architecture, landscape, infrastructural amenities. The project is being designed keeping in mind local considerations of urban form & urban design. The project lies in the Zone F, Residential Area as per the Land Use Plan of MPD – 2021. The project is constructed within the designed site as per the defined building by-laws of Delhi.

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

S. No.	Name of Monuments	Distance from Project Site
1	Ashokan Rock Edict at Bahapur	0.48 Km; South
2	Humayun's Tomb	2.8km; N
3	Mazar of Mirza Ghalib	2.8km;N
4	The Gate way of Arab Sarai facing North towards Purana Qila	2.9Km; N
5	Shish Gumbad	4.5km; NW
6	Tomb of Usuf-Quttal situated at Khirki	4.6m; SW
7	Group of monuments at Sarai Shahji	4.67 Km; SW
8	Tughlakabad Fort	5.3KM;S
9	Ugrasen ki Baoli	7.2km; NW
10	Bara Khamba	7.3km; WNW
11	Qutub Minar	7.9km;SW
12	Red Fort (Naubat Khana, Diwan-i-am, Mumtaz Mahal' Rang Mahal, Baithak,Maseu Burj, diwan-i-Khas' Moti Masjid, sawan Bhadon ,Shah Burj, Hammam with all surrounding including the gardens, paths, terraces and water courses)	9.4km; N

7. SOCIO-ECONOMIC ASPECTS

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

Construction phase: About 500 labours will be engaged during construction phase. Mostly local labourers will be engaged. Migrant labourers will be provided hutment with adequate sanitation facilities within the project premises.

Operation phase: The changing demography in the area is another impact that needs attention. It is a redevelopment project. Earlier, the Residential Colony consists of Type I, Type II and Type III residential building and other Social Infrastructure such as Shops, Markets, Schools, Health Centers, Temples etc. These buildings/structures are to be demolished and in place of it; Residential buildings of Type II, Type III, Type IV, Type V and Type VI are proposed to be constructed along with other social Infrastructure. The detailed socio-economic aspect will be carried out in the Environment Impact Assessment Report.

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

The project lies in the Zone F, Residential Area as per the Land Use Plan of MPD – 2021. The ancillary infrastructure like roads, amenities and conveyance facilities will be developed in the project area. However some of the social infrastructures available inside and around the project site are mentioned in **Table 17.**

Table 17: Important infrastructural facilities inside and around the project site

Features within project site		
S. No.		
15.	Boys Govt Senior Secondary School	
16.	Delhi Jal Board Officer – 3 No.	
17.	Bharat Sevashram,Delhi Headquarters	
18.	Police Station, South-West Zone, Sriniwaspuri	
19.	L Market, T Market and I Market	
20.	Delhi Public Library, Sriniwaspuri	
21.	Post Office Sriniwaspuri	
22.	Savera Foundation	
23.	SevaSadan	
24.	MCD Primary Model School	
25.	BaraatGhar (Community Centre), Sriniwaspuri	
26.	Govt Maternity Centre, Sriniwaspuri	
27.	CGHS Dispensary, Sriniwaspuri	
28.	Girls Sr. Secondary School	
Features around project site		
S. No.	**Details of sensitive receptors**	**Distance and Direction**
13.	RadhaKrishana Temple	Approx. 49 Meter South
14.	Arya SamajMandir	Approx. 32 Meter East
15.	Gurudwara (Yadgaar Baba Banda Singh Bhahadur), Sri Niwas Puri	Approx. 27 Meter East
16.	Nurses Residential Complex, Sriniwaspuri	Approx. 20 meter West
17.	Indian Oil Petrol Pump, Sriniwaspuri	Approx. 60 meter West
18.	Cambridge School, Sriniwaspuri	Approx. 17 meter West
19.	Leprosy Society	Approx. 15 Meter West
20.	HazratNizamuddin Railway Station	Approx. 2.50 km towards North
21.	Safdarjung Airport	Approx. 4.50 km towards NW
22.	NH-2	Approx. 0.40 km East
23.	Moolchand Metro Station	Approx. 1.70 km towards West
24.	Yamuna River	Approx. 2.6 Km towards NNE

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

The redevelopment of the GPRA Colony will be done within the designated site as per the defined Delhi bye-laws. There are few sacred sites or cultural heritage site in nearby vicinity of project mainly religious in nature. Respect to the local sacred sites or other cultural values will be an integral part of the operational policy of the proposed project.

8. BUILDING MATERIALS

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

Conventional construction material will be used. Energy efficient building materials will be used as specified in the Energy Conservation Building Code. The major materials used for the construction of the project will be steel, cement, bricks, metal, flooring tiles/stones, sanitary and hardware items, electrical fittings, water etc.

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

Construction activities especially related to handling of loose material likely to cause generation of fugitive dust that adversely impacts the air quality of the surrounding area of the project site. To minimize the impact, loose material are either stacked or transported with proper cover.
During construction phase the expected noise levels lie between 70- 85 dB (A), which will decreases with increase in distance. Administrative as well as engineering control measures of noise will be implemented.

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

Yes, the recycled material will be used in the proposed project to the extent possible. The possibilities will be searched and if feasible following recyclable material will be used in construction.

1. Fly ash Bricks
2. Clean wood
3. Recycled Gypsum Wallboard, and cardboard
4. Particle boards or other fiber-boards

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

During the operation phase, waste will comprise domestic as well as horticultural waste. The estimated quantity of the domestic waste shall be approx. **16,546.48** kg per day day (@0.50kg per capita per day for residents, @0.15 kg per capita per day for the visitor, @0.25 kg per capita per day for the staff members and landscape wastes @ 0.2 kg/acre/day). Following arrangements will be made at the site in accordance to Solid Wastes Management Rules, 2016.Calculation and Composition of solid waste generation is given in **Table 18.**

Table 18: Solid Waste Calculation

Sr. No.	Particular	Occupancy	Area in acres	Waste Generated per kg/day	Waste Generation
1	**Residential Population**	28850		0.5	14425
2	Visitors population	10122		0.15	1518.24

Sr. No.	Particular	Occupancy	Area in acres	Waste Generated per kg/day	Waste Generation
3	Staff Population	2382		0.25	595.48
4	Landscape Area		38.78	0.2 kg/acre/day	7.756
5	**Total**				**16,546.48**

(Source: For Waste Collection, Chapter 3, Table 3.6, Page no. 49, Central Public Health & Environment Engineering Organization, Ministry of Urban Development, (Government of India, May 2000)

❖ **Collection and Segregation of waste**

1. A collection system will be provided for collection of waste in colored bins for separate blocks
2. The local vendors will be hired to provide separate colored bins for dry recyclables and Bio-Degradable waste.
3. Adequate number of colored bins (Green and Blue & dark grey bins– separate for Bio-degradable, Non-Bio-degradable & inert waste) will be provided at the suitable locations of the project site.
4. Litter bin will also be provided in open areas like parks etc.

❖ **Treatment of waste**

- Bio-Degradable wastes

1. Bio-degradable waste will treated through Organic Waste Converter and the Manure will be used in greenbelt development.
2. Horticultural Waste is proposed to be composted and will be used for gardening purposes.
3. 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 Solid Wastes Management Rules,2016. A Solid waste management Scheme is depicted in the following figure for the project.

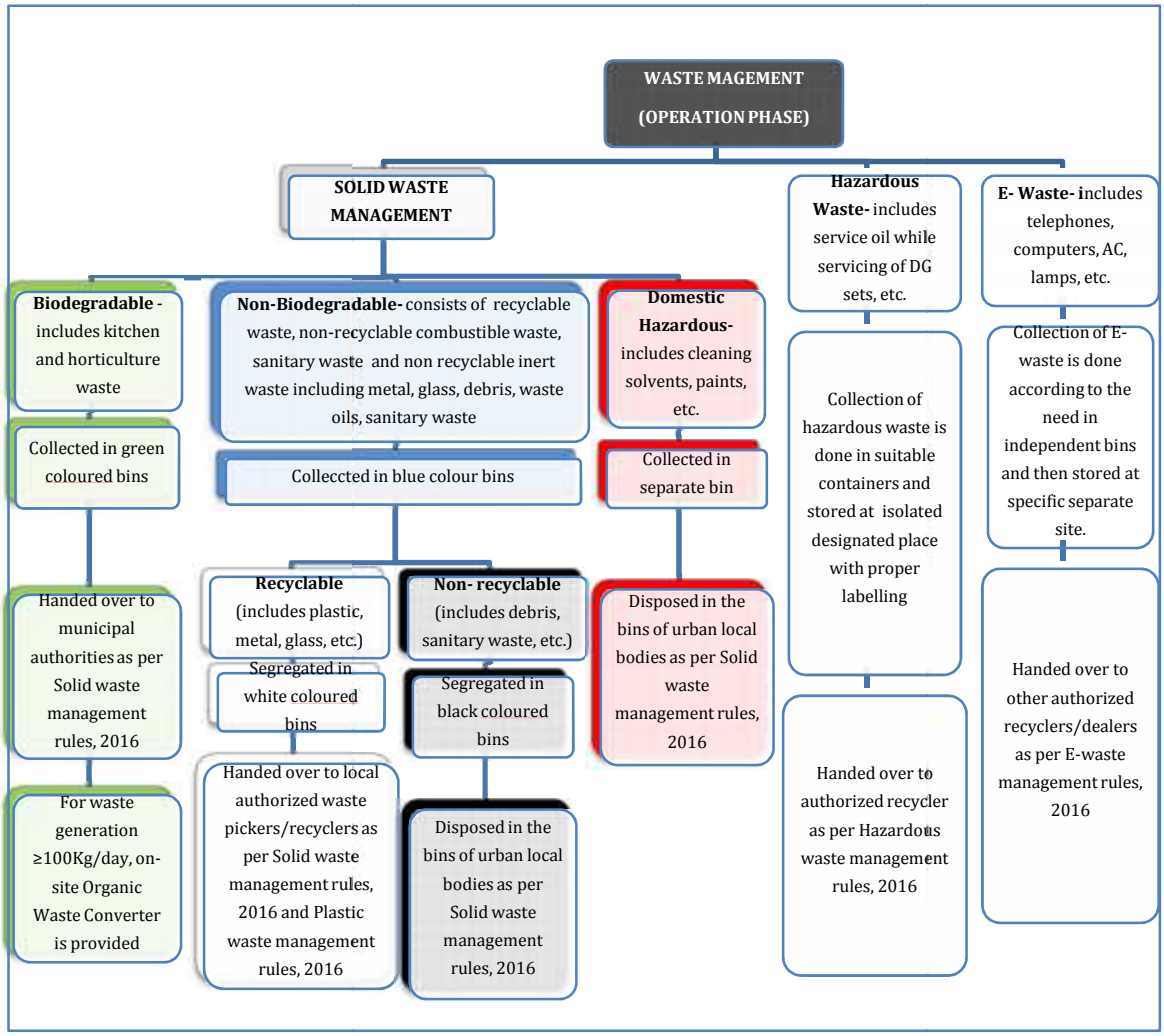


Figure 4: Solid Waste Management Scheme (Operation Phase)

9. ENERGY CONSERVATION

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

The maximum demand load for the proposed project will be 27,849 KW. DG sets will be installed for power back up in the project. The DG sets will be equipped with acoustic enclosure to minimize noise generation and adequate stack height for proper dispersion. Approx. 2.75W is the energy consumption per square feet of the built up area.

Energy Conservation Measures & Management Plan:

In the operational phase, appropriate energy conservation measures and management plan will be adopted in order to minimize the consumptions of non-renewable fuel. The following measures are suggested to be adopted:

- LED will be used in place of incandescent lamps in common areas and parking.
- Percentage saving in energy consumption due to use of CFL will be 15 -20 %.
- Lighting and switching of common area shall be designed keeping in mind day light integration.
- Roof insulation shall be planned to conserve energy.
- D.G. sets would be provided with auto cut and auto start mechanism.
- The water supply pumping system shall be provided with variable speed drive to conserve energy at part load.
- Space heating load will be minimized using passive solar structures.
- Building will have appropriate design to shut out excess heat and gain loss.

Following measures have been proposed to reduce energy consumption for Electrical installations:

- Common area shall be provided LED based lighting predominantly; parking and in all common areas.
- Dynamic Balancing valves in piping reduce pump capacity & power consumption due reducing pipe lengths.
- Air handling unit shall be provided with Variable frequency drive system to cater exact loads.
- There shall be maximum utilization of natural light.

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

5 DG sets of capacity 500 kVA each will be used for the power back up in the project. The DG sets will be equipped with acoustic enclosure to minimize noise generation and adequate stack height for adequate dispersion.

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

Suitable thickness of glass will be used depending upon the panel size to keep the U-value as per the requirement of ECBC will be provided.

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

- The orientation of the building will be done in such a way that maximum daylight is available.
- The orientation of the building would be done in such a manner that most of glazed areas in north and east.
- Public areas will be cooled by natural ventilation as opposed to air conditioning.
- Lesser opening will be provided on the west facing walls.
- Landscape and green areas will be so spaced so as to cool the surrounding environment, which will reduce energy consumption.

9.5 Does the layout of streets & buildings maximize the potential for solar energy devices? Have you considered the use of street lighting, emergency lighting and solar hot water systems for use in the building complex? Substantiate with details.

- Orientation is done in such a manner so that surface of the building cuts direct radiation of critical hours and thus building will be less affected with the heat. Building units will be made environment friendly with optimum use of solar radiations.
- Feasibility for installation of solar photovoltaic cells for street lighting will be assessed.
- There will be the provision of solar hot water system.

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

The shading has been effective to reduce the cooling loads. The following techniques will be adopted:

- For walls on of the building, a maximum of 10% window to wall ratio will be there to minimize solar radiation, which further helps minimizes cooling/ventilation costs.
- Living areas will be aligned to get maximum north south light and services areas are to be located on the western side.
- Shading will be used to increase cooling effect in the buildings.
- There will be less number of openings on the west side and more number of openings on the south side.
- Promoting awareness on energy conservation.
- Training of staff on methods of energy conservation and to be vigilant to such opportunities.
- Passive solar architectural measures will be adopted to provide shading devices for windows and roof, which would effectively reduce heating up of building envelope.
- Roofs will be painted with reflective, aluminum based paints with solar reflectance ranging from 0.3 - 0.6. This will result in less absorption of sunlight causing 40% back reflection and less heating of building structures during summer seasons.

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

The design of the building will be such that maximum use of natural lighting can be achieved. The walls, roofs and opening will be designed that influx of heat is minimum. The design also incorporates the optimal and judicious use of natural lighting.

Energy Efficient Features:

- Use of LED`s lamps instead of GLS lamps for Common area Lights.
- Use of T5 lamps instead of Normal Fluorescent lamps in Basements.
- Use of Solar backed LED landscape lights instead of par lamps.

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

- The building will use energy efficient and environmental friendly designs that will control formulation of heat island effect. There will be also green cover at the site to reduce formation of

heat island. Passive design concepts have been used to minimize energy consumption and maximize the energy efficiency.

- Heat emission from the project and associated operations can be from the following sources:

Heat absorbed and radiated from the paved and concrete structures, heat generated from equipments/appliances and due to increased population for a particular stretch of land. However, the heat generated will not be significant and will be dissipated with the lush green provided within the project. Hence, it can be concluded that the heat island effect shall not be a concern for the project and will have an overall positive effect on the microclimate of the area.

- Due to the project there would be insignificant emission of air pollutants by vehicular movements and occasional use of D.G sets, hence no heat island effect is envisaged.
- To reduce the heat load reflective insulated glass shall be used in fenestrations to cut on heat loads and subsequently capital & operating cost of air conditioning.

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

The building envelope for external walls will be made of bricks, concrete and steel. Proper roof insulation will be provided to achieve desired thermal comfort. The entire building envelope, opening between conditioned and non- conditioned spaces will be gasketed, provided with air curtains or sealed with sealants. Bricks, concrete & Glass will be used as construction material.

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

In case of emergency, immediate steps will be taken to raise alarm and stop fire. The Fire Protection System would be based on the regulations of National Building Code, 2016 and local fire norms.

- Provision of Automatic water sprinklers.
- Provision of separate fire hydrant pipe.
- Provision of Overhead water storage tank.
- There is provision of firefighting pumps.
- Optical type smoke detectors shall be used in most areas.
- Rate of rise heat detectors shall be planned for all potentially smoky areas and in the basements.

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

Glass will not be used as a wall material.

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

- Reduced air infiltration combined with proper ventilation cannot only reduce energy consumption but it can also improve the quality of indoor air.

- Outdoor air for which leakage account for 25 - 40% of energy will be used for heating and cooling in a typical building. For this purpose the building will be designed in a compact manner, leaving ventilation shafts in between for facilitating the escape of hot exhaust air.

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

Non- conventional energy technologies shall be used to save overall energy consumption. Following technologies would be used in order to conserve energy:

- Introducing electric meters with timer.
- Replacement of High energy consuming incandescent lights with florescent lighting.
- Using solar controlled glass in windows.
- Renewable energy technologies will be promoted in the form solar water heating. Solar water heating system consisting of solar panels of and hot water storage insulation tank is also proposed.
- After testing the viability, solar energy will also be used to meet electricity requirements.

ENVIRONMENT MANAGEMENT PLAN

Introduction

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. 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.

Objectives

- Actions/ activities required to comply with rules and requirements of the environmental clearance, consent to operate and other NOCs from Govt. Departments.
- Ensure that the Project meets all contractual, legal and other environmental requirements including best practices of construction.
- To ensure that the redevelopment of residential colony is operated in accordance with the approved design.
- A system that addresses public complaints during construction and operation of the facilities.
- A plan that ensures remedial measures is implemented effectively in a planned way.
- Building and securing an unblemished reputation for environment management within the market place.

EMP includes four major elements:

- Commitment & Policy: The CPWD 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.

Activities:

The following table is a detailed list of activities that will be carried out during each phase of construction of the project and which phases require environmental management monitoring and reporting, **Table 19**.

Table 19 :Activities and requirement of EMP

Phases	**Activities**	**Required environmental management monitoring and reporting**
Construction Phase		
Site Establishment	• Fences & hoardings to site compound. • Temporary services and site amenities. • Temporary access roads. • Labour hutments	Required throughout the duration of this phase.
Foundations & Ground works	• Bored piers. • Detailed excavation. • Lift Pit; • Formwork. • Sand blinding & plastic membrane. • Steel reinforcement. • Place concrete • In ground hydraulic services. • In ground electrical services. • In ground Fire Sprinkler services. • Termite barriers.	Required throughout the duration of this phase.
Structure	1. Footings; • Formwork edge boards. • Sand blinding & plastic membrane. • Steel reinforcement. • Place concrete. 2. Slab on ground; • Formwork edgeboards. • Sand blinding & plastic membrane. • Steel reinforcement. • Place concrete. 3. Suspended Slabs • Formwork decks & columns. • Electrical conduits & penetrations. • Hydraulic pipework & penetrations. • Steel reinforcement. • Place concrete. 4. Structural Steel framing. 5. Roofing. 6. External wall cladding.	Required throughout the duration of this phase.
Fit Out & Finishes	• Masonry Walls • Steel Stud wall & ceiling framing • Windows & glazed doors • Electrical services • Hydraulic services	Required throughout the duration of this phase.

Phases	Activities	Required environmental management monitoring and reporting
	• Mechanical services • Fire sprinklers • Plasterboard wall & ceiling linings • Cement Rendering • Carpentry & joinery fitout • Tiling • Painting • Carpet • Vinyl	
External Works	• Concrete Footpaths • Formwork edge boards. • Sand blinding & plastic membrane. • Steel reinforcement. • Place concrete.	Required throughout the duration of this phase.
Transportable Building Site Establishment	• Fences & hoardings to site compound. • Confirm location of services installed by others.	Required throughout the duration of this phase.
Transportable Building Foundations	• Bored Piers • Detailed excavation. • Footings; • Fix Steel reinforcement. • Place concrete	Required throughout the duration of this phase
Transportable Building Delivery & Installation	• Deliver to site on trucks • Crane into position • Connect Services to buildings.	Required throughout the duration of this phase

An Environmental Management Plan (EMP) is required to mitigate the adverse environmental impacts during construction and operation phase of the project and these are discussed as follows.

EMP for Air

Construction Phase

To mitigate the impacts of PM_{10}& $PM_{2.5}$ during the construction phase of the project, the following measures are recommended for implementation:

- The most cost-effective dust suppressant is water because water is easily available on construction site and it can be applied using water trucks, handled sprayers and automatic sprinkler systems.
- Incoming loads could be covered to avoid loss of material in transport, especially if material is transported off-site.
- The whole site is covered with GI sheets in order to contain the dust within project site.
- 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.

- 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.
- 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 proposed project, following measures are recommended for implementation:

- 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.
- During construction, vehicles will be properly maintained to reduce emission.
- Adequate footpaths and pedestrian ways would be provided at the site to encourage non-polluting methods of transportation.
- 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.

EMP FOR NOISE

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.

- Noisy construction equipment would not be allowed to use at night time.
- 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:

- DG set will be housed in a suitable acoustic enclosure so that noise level at a distance of 1 m does not exceed 25 dB(A) as per CPCB standards or is meeting the local standard (whichever is higher).
- 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 staff of the project and surrounding receptors.

EMP FOR WATER: Construction Phase

To prevent degradation and to maintain the quality of the water source, adequate control measures needs to be adopted. The prime objective is to check the surface run-off as well as uncontrolled flow of water into any water body check dams with silt areas. The following management measures are suggested to protect the water source being polluted during the construction phase:

- Avoid excavation during monsoon season
- Care would be taken to avoid soil erosion
- Common toilets will be constructed on site during construction phase and the waste water would be channelized to the septic tanks in order to prevent waste water to enter into the water bodies.
- 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 impervious drains.
- 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. Following measures will be adopted:

- Minimizing water consumption.
- Promoting reuse of water after treatment and development of closed loop systems for different water streams.

Water Conservation

The water conservation is the need of the hour and 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 staff. The following section discusses the specific measures, which shall be implemented:

Domestic Usage

- Use of water efficient plumbing fixtures (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.

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.

Storm Water Management

Most of the storm water produced on site will be harvested &reused by storing in a underground water tank of suitable size. Thus proper management of water 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

Storm water management 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

EMP FOR WASTE: Construction Phase

The waste generated from construction activity includes construction debris, biomass from land clearing activities, waste from the temporary make shift labour hutments 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.

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, and will be send to designated solid waste composting site.

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.

Hazardous waste

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 off as per the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.

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.

  Even with careful management, some of these substances are released into air, soil and water and many are hazardous to workers. With these reasons, the best choice is to avoid their use as much as possible by using low-toxicity substitutes and low VOC (Volatile Organic Compound) materials.

Waste from Labour Hutments

Wastes generated from temporary make shift labor hutments will mainly comprise of household domestic waste, which will be managed by the contractor of the site. The wastewater 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, leak 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 project 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 staff 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.

Collection and Transportation

- During the collection stage, the solid waste of the project will be segregated into biodegradable waste and recyclable waste. Biodegradable waste and recyclable 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 recyclers. Proper guidelines for segregation, collection and storage will be prepared as per Solid waste Management Rules, 2016. To minimize littering and odour, 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.

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.

EMP FOR ECOLOGY & BIODIVERSITY

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 hutments 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:

- Plantation and Landscaping
- Green Belt Development
- Avenue Plantation

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

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.

Green Belt Development Plan

The green belt will be developed as per the guidelines for developing green belt by CPCB, 2007. The plantation matrix adopted for the green belt development includes pit of 0.3 m × 0.3 m 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.

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.

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

1. The species should be fast growing and providing optimum penetrability.
2. The species should be wind-firm and deep rooted.
3. The species should form a dense canopy.
4. As far as possible, the species should be indigenous and locally available.
5. Species tolerance to air pollutants like SO_2 and NO_2 should be preferred.
6. The species should be permeable to help create air turbulence and mixing within the belt.
7. There should be no large gaps for the air to spill through.
8. Trees with high foliage density, leaves with larger leaf area and hairy on both the surfaces.
9. Ability to withstand conditions like inundation and drought.
10. Soil improving plants (Nitrogen fixing rapidly decomposable leaf litter).
11. Attractive appearance with good flowering and fruit bearing.
12. Bird and insect attracting tree species.
13. Sustainable green cover with minimal maintenance.

Avenue Plantation

- 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.
- 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.

EMP for Socio-Economic conditions

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 area. The Social Management Plan for the proposed project focuses on the following components:

Income Generation Opportunity during Construction and Operation Phase

The redevelopment of the GPRA colony 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 proposed project. 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 proposed 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 project will also provide a new experience in living, work environment, seem less data transfer, edge cutting technologies etc. 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.

EMP FOR ENERGY CONSERVATION

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

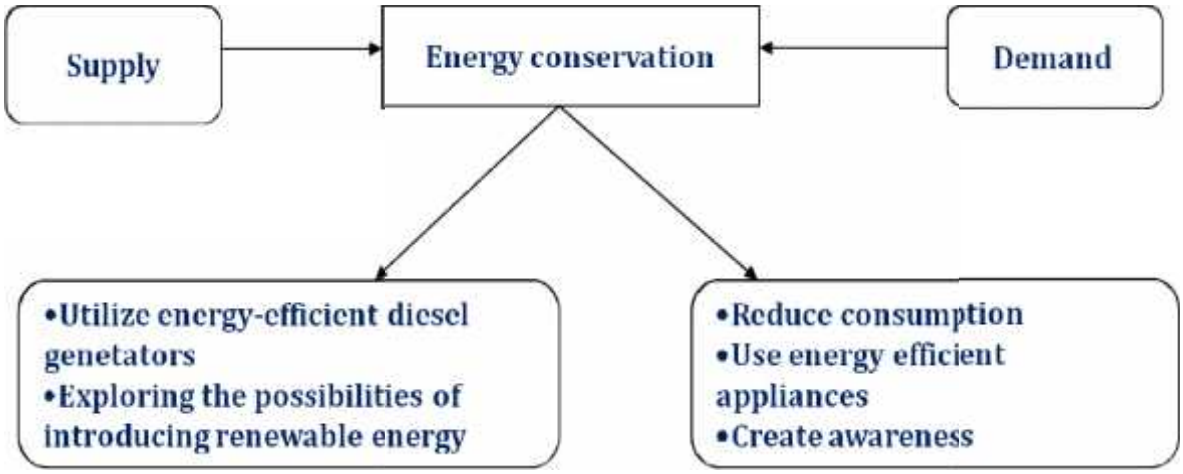


Figure 5: Energy Conservation measures

Energy conservation will be one of the main focuses during the redevelopment of GPRA Colony in planning and operation stages. The conservation efforts would consist of the following:

❖ **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.

❖ **Energy Saving Practices**

- Energy efficient lamps will be provided within the proposed project
- 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.

❖ **Behavioral Change on Consumption**

- Promoting staff, and neighbor's awareness on energy conservation
- Training staff on methods of energy conservation and to be vigilant to such opportunities.

The summary of management measures and responsibility is given at **Table 20.**

ENVIRONMENTAL MANAGEMENT SYSTEM AND MONITORING PLAN

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

- Environmental management cell.
- Environmental Monitoring.
- Personnel Training.
- Regular Environmental audits and Correction measures.
- Documentation – standards operation procedures Environmental Management Plan and other records.

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.

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 proposed project. The hierarchical structure of suggested Environmental Management Cell is given in following **Figure 6.**

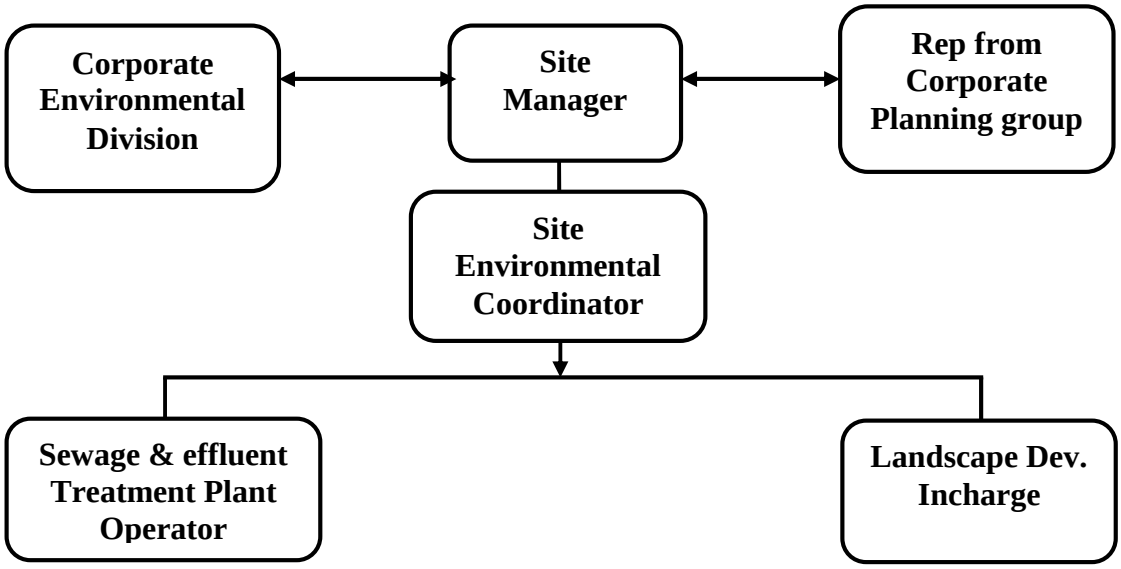


Figure 7: Environnent Management Cell Structure

Table 20: SUMMARY OF MANAGEMENT MEASURES AND RESPONSIBILITY

S. No.	Environmental Issues	Potential Impacts (Direct/ Indirect)	Potential Source of Impact	Management Measures	Responsibility	
					Execution/ Civil Work	Supervision
1.	Ground Water Quality	Ground Water Contamination	Construction Phase • Waste water generated from temporary labor hutments.	• No surface accumulation will be allowed.	CPWD	Project Proponent (SHE division)
			Operation Phase • Discharge from the project	• Approximately 1989 KLD of treated water will be recovered from the STP. During non-rainy season; STP treated water will be reused in flushing (774 KLD) and horticulture (157 KLD) while the surplus will be used in nearby parks and other construction activities	RWA	Project Proponent (SHE division)
2.	Ground Water Quantity	Ground Water Depletion	Construction Phase • Ground water will not use during construction phase.	• Not Applicable	None	Not applicable
			Operation Phase • The source of water during operation	• Black and Grey water treatment and reuse. • Rainwater will be	RWA	Project Proponent (SHE division)

			phase is Delhi Jal Board and ground water abstraction is not proposed.	used to recharge the ground water • Awareness Campaign to reduce the water consumption.		
3.	Surface Water Quality	Surface water contamination	<u>Construction Phase</u> • Surface runoff from site during construction activity.	• Silt traps and other measures such as additional onsite diversion ditches will be constructed to control surface run-off during site development	CPWD	Project Proponent (SHE division)
			<u>Operation Phase</u> Discharge of domestic wastewater STP of capacity 2800 KLD which will be installed in phase wise manner	• Domestic water will be treated into STP of capacity 2800 KLD which will be installed in phase wise manner	RWA	Project Proponent (SHE division)
4.	Air Quality	Dust Emissions	<u>Construction Phase</u> • All heavy construction activities	• Regular sprinkling • Covered transportation of construction material • Covered storage of loose material • Arrangement of	CPWD	Project Proponent (SHE division)

				wheel wash • Covering of project site with GI sheets		
		Emissions of PM, SO_2, NO_2 and CO	<u>Construction Phase</u> • Operation of construction equipment and vehicles during site development. • Running D.G. set (back up)	• Rapid on-site construction and improved maintenance of equipment.	CPWD	Project Proponent (SHE division)
			<u>Operation Phase</u> • Power generation by DG Set during power failure • Emission from vehicular traffic in use	• Use of low sulphur diesel if available • Providing Footpath and pedestrian ways within the site for the staff. • Green belt will be developed with specific species to help to reduce pollution level • Use of equipment fitted with silencers • Proper maintenance of equipment.	RWA	Project Proponent (SHE division)
5.	Noise Environment					
			<u>Operation Phase</u>	• Green Belt	RWA	Project Proponent (SHE

			• Noise from vehicular movement • Noise from DG set operation	Development • Development of silence zones to check the traffic movement • Provision of noise shields near the heavy construction operations and acoustic enclosures for DG set. • Construction activity is limited to day time hours only • DG set room will be equipped with acoustic enclosures		division)
6.	Land Environment	Soil contamination	<u>Construction Phase</u> • Disposal of construction debris	• Construction debris will be collected and suitably used on site as per the solid waste management plan for construction phase.	CPWD	Project Proponent (SHE division)
			<u>Operation Phase</u> • Generation of municipal solid waste • Used oil	• It is proposed that the solid waste generated will be managed as per Solid Waste Management	RWA	Project Proponent (SHE division)

			generated from D.G. set	Rules, 2016. • Collection, segregation, transportation and disposal will be done as per Solid Waste Management Rules, 2016 by the authorized agency. Used oil generated will be sold to authorized recyclers		
7.	Biological Environment (Flora and Fauna)	Displacement of Flora and Fauna on site	<u>Construction Phase</u> • Site Development during construction	• Important species of trees, if any, will be identified and marked and will be merged with landscape plan.	CPWD	Project Proponent (SHE division)
			<u>Operation Phase</u> • Increase in green covered area	• Suitable green belts will be developed as per landscaping plan in and around the site using local flora	RWA	Project Proponent (SHE division)
8.	Socio-Economic Environment	Population displacement and loss of income	<u>Construction Phase</u> • Construction activities leading to relocation	• The project lies in the Zone F, Residential Area as per the Land Use Plan of MPD – 2021	CPWD	Project Proponent (SHE division)
			<u>Operation Phase</u>	• Project	RWA	Project Proponent (SHE

			• Site operation	Proponent will provide employment opportunities to the local people in terms of labor during construction and service personnel (guards, securities, gardeners etc) during operations • Providing quality-Integrated infrastructure.		division)
9.	Traffic Pattern	Increase of vehicular traffic	<u>Construction Phase</u> • Heavy Vehicular movement during construction	• Heavy Vehicular movement will be restricted to daytime only and adequate parking facility will be provided.	CPWD	Project Proponent (SHE division)
			<u>Operation Phase</u> • Traffic due to staff once the project is operational	• Vehicular movement will be regulated inside the project with adequate roads and parking lots in the project.	RWA	Project Proponent (SHE division)

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. The schedule will be developed during EIA study.

CONCEPTUAL PLAN

INTRODUCTION

Central Public Works Department (Redevelopment Project Division-II) has planned for the Redevelopment of GPRA Colony measuring 73.14 acres of land at Srinivaspuri, New Delhi. Earlier, the Residential Colony consists of Type I, Type II and Type III residential building and other Social Infrastructure such as Shops, Markets, Schools, Health Centers, Temples etc. These buildings/structures are to be demolished and in place of it; Residential buildings of Type II, Type III, Type IV, Type V and Type VI are proposed to be constructed along with other social Infrastructure. Only one temple of Built up Area 2,680 sq. m from the existing building will be retained. The ground coverage, FAR and the built up area of will the project after redevelopment will be 80,177.63 m^2, 6,42,738.74 m^2 and 9,57,991.35 m^2 respectively. Development be done in phase wise manner.

The salient feature of the project includes energy saving fixtures, rain water harvesting system, sufficient aesthetic green cover and water conservation measures.

TYPE OF PROJECT

The project is a construction project falls under schedule8(b); Category B of Township and Area Development project (As per EIA notification dated 14th September 2006 and amended to the date) as the Built-Up Area of the project is >1,50,000 m^2.

This project is independent and does not link with any other project/s which attracts directly or indirectly any provisions of schedule of EIA notification 2006 amended to date.

LOCATION & LINKAGES

The site is located at Srinivaspuri, New Delhi. The proposed site is connected through Ring Road. The site is at an approx. distance of 400 m from NH-2. The coordinates for location of the project are shown in **Table 1.**

Table 1: Latitude and Longitude of the Project Site

Pillar No	Latitude	Longitude
1	28°34'6.319"N	77°15'25.206"E
2	28°34'4.174"N	77°15'22.076"E
3	28°33'54.698"N	77°15'9.76"E
4	28°33'51.684"N	77°15'5.616"E

Source: Secondary data (Desktop Analysis)

The google image of 500m radius and 10/15 kmtopo-map is attached as **Annexure I**. The surrounding features within and surrounding the project site are presented in **Table 2.**

Table 2: Surrounding Features of the Project Site

Features within project site		
S. No.		
1.	Boys Govt Senior Secondary School	
2.	Delhi Jal Board Officer – 3 No.	
3.	Bharat Sevashram,Delhi Headquarters	
4.	Police Station, South-West Zone, Sriniwaspuri	
5.	L Market, T Market and I Market	
6.	Delhi Public Library, Sriniwaspuri	
7.	Post Office Sriniwaspuri	
8.	Savera Foundation	
9.	Seva Sadan	
10.	MCD Primary Model School	
11.	BaraatGhar (Community Centre), Sriniwaspuri	
12.	Govt Maternity Centre, Sriniwaspuri	
13.	CGHS Dispensary, Sriniwaspuri	
14.	Girls Sr. Secondary School	
Features around project site		
S. No.	**Details of sensitive receptors**	**Distance and Direction**
1.	RadhaKrishana Temple	Approx. 49 Meter South
2.	Arya SamajMandir	Approx. 32 Meter East
3.	Gurudwara (Yadgaar Baba Banda Singh Bhahadur), Sri Niwas Puri	Approx. 27 Meter East
4.	Nurses Residential Complex, Sriniwaspuri	Approx. 20 meter West
5.	Indian Oil Petrol Pump, Sriniwaspuri	Approx. 60 meter West
6.	Cambridge School, Sriniwaspuri	Approx. 17 meter West
7.	Leprosy Society	Approx. 15 Meter West
8.	HazratNizamuddin Railway Station	Approx. 2.50 km towards North
9.	Safdarjung Airport	Approx. 4.50 km towards NW
10.	NH-2	Approx. 0.40 km East
11.	Moolchand Metro Station	Approx 1.70 km towards West
12.	Yamuna River	Approx. 2.6 Km towards NNE

Desktop Study: Wikimapia& Google Earth

SITE SELECTION & ALTERNATIVES

The project lies in the Zone F, Residential Area as per the Land Use Plan of MPD – 2021.The redevelopment is aimed by demolition of the existing buildings and proposal of new buildings as per the modern amenities. The project will have the energy saving measures, water conservation fixtures and rain water harvesting pits required for the sustainable development.

PROJECT MAGNITUDE

The plot area of the project is 73.14 acres. Earlier, the Residential Colony consists of Type I, Type II and Type III residential building and other Social Infrastructure. These buildings are to be demolished and in place of it; Residential buildings of Type II, Type III, Type IV, Type V and Type VI are proposed along

with other social Infrastructure.

AREA DESCRIPTION OF THE PROJECT

The plot area of the project is **2,95,987.34 m²**. The FAR of the project after re-development will be **6,42,738.74 m²**; while the total built-up area of the project will be **9,57,991.35 m².** The detailed area statement is show in **Table 3** and the details of tower wise FAR and built up area is shown in **Table 4.**

Table 3 : Area Statement

S. No.	Particulars	Existing (A) (in m²)	Demolition (B) (in m²)	Proposed (C) (in m²)	Total ((A-B)+C) (in m²)
1	Plot Area	2,95,987.34			
2	Permissible Ground Coverage (@33.3% of the net plot area)	98563.78			
3	Achieved Ground Coverage	53,210.27 (17.9% of Plot Area)	52,540.27 (17.7% of Plot area)	79,507.63 (26.86% of Plot Area)	80,177.63 (27.09 % of plot area)
4	Open Area (1-3)	2,42,777.07	2,43,447.07	2,16,479.71	2,15,809.71
5	Green Area Achieved	1,56,918.71			
6	Surface Parking Area	48,208			
7	Area under Road pavements	10,683			
7	Permissible FAR (@3 of the plot area)	88796.202			
8	Achieved FAR	91,942.55 (31.06 of plot Area)	89,262.55 (30.15 of Plot Area)	6,40,058.74 (2.16 of plot Area)	6,42,738.74 (2.17 of Plot Area)
9	Non FAR	21,306.25	21,306.25	3,15,252.61	3,15,252.61
10	Built Up Area (8+9)	1,13,248.8	1,10,568.8	9,55,311.35	9,57,991.35

Table 4: Tower wise details of FAR &Built Up Area

S. NO.	BUILDING NAME	TOWER	FAR (sq. m)				BUA (sq. m)			
			Existing (A) (in m^2)	Demolition (B) (in m^2)	Proposed (C) (in m^2)	Total((A-B)+C) (in m^2)	Existing (A) (in m^2)	Demolition (B) (in m^2)	Proposed (C) (in m^2)	Total (A-B+C) (in m^2)
A. RESIDENTIAL BUILDINGS										
1	TYPE I		22032	22032	0	0	30099.6	30099.6	0	0
2	TYPE II	T1 – T11	34020	34020	120614.20	120614.20	43432.2	43432.2	135230.84	135230.84
3	TYPE III	T12 – T22	1393.75	1393.75	135032.36	135032.36	1705	1705	147175.13	147175.13
4	TYPE IV	T23 – T36	0	0	210,022.75	210022.75	0	0	232241.45	232241.45
5	TYPE V	T37 – T40	0	0	83344	83344.00	0	0	89747.8	89747.8
6	TYPE VI	T41 – T42	0	0	55675	55675.00	0	0	56023.5	56023.5
7	SCHOOL I		0	0	7466.34	7466.34	0	0	9109.74	9109.74
8	SCHOOL II		0	0	4810.87	4810.87	0	0	4810.87	4810.87
9	SCHOOL III & IV		0	0	5059.84	5059.84	0	0	6788.1	6788.1
10	SHOPPING I		0	0	3320.24	3320.24	0	0	3904.7	3904.7
11	(SHOPPING , POST OFFICE , LIBRARY, DISPENSARY AND MATERNITY)		0	0	8616.27	8616.27	0	0	11240.25	11240.25
12	SHOPPING III COMPLEX		0	0	4976.69	4976.69	0	0	5812.64	5812.64
15	POLICE STATION		0	0	1120.18	1120.18	0	0	1212.66	1212.66
16	SHOPS/ MARKETS		2880	2880	0	0.00	3200	3200	0	0
17	SCHOOL		17632.8	17632.8	0	0.00	19592	19592	0	0
18	HEALTH CENTER		2479.5	2479.5	0	0.00	2755	2755	0	0
19	OTHER BUILDINGS (OFFICE, LIBRARY, NGO, COMMUNITY CENTER ETC.)		8644.5	8644.5	0	0.00	9605	9605	0	0
20	RELIGIOUS BUILDINGS		2860	180	0	2680.00	2860	180	0	2680

S. NO.	BUILDING NAME	TOWER	FAR (sq. m)				BUA (sq. m)			
			Existing (A) (in m^2)	Demolition (B) (in m^2)	Proposed (C) (in m^2)	Total((A-B)+C) (in m^2)	Existing (A) (in m^2)	Demolition (B) (in m^2)	Proposed (C) (in m^2)	Total (A-B+C) (in m^2)
Total			**91942.55**	**89262.55**	**640058.74**	**642738.74**	**113248.8**	**110568.8**	**703297.68**	**705977.68**
C.	BASEMENT AREA (Non FAR)						72778.67			
D.	PODIUM AREA (Non FAR)						179235			
TOTAL BUILT UP AREA							**9,57,991.35**			

POPULATION DENSITY

Existing Population: There is total 1,429 dwelling units in the project site in existing towers of Type-I, Type II and Type III. The population of the existing phase is enumerated in **Table 5**:

Table 5: Existing Population Details

S. No.	Particulars	Total no. of Dwelling units/Beds	Density	Population
1	Residential	1,429	5	7,145
2	Visitors		10% of residential population	715
3	Staff		5% of residential population	357
5	Other Social Infrastructure (Shops, Markets, Schools, Health Centers, Temples)			5,000
	Total			**13,217**

Construction Phase: During construction phase approximately 500 workers will be employed for construction purpose for whom there will be arrangements of labour hutments outside the project premises.

Operation Phase: The total population of the project after the redevelopment is envisaged to be 41,354; which includes residential, school population, commercial population, staff and visitor's population. The detailed population breakup is shown in the **Table 6.**

Table 6: Population Calculation Details

S. No.	Particulars	Basis	Density	Population
A.	**Residential Population**			
1.	Type II	1,554 dwelling units	@ 5 PERSON / UNIT	7770
2.	Type III	1,500 dwelling units	@ 5 PERSON / UNIT	7500
3.	Type IV	1,350 dwelling units	@ 7 PERSON / UNIT	9450
4.	Type V	400 dwelling units	@ 7 PERSON / UNIT	2800
5.	Type VI	190 dwelling units	@ 7 PERSON / UNIT	1330
	Total			28850
6.	Staff Population		3% of Residential Population(Type II and Type III)	745
7.	Visitors population		5% of Total Residential Population	1407
Total Residential Population				**31002**
B.	**Non Residential Population**			

8.	**Shopping I, II and III** Staff Visitors	16913.20 sqm	@ 1 person per 3 Sqm of area	**5638** 1185 4453
9.	**Police station + Existing temple** Staff Visitors	3800.18 sqm	@ 1 person per 10 Sqm of Area	**380** 19 361
10.	**School Population** Staff Students	17337.05 sqm	@ 1 person per 4 Sqm of area	**4334** 433 3901
Total Non Residential Population(8+9+10)				**10352**
Total Population(A+B)				**41354**

WATER CONSUMPTION

Existing Phase: For the existing facility, the total water requirement is approx. 800 KLD while the wastewater generation is in tune of approx. 700 KLD.

Construction Phase: The water requirement during the construction phase comprises mainly of two parts i.e. fresh water for labourers and treated water for building constructions. It is estimated approx**. 20KLD** 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.
Approx. **50 KLD** of water will be required for construction purpose of the building. The treated water requirement will be met by the treated water from the nearby CSTP, which will be brought by the private water tank.

Operation Phase: It is estimated that the total water demand during the operation phase will be **2861 KLD.** The fresh water requirement for residential population, staff and visitors is envisaged to be **1930 KLD**, whereas the treated water requirement is approx. **931 KLD** which includes water requirement for flushing and horticulture. Source of water supply will be Delhi Jal Board. Detailed Water requirement is given in **Table 7.**

Table 7: Water Calculation

Sr. No.	Particular	Occupancy / Population	Area in Sqm	Water Demand per capita	Fresh Water	Treated Water	Total Water Demand	Wastewater generation
1	Residential Population	28850		86	1875.25	605.85	2481.10	2106.05
2	Visitors population	10122		15	37.07	114.75	151.83	144.41
3	Staff Population	2382		30	17.45	54.02	71.47	67.98
4	Landscape Area		156918.71	1 ltrs/sqm/day	0.00	156.92	156.92	

5	Total				**1929.78**	**931.54**	**2861.31**	**2318.44**
	Say				**1930**	**931**	**2861**	**2318**

Source:(i) Manual on norms and standards for environment clearance of large construction projects, Ministry of Environment and Forests, Government of India (iii) National Building Code of India, 2005,

The water balance diagram during the non-rainy is shown below in Figure 1:

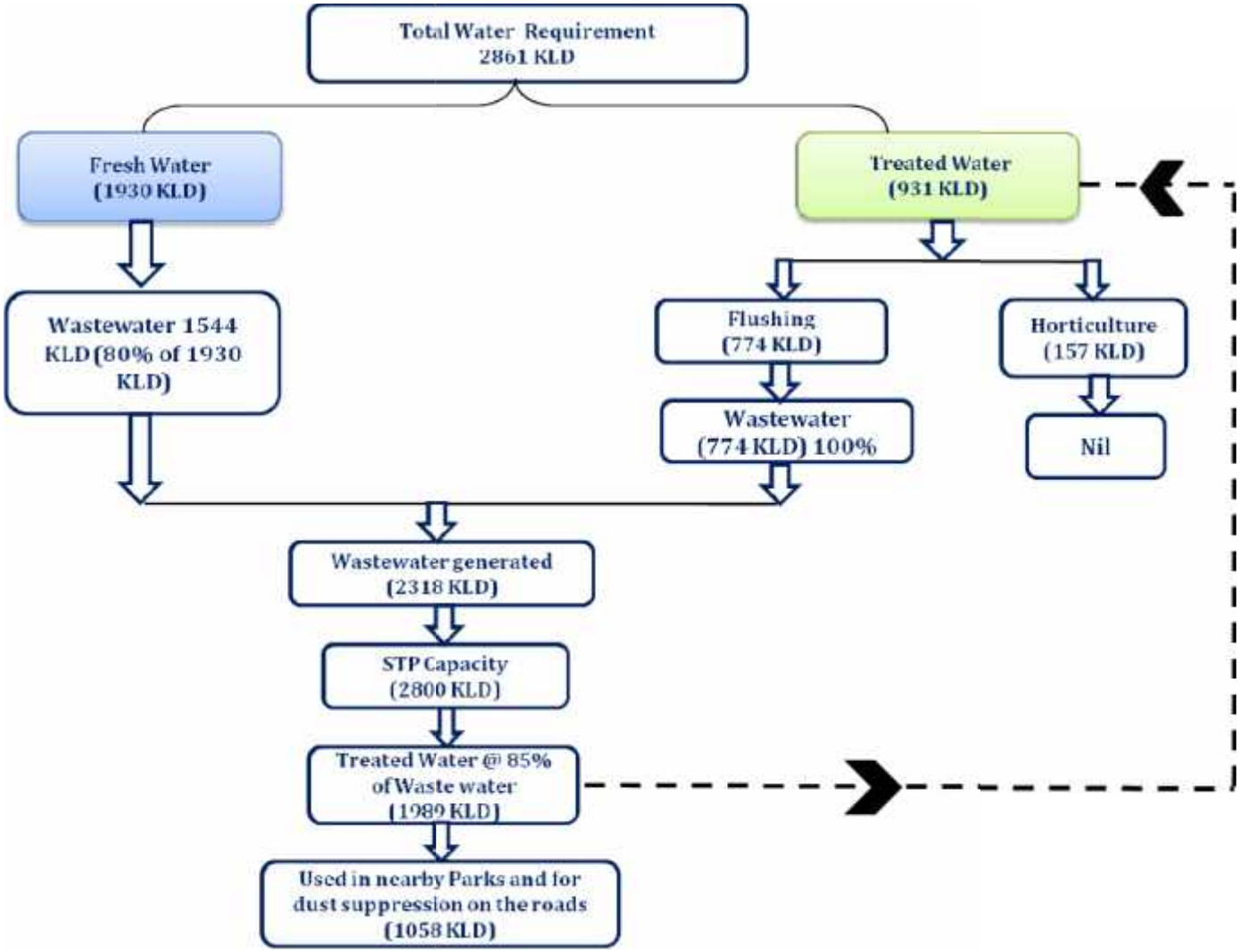


Figure 1: Water Balance Diagram (Non-rainy Season)

Wastewater Treatment & Disposal

Construction Phase: There will be necessary arrangements for the septic tanks for the wastewater generated within the project site.

Operation Phase: During the operational phase; approximately 2,318 KLD of wastewater will be generated from the project which will be treated in the MBBR based Sewage Treatment Plant of total capacity 2800 KLD which will be installed in phase wise manner. It is expected that approximately 1,989 KLD of treated water will be recovered from the STP. During non-rainy season; STP treated water will be reused in flushing (774 KLD) and horticulture (157 KLD) while the surplus of 1058 KLD will be used in nearby parks and for dust suppression on the roads.

Sewage Treatment Plant:

MBBR Technology: 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 treated waste water. This shall consequently lead to a lower withdrawal from the underground aquifer water sources.
- 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.

Desired treated waste water characteristics for BOD and suspended solids levels shall be as per CPCB norms. The characteristics of treated water shall depend on the quality of raw water of the system**.**

a. Daily Load : 2,318 KLD
b. Duration of Flow to STP : 24 hours
c. Temperature : Maximum 32^0C

Table -8: Influent Properties

S. No.	Parameter	Quality of Inlet Wastewater
1	pH	6.5 – 8.5
2	BOD_5	Upto 500 mg/L
3	COD	Upto 750 mg/L
4	Suspended Solids	Upto 250 mg/L
5	Oil & Grease	Upto50 mg/L

Table -9: Desired Quality of Treated Water after Ultra Filtration

S. No.	Parameter	Quality of Outlet Wastewater
1	pH	6.0 – 8.5
2	BOD_5	Less than 5 mg/L
3	COD	Less than 20 mg/L
4	Suspended Solids	Less than 50 mg/L
5	Oil & Grease	below the detectable limit

Treatment scheme includes the collection of sewage by gravity into collection –cum-equalization tank. The pre tank, Disinfection in Chlorine contact tank by using Chlorine Dosing System, Polishing by Multi-grade Sand Filter and Activated Carbon Filter or by Ultra Filtration, removal of water hardness through softener and disposal of sludge through tankers or other suitable means like

Sludge Drying Beds or Filter Press. Treatment of kitchen wastewater will be done by using grease interceptor for oil & grease segregation. Sewage lifting & transfer to aeration tank by submersible type pumps. The Biological Oxidation of waste water by Extended Aeration process using diffused aeration system and Secondary clarification in secondary settling **(Refer Figure 2).**

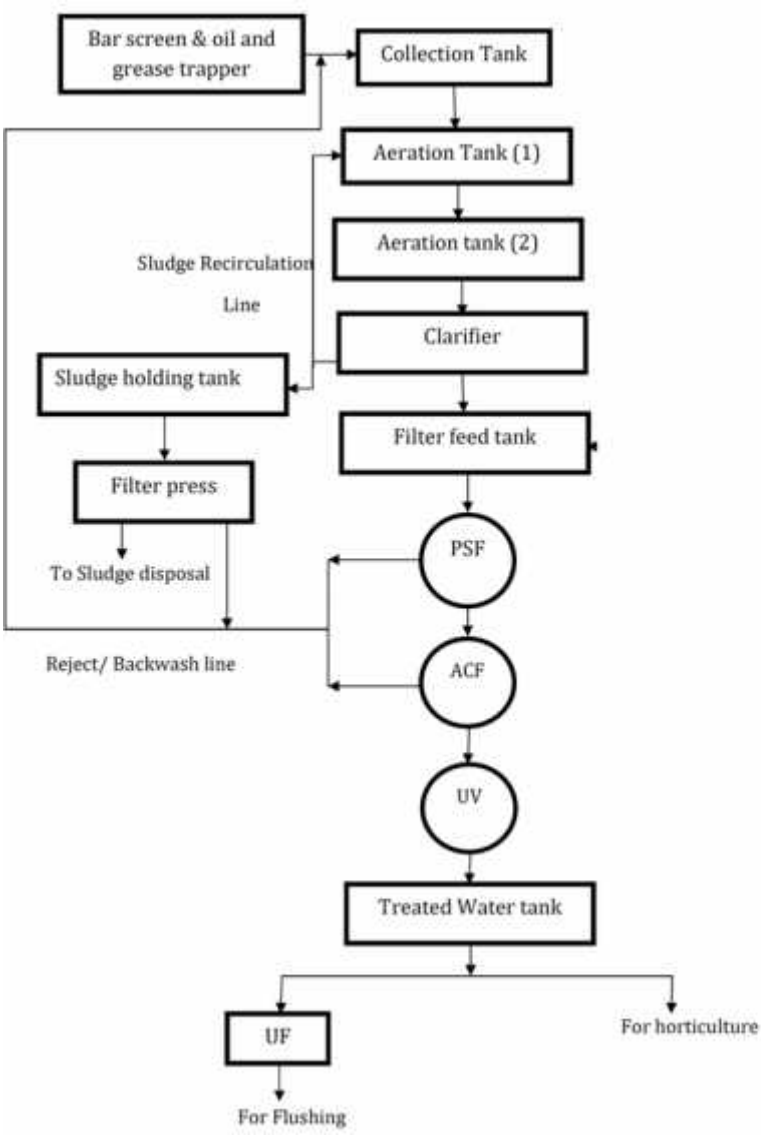


Figure 2 : Schematic of STP design

Collection of sewage: The sewage generated shall be collected by gravity in the collection cum equalization tank located below the ground. Kitchen wastewater shall be put into general waste after passing through the grease interceptor. Air piping shall be provided in this tank for the mixing of sewage & to avoid anoxic conditions & the sedimentation of suspended impurities.

Extended Aeration (Proposed Treatment Process): The aerobic environment in the aeration tank shall be achieved by the use of fine bubble diffused aeration, which also serves to maintain the

liquor in a completely mixed regime. From Aeration tank sewage will flow to secondary settling tank where secondary clarification will takes place in Secondary Settling Tank (SST). The settled sludge from SST shall transfer to the sludge holding tank. The treated water from the secondary tube settlers shall be collected in to Chlorine contact tank. In this, Hypochlorite solution is dozed for the dis-infection of clarified water. This tank will also act as storing tank for filter feed pumps. Treated water from CCT will pump to multi grade filter for removal of suspended solids and turbidity. This filter shall be provided with Sand & Anthracite as filtering media. After multi grade filter, the treated water will be passed through the Activated carbon filter for further polishing. After this tertiary treatment, the treated water can be used for the Horticulture/ Flushing purposes.

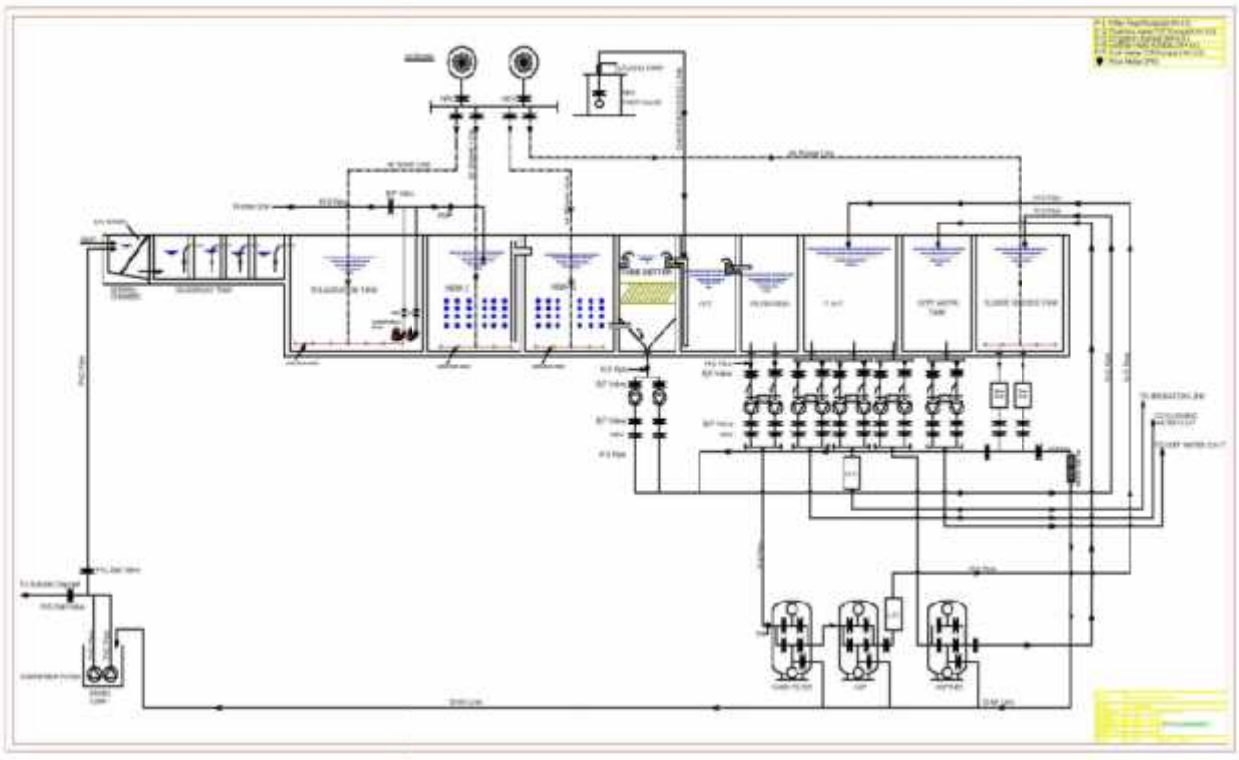


Figure 3: STP Treatment Scheme

Details of Dual Plumbing: - 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.

PARKING CALCULATIONS

Adequate provision for car parking will be made at the project site. There will be also an adequate parking provision for visitors so as not to disturb the traffic and allow smooth movement at the site. The parking required and the parking proposed is shown in **Table 10** & **Table 11**.

A. Required Parking:

Table 10: Parking Requirement

As per MPD-2021 Norms	
Parking Facilities	2 ECS/100 m^2 of FAR
	= 6,42,738.74/100= 6,427 ECS

B. Parking Proposed:

Table 11: Parking Provided

Parking Proposed			
	Basis	**Density**	**No. of ECS**
Open Parking	48,208 sqm	@ 23 sq. m. /ECS	2096
Podium Parking	1,79,235 sqm	@ 28sq. m./ ECS	6401
Basement Parking	72,778.67 sqm	@ 32 sq. m. / ECS	2274
Total Car Parking			**10,771**

GREENBELT DEVELOPMENT

Operational Phase: An area of 1,56,918.71 m^2 (approx. 53% of the plot area) will be provided for the landscape development which includes ornamental trees and shrubs. Currently, there are 2,763 trees present on the site out of 1,239 trees will be transplanted within the project site and the remaining tree will be merged with the proposed landscape. The main trees species found at the project site are Mulberry; Amaltas; Siris; Kaner; Mango; Mehndhi; Alstonia; Papdi; Peepal; Jamun; Bakaian; Jungle Jelebi; Shehtut; Ashok; Moringa; Reinta; Bargad; Neem; Anar; Kikar; Guava; Bael; Eucalyptus; Katal; Lemon; Siris; Kassod; Pilkhan; Khirni; Sagwan; Harsingar; Gular; Peech /Aadu; Lily Flower; Kadipatta; Bottal palm; Champa; Beliaphool; Kadipatta; Sheesham; Babul; Godly; Cheed and Semal.

Greenbelt Development: The following plants species are suggested for plantation is as given in **Table 12 & Table 13**.

Table 12: Trees for Greenbelt Development

S. No.	Binomial Name	Common Name	Height (Meters)	Flowering Season
1	*Acacia auriculiformis* A.cunn	Australian Wattle	16m	June-Jan
2	*Acacia nilotica* (Linn) *w*illd.	Indian Gum-Arabic-tree	8m	Aug-JAN.
3	*Anona squamosa* Linn.	Custard apple	10m	March -July extended upto sept.
4	*Anona reticulata* Linn.	Bullock's Heart	10m	June.
5	*Cassia pumila* Lamk	Yellow Cassia	10-12m	
6	*Cassia siamea* Lamk	Iron wood tree	10-12m	Aug - May
7	*Citrus aurantium* Linn		5m	Sept - Nov
8	*Dalbergia sisoo* Roxb	Sissoo	10m	March-April-June
9	*Derris indica* (Lam.) Bennett.	Pongam-Oil Tree, Karanj	10m	April - June

Source: Guidelines for Developing Greenbelts, CPCB, 2007

Table 13: Shrubs for Greenbelt Development

S.No.	Binomial Name	Common Name	Height (Meters)	Flowering Season
1	*Bougainvillea spectabilis* Willd	Bougainvillea	8m	Through the year
2	*Clerodendrum infortunatum* Linn (auct), Wight	Bhant	3-4m	Oct-Jan
3	*Hamelia patens* Jacq	Scarlet bush	3m	Oct.- Jan
4	*Lawsonia inermis* Linn	Henna	5m	April –July
5	*Murraya paniculata* Linn		5m	June - Oct.
6	*Nerium indicum* Mill	Pink oleander	5m	Throughout the year
7	*Ricinus communis* Linn	The castor	6m	Sept – Oct
8	*Tabernaemonatana divaricata* Linn		3m	Through the Year
9	*Tecoma stans* Linn.		5m	Feb –April
10	*Thevetia peruviana* (Pers.)Merrill.	Yellow oleander	6m	

Source: Guidelines for Developing Greenbelts, CPCB, 2007

RAINWATER HARVESTING

The rainwater harvesting will help in raising the ground water table. As such, the Ground water extraction is not envisaged for this project.

The rainwater harvesting through recharge pit process will be used for the recharge of the water at the project site. The quantity of annual harvested rainfall at the project site at present is

1,08,032.14 cum. Annual rainfall has been considered as 0.79 mm for designing of rainwater harvesting pit. 70 recharge pits of diameter 4 m and effective depth 3.5 m are being proposed.
Mesh will be provided at the roof so that leaves or any other solid waste/debris will be prevented from entering the pit. Rainwater from roofs will be taken to collection/desilting chambers located on ground. These collection chambers are interconnected to the filter pit through pipes. The filter pit will be circular in shape and will be back-filled with graded material, boulder at the bottom, gravel in the middle and sand at the top. The final disposal of storm / rain water shall be in multiple recharge / rain harvesting pits to recharge the ground water. The water collected will be used for replenishing the ground water aquifers and creating surface storages for utilization in non-rainy season (**Table 14**).

Table 14: Annual Recharge Potential (After Construction)

S. No.	Description	Coefficient	Area (m^2)	Average annual rainfall (m)	Quantity (cum/year)
1	Roof top	0.8	80,177.63	0.79	50,672.26
2	Paved	0.7	58,891.00	0.79	32,566.72
3	Green	0.2	156,918.71	0.79	24,793.16
Annual Recharge Capacity					**1,08,032.14**

Storm Water Drainage

A detailed "Storm Water Management" has been proposed to develop. This will incorporate the following management practices which will include:

- Regular inspection and cleaning of storm drains.
- Clarifiers or oil/water separators shall be installed in all the parking areas.
- Cover waste storage areas.
- Avoid application of pesticides and herbicides before wet season.
- Secondary containment and dykes in fuel/oil storage facilities
- Conducting routine inspections to ensure cleanliness
- Preparation of spill response plans, particularly for fuel and oil storage areas.
- Provision of slit traps in storm water drain

Rainwater harvesting Pits Calculations

The calculations of rain water harvesting pits are shown in **Table 15.**

Table 15: Storm Water Load & Rain Water Harvesting Pits Calculations

Type of Area	Area(m^2)	Coefficient of run-off	Peak rainfall intensity during one hour of rainfall (in m)	Rain water harvesting potential/hour (in m^3/hr)
Roof-top area	80,177.63	0.8	0.09	5,772.79
Paved Area	58,891.00	0.7	0.09	3,710.13
Green Area	1,56,918.71	0.2	0.09	2,824.54
Total				12,307.46
Total storm water load on the site with per hour retention is = 12,307.46 m^3/hr				
Considering 15 minutes retention time, total storm water load			12,307.46 x (15/60) =3076.86 cum	

Taking the diameter and effective depth as 4 m and 3.5 m respectively, Volume of a single pit = 3.14 x 2 x 2 x 3.5	43.96
Hence no. of pits required in approx = Total storm water load considering 15 minutes retention time / Volume of a RWH pit	69.99 ~ 70 pits

In view of the above requirement 70 numbers of Rainwater Harvesting pits are proposed in the project. These pits are connected with the rooftop and all the water collected in the rooftop is being diverted to these Rainwater Harvesting pits.

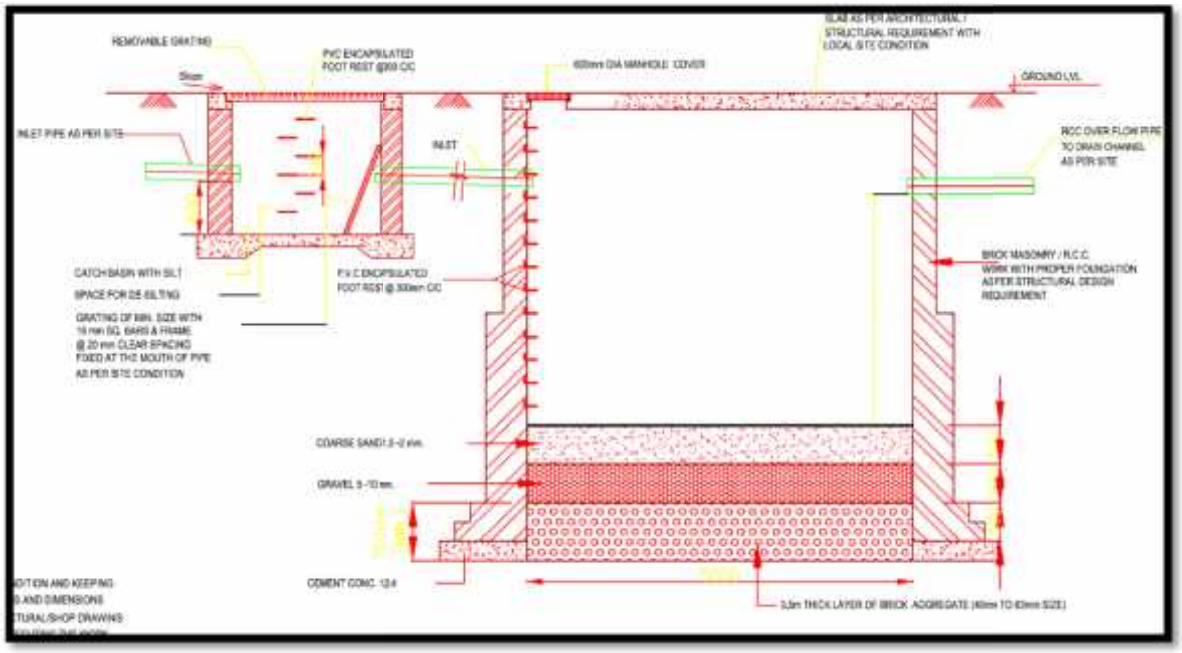


Fig 5: Typical Section of the Pit

POWER REQUIREMENT

The power supply shall be supplied by BSES Rajdhani Power Limited. The demand load for the project is estimated to be 27,849 KW.
There is provision of 5 Number of DG sets of 500 kVA each for power back up in the project. The DG sets will be equipped with acoustic enclosure to minimize noise generation and adequate stack height for proper dispersion.

Table 16: Power Requirement Operation Phase

Parameters	Operation Phase
Power requirement	27,849 KW
Supply by	BSES Rajdhani Power Limited

Parameters	Operation Phase
Back-up power supply	5 nos. of DG sets of capacity 500 kVA each

SOLID WASTE GENERATION

Solid waste will be generated both during the construction as well as during the operation 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.
- Remaining soil shall be utilized for refilling / road work / rising of site level at locations etc.

Since, this is a redevelopment project; which involves demolition work also; approx. 300-500 kg/sqm of the built-up area will be generated as demolition waste which includes major demolition waste is soil, sand and gravel accounting for bricks (26%) & masonry (32%), Concretes (28%), metal (6%), wood (3%) others (5%).
Approx.40-60 kg/sqm of the built up area will be generated during the fresh construction. The waste generated be disposed to the Facility Centre at Burari for managing the Construction and demolition waste as per the provisions of the Construction & Demolition Waste Rules, 2016. The boundary wall, pavements and footpath inside the campus will be constructed using the processed material from the Facility Centre at Burari.
The solid waste management scheme during the construction phase is shown in **Figure 4**

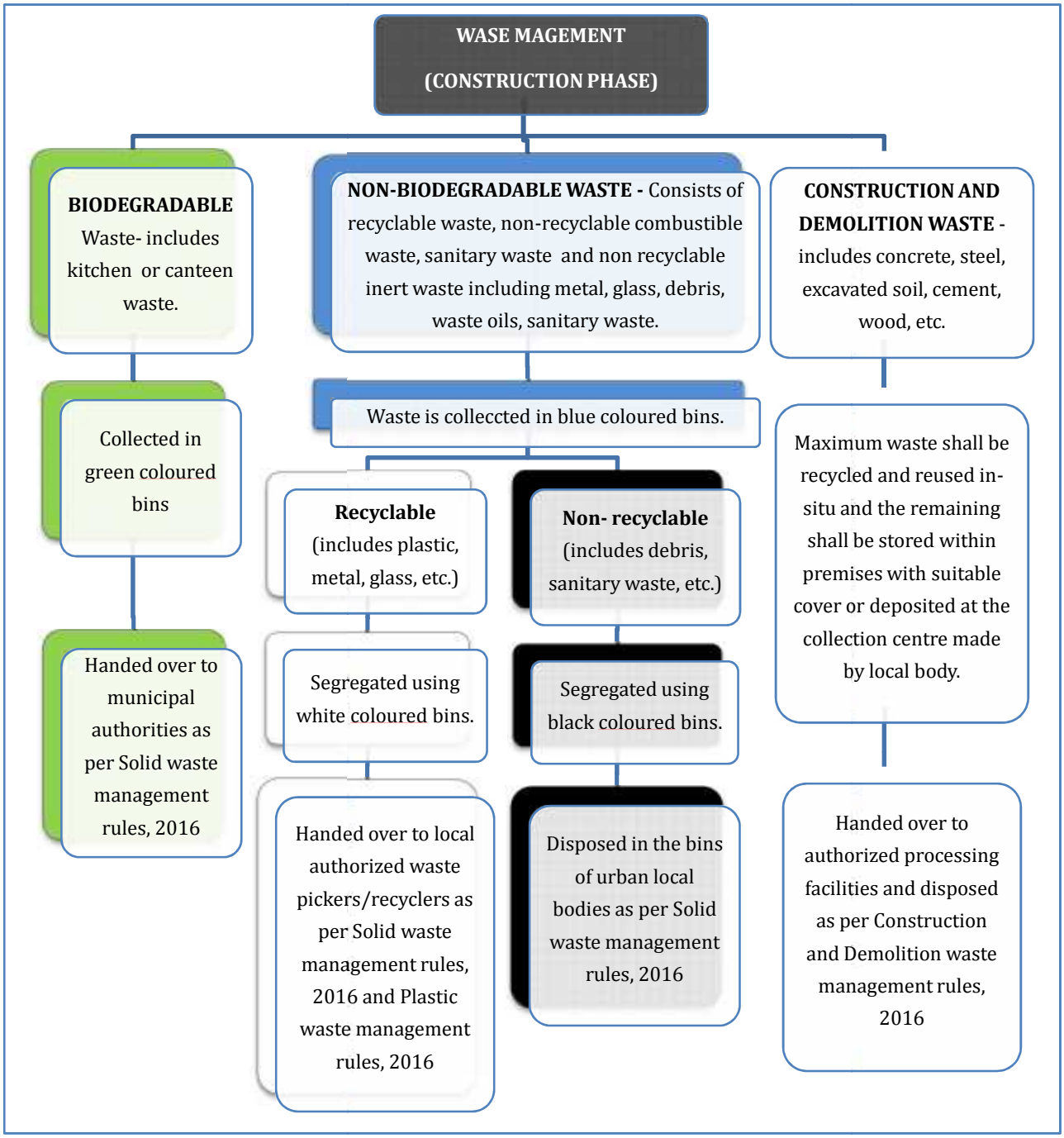


Figure 4: Solid Waste Management Scheme (Construction Phase)

During the operation phase, waste will comprise domestic as well as agricultural waste. The solid waste generated from the project shall be mainly domestic waste and estimated quantity of the waste shall be approx. **16,546.48**kg per day (@0.50kg per capita per day for residents, @0.15 kg per

capita per day for the visitor, @0.25 kg per capita per day for the staff members and landscape wastes @ 0.2 kg/acre/day). Following arrangements will be made at the site in accordance to Solid Wastes Management Rules, 2017.

Table 17: Solid Waste Estimation

Sr. No.	Particular	Occupancy	Area in acres	Waste Generated per kg/day	Waste Generation
1	**Residential Population**	28850		0.5	14425
2	Visitors population	10122		0.15	1518.24
3	Staff Population	2382		0.25	595.48
4	Landscape Area		38.78	0.2 kg/acre/day	7.756
5	**Total**				**16,546.48**

(Source: For Waste Collection, Chapter 3, Table 3.6, Page no. 49, Central Public Health &Environment Engineering Organization, Ministry of Urban Development, (Government of India, May 2000)

❖ **Collection and Segregation of waste**

1. A collection system will be provided for collection of waste in colored bins for separate blocks
2. The local vendors will be hired to provide separate colored bins for dry recyclables and Bio-Degradable waste.
3. Adequate number of colored bins (Green and Blue & dark grey bins– separate for Bio-degradable, Non-Bio-degradable & inert waste) will be provided at the suitable locations of the project site.
4. Litter bin will also be provided in open areas like parks etc.

❖ **Treatment of waste**

- Bio-Degradable wastes

1. Bio-degradable waste will treated through Organic Waste Converter and the Manure will be used in greenbelt development.
2. Horticultural Waste is proposed to be composted and will be used for gardening purposes.
3. 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 Solid Wastes Management Rules,2016. A Solid waste management Scheme is depicted in the following figure for the project.

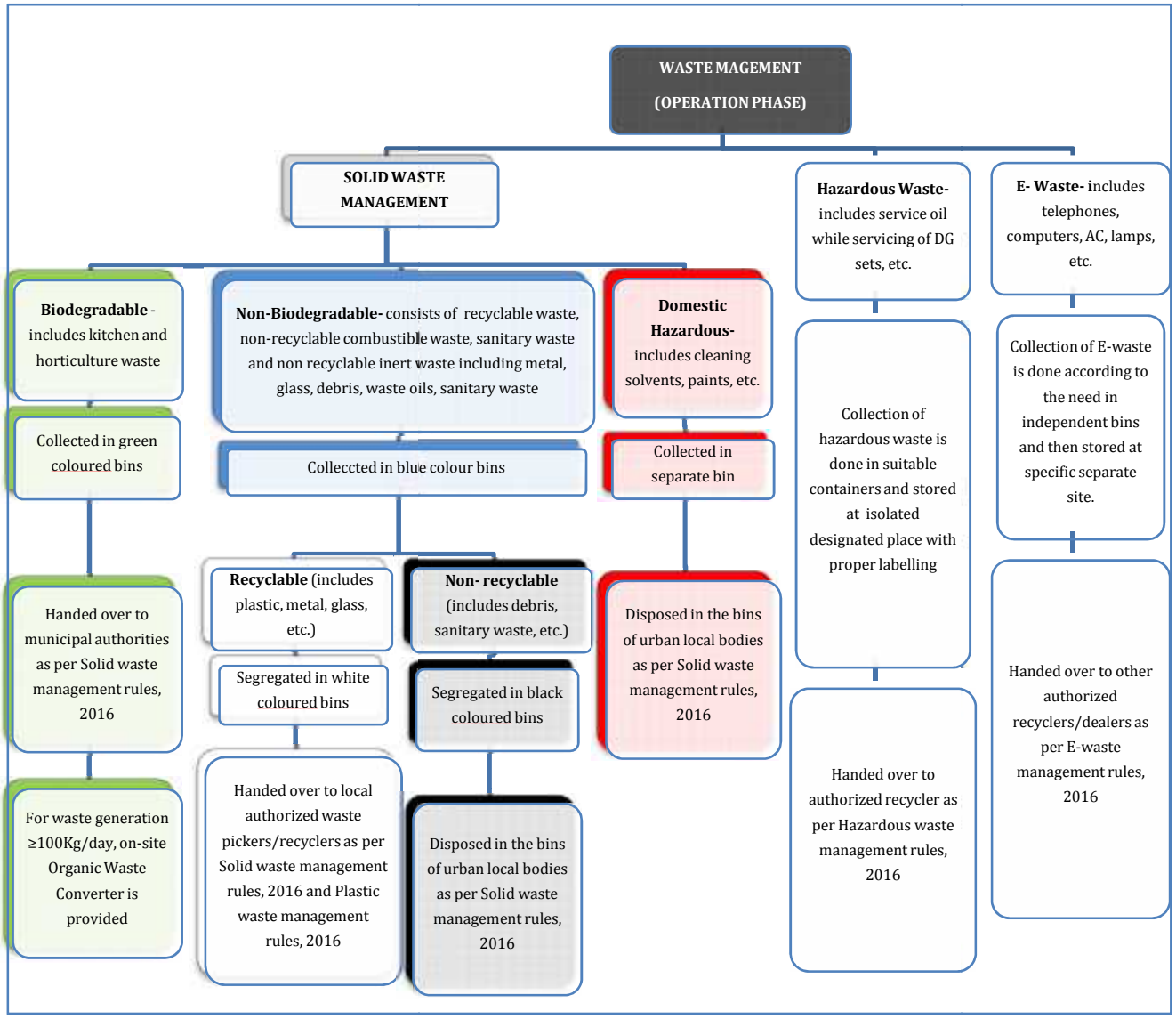


Figure 5: Solid Waste Management Scheme (Operation Phase)

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.

Principle

The organic waste converter works on the principle of aerobic microbial decomposition of solid waste into compost. This is a bio-mechanical process which produces homogeneous odour free output in 15 minutes.

The compost which is generated can be utilized for horticulture development and soil conditioning. It prevents production of methane gas. The organic waste converter converter is shown in Figure 8.

Figure 6: Organic Waste Converter

Benefits of organic waste converter:

1. Large quantity of solid waste is converted to fertilizer in a very short period
2. This fertilizer 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.

Use of Organic waste converter:

A typical Organic Waste Converter - 300 (Dim. 3m × 4m) is used for composting waste 125kg/batch or 3000 kg/shift & it requires electricity of about 13.5 HP.

No. of batches /day = 3000/125 = 24

No. of batches to convert 9927.6 kg =9927.6/125 =79 batches.

Operation Cost-monthly per capita:

The operating cost of OWC-300 = 1,80,000 INR/month

Cost/day = 1,80,000/30

= 6000/-

1 batch/day cost = 6,000/24

= 250 INR

Cost for 79 batch/day = 79× 250

= 19,750/-

Monthly operating cost = 30 × 19,750

= 5,92,500/-

Permanent population of the project = 28,850

Operating cost of OWC-300 = 5,92,500 INR/month

Per capita cost/month = Monthly operating cost/Total population of the project

=592500/28,850

= 20.53

~21 INR/Month

FIRE SAFETY

Adequate firefighting arrangements will be provided in the proposed project. The firefighting arrangements provided in the proposed project are given below:

- Provision of Automatic water sprinklers.
- Provision of separate fire hydrant pipe.
- Provision of Overhead water storage tank.
- There is provision of firefighting pumps.
- Optical type smoke detectors shall be used in most areas.
- Rate of rise heat detectors shall be planned for all potentially smoky areas and in the basements.

CONSTRUCTION MATERIAL

Wind Velocity, Seismicity, Rainfall of Region, has taken in consideration during designing. Only IS approved building materials will be used for construction. Construction materials have been selected based on their thermal and combustible characteristic. The quantity of construction material required is presented in **Table 18**. All the items to be used in the project will be as per the national building code specification. If the building materials with high-embodied energy are locally available, it will be used in construction.

Table 18: Construction Material Requirement

Type of Construction	U values (in W/m²deg C)
WALLS	
Brick:	
Plaster both sides -114 mm	3.24
Solid, Unplastered-228 mm	2.67
Plastered both sides-228 mm	2.44
Concrete, ordinary, Dense:	
-152 mm	3.58
-203	3.18
Concrete block, cavity, 250 mm (100+50+100), outside rendered, inside plastered:	
Aerated concrete blocks	1.19
Hollow Concrete block, 228 mm, single skin, outside rendered, inside plastered:	
Aerated concrete blocks	1.70
Roofs pitched:	
Tiles or Slates on boarding and felt with plaster ceiling	1.70
Roofs Flat:	
Reinforced concrete slab, 100 mm, screed 63-12 mm, 3 layers bituminous felt	3.35
Floors:	
Concrete on ground or hardcore fill	1.13
+ Grano, Terrazzo or tile finish	1.13
+ Wood block finish	0.85
WINDOWS:	
Exposure South, Sheltered:	
Single glazing	3.97
Double glazing 6 mm space	2.67

Thermal characteristics of the materials used for building envelop v.i.z, roof, external walls, fenestration will be provided in accordance with energy conservation building Code 2006.
R & U values: Achieved / permissible as per ECBC norms:

(i) Roof: 0.409/0.409
(ii) Exposed wall: 0.44/0.44
(iii) Glazing: 2.8/3.3

CONSTRUCTION MATERIAL

LIST OF MACHINERY USED DURING CONSTRUCTION

(i) Dumper
(ii) Concrete mixer with hopper
(iii) Excavator
(iv) Concrete Batching Plant
(v) Cranes
(vi) Road roller
(vii) Bulldozer

(viii) RMC Plant
(ix) Tower Cranes
(x) Hoist
(xi) Labor Lifts
(xii) Pile Boring Machines
(xiii) Concrete pressure pumps
(xiv) Mobile transit mixer

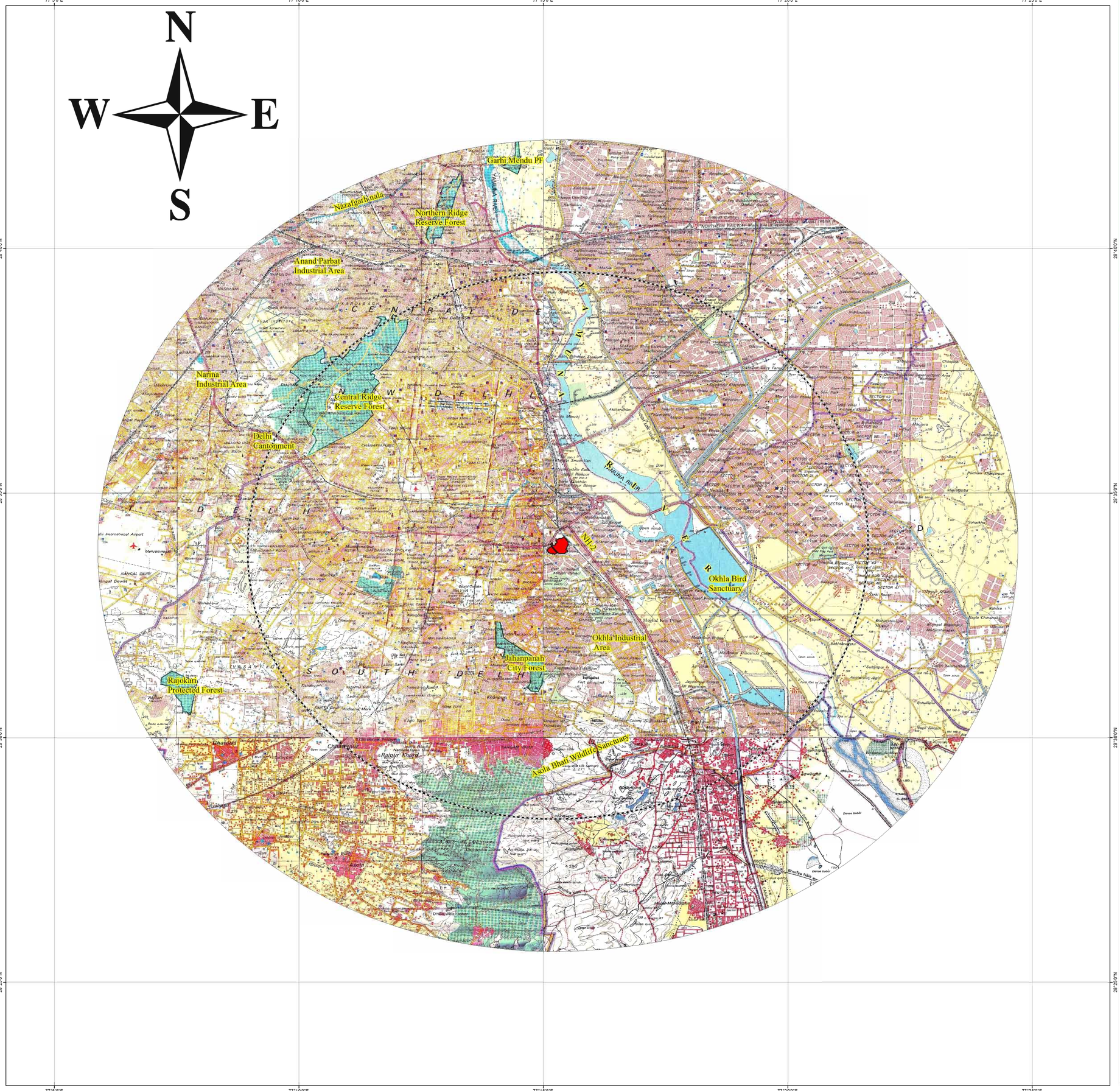
ENERGY CONSERVATION MEASURES:

Energy Conservation Measures & Management Plan:

- Passive Solar designs refer to the use of Sun's energy for the heating and cooling of living spaces.
- The orientation of the building will be done in such a way that maximum daylight is available.
- The orientation of the building would be done in such a manner that most of glazed areas in north and east.
- Lesser opening will be provided on the west facing walls.
- Landscape and greens areas will be so spaced so as to cool the surrounding environment, which will reduce energy consumption.
- Green belt in the site will be maintained by the project proponents, which would have an overall cooling effect on the surroundings.
- Using electronic ballast for discharge lamps.
- Use of Solar backed LED landscape lights instead of par lamps.

Following measures have been proposed to reduce energy consumption for Electrical installations:

- In the operational phase, appropriate energy conservation measures and management plan will be adopted in order to minimize the consumptions of non-renewable fuel. The following measures are suggested to be adopted:
- Solar lighting will be provided in open area.
- Use of LED instead of GLS lamps for flats and Common Areas.
- Use of T5 lamps instead of normal fluorescent lamps in basement



Topographic Map
(15 Km BUFFER)

Name of Project:Redevelopment of GPRA; Sriniwaspuri New Delhi
Name of Proponent:Central Public Works Department (CPWD)
Location of Project:Sriniwaspuri
Tehsil:Kalka Ji
District: South Delhi
State: Delhi
Country: India
Plot Area: 73.20 Acres

CONVENTIONAL SYMBOLS

Express highway: with toll; with bridge; with distance stone . . . Toll 20
Roads, metalled: according to importance . . . .
Roads, double carriageway: according to importance . . . .
Unmetalled road. Cart-track. Pack-track with pass. Foot-path . . . .
Streams: with track in bed; undefined. Canal . . . .
Dams: masonry or rock-filled; earthwork. Weir . . . .
River: dry with water channel; with island & rocks. Tidal river . . 3r
Submerged rocks. Shoal. Swamp. Reeds . . . .
Wells: lined; unlined. Tube-well. Spring. Tanks: perennial; dry . . .
Embankments: road or rail; tank. Broken ground 2r 4r
Railways, broad gauge: double; single with station; under constrn. . RS
Railways, other gauges: double; single with distance stone; do . . 20
Mineral line or tramway. Kiln. Cutting with tunnel . . . .
Contours with sub-features. Rocky slopes. Cliffs 50
Sand features: (1)flat.(2)sand-hills (permanent). (3)dunes(shifting). . . ① ② ③
Towns or Villages: inhabited; deserted. Fort . . . .
Huts: permanent; temporary. Tower. Antiquities. . . . . Gaur
Temple. Chhatri. Church. Mosque. Īdgāh. Tomb. Graves . . . .
Lighthouse. Lightship. Buoys: lighted; unlighted. Anchorage . . . . .
Mine. Vine on trellis. Grass. Scrub . . . .
Palms: palmyra; other. Plantain. Conifer. Bamboo. Other trees . . .
Areas: cultivated; wooded. Surveyed tree . . . .
Boundary, international. . . . .
" state: demarcated; undemarcated . . . .
" district; subdivision, tahsīl or tāluk; forest . . . .
" Pillars: surveyed; unlocated; village trijunction. . . . .
Heights, triangulated: station; point; approximate. . . . . △ 200 . 200 . 200
Bench-mark: geodetic; tertiary; canal . . . . BM 63·3 . BM 63·3 . 63
Post office. Telegraph office. Overhead tank. . . . . t
Rest house or Inspection bungalow. Circuit house. Police station . .
Camping ground. Forest: reserved; protected . . . . CG RF PF
Spaced names: administrative; locality or tribal . . . . KIKRI NĀGA
Hospital. Dispensary. Veterinary hospital . . . .
Aerodrome. Helipad. Tourist site . . . .
Power line; with pylons surveyed; with poles unsurveyed . . . .
Metro Railways with station, under constrn.. . . . .

Project Site 🟥 10 Km Buffer ○

Marked By:
Aplinka Solutions & technologies Pvt. Ltd (ASTPL),
Noida, Gautambuddha Nagar, (U.P)

77°15'0"E

28°34'0"N

N
W
E
S

Ashram

Ring road

National Highway-2(Delhi-Kolkata)

Northern Railway Main Line

Nurses
Residential Complex

New Friends
Colony(West)

MCD
School

Mahatama Gandhi Marg

Cambridge
School

Private Colony
Sriniwaspuri

Boys Senior
Secondary School

Lajpat Nagar

Captian Shashikant Gaur Marg

East of Kailash

Garhi

77°15'0"E

Google Map
(500m Buffer)

Name of Project:
Redevelopment of GPRA Colony
Name of Proponent:
Central Public Works Department(CPWD)
Location of Project:
Sriniwaspuri, South Delhi;
Tehsil:Kalkaji; District: South Delhi
State: Delhi, Country: India
Net Plot Area: 73.20 Acres

Legends

Project Site

500 Meter Buffer

Scale

0 300 600 Meters

RF 1:3,100

Marked By:
Aplinka Solutions & technologies Pvt. Ltd (ASTPL),
Noida, Gautambuddha Nagar, (U.P)

TOWARDS DHAULA KUAN
RING ROAD
RING ROAD
RING ROAD
PLOT LINE
Swami Pranavananda Marg
Swami Pranavananda Marg
ENTRY
ENTRY
ENTRY
ENTRY
EXIT
EXIT
EXIT
EXIT
GREEN LANDSCAPE
GREEN LANDSCAPE
9.00 MT. WIDE VEHICULAR ACCESS
15 M SETBACK LINE
12 M SETBACK LINE
EXISTING TEMPLE
CNG PUMP
J.J.CLUSTERS/JHUGGIES SHOP
RESIDENTIAL FLATS
DELHI JAL BOARD OFFICE
EXISTING ROAD
PROPOSED ROAD
PLOT LINE
RAILWAY BOUNDARY WALL
RAILWAY LINE
RAILWAY LINE
P1
P2
P3
P4