

FORM-1 A

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

CHECK LIST OF ENVIRONMENTAL IMPACTS

Name of the project/s - Modification of Integrated Township – **“Sri Radha Vrindavan Chandra Mandir, Krishna Lila Theme Park and Group Housing”** at Vrindavan, Mathura

(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

(Panoramic View of the Project site are attached)

1.1 Will the existing landuse get significantly altered from the project that is not consistent with the surroundings? (Proposed landuse must conform to the approved Master Plan / Development Plan of the area. Change of landuse if any and the statutory approval from the competent authority is 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.

i) Vision of Integrated Spiritual Township

Mathura and Vrindavan are important places for Hindus all over the world. Vrindavan is especially a very revered and sacred place for the devotees of Krishna. Great devotees in the past have built magnificent temples, small and big.

M/s Hare Krishna Movement plans to set up a township with a grand temple of Krishna at the center. It has a unique architectural feature that harmoniously blends the elements of Indian traditional temple architecture of Nagara style and elements of modern architecture. The grand temple shall be of monumental proportions and iconic architecture that harmoniously fuses essentials of Indian temple architecture and elements of modern architecture. This temple is poised to become the tallest, grandest and largest religious structure in India. The temple has a footprint of about 38 acres and rises to a height of about 332 meters. The housing development project comprises of rows of houses (villas) and group housings to be occupied by devotees of Krishna who

wish to be in the precincts of a grand temple in the holy land of Vrindavan. The housing development project also will have a place for the lower income group and economically weaker section. The temple is planned to be vibrant with festivals and religious activities all through the year.

The grand temple would be surrounded by wooden area that constitutes green area. This green area will be revived and recreated around the grand temple in their original glory. Designed by the world's best landscape architects, it will be made of the green area as described in the *Srimad Bhagavatam (dvadasha kanana)* with varieties of vegetation, green pastures, fruit bearing trees, flower laden creepers, clear water lakes and water falls from small hillocks– all created to transport the visitors to Krishna's times in Vrindavan. The area will also house Krishna Lila Theme Park attractions that celebrate the various pastimes of Krishna that he performed in Vrindavan. Using dolls, settings, light and sound effects, projection effects and ride systems, these attractions tell the stories of Krishna in an entertaining manner to guests of all ages.

The Grand Temple and Theme Park will be the USP of the project to attract potential buyers for the residential space. The surpluses from the residential development will finance the development of the grand temple and theme park. The devotees of Krishna will want to have a second home or a vacation home at Vrindavan, and the temple-centered township will be a major attraction.

ii) Overview:

Environmental Clearance was granted vide the Directorate of Environment, UP letter Ref. No. 1119/SEAC/379/2010/JDCA, Dated 10-July-2010. This is modification of Integrated Spiritual Township and Housing Development Project on land earmarked for Math/Spiritual Township as per Master Plan 2021 of MVDA due to decrease in land area from 130.31 acres – 110.15 acres.

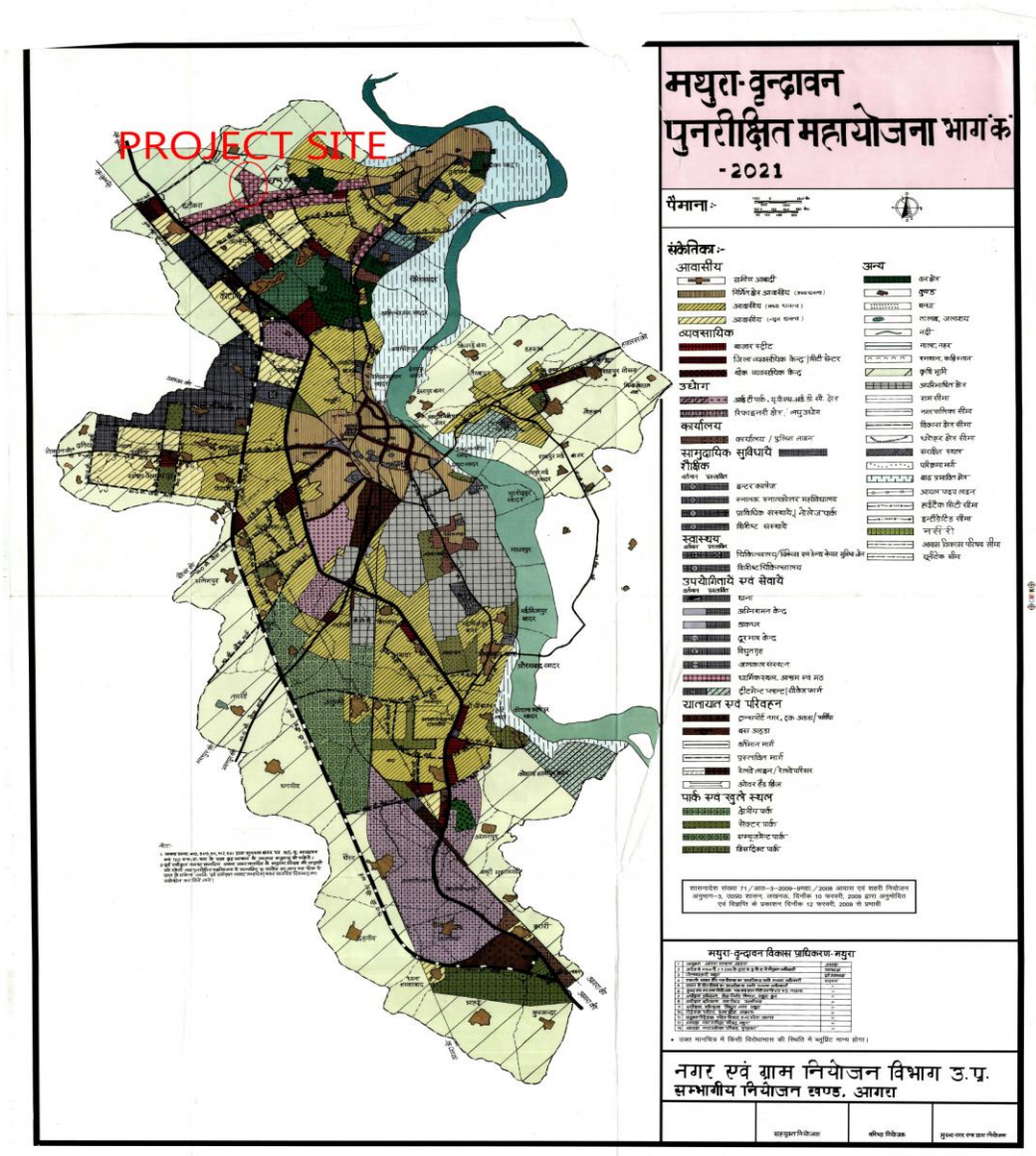
iii) Location and landuse of the Project:

The following sections describe the details of where the project is located, what are the surroundings, the approach to the Integrated Spiritual Township as well as the Housing Development Project.

Landuse: Math/Spiritual Township as per Master Plan 2021 of MVDA. [Refer Fig. 1(a)].

Location Description, Surrounding and Neighborhood:

The site is strategically located, flush on the Chhatikara Road, which is the main access to Vrindavan from the Agra Mathura Highway. Location of the proposed site is shown in Figure 1. Furthermore, location map showing the site and surroundings of the proposed project in the range of 30 m, 500 m and 2 km is shown in Figures 2, 3 and 4, respectively. The site and connectivity of the location is illustrated in Figure 5. All pilgrims and tourists to Vrindavan will necessarily pass on the Chhatikara Road and therefore the project will enjoy easy visibility and enormous footfall.



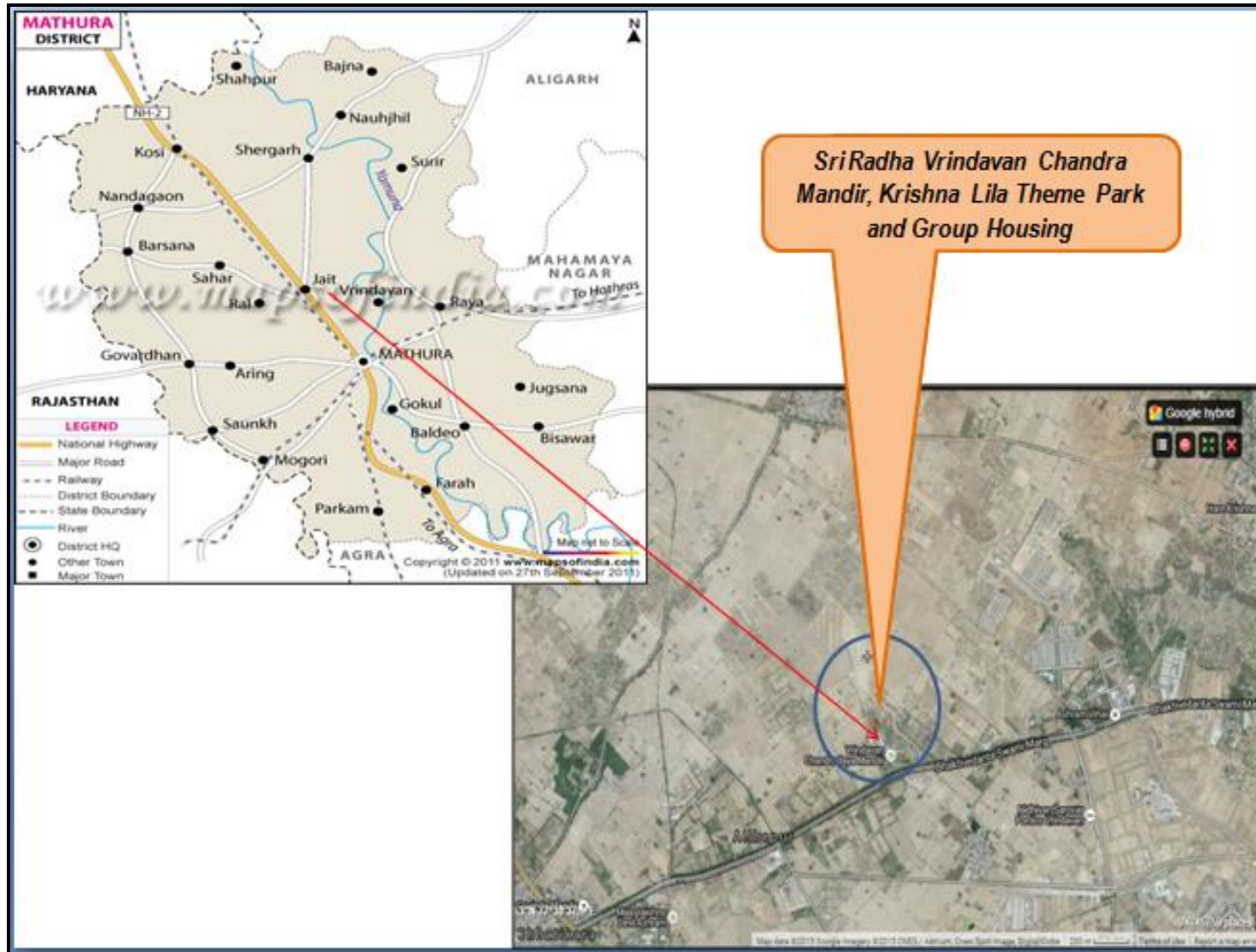


Fig. 1(b): Map showing location of the project.



Fig. 2: Google map showing location of site and its surrounding in the range of 30 m.



Fig. 3: Google map showing location of site and its surrounding in the range of 500 m.

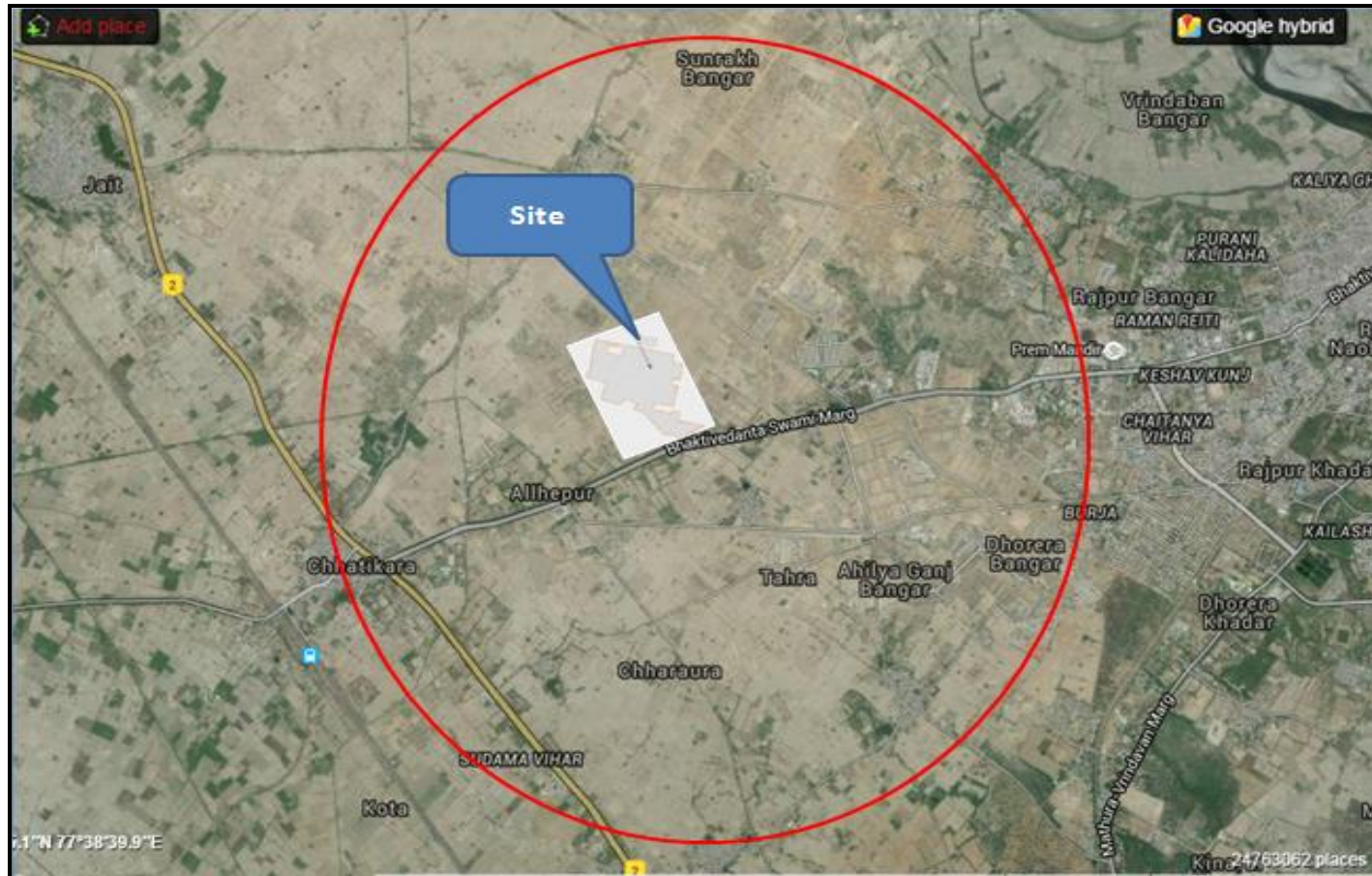


Fig. 4: Google map showing location of site and its surrounding in the range of 2 km.



Fig. 5: Google map showing location of site and its connectivity.

The complex also has a huge facility to support its social responsibility through the Akshaya Patra foundation. This facility provides mid day meals to schools in the local community in surrounding areas. All services such as water, electricity, sewage, roads, lighting will be available within the complex making this an “integrated township” which will be self-sustaining in nature.

There is ample provision for community facilities like school, basic medical care facility, convenience store, etc. There is provision for living quarters for staff, as well as in house workshop and maintenance of the complex in addition to Stores. This is in addition to facilities provided for devotees living with the temple premises the land comes under the land already declared for residential developmental activities by Mathura-Vrindavan Development Authority. Thus, there will be no land use change and the land confirms to approve Development plan. The integrated town ship layout spreads over land of 110.157 acres divided into public, residential, commercial and community zones.

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.

i) Site Details:

Table 1: Comparative area statement

Comparative Area Statement of Hare Krishna Movement, Mathura				
S.No.	Items	As per EC Issued (sqm)	Proposed Modification (sqm)	Remarks
1	Total Plot Area	5,27,566.0 (130.36 acres)	4,45,788.86 (110.157 acres)	Area - 81777.0 sqm Sold
2	Akshaya Patra (kitchen building)		4,930.45 (1.218 acres)	
3	Main temple & related facilities		1,53,104.48 (37.83 acres)	
4	Residential (Group housing + villas + donor ashram)		2,82,729.13 (69.86 acres)	
5	School		4006.38 (0.99 acres)	
6	Floor Area Ratio (FAR)		Akshaya Patra - 3130.50 sqm @0.75 Main Temple & related facilities - 187692.89 sqm @1.44 Residential - 255536.26	

**Modification of Integrated Township – Sri Radha Vrindavan Chandra Mandir, Krishna Lila
Theme Park and Group Housing at Vrindavan, Mathura**

			sqm@1.06	
7	Ground Coverage		Akshaya Patra - 1299.77 sqm (26.5%) Main Temple & related facilities - 34578.5 sqm (26.6) Residential - 51307.89 sqm (21.3%)	
8	Built up Area for Integrated Township	5,78,317.6	4,46,359.65	
9	Open area		357583.9 sqm	
10	Road/paved area		133431.0 sqm (30%)	
11	Landscape/Green Area		168231.9 sqm (68334.8 sqm under park/green and 99897.10 sqm under green belt)	
10	Nos. of Trees (proposed)		6536 nos.	
11	Units Planned	Group housing – 3824 LIG & EWS – 760 Total Units - 4584	Villas - 444 Group housing – 2091 LIG & EWS – 458 Total Units - 2993	Units Decreases 1591
12	Nos. of Block and Max. Height		29 Blocks and Max height - B+S+14	
13	Population	22920	14965	
14	Fresh Water	4500 KLD	1154KLD	
15	Recycled Water	1850 KLD	1011KLD	
16	Total Water Requirement	6350 KLD	2165 KLD	
17	STP Capacity	6500 KLD	1400 KLD	
18	Wastewater Generation	4400 KLD	1264 KLD	
19	Source of Water Supply	Ground water	Ground water	
20	DG Sets	1250 * 15 kVA	1250 * 10 kVA	
21	Municipal Solid waste	12 TPD	8 TPD	

Table 2: Area statement of Development Mix

Items	Proposed (sqm)	Permissible (sqm)
AKSHAYA PATRA (KITCHEN BUILDING)		
FAR	3,130.50 (0.75)	6,286.32 (1.5)
Ground coverage	1,299.77 (26.5%)	1,676.35 (34%)

Items	Proposed (sqm)	Permissible (sqm)
MAIN TEMPLE AND RELATED FACILITIES		
FAR	1,87,692.89 (1.44)	1,95,208.21 (1.5)
Ground coverage	34,578.50 (26.6)	52,055.52 (40%)
Temple Height	332 m	

Items	Proposed (sqm)	Permissible (sqm)
RESIDENTIAL (GROUP HOUSING + VILLAS + DONOR ASHRAM)		
FAR	2,55,536.26 (@1.06)	3,60,479.64 (@1.5)
Ground coverage	51,307.83 (21.3%)	96,127.90 (40%)
Units planned for Housing Project	Villas-444, Group housing – 2,091, LIG & EWS – 458	
Total Permanent Population	Plotted development – 2,220 Group housing – 10,455 LIG & EWS – 2,290	

SOFT AND HARD GREEN AREA DETAILS:

Plot Area	440,764.05 sq m
Ground Coverage	87,186.100 sq m
Open area	357583.9 sq m
Landscape/ Green area Provided	1,68,231.9 sqm (35% of plot area)
Soft Green	68334.80
Hard Green	999897.1
Nos. of Trees required	Total Open Area/80sqm = 4419nos.
Provided Trees	6536nos

i) Development Mix

The development mix of the entire project is given in Table 1. The same is also shown in Figure 6. The detail of group housing and plotted development has been given in Table 3 and 4 respectively.

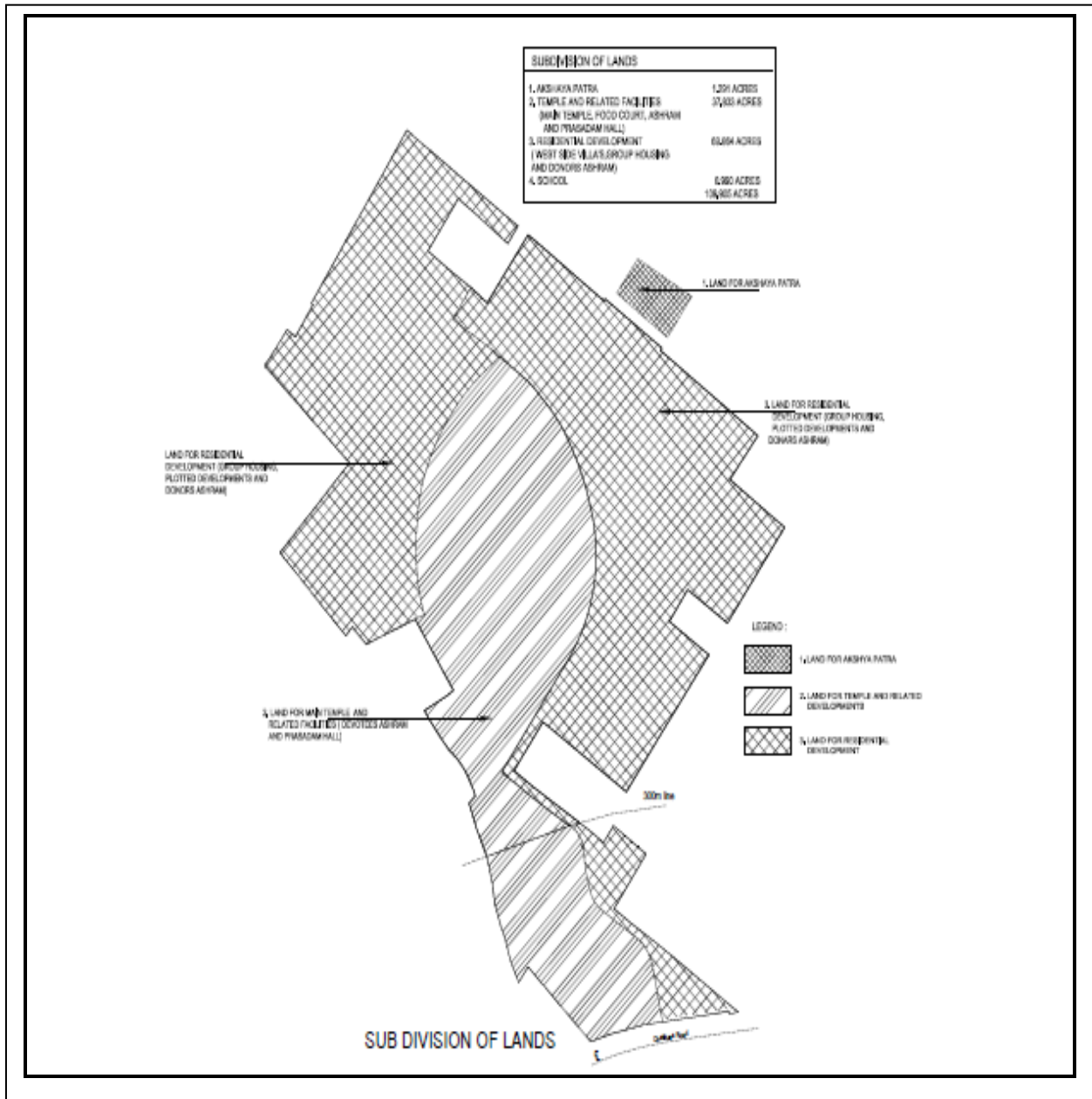


Fig. 6: Development mix of the project

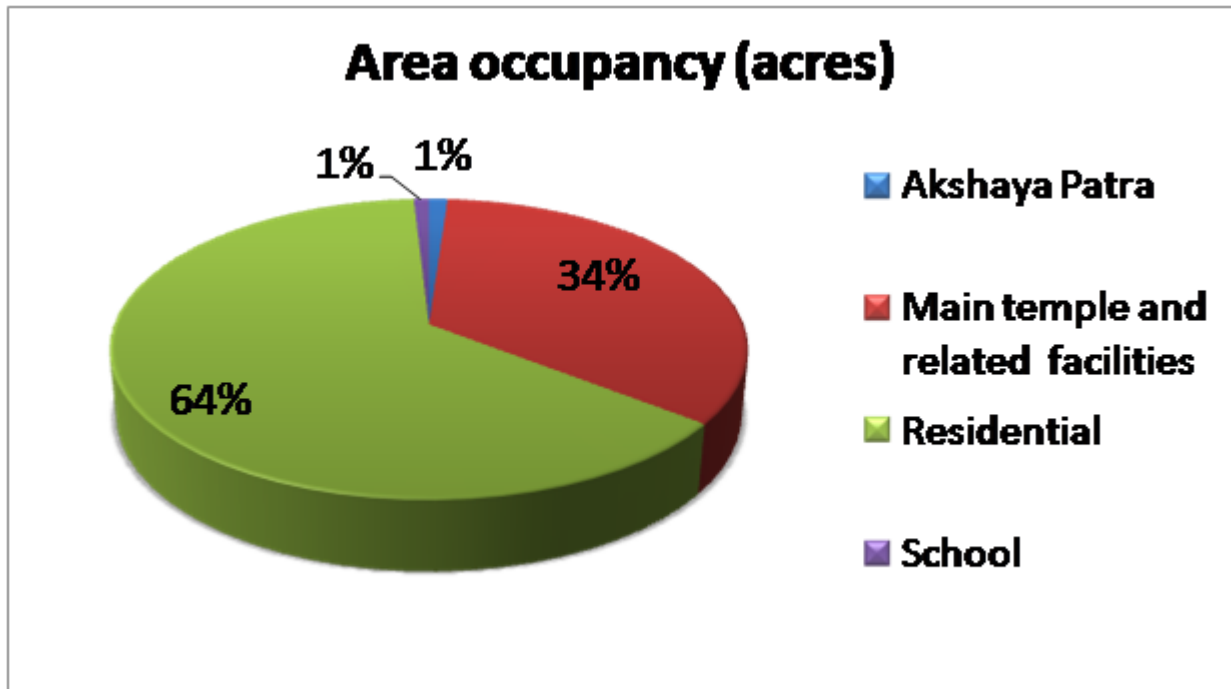


Fig. 7: Pie chart showing development mix of the project

- 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 landuse disturbance to the local ecology).

There will not be any significant impacts of the proposed activity on the existing facilities adjacent to the proposed site, as the MVDA has provided all the facilities such as connectivity roads, open space etc. keeping in view the land use as per Master Plan.

- 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).

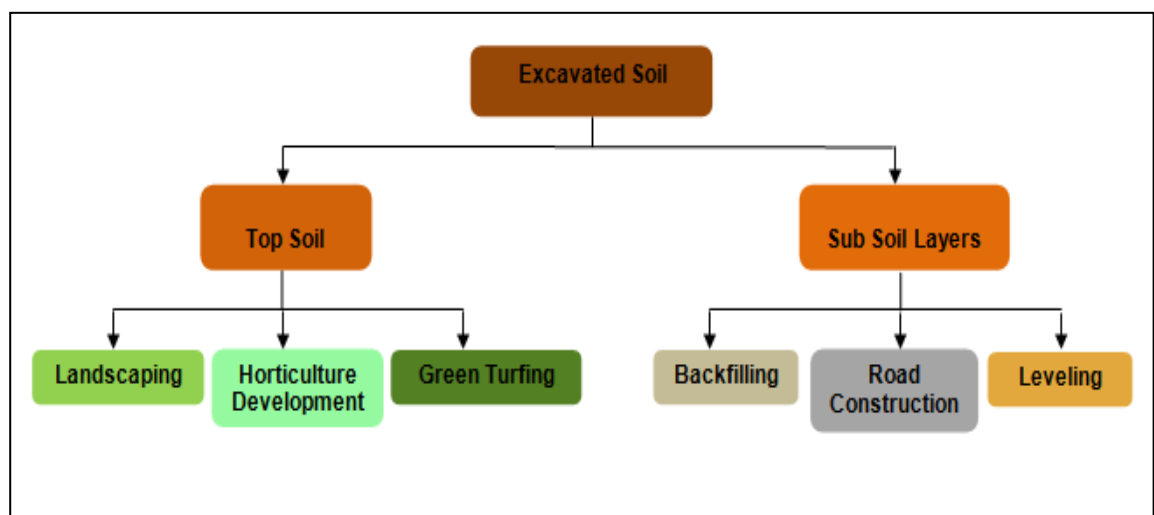
There will not be any significant land disturbance resulting in erosion, subsidence or instability. The area is fairly plain and subsoil strata are alluviums deposited by water courses, geologically the litho log sections show dominant of sand percentage. The proposed project site is falling under Zone IV as per Indian Seismic Zoning Plan.

- 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).

There will be no alteration of natural Drainage System. The area is fairly plain and MVDA has already constructed a system of drains.

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

A very little cutting or filling will be required as the site is fairly plain and devoid of any water body or low laying area.



Construction of basements and foundations will require excavation of earth material. Top soil (fertile) will be stored separately and reutilized for landscaping, green turfing and horticultural development. 100% of total excavated earth will be reutilized into backfilling, leveling and road construction. Figure 8 illustrates the management strategy of the excavated soil for the proposed project.

Fig. 8: Management strategy of the excavated soil

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

Water requirement during construction phase will vary depending upon construction activities and will be met by bore-wells at the site. In the area around the proposed site, rich aquifers are present in the area. The requirement of construction water will not put sudden pressure on the available Groundwater of the area. Gradually, water will be recharged during rains and percolation of water.

Solid waste generated during the construction phase shall be properly collected and segregated as plastic; paper, metal and other shall be disposed off as per the standard practice.

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 on the project area.

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

Wastes which will be generated during the construction phase include the following:

- **Excavated Materials From Earthworks & Foundation etc:**

Construction of Basement will require excavation of earth material. The top soil (fertile) will be stored separately and reutilized for landscaping, green turfing and horticultural development. The sub-soil layers will be reutilized into backfilling, leveling and road construction.

- **Construction waste** (e.g. wood, packing material, scrap metal, concrete and empty cement bags):

Wood - It would be reutilized in construction of sitting areas in the parks.

Packing material - The packing material from the project site will be used in composting.

Scrap metal - It would be given away to authorized recycler.

Concrete - Concrete will be reutilized in construction of amenities for the parks and will be kept over the empty cement bags covering the excavated earth thereby preventing the displacement of bags.

Empty cement bags - The excavated earth materials will be covered by empty cement bags that will prevent the soil from being blown away with air.

- **Hazardous wastes generated by servicing of DG sets and waste paints** (e.g. vehicle and plant maintenance/servicing):

The hazardous wastes would be handover to authorized recycler.

- **Municipal wastes generated by site workers:**

This will be stored in bins and used in composting. Municipal wastes comprise of food wastes, packaging and waste paper. Generation rate of solid waste from labour camps will

vary from place to place due to habits and living condition. Approximately 0.15 Kg/capita/day of municipal waste may be expected during construction phase. The domestic waste water generated from construction camps shall be disposed off through septic tank/soak pit. Some amount of debris, cuttings and construction materials may be observed at construction site. However the quantity of their waste materials would be very small and limited up to the construction site only. Contamination by these wastes would be negligible and would be collected time to time during construction phase. The impact on soil during construction phase will be marginal and reversible in nature.

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.

Fresh water requirement will be met through ground water and will be 3,656 KLD for domestic, commercial and public use.

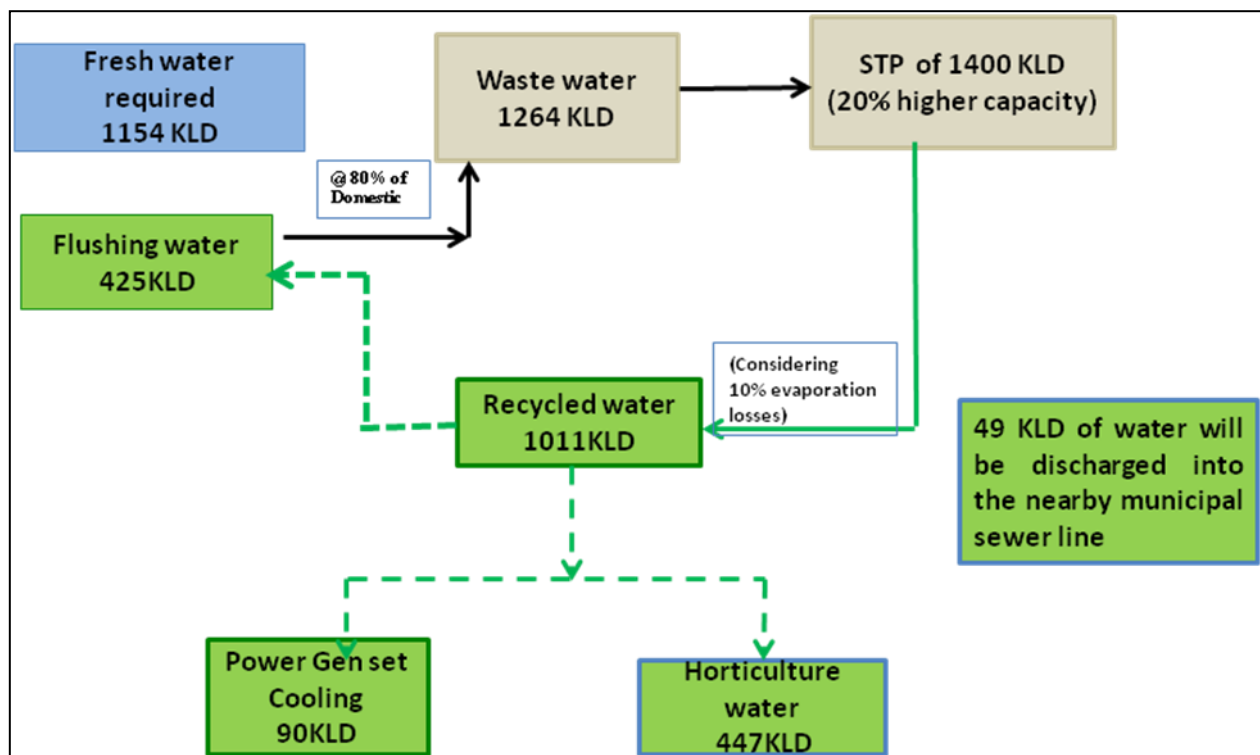
Table 7: WATER DEMAND OF THE PROJECT

S. No.	Description	unit/ Area (in m ²)	Occupancy	Rate of water demand (lpcd)	Total Water Requirement (KLD)
1.	Residential				
	Villas	444	2220	86 LPCD	191
	Group housing	2091	10455		900
	LIG/EWS	458	2290		197
2.	Staff (residential)	5% of total population	850	45 LPCD	38
3.	Visitors (residential)	10%of total population	1500	15 LPCD	23
4.	Visitors (temple and Prasadam hall)	-	3100^	15 LPCD	47
5.	Staff (temple and Prasadam hall)	-	500	45 LPCD	23
6.	Akshaya Patra	-	1,50,000	1LPCD*	150
7.	School	-	-	-	10
Domestic water (A)					1579

8.	Horticulture and Landscape development	1,68231.9 sqm		2.5 lt/sqm/day	447
9.	Cooling water for generator sets	(1250*10) kVA		0.9 l/KVA/Hr	90
Non-domestic water (B)					537
10.	Fire fighting (C)				48
Total Water Requirement (A+B+C)					2164

* Based on data given on pg 65 of Construction manual

The water requirement for the proposed project will be 2164 KLD, and the fresh water requirement is 1154 KLD which will be met from ground water. 1264 KLD waste water will be generated from the project which will be treated in STP (1400KLD) and recycled within premises for flushing, horticulture, DG sets cooling, fire fighting and other low end uses. The surplus quantity will be discharged into the nearby municipal sewer line; necessary permission would be



taken from the concerned authority before discharge of the same.

Fig. 9: WATER BALANCE FOR THE PROJECT.

Quality Standards of Water Supply

The objective of Water Works Management is to ensure that the water supplied is free from pathogenic organisms, clear, palatable and free from undesirable taste and odour, of reasonable temperature, neither corrosive nor scale forming and free from minerals which could produce undesirable physiological effects. The establishment of minimum standards of quality for public water supply is of fundamental importance in achieving this objective. The physical and chemical quality of drinking water shall be in accordance with the recommended guidelines. Parameters for analysis of water quality were selected based on the utility of the particular source of water as per MoEF guidance. Hence quality of ground water was compared with IS: 10500 for drinking purposes and surface water quality were compared with CPCB Water Quality Criteria against A, B, C, D & E classes of water.

Water Supply

Underground tanks shall be provided in the proposed project for domestic and firefighting purposes. The water shall be distributed through gravity system from the respective overhead tanks. Network of distribution system is planned on the basis of closed loops, so that a specific pocket gets water from minimum two points. In case one point is under repair, the entire distribution system will not be affected. The water will be boosted from central underground storage tank to overhead tanks over building roofs by hydro-pneumatic pumps. By using hydro-pneumatic pump set of variable drive, the same set of pumps will be used for a group of buildings by single supply feeder.

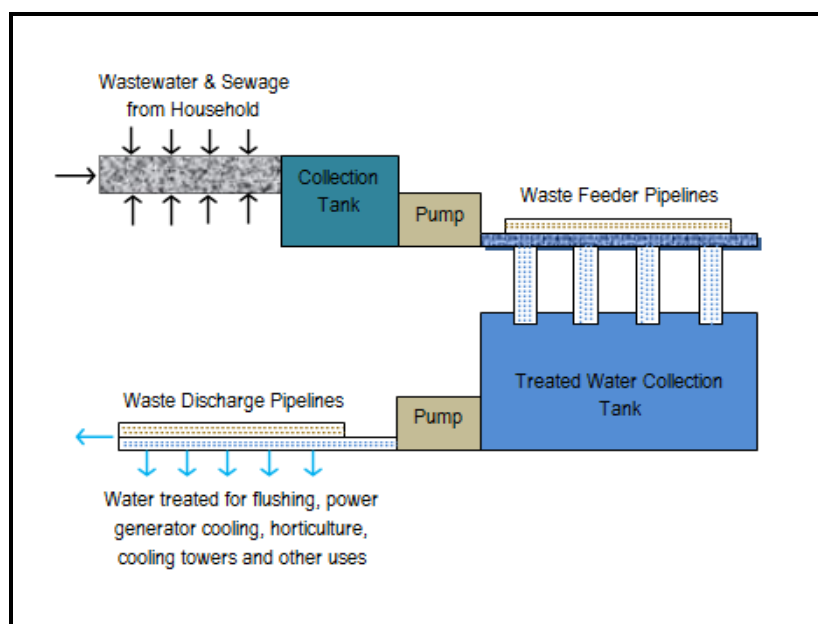


Fig. 10: A Schematic of the Sewage Treatment Plant

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

- Utilization of ground water for the operation of the group housing will be very scientific and systematic. The anticipated tube wells, required to trap the groundwater fulfilling the water demand, is considered having a yield of 500 LPM. Each tube well will have separate pumping plant and 25 m of head requirement is taken for underground storage and 60 m head for OHT.
- For watering in green areas like gardens, parks, green landscape etc, it is proposed to use recycled water collected from STP so that water would be conserved.

Therefore, the sources of water identified for water supply system are:

1. Ground Water
2. Recycling of treated effluent from STP

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 supply is through tube wells, the quality of water is drinkable as per norms. The ground water quality monitoring is in progress. Water Treatment plan for portable water will be provided as per requirement.

2.4 How much of the water requirement can be met from the recycling of treated wastewater?

The total anticipated sewage to be generated from the group housing is 1264 KLD (approx.) and 80 % of the sewage (1011KLD) will be available for recycling. Hence the treated sewage will be utilized for the above said purpose and the remaining quantity will be used for flushing and similar requirements.

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

There is no diversion of water from other users.

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

Waste water generated is 1264 KLD which will be treated in the STP of 1400 KLD (designed at 20% higher capacity). Treated water will be recycled for various uses including flushing, horticulture, DG sets cooling, fire fighting and other low end uses. The surplus quantity will be discharged in the nearby municipal sewer line; necessary permission will be taken from the concerned authority for the same.

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

The rainwater will be collected through piped drains and conveyed into rainwater harvesting system. All storm water drains would be designed for adequate size and slope such that there shall not be any flooding in the site. It shall be ensured that no wastewater shall enter into storm water drainage system.

Water harvesting pits have been proposed for augmentation of ground water. The rainwater collected from the rooftop will be conveyed into the rainwater harvesting system consisting of desilting-cum-filter chamber, oil and grease separators and bore wells for recharge into the groundwater. RWH will be initially done only from the roof top. Runoff from green and other open areas will be done only after permission from CGWB. No demand will be met from the process.

Analysis of the observed data on intensity duration of rainfall of past records over a period of years in the area is necessary to arrive at a fair estimate of intensity-duration for given frequencies. The longer the record available, the more dependable is the forecast. In Indian conditions, intensity of rainfall adopted in design is usually in the range of 15 mm/hr to 30 mm/hr. The intensity of precipitation for design of drainage scheme has been taken 30 mm/hr.

Table 9: Storm water calculation

Peak Run off				
Max, Rainfall Intensity 30 mm/hr				
Location	Runoff Coefficient	Area m ²	Rainfall intensity (in m)	Peak Run off in m ³ /hr
Roof Area	0.8	87,186.10	0.03	2092.14
Paved area	0.6	1,33,431.0	0.03	2401.75
Green Area	0.2	1,68,231.9	0.03	1009.39
Open area	0.25	51915.05	0.03	389.36
Total Runoff m³/hr				5892.64

Total Runoff Potential = **5892.64**m³/hr

Taking 15 minutes Retention Time, total volume of storm water = **5892.64**/4 = 1473.16m³

Taking the effective diameter and depth of a recharge pit be 5 m and 2 m respectively:

Volume of a single Recharge pit (b) = $\pi r^2h = 3.14 \times 2.5 \times 2.5 \times 2 = 39.25 \text{ m}^3$

Hence No. of pits required = 1473/39.25 = 38 pits

Provided Pits: 38 Pits

Desilting tank shall be 3 x 2 x 1.5 m.

Recharge Pit: dia = 5 m and depth = 2 m

A pond is to be constructed that would also aid groundwater recharge.

- 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?**

There is no landscape change planned. The project will not aggravate the problem of flood or water logging in any way as the land is plain.

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

Construction Phase: No hazardous chemical and material will be used in the development and construction phase of a project. Debris and wastes generated during this

phase will be collected and disposed suitably. Therefore, possibility of contamination of ground water will be negligible. Hence, no impact is anticipated on the ground water quality during the construction phase.

Operation Phase:

Fresh water shall be obtained through ground water. However, the same will be augmented further as rainwater harvesting is proposed.

The rain water collected from roof top will be sent for ground water recharging through 38 nos. of RWH pits. 5892.64 m³/hr of water is available for ground water recharge which will be recharged through RWH pits. A major part of the area is under green or open land which will percolate naturally and augment the ground water. Therefore, most of the rain water will be directly infiltrated through these open/green areas. Hence no adverse impacts are envisaged due to the project on the ground water quality and the level. Maximum recharging of the underground aquifer will be done.

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).

Surface water quality may be affected with the discharge of the runoff from the project site. The impact to the surface water bodies could arise from the increased soil erosion from excavated site only came to increase in the suspended particles and turbidity of runoff water from the site. However, this impact will be temporary in nature and would be observed in first rain only, and as soon as the rain is over, excavated soil at site would be stabilized therefore the surface water quality during rains will be impacted marginally for very short duration. No runoff will be disposed outside the project boundary.

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).

Since the existing topography is congenial to surface disposal, a network of storm water pipe drains has been planned adjacent to roads. All building roof water will be brought down through drain water pipes. Proposed storm water system consists of pipe drains, catch basins and seepage pits at regular intervals for rain water harvestings for ground

water recharging. The average rainfall of 30 mm/hr shall be considered for designing the storm water drainage system.

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).

Sewerage and solid waste will be generated from temporary labour camps on site, which will be temporary in nature during the initial construction phase. Wash bins should be placed near the camps solid waste collection; the camps solid waste will be properly disposed at the designated landfill site. The sewerage will be disposed through septic tank or municipal sewer. Therefore during, construction their will not be any unsanitary conditions around the project area.

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).

Sanitary sewage is mostly the spent water of the community draining into the sewer system with some ground water and a fraction of storm run-off from the area, draining into it. The sewers should be capable of receiving the maximum discharge expected at the end of design period.

Since it is both difficult and uneconomical to augment the capacity of the system at a later date, sewers are usually designed for the maximum expected discharge to meet the requirement of the ultimate development of the area. A design period of 30 years for all types of sewers is usually considered.

Sewage Collection & Treatment

An external sewage network shall collect the sewage from all the units, and flow by gravity to the proposed sewage treatment plant. Following are the advantages of providing STP in the proposed project:

1. Reduced daily net water requirements, source for horticulture purposes by utilization of the treated waste water.
2. Reduced dependence on the public utilities for water supply and sewerage systems.
3. Sludge generated from the STP shall be rich in organic content and an excellent fertilizer for horticultural purposes.

The proposed sewage treatment plant would work on the FAB technology. The treatment process consists of the following stages:

1. Equalization
2. Bio-degradation
3. Clarification & Settling
4. Filtration

The technology is based on attached growth aerobic treatment followed by clarification by a tube settler. Lime will be dosed in for suppression of foaming tendencies. The clarified water will be filtered in a pressure sand filter after dosing of coagulant (alum) for removal of unsettled suspended impurities. This filtered water from ACF is then chlorinated and stored in the flushing tank.

The attached growth fluidized aerobic bed reactor (FAB) process combines the biological processes of attached and suspended growth. It combines submerged fixed film with extended aeration for treatment of the waste water.

The waste water after screening is collected in an equalization tank. The equalization tank is required for preventing surges in flow and facilitating equalization of characteristics over the entire quantity of effluent in a given time. A provision for pre-aeration is made in the equalization tank in order to ensure mixing and to prevent the sewage from going septic.

The equalized sewage is pumped into the FAB reactor for biological processing. The water enters the bottom of the reactor and flows up through the fixed film media that grossly enhances the hydraulic retention time and provides a large surface area for growth of biological microbes. The FAB reactor is aerated by fine pore sub-surface diffusers that provide the oxygen for organic removal. The synthetic media floats on the water and the air agitation ensures good water to microorganism contact.

The FAB treatment is an attached growth type biological treatment process where in, the majority of biological activity takes place on the surface of the PVC media. Continuous aeration ensures aerobic activity on the surface of the media. Micro-organisms attach themselves on the media and grow into dense films of a viscous jelly like nature. Waste water passes over the film with dissolved organics passing into the bio-film due to concentration gradients within the film. Suspended particles and colloids may get retained on this sticky surface where they are decomposed into soluble particles. Oxygen from the aeration process in the waste water provides oxygen for the aerobic reactions at the bio-film surface. Waste products from the metabolic processes diffuse outward and get carried away by the waste water or air currents through the voids of the media.

The aerated effluent passes into a tube deck settler for clarification. The theory of gravity tube settler system is that the carrier fluid maintains laminar flow in the settling media at specified maximum viscosity. These two parameters of a carrier fluid, flowing through a hydraulic configuration, will determine the velocity gradients of the flow, the height of boundary layer at the inclined surface and the residence time within the media.

The carrier fluid must be viscous Newtonian, exhibiting a Reynolds number of less than 1000 and preferably, a number under 400. The laminar flow, through the inclined tubes, will produce velocity gradients sufficiently large to form an adequate boundary layer, where the velocity of suspended solids to separate from the viscous carrier fluid. Under gravitational forces, they will settle to the hydraulic surface of the tube and subsequently from the clarifier media.

Since the tubes are inclined at 60 degrees, solids settled on the tubes are continually discharged down. This downward rolling action increases particle contact and hence further agglomeration, which increases the sludge settle ability. Studies show that these agglomerated sludge particles can have a settling rate in excess of ten times the settling rate of the individual floc particles in the influent. These heavy agglomerated masses quickly slide down the 60 degree inclined tube and settle at the bottom of the tank.

At the bottom of the Tube deck, where the sludge leaves the Tube surface, the larger agglomerated sludge particles captures smaller particles in the upcoming stream. This solid contact phenomenon enhances the capture efficiency. The components of the proposed STP are stated as under:

1. Bar Screen
2. Oil and Grease trapping unit
3. Equalization tank
4. FAB tank
5. Settling Unit
6. Chlorine Contact tank
7. Sludge holding unit
8. Treated water storage facility

Sewer System

The alignment and slope of the sewer line will follow the road network, drains or natural ground surface and will be connected to the truck sewers. The discharge point will be a

treatment plant, a pumping station, a water course or an intercepting sewer. Pumping stations would be provided at places where natural slope of the terrain is insufficient to permit gravity flow or the cost of excavation is uneconomical to do the same.

The soil and waste from toilets & kitchen will be collected in Gully Traps & Manholes in single network of S.W./R.C.C. pipes laid underground having Manholes/Inspection chambers at appropriate intervals and shall be discharged into proposed STP for recycling of treated waste water within premises for different uses like flushing, horticulture, cooling towers, DG set cooling and other low end uses. Table 10 illustrates the estimated raw effluent characteristics.

Table 10: Estimated characteristics of treated and raw sewage

Parameter	Raw Sewage (Influent)	Treated Sewage (After Secondary Treatment)	Treated Sewage (After Tertiary Treatment)
pH	7.5 – 8.5	6.5- 8.5	6- 8
BOD ₃ at 27°C (mg/l)	250 - 350	< 30	< 5
COD (mg/l)	400 - 500	< 100	< 10
Suspended solids (mg/l)	250 - 450	< 100	< 5
Oil and Grease (mg/l)	30	< 10	< 1

The surplus quantity will be discharged into the nearby municipal sewer line; necessary permission will be taken from the concerned authority for the same. The STP capacity has been designed at 20% higher capacity for future use. Thus the STP capacity will be 1400 KLD. Total waste water generated is approximately 1264 KLD and the STP sludge shall be used as manure for horticulture.

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

Dual plumbing shall be used for recycled water using different color pipes.

3. VEGETATION

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

There is no threat to local bio diversity.

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 is no significant vegetation, except some ground cover within the site.

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

A combination of evergreen and ornamental flowering trees, palms, shrubs and ground covers will be planted along the sides of the roads and in open spaces & set back area within the complex.

Landscaping is an important element in altering the microclimate of a place. Proper landscaping reduces direct sun from striking the buildings and heating up building surfaces, prevents reflected light carrying heat into a building from the ground or surface, creates different airflow patterns and can be used to direct or divert the wind advantageously by causing a pressure difference. Shade created by trees and the effects of grass and shrubs reduce air temperature adjoining the building and provide evaporative cooling. A study shows that the ambient air under a tree is 2 to 2.5 °C lower than that for adjacent non-shaded areas.

Parks & Avenue Plantation

Ornamental trees with spreading branches, shade giving with colorful flowers for visitors to relax and suitable patches of lawns shall be provided. The following trees are proposed to be planted in the proposed project:

- Trees with colonial canopy with attractive flowering.
- Trees with branching at 10 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.

The selection of plant species for the development depends on various factors such as climate, elevation and soil. The list of plant species, which can be suitably planted, and having significant importance are provided in Table 11.

Table 11: List of plant species to be planted in the green area

S. No.	Scientific Name	Standard Name	Time when Flowering/Fruiting Occurs
1	<i>Ailanthus excelsa</i>	Maharuk	January- March
2	<i>Albizia labbeck</i>	Sirish	January- March
3	<i>Alibizia procera</i>	Safed Sirish	January- March
4	<i>Alstonia scholaris</i>	Chitwan	January- April
5	<i>Anthocephalus cadamba</i>	Kadamb	August-October
6	<i>Azadirachta indica</i>	Neem	June-July
7	<i>Bauhinia variegata</i>	Kanchan	May-June
8	<i>Butea monosperma</i>	Palash	February-April
9	<i>Cassia Fistula</i>	Amaltas	March-June

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.

There is no displacement of fauna or creation of barriers for their movement.

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

There is no impact on the avifauna of the area. Due to the provision of extensive green area on the project site it is expected that site will attract small fauna.

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

As there is no displacement of fauna, no mitigation measures are required and provided.

5. AIR ENVIRONMENT

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

Increased traffic generation due to project is not going to cause significant increase in atmospheric concentration of gases and will not result in heat island formation. The minor impacts of emissions from traffic will be neutralized by developing a thick green belt along the periphery and internal road side.

During construction phase, fugitive dust emissions will be the main pollutants associated within on-site roads (paved and unpaved), stockpiles, material handling, excavation of channels and foundations. It may be noted that these emissions would be in the form of coarse particulate matter and will be settled down ultimately in the closed vicinity of construction site. Therefore, no significant impact is anticipated due to dust emission during development and construction phase.

Regular water sprinkling will be done and construction material will be transferred in trucks covered with tarpaulin.

The other source of pollution during operational phase will be emissions from DG sets. Adequate height of stacks will be provided to the DG sets as per guidelines of MoEF (**as per the Gazette of India Part II, Section 3, Sub-section (I) No. 318, dated July 11, 2002, is given below, refer table no. 4.3**) to facilitate the dispersion of flue gases into the atmosphere.

Table 12(a): D.G. set stack height rule, as per MoEF

Stack height (for generator sets commissioned after 1/7/2003)	Stack height shall be maximum of the following, in meter: i. $14 Q^{0.3}$, Q = Total SO ₂ emission from the plant in kg/hr ii. Minimum 6 m above the building where generator set is installed. (iii) 30 m
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Table 12(b): D.G. set stack height (provided)

Capacity of DG set	Stack Height
1250 KVA (10 NOS.)	7 m + height of the building

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.

During operation phase, DG sets operated for back-up power supply are identified as the only major sources of gaseous and particulate emission. SO₂ emissions are expected due to fuel combustion in generator sets. During the construction stage of the project, there remain chances for generation of dust, which will be controlled by sprinkling of water, covering building materials by tarpaulin, covering the structure with Hessian clothes etc. No hazardous gases will be generated during the construction stage of the project. Most of the concrete to be used at site, will be ready mix concrete procured from nearby factories.

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.

The project complex will have bell shaped entry from 15 m wide road. All the internal roads would be 12 m wide. The entry/exit point has been marked on the layout plan. The project site is well connected to network of roads leading from various parts of the city.

Adequate provision has already been kept for car/vehicles parking at the proposed project. Vehicle parking will be both in the basement and in open within the premises.

Table 13(a): Calculation for parking required

Project Parking Summary			
S. No.	Description	Required parking	Proposed parking
1	Main temple	4293	4296
2.	Group Housing/Apartment	2041	2112
	TOTAL	633 4	6408

Table 13(b): Calculation for parking provided

MAIN TEMPLE

Sl.No.	Description		Permissible Car parking
1	Parsadam hall (Surface -1 parking) [TOTAL FAR AREA / 100 X 2]	4506.76/100*2	90
2	Main Temple (Surface-1+Basement Parking) [TOTAL FAR AREA / 100 X 2]	166328.81/100*2	3327
3	Ashram (Surface-2+Stilt Parking) [TOTAL FAR AREA / 100 X 2]	16857.32/100*2	337
4	Govardhan kutir Ashram (Surface-3+Stilt Parking) [TOTAL FAR AREA / 100 X 1.25]	15132.68/100*1.25	189
5	Dhamodhar Kutir (Surface -4 parking) [TOTAL FAR AREA / 100 X 1.25]	22976.25/100*1.25	287
6	Akashaya Patra [TOTAL FAR AREA / 100 X 2]	3130.50/100*2	63
	Total car parking		4293

BASEMENT PARKING CALCULATION						
	Description	Hectares	acre	Sqm	Permissible Car parking@32 sqm. Per car	PROVIDED
1	Upper Basement	3.69	9.118	36,900.39	1153	1382
2	Lower Basement	3.69	9.118	36,900.39	1153	1420
	Total	7.38	18.237	73,800.78	2306	2802

SURFACE PARKING CALCULATION					
	Description	Hectares	acre	Sqm	Permissible Car parking@23sqm. Per car
	Surface parking-1	3.41	8.436	34,140.00	1484
	Total				1484

GROUP HOUSING

Sl.No.	Components	REQUIRED	PROPOSED		
			Stilt/Surface	Basement	Total
1	For Group Housing	1975 (157968 sqm @ 1.25 ECS per sqm)	947	1041	1988
2	Basement 2 for CLUB	66		124	124
GRAND TOTAL		2041	2112		

Note: Parking calculation has been done on the basis of standards provided by the State Byelaws.

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

The site layout plan is enclosed.

- 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.**

During the construction phase, some noise will be generated through the operation of construction machines, excavators, DG set, etc. Following measures should be taken; into consideration to mitigate the noise at construction site:

- Efforts shall be made to the extent feasible not to use such excavation/ construction machines, which generate noise levels much more than 85 dB (A),
- Silencers shall be fitted on construction machines and DG set,

- Acoustic enclosures should provide to DG set at the construction site,
- Earmuff and other protecting devices shall be provided to labour working with high noise generation machines.

During post construction phase, adverse impacts of noise will be mitigated by adopting following measures.

- DG set will be provided with the acoustic enclosures.
- Use of horn should be discouraged in the internal roads of the proposed project.
- Green belt/plantation along the internal roads will also work as noise harriers.

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

Impacts on Air Quality due to DG Sets:

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

Mitigation Measures

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

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 architecture of the proposed project will be in accordance with the architecture of the commercial buildings in the area. The project will have world-class ambience and state of are infrastructures.

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

Various activities from the proposed project scheme are likely to have some impacts on the environmental constituents during its construction as well as functional phase. The impact assessment matrix given in Table: 4.5 reveals the impact associated with each activity of the project on various environmental parameters during construction and function phase respectively.

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

The architectural design of the project is in accordance with the guidelines of Mathura Vrindavan Development Authority.

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.

No.

7. SOCIO-ECONOMIC ASPECTS

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

As most of the workers/ staff in construction as well as operation stages will be from the local villages, no significant change in the local demographic structure is envisaged for the project.

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

The area is earmarked for Ashram/Math and group housing. The 10 km radius around the project has been studied and the socio-economic details are given below.

Table 15: Demographic details of study area

Description	Total	Percentage
No of Households	84322	
Total Population	529988	100.0

Male Population	287202	54.19
Female Population	242786	45.81
Schedule Castes	94382	17.81
Schedule tribes	32	0.01
Total Literate	295224	55.70
Female Literate	110740	45.61
Male Literate	184484	64.23

Table 16: Summary of employment and occupation in study area

Description	Total	Percentage
Total workers	156078	100
Main workers	128044	24.16
Marginal workers	28034	5.29
Non workers	373910	70.55
Break up of main workers		
Cultivators	19130	14.94
Agricultural laborers	5101	3.98
Household industries	6773	5.29
Other workers	97040	75.79
Break up of marginal workers		
Cultivators	5278	18.83
Agricultural labour	4699	16.76
Household industries	2751	9.81
Other workers	15306	54.60

A summary of the amenities available in the individual villages is as follows:

Educational facilities in the rural villages of the study area comprise of 85 primary, 18 middle, 9 secondary and 7 senior secondary schools, 7 adult literacy centers, 2 graduate colleges, 2 Industrial schools, 2 training schools and 1 other institutions.

There are 3 allopathic hospitals, 1 ayurvedic hospital, 7 ayurvedic dispensaries, 10 allopathic dispensaries, 2 homeopathic hospital, 8 maternity and child welfare centers, 4 maternity homes, 6 child welfare centers, 2 health centers, 3 primary health centers, 3 family welfare centers, 43 registered private medical practitioners, 3 subsidized medical

practitioners and 35 community health workers exists as per census 2001 records within the study area.

There are 39 tap water, 53 wells water, 21 tank water, 32 tube wells water and 64 hand pumps for water supply within the study area.

Census data for power supply shows that 33 villages have power supply for domestic purpose, 48 villages have power for agriculture purpose, 60 villages have power for other purposes, and 98 have power for all purposes. Census data for post and telegraphic amenities in the villages shows that there are 14 post offices and 180 telephones.

There are 68 pucca roads approaching to villages and 24 mud roads in the rural villages of the study area. 17 areas are accessible by footpath. The communication of the study area is through 9 bus stops and 1 railway station.

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 project will provide employment to people from all walks of life: Construction, Construction related materials, Engineering, Medicine, Landscapists, Animal Husbandry, Hospitality, Facility Management, Education, Artisans, Information Technology, Administration etc. The project is expected to provide employment to approximately 2000 people across the above vocations. It is expected that the number of tourists visiting Vrindavan will increase because of the attractions and experience this spiritual township will offer. This in turn will result in increased customers for businesses within not only Vrindavan but entire Braj. More importantly because of increased visitors and pilgrims, important temples of Vrindavan will get higher patron ship because of which the upkeep and maintenance of Vrindavan's spiritual heritage can improve.

Since considerable units are planned, the residents of township themselves will be consuming considerable goods and services locally and therefore will contribute significantly to the economy of the local community. Inside the spiritual township, we have a huge state of the art kitchen facility to prepare and supply Free, Hot, Ready to serve, nutritious mid day meals to children in the surrounding schools. Because of this project more and more children will get served. We have proved all over Indian that more children enroll and attend school because they get Akshaya Patra Mid day meals. We also intend

to build and run a school for under privileged children that will give them access to good education and therefore give them a chance for living more options of livelihood. Another important aspect of this project is that unlike other developments, the Integrate Spiritual Township has plans to create acres of green area within the premises. This will make a significant contribution to add to the ecosystem of Vrindavan.

However most importantly, the Township with its Krishna Leela theme park and Grand Temple will service to spread the Glories of Lord Krishna and His Pastimes in the whole world, in process glorifying the importance of Vrindavan and whole of Braj in the whole world.

8. BUILDING MATERIALS

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

The major materials required for construction of the proposed project will be steel, cement, bricks, metal, flooring tiles/stones, sanitary and hardware items, electrical fittings, water, etc.

- Conventional construction material will be used outsourced from authorized vendors/sellers.
- All items to be used in the proposed project will be as per the National Building Code specification. If the building materials with high-embodied energy are locally available, it will be used in construction.
- Low embodied energy material like ready mix concrete, fly ash bricks will be used in construction.

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

Mitigation Measures for Air Pollution (Construction Stage)

To minimize the adverse impact due to air pollution during construction, following measures will be taken:

- Transportation of construction material will be provided with suitable covering like tarpaulin cover.
- Water sprinkling shall be done at the location where dust generation is anticipated.
- Raw material handling yard will be enclosed from all sides.
- To minimize the occupational health hazard, proper personal protective gears i.e. mask shall be provided to the workers who are engaged in dust generation activity.

Mitigation measures for Noise Pollution (Construction Stage)

Administrative as well as engineering control of noise will be implemented. To prevent occupational hazard earmuffs / earplugs shall be given to the workers working around the operating plant and machinery emitting high noise levels. Use of such plant or machinery shall not be allowed during night hours. Careful planning of machinery operations and scheduling of operations shall be done to minimize such impacts.

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

Waste from construction like excavated earth, iron rods etc will be reused/recycled as far as possible.

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

The solid waste generated from the project will be mainly domestic in nature. The solid waste shall be first segregated as bio-degradable and non bio-degradable separately. The recyclable inorganic waste will be sold to registered buyers. The bio-degradable wastes will be transferred into a designated collection point for disposal by municipal authority/hired agency.

Table 17: Waste produced from the building and construction industry

S. No.	Description	Percent by Weight
1	Vegetables, Leaves	40.15
2	Grass	3.80
3	Paper	0.81
4	Plastic	0.62

5	Glass/Ceramics	0.44
6	Metal	0.64
7	Stones/Ashes	41.81
8	Miscellaneous	11.73

Source: Manual on Norms and Standards for Environment Clearance of Large Construction Projects, Ministry of Environment and Forests

Table 18: Municipal solid waste estimation

S. No.	Particulars	Population	Waste generated(Kg/day)
1	Residential (@ 0.5 Kg/day)	14965	7482
2	Visitors (@ 0.15 Kg/day)	1500	225
3	Staff (@ 0.15 Kg/day)	750	112
Total Solid Waste Generated			7819.0
Horticulture Waste			622.4
E-Waste (0.15 Kg/C/Yr)			6.15
STP Sludge			252

Operation Phase	
Nature of waste	<ul style="list-style-type: none"> • Biodegradable waste – Food, garden waste etc. • Non-biodegradable waste – Recyclable & inert waste
Method of treatment and Disposal	<ul style="list-style-type: none"> • Waste segregated at source and collected in colored coded bins. • Recyclable waste will be sold to recyclers • Organic waste will be send to bio-composting site of Nagar Nigam and inert waste will be converted into paving blocks

Following arrangements will be made at the site for management of solid waste in accordance to MSW Rules, 2000:

Segregation & Collection of waste:

- A door to door system through garbage chute collection shall be provided for collection of solid waste generated.
- Adequate number of colored bins (green and blue - separate for bio-degradable and non bio-degradable) will be placed.
- Storage of solid waste shall be done only for 48 hours at site.

- Recyclable waste will be sold to authorized agencies.
- Hazardous waste (spent oil) & e-waste will be stored at separate place and handover to authorized dealers of CPCB.
- Litter bin will also be provided in open areas like community spaces, parks & grounds etc.

Treatment of waste:

Municipal Solid Waste predominantly includes household waste (domestic waste) and sometimes with the addition of commercial wastes collected by a municipality within a given area. Rapid increase in volume and types of solid and hazardous waste, as a result of continuous economic growth, urbanization and industrialization, is becoming a burgeoning problem for national and local governments to ensure effective and sustainable management of waste.

A. Bio-Degradable wastes:

- Bio-degradable waste will be subjected to composting and the compost will be used as manure.
- Horticultural waste is proposed to be composted and will be used for gardening purposes. The cropped grass will be spread on the green area. It will act as manure after decomposition.

B. Recyclable wastes:

Recyclable waste like paper, plastics, and metals will be sold to the authorized recycler of the area.

Disposal:

The proper disposal of urban waste is not only enormously necessary for the preservation and improvement of public health but it has an immense potential for resource recovery.

Generated Solid waste shall be segregated & collected on common solid waste collection center at site, from where it will be transported to the nearest landfill site by the hired waste management/municipal agency for their treatment and disposal. However, the MSW management approach will be towards zero landfill by reducing the amount of inert waste.

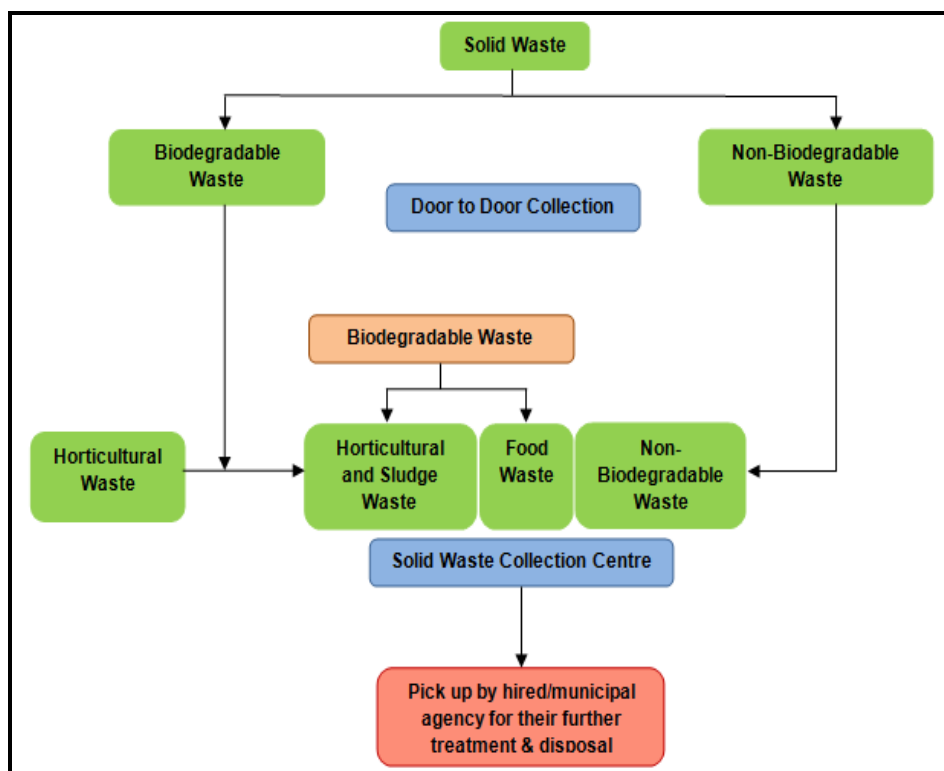


Fig. 12: Waste Management Flow Diagram (Operational Phase).

E-Waste

E-Waste (Management & Handling Rule, 2011, 12th May) Electronic waste, popularly known as 'e-waste' can be defined as waste electrical and electronic equipments whole or in part or reject (such as CDs, floppies, keyboards, monitors, power plug, batteries, etc.) which have become obsolete due to:

- Advancement in technology
- Changes in fashion, style and status
- Nearing the end of their useful life

Responsibility of Consumer or Bulk Consumer

According to E-Waste (Management & Handling Rule, 2011) responsibility of consumer or bulk consumer is given below:

- Consumer or bulk consumer of electrical and electronic equipment shall ensure that e-waste generated by them is channelized to authorized collection centers or registered dismantlers or recyclers or is return back to the pick-up or take back services provided by the producers.

- Bulk consumers shall maintain records of e-waste generated by them in Form-2 and make records available to UPPCB.

The e-waste generated from the proposed project would be suitably managed through assistance from E-parisira.

The mantra of "Reduce, Reuse, and Recycle" applies here also.

- Reduce generation of e-waste through smart procurement and good maintenance.
- Reuse still functioning electronic equipment by donating or selling it to someone who can still use it.
- Recycle those components that cannot be repaired. To identify organizations who reuse or recycle electronics.

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 details of power requirement, source, and backup power arrangements are given below:

Table 19: Power requirement, source and backup arrangement

Power requirement	25000 KVA
Source of power and supply capacity	State Grid Power Supply/DG sets
Backup power supply arrangement	100 % back up by DG sets
Location of gen sets	Sub station

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

Details are given in Item 9.1.

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

The thickness of glazing glass is 6.12.06 mm depending upon the panel size to keep the U value within the permissible limit of 3.3 W/m² 0C as per ECBC.

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

Efforts will be taken for energy conservation using passive solar architecture wherever it is possible.

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.

Solar lighting will be used in the open areas and solar hot water systems will be used as feasible.

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?

Shading options wherever feasible will be used for energy saving.

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.

Energy Efficient Features:

- Maximum utilization of natural light.
- CFL & T-5 lighting fixtures in the common areas and Truelite fluorescent lamps in basements.
- Use of solar lights partly in open areas and landscaped area.
- Energy efficient HVAC systems to maintain indoor air quality.
- Appropriate thermal insulation in walls and roofs to reduce heat gain and loss.
- Glazing glass: to keep the U value as per ECBC.
- External glazing will be below 40% of the total vertical surface as per ECBC.

- 9.8 What are the likely effects of the building activity in altering the microclimates? 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 sufficient green cover at the site to reduce formation of heat island.

- 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 U-values of the roof, external wall and fenestration of the building will meet the requirements as specified in the Energy

Table 20: Conservation building code (ECBC)

S. No.	Component	Material Used	Permissible U-Value as per ECBC (W/m ² -°C)
1	Roof	Concrete	0.409
2	External wall	Brick	0.44
3	Fenestration	Glass Facade	3.3

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

Adequate fire protection facilities will be installed including fire detectors, fire alarm and fire fighting system to guard the building against fires. All fire protection facilities as designed as per the latest National Building Code. The approvals in this regard have been obtained.

- 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 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.**

Adequate provisions are provided to mitigate the effects of air infiltration.

- 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.**

Solar energy will be used for external lighting. No other technologies are viable in the case. Solar water heating systems will be used for 20% of the total hot water requirement for the hotel & kitchens as per ECBC norms.

10. ENVIRONMENT MANAGEMENT PLAN

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