# PROJECT REPORT

# OF

# SIGNATURE GLOBAL

# PARK –I (2)

## M/S SIGNATUREGLOBAL HOMES LIMITED

## (FORMERLY KNOWN AS M/S SIGNATUREGLOBAL HOMES LIMITED)

## BRIEF DETAILS OF THE PROJECT

| | | |
|---|---|---|
| **1.** | **Name of the project** | Signature Global Park-I (2) |
| **2.** | **Name of the promoter/applicant** | Signatureglobal Homes Limited |
| **3.** | **Name of the license holder** | Signatureglobal Homes Limited |
| **4.** | **Location of the project** | Village Dhunela, Sector-36, Sohna, Gurugram |
| **5.** | **Registered address** | 13th Floor, Dr. Gopal Das Bhawan, 28 Barakhamba Road, New Delhi 110001 |
| **6.** | **Status of the project** | Continuation U/S 7(3) |
| **7.** | **Nature of the project** | DDJAY(Residential Floors) |
| **8.** | **Planning area** | GMUMC 2031 |
| **9.** | **Type of zone** | High-II Potential Zone |
| **10.** | **Web address of the project on the website of the promoter** | www.signatureglobal.in |
| **11.** | **Email address for communication regarding project** | compliance@signatureglobal.in |
| **12.** | **Total licensed area of the project** | 5 Acres |
| **13.** | **Area applied for registration** | 1.031 Acres |
| **14.** | **Date of very first license of the project** | 18 of 2021 dated 16/04/2021 |

## DETAILS OF PROJECT COST

| S.NO | DETAILS | AMOUNT IN Lacs. |
|---|---|---|
| 1. | **Cost of land** | 485.31 |
| 8. | **Cost of Construction** | 6000 |
| 9. | **Other Cost** | 1682.96 |
| | **Total Project Cost** | **8168.27** |

## REVENUE FROM THE PROJECT

| **Total estimated sale value of units/ plots/ apartment/ sale proceeds** | | | |
|---|---|---|---|
| **Component** | **Average Rate** | **Area** | **Estimated sale proceeds** |
| **Apartments** | Rs. 14274.21 /sq.ft. | **100591.39 Sq ft.** | 14358.63 |
| **Commercial** | Rs. per sq. mtrs | **0. 00 Sq meter** | - |
| **Estimated total sale proceeds** | | | **14358.63** |
| **Total Project Cost** | | | **8168.27** |
| **Return from the project** | | | **6190.36p** |

## CONCEPTUAL PLAN

### INTRODUCTION

Residential Plotted Colony Project under DDJAY (Site-I) is to be developed by M/s Signature Global Homes Pvt. Ltd. The project site is located at Village-Dhunela, Sector-36, Sohna, Gurugram, Haryana on a land measuring of 5.0 acres.

The company has vast experience in planning and construction of Residential & Commercial projects.

The project facilities include:

- Plotted Development

- Community facilities
- Commercial facilities

## SITE LOCATION AND SURROUNDINGS

The project site is located at Village-Dhunela, Sector-36, Sohna, Gurugram, Haryana on a land measuring of 5.0 acres.
The geographical co-ordinates of project site are 28°17'27.59"N and 77°03'48.34"E.

## PROJECT COST

Total Project cost is INR 81.68 Crores

## CONNECTIVITY

The Nearest Highway is SH-13 which is 0.1 km (E) away from project site. NH-71B is 5.0 km towards South direction, NH-8 is 13.2 km towards WNW direction. The neares]
Ulo0t Railway Station being Garhi Harsaru Railway Station is about 20.4 km (NW) away from the project site. Indira Gandhi International Airport at 27.5 km (N) from project site.

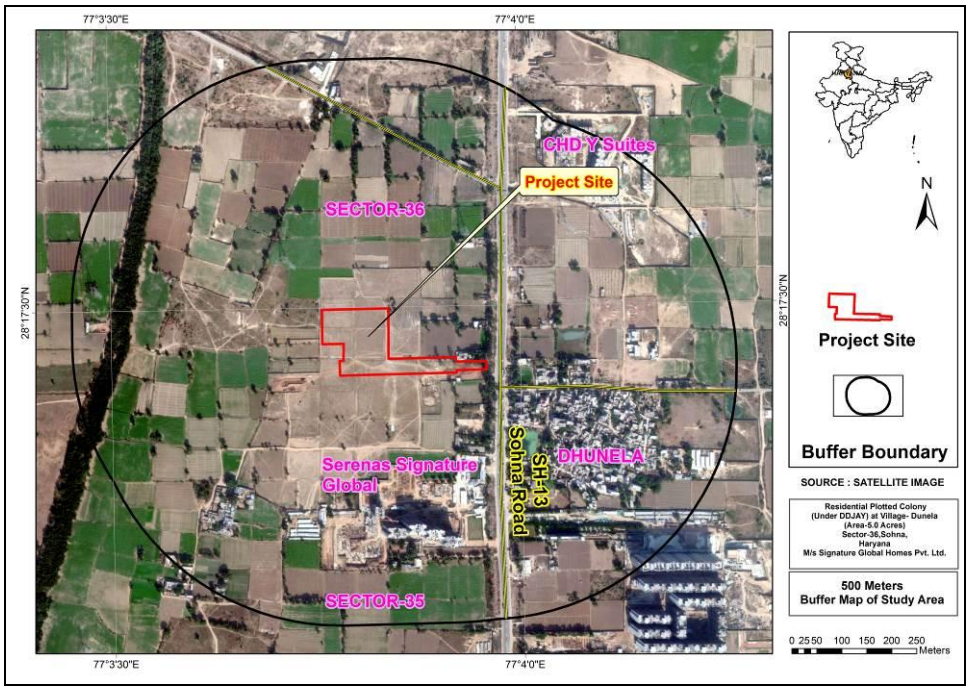



**Fig.1: Location of the Project Site on 500 m Buffer Map**

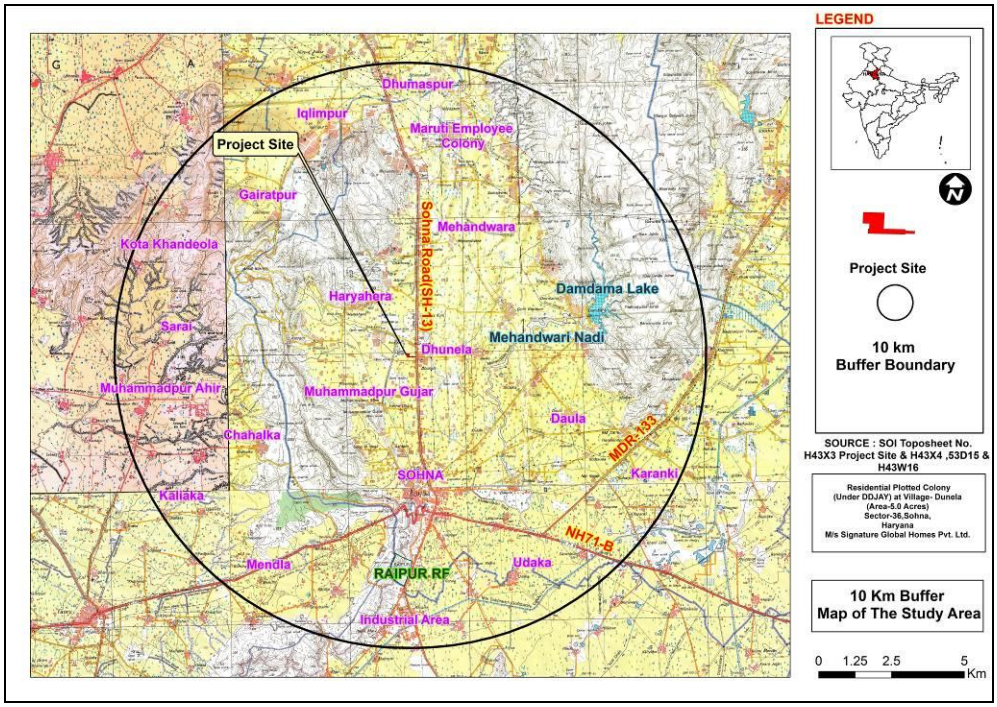



**Fig. 2: SOI Toposheet Showing 10 km radius around Project site**

## AREA STATEMENT

The total area of project site is 20,234.28 $m^2$ (5.0 acres). The detailed area statement along with brief details of the project is provided below in **Table 1:**

**Table 1: Detailed Area Statement**

| S. No. | Particulars | Area ($m^2$) |
|---|---|---|
| 1. | **Total Plot area** | **20,234.28** |
| 2. | Area Under Sector Road & 50 m wide Green Belt with service road | 615.121 |
| 3. | Balance Area (1-2) | 19,619.129 |
| 4. | 50% of the area under road & green belt | 307.561 |
| 5. | Net Plot Area (3+4) | 19,926.690 |
| 6. | Permissible Area | **14,975.773** |
| | • Residential (61% of Net Plot Area) | 12,155.28 |
| | • Commercial (4% of Net Plot Area) | 797.068 |
| | • Community (10% of Plot Area) | 2,023.425 |
| 7. | Proposed Area | **14,975.773** |
| | • Residential (43.96% of Net Plot Area) | 8,760.174 |
| | • Commercial (4% of Net Plot Area) | 797.435 |
| | • Community (10.01% of Plot Area) | 2,026.338 |
| 8. | Permissible FAR | **24323.01** |
| | • Residential (@2.64 of the proposed residential area) | 23,126.86 |
| | • Commercial (@1.5 of the proposed commercial area) | 1,196.15 |
| 9. | Proposed FAR | **22,252.327** |
| | • Residential (@2.40 of the proposed residential area) | 21,056.177 |
| | • Commercial (@1.5 of the proposed commercial area) | 1,196.15 |

| | | |
|---|---|---|
| 10. | Total NON-FAR Area | **27,889.683** |
| | • Basement Area | 7,604.01 |
| | • Terrace Area | 4,885.83 |
| | • Stilt Area | 5,723.03 |
| | • Residential (Balcony etc.) | 9,676.813 |
| **11.** | **Total Built up area** | **50,142.01** |
| 12. | Proposed Landscape Area (@10.21% of the plot area) | 2,065.222 |

## POPULATION DENSITY

The total population of project after proposed will be 1786 persons. The detailed population break-up is given below in Table 2:

The detailed population breakup is given below in the following **Table 2.**

**Table 2: Population Break-up**

| S. No. | Description | No. of Plots | DUs Or area in sq.m | PPU | Total Population |
|---|---|---|---|---|---|
| 1. | **Residential** | | | | **1387** |
| | • Residents | 67 | | 18 | 1206 |
| | • Maintenance Staff | 5% of residential population | | | 60 |
| | • Visitors | 10 % of residential population | | | 121 |
| 2. | **Commercial** | | 1195.603 | 3 Sqm/ person = 399 persons | **399** |
| | • Staff | 10% of Commercial population | | | 40 |
| | • Visitors | 90% of Commercial population | | | 359 |

| | | |
|---|---|---|
| | **Grand Total Population (1+2)** | **1786** |

## WATER REQUIREMENT & SUPPLY SYSTEM

During operation phase, the source of water supply will be GMDA. The total water requirement for the project will be approx. 121 KLD out of which domestic water demand is 115 KLD. The fresh water requirement will be 83 KLD. The water calculation is given below in Table 3 & 4.

**Table 3: Calculations for Daily Water Demand**

| S. No. | Description | No. of DUs/Area ($m^2$) | Occupancy | Rate of water demand (lpcd) | | Total Water Requirement (KLD) | | |
|---|---|---|---|---|---|---|---|---|
| **A.** | **Domestic Water** | | | **Fresh** | **Flushing** | **Fresh** | **Flushing** | **Total** |
| | • Residents | | 1206 | 65 | 21 | 78.4 | 25.3 | **103.7** |
| | • Staff (Maintenance & Commercial) | | 100 | 25 | 20 | 2.5 | 2.0 | **4.5** |
| | • Visitors | | 480 | 5 | 10 | 2.4 | 4.8 | **7.2** |
| | | | | | | **83.3 say 83 KLD** | **32.1 say 32 KLD** | **115.4 say 115 KLD** |
| **Total Domestic Water = 115 KLD** | | | | | | | | |
| **B.** | **Horticulture** | 2,065.22 $m^2$ | | 3 l/sqm | | 6 KLD | | |
| **Grand Total (A+B) = 121 KLD** | | | | | | | | |

**TABLE 4: WASTE WATER CALCULATIONS**

| | |
|---|---|
| **Domestic Water Requirement** | **115 KLD** |
| • Fresh | 83 KLD |
| • Flushing | 32 KLD |
| **Waste water generated** [@80% fresh + 100% flushing] | 66.4 + 32 = 98.4 say **98 KLD** |
| **STP Capacity (125%)** | 125 KLD |

The water balance diagrams for different seasons are shown below:

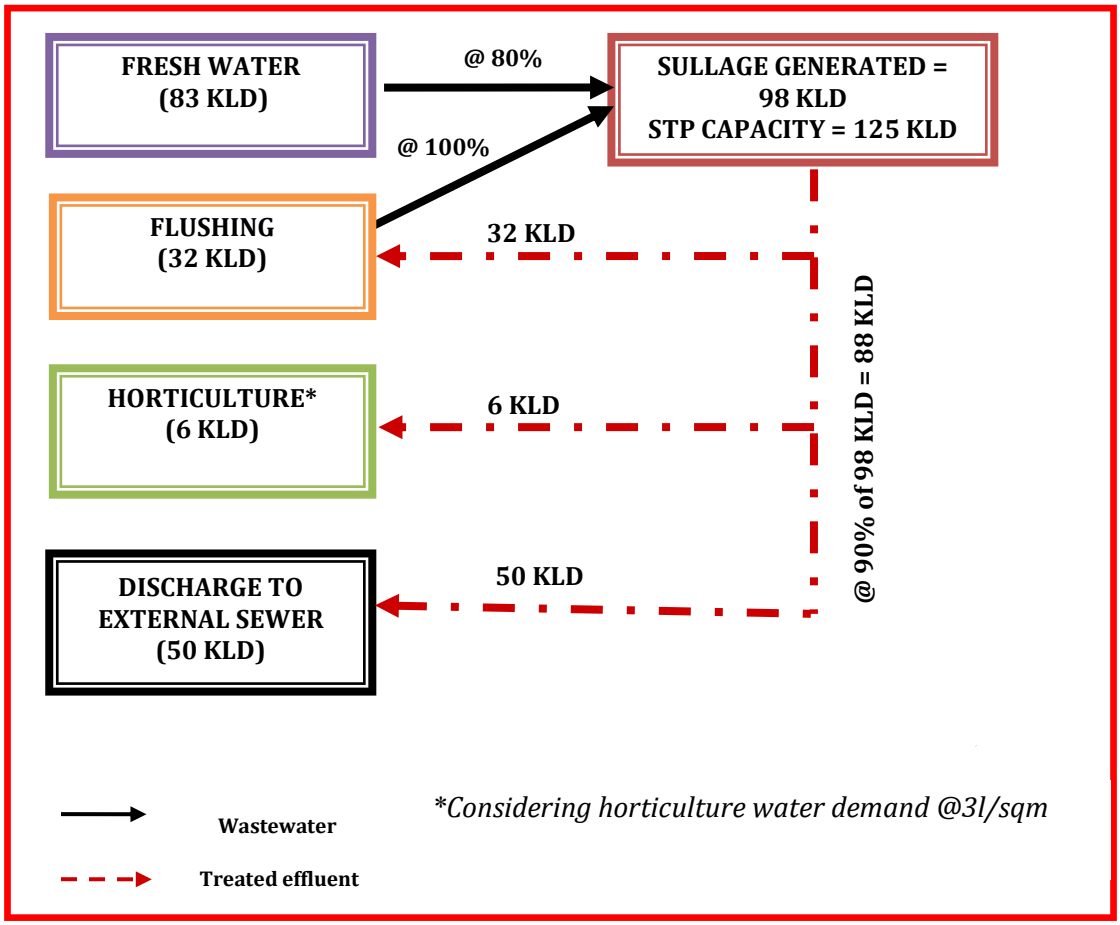



**Figure 3: Water Balance Diagram (Summer Season)**

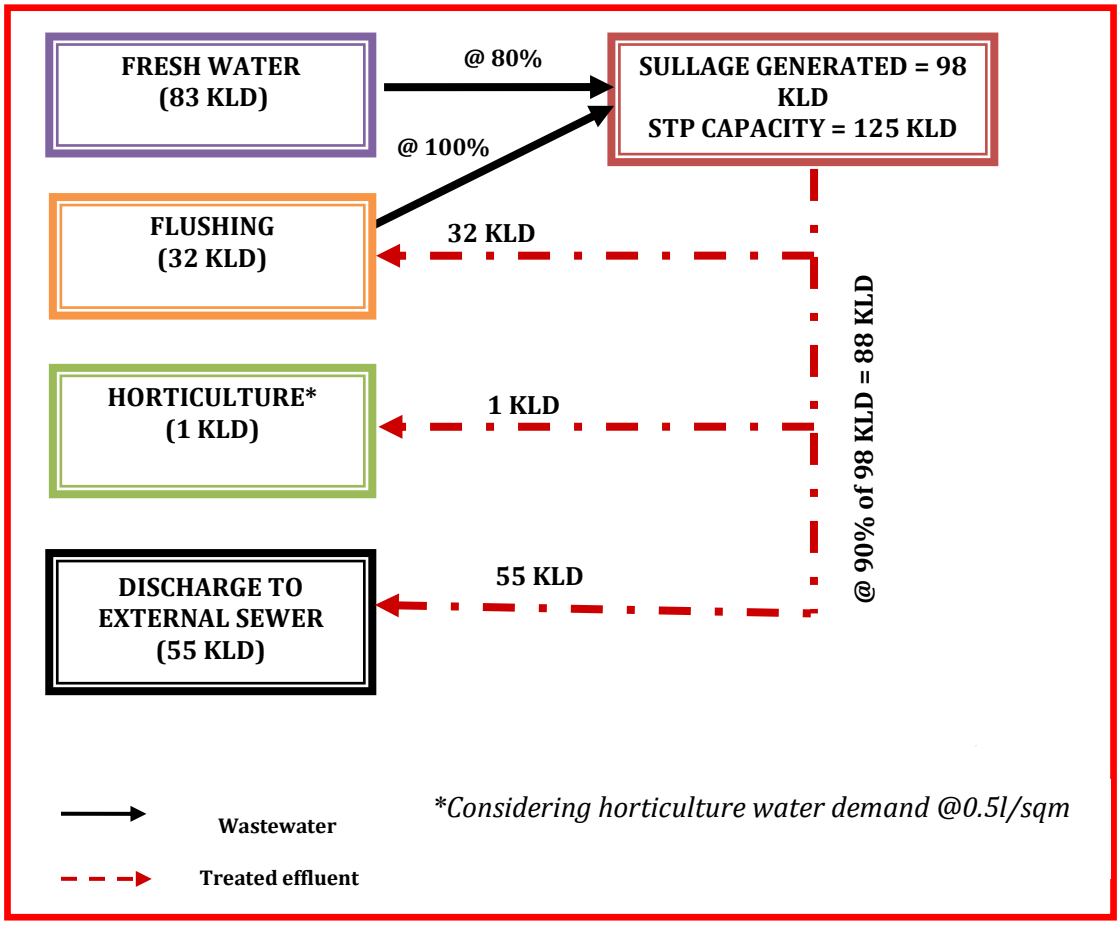



**Figure 4: Water Balance Diagram (Monsoon Season)**

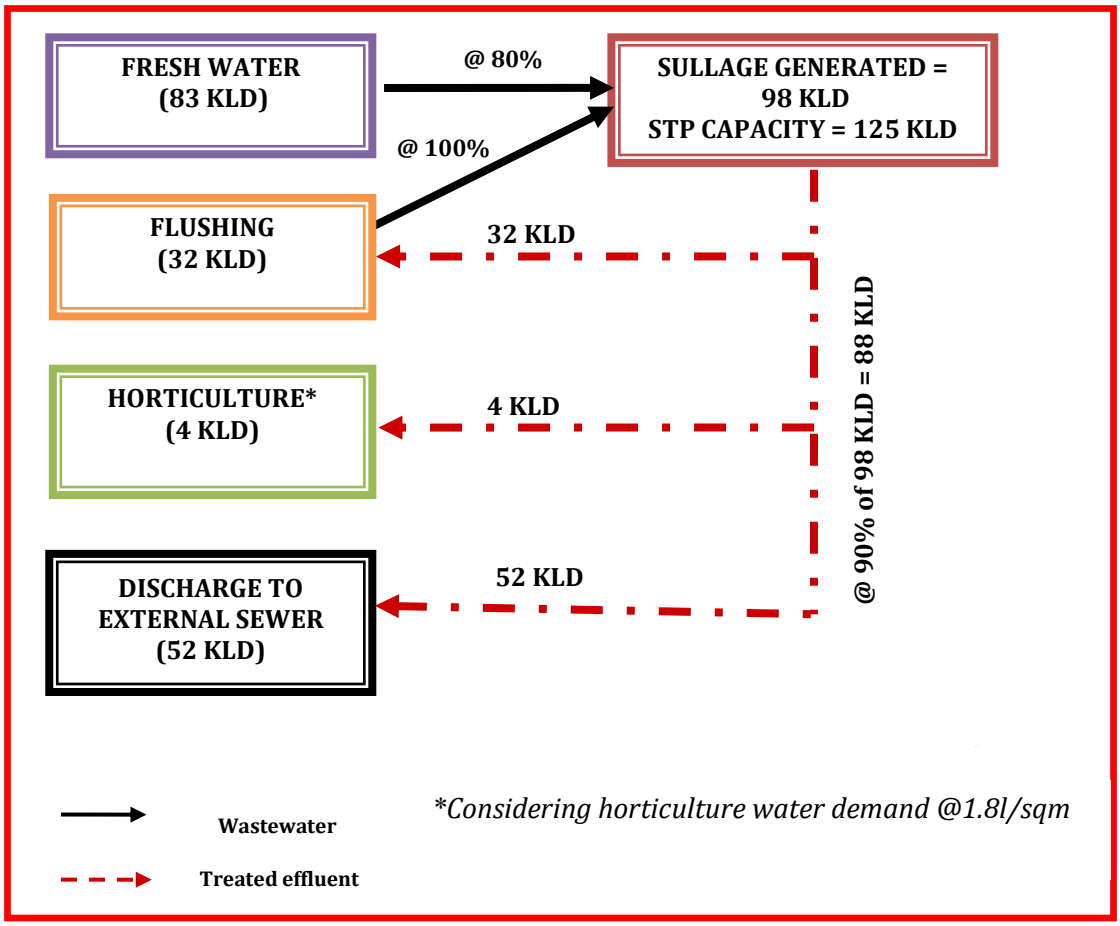



**Figure 5: Water Balance Diagram (Winter Season)**

**Sullage Generation & Treatment**

It is expected that the project will generate approx. 98 KLD of wastewater. The wastewater will be treated in onsite STP of 125 KLD capacity. The treated effluent will be reused for flushing & horticulture. Surplus treated effluent will be discharged to external sewer.

## SEWAGE TREATMENT PLANT

### MBR TECHNOLOGY

An external sewage network will collect the sewage from all units, and flow by gravity to the 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 Sullage.
- Reduced dependence on the public utilities for water supply and sewerage systems.
- Sludge generated from the Sewage Treatment Plant will be rich in organic content and an excellent fertilizer for horticultural purposes.

**a. Wastewater Details**

| | | | |
|---|---|---|---|
| (a) | Daily load | : | 98 KLD |
| (b) | Duration of flow to STP | : | 24 hours |
| (c) | Temperature | : | Maximum 32oC |
| (d) | pH | : | 6.5-8.5 |
| (e) | Colour | : | Mild |
| (f) | T.S.S. (mg/l) | : | 250-400 mg/l |
| (g) | BOD3 (mg/l) | : | 300-400 mg/l |
| (h) | COD (mg/l) | : | 600-700 mg/l |

**b. Treated effluent**

| | | | |
|---|---|---|---|
| (a) | pH | : | 6.0 to 8.5 |
| (b) | B.O.D. | : | <10 mg/l |
| (c) | C.O.D. | : | <30 mg/l |
| (d) | Total Suspended Solids | : | <10mg/l |

**c) Treatment Technology**

Membrane bio reactor technology is based on the principle of attached growth process. Raw sewage will be collected under gravity into the equalization tank after allowing to pass through the bar screen. Screens will be provided in screen chambers and it will be manually cleaned by going down to a platform. The bar screen, by removing coarse solids from the sewage help in protecting the raw sewage pump.

Fully submersible centrifugal non clog sewage handling pump will be provided in the collection cum equalization tank to pump the collected Sullage to the next MBR tanks. Automatic level controller will be provided in the tank to turn the pump off at the low water level in the tank and to start the pump when water level is high automatically. Air will be introduced in this tank to prevent any potential foul smell problem & to provide the mixing

of wastewater to avoid the sedimentation of solids in this tank. Air Grid used for aeration purpose will be non-clog.

The sewage collected in equalization tank is pumped the moving bed bioreactor. There will be two nos. of bioreactors in series for the efficient working and removal of BODs for the required retention time. The process inside the moving bed bioreactors consists of adding small cylindrical-shaped polyethylene/polypropylene carrier elements in aerated basins to support bio-film growth. The small cylinders are provided with a cross inside the cylinder and longitudinal fins on the outside. The bio-film carriers are maintained in the reactor by the use of a perforated plate with appropriate slot at the tank outlet. Air agitation or mixers are applied in a manner to continuously circulate the packing. The packing may fill 25 to 50 percent of the tank volume. Specific surface area of the packing is about 450-500 $m^2/m^3$ of bulk packing volume. The Sullage from first bioreactor flows by gravity through the perforated plate/mesh to the next bioreactor kept in series. Inside the bioreactors, aerobic bacteria grow in an attached growth from around the moving plastic media inside the reactors. The bacteria have to reduce BOD & COD of Sullage in the presence of oxygen provided through the air grids located at the bottom of the reactors. The Process does not require any return activated sludge flow or backwashing.

From the bio-reactors, the effluent passes by gravity into the clarifier (Tube Settling Tank). Clarifier will be a hopper bottom sedimentation tank provided with appropriate size PVC tube deck media. The suspended solids will settle at the bottom of the tank & clear supernatant will overflow to filter feed tank through outlet launder. The collected sludge at bottom will be transferred through pumps to sludge holding tank.

The clear supernatant after clarifier will be collected in to filter feed tank. This tank will act as housing tank for filter feed pumps. The clarified & dis-infected water will be then fed to filtration unit.

Filtration unit consisting of Dual Media sand filter, activated carbon filter and ultra-filtration system (optional) will remove the residual impurities such as odor/color, suspended solids, BOD/COD. The treated water after the filtration unit will be collected in Irrigation cum Flushing water storage tank from where it is transferred to flushing water tank at terrace & Irrigation System.

Excess sludge from the bottom of the settling tank will be removed and transferred to sludge holding tank. Air grid will be provided in this tank to avoid conversion into anaerobic conditions, thickening of sludge and keep sludge in homogenous condition. The digested & thickened sludge will be further thickened through Sludge Dewatering System (Filter press with screw pump) and disposed-off periodically through closed tanker or can be reused as manure.

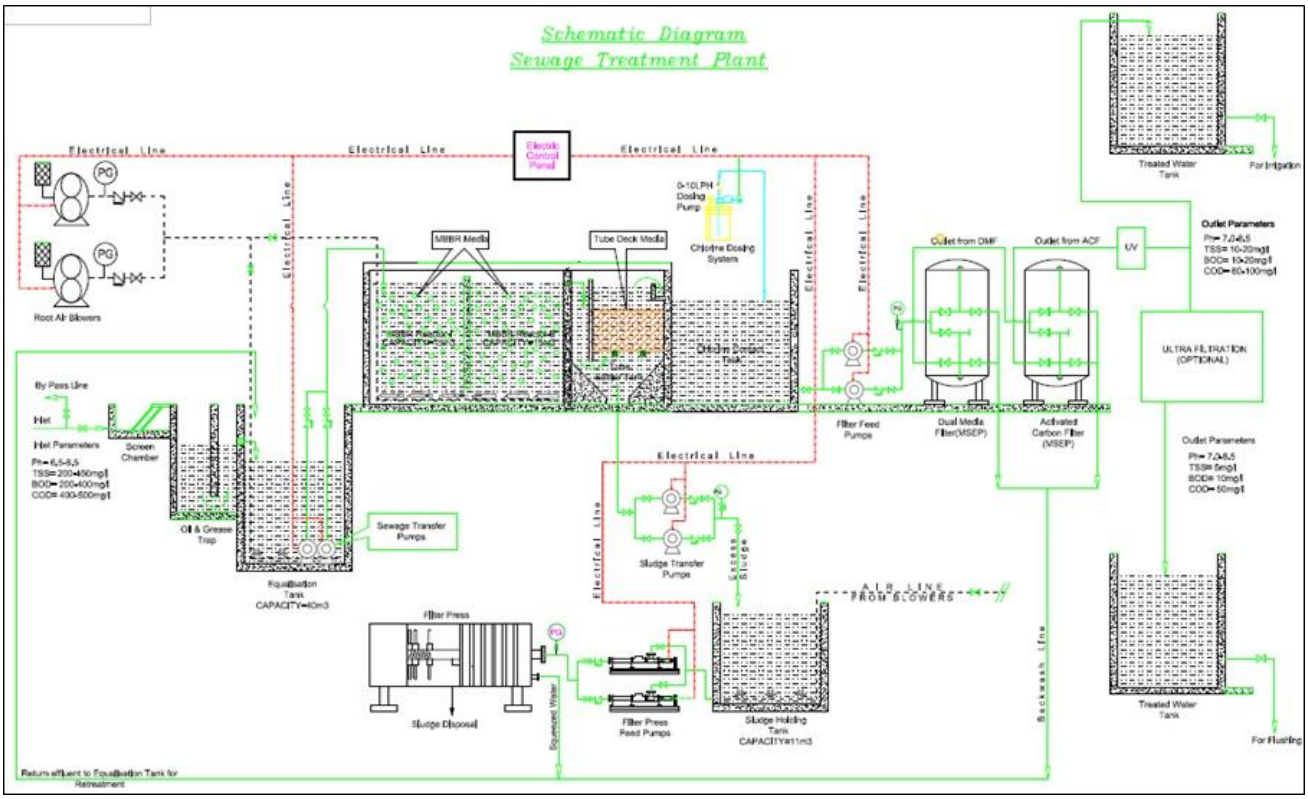



**Figure 6: Schematic Diagram of MBR STP**

**Sewer System**

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

## RAIN WATER HARVESTING

The storm water collection system for the premises shall be self-sufficient to avoid any collection/stagnation and flooding of water. The amount of storm water run-off depends upon many factors such as intensity and duration of precipitation, characteristics of the tributary area and the time required for such flow to reach the drains. The drains shall be located near the carriage way along either side of the roads. Taking the advantage of road camber, the rainfall run off from roads shall flow towards the drains. Storm water from various plots/shall be connected to adjacent drain by a pipe through catch basins. Therefore, it has been calculated to provide 5 rainwater harvesting pits at selected locations, which will catch the maximum run-off from the site.

1) Since the existing topography is congenial to surface disposal, a network of storm water pipe drains is planned adjacent to roads. All building roof water will be brought down through rain water pipes.
2) Proposed storm water system consists of pipe drain, catch basins and seepage pits at regular intervals for rain water harvesting and ground water recharging.
3) The peak hourly rainfall of 90 mm/hr shall be considered for designing the storm water drainage system.

Rain water harvesting has been catered to and designed as per the guideline of CGWA. Peak hourly rainfall has been considered as 90 mm/hr. The recharge pit of 5 m diameter and 5 m depth is constructed for recharging the water. Inside the recharge pit, a recharge bore is constructed having adequate diameter and depth. The bottom of the recharge structure will be kept 5 m above this level. At the bottom of the recharge well, a filter media is provided to avoid choking of the recharge bore. Design specifications of the rain water harvesting plan are as follows:

- Catchments/roofs would be accessible for regular cleaning.
- The roof will have smooth, hard and dense surface which is less likely to be damaged allowing release of material into the water. Roof painting has been avoided since most paints contain toxic substances and may peel off.

- All gutter ends will be fitted with a wire mesh screen and a first flush device would be installed. Most of the debris carried by the water from the rooftop like leaves, plastic bags and paper pieces will get arrested by the mesh at the terrace outlet and to prevent contamination by ensuring that the runoff from the first 20 minutes of rainfall is flushed off.
- No sewage or wastewater would be admitted into the system.
- No wastewater from areas likely to have oil, grease, or other pollutants has been connected to the system.

**Calculations for storm water load:**

Plot Area = 20,234.28 $m^2$

Roof top Area = 14,975.773 $m^2$

Green Area = 2,065.22 $m^2$

Paved Area = Total Plot Area – (Roof top Area + Green Area)

= 20,234.28 – (14,975.773 + 2,065.22)

= 3,193.287

**Runoff Load:**

Roof-top Area = 14,975.773 × 0.090 × 0.90

= 1,213.03 $m^3$/hr

Green Area = 2,065.22 × 0.090 × 0.20

= 37.17 $m^3$/hr

Paved Area = 3,193.287 × 0.090 × 0.70

= 201.17 $m^3$/hr

Total Runoff Load = 1,213.03 + 37.17 + 201.17 $m^3$/hr = 1,451.37 $m^3$/hr

Taking 20 minutes Retention Time, total volume of storm water = 1,451.37/3 = 483.79 $m^3$

Volume of desilting chamber = l x b x h = 2 x 2 x 3 = 12 $m^3$

Taking the effective dia and depth of a Recharge pit 4.5 m and 5 m respectively, Volume of a single Recharge pit = $\pi r^2 h$ = 3.14 × 2.25 × 2.25 × 5 = 79.48 $m^3$

Total volume of recharge pit including desilting chamber = 12 + 79.48 = 91.48 $m^3$.

Hence, No. of Pits required = 483.79/91.48 = 5.28 say 5 Pits.

Total of 5 Rain Water Harvesting pits are being proposed for artificial rain water recharge within the project premises.

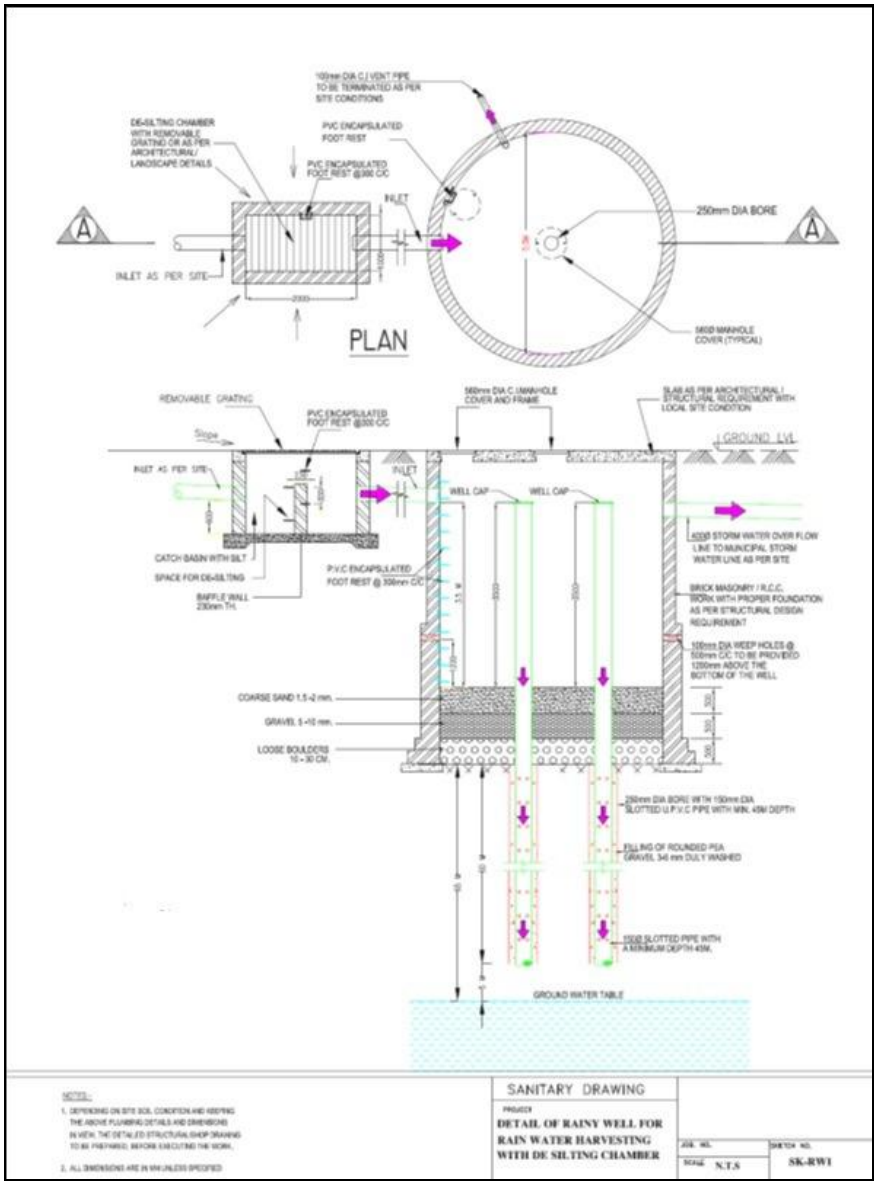



**Figure 7: Rain Water Harvesting Pit Design**

## PARKING FACILITIES

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

For plotted development the parking shall be within the plots by the individual plot owners.

## POWER REQUIREMENT

The power supply will be supplied by Dakshin Haryana Bijli Vitran Nigam (DHBVN). The total maximum demand is estimated as 4,800 kVA.

## POWER BACK UP

There will be provision of 3 DG sets of total capacity (1*1500 kVA & 2*500 kVA) for plotted Colony Project. The DG sets will be equipped with acoustic enclosure to minimize noise generation and adequate stack height for proper dispersion.

## SOLID WASTE GENERATION

Solid waste would be generated both during the construction as well as 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 of the group housing project**.**
- Remaining soil shall be utilized for refilling / road work / rising of site level at locations/ selling to outside agency for construction of roads etc.

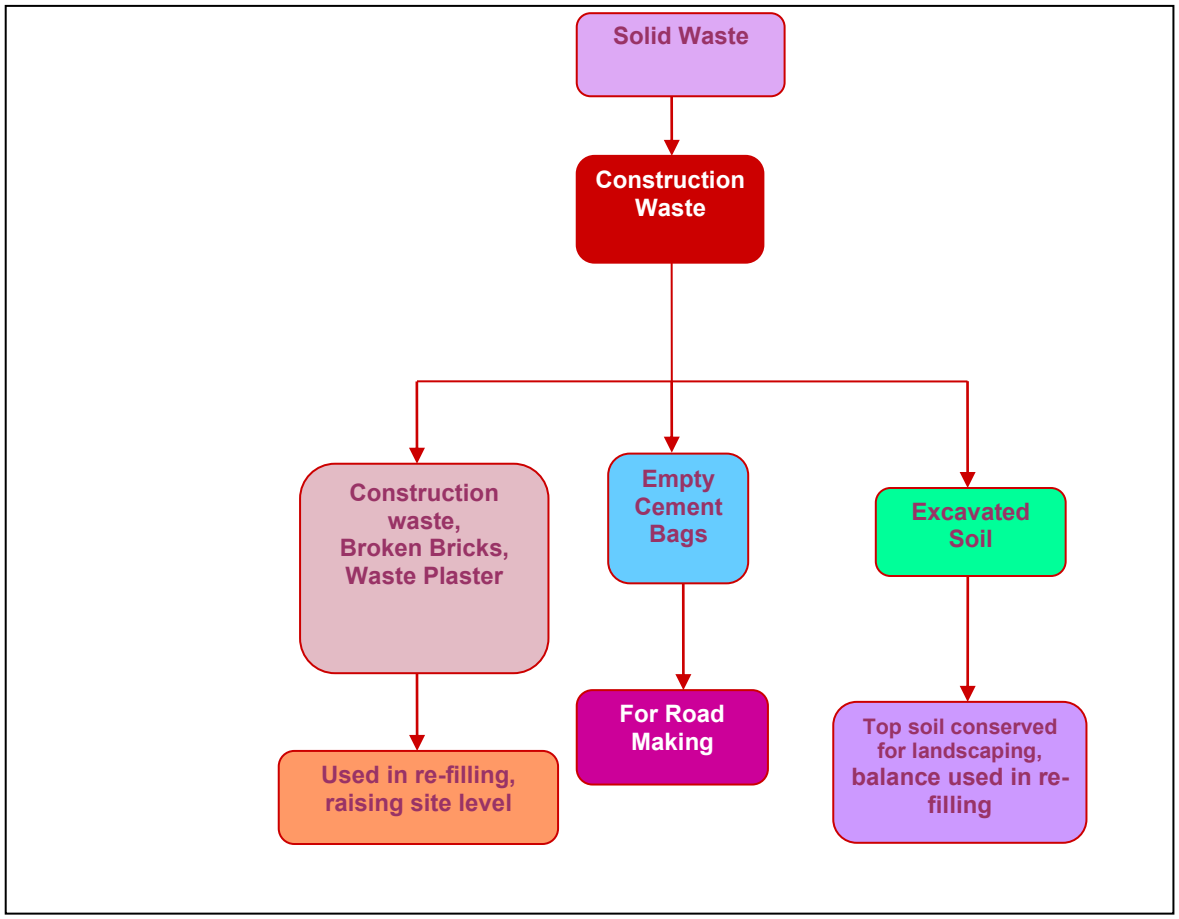



**Figure 8: Solid Waste Management Scheme (Construction Phase)**

During the operation phase, waste will comprise domestic as well as horticultural waste. The solid waste generated from the project shall be approx. 714 kg per day (@ 0.5 kg 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 waste @ 0.12 kg/acre/day). Following arrangements will be made at the site in accordance to Municipal Solid Waste (Management and Handling) Rules, 2000 and amended Rules, 2016:

**Table 5: Calculation of Solid Waste Generation**

| S. No. | Description | Occupancy | Waste Generated (kg/capita/day) | Waste Generated (kg/day) |
|---|---|---|---|---|
| 1. | **Domestic Solid Waste** | | | |

| | | | | |
|---|---|---|---|---|
| | • Residents | 1206 | 0.5 | 603 |
| | • Staff (Maintenance & Commercial) | 100 | 0.25 | 25 |
| | • Visitors | 480 | 0.15 | 72 |
| 2. | Horticultural Waste (0.51 acre) | | @ 0.2 kg/acre/day | 0.102 |
| 3. | STP Sludge | | Sludge generated x 0.35 x B.O.D difference/1000 | 13.37 |
| **Total Solid Waste Generation= 713.47 kg/day say 714 kg/day** | | | | |

❖ **Collection and Segregation of waste**

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

❖ **Treatment of waste**

- Bio-Degradable waste

1. Bio-degradable waste will be subjected to composting by organic waste converter and the compost will be used as manure.
2. STP sludge is proposed to be used for horticultural purposes as manure.
3. Horticultural Waste is proposed to be composted and will be used for gardening purposes.

- Recyclable wastes

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

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

❖ **Disposal**

Recyclable and non-recyclable waste will be disposed through a local agency. Solid waste management scheme is depicted in the following figure:

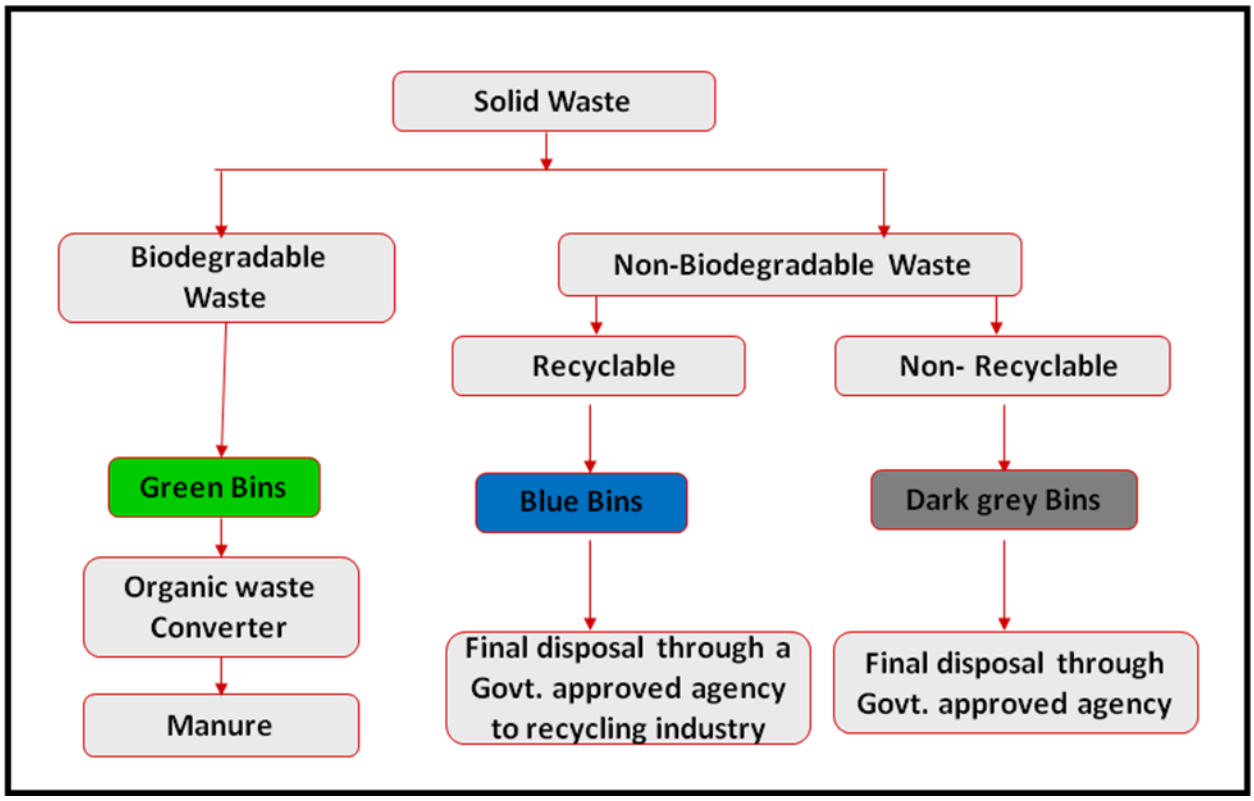



**Figure 9: Solid Waste Management Scheme (Operation Phase)**

**Organic Waste Converter**

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




**Figure - 10: Organic Waste Convertor**

**Benefits of organic waste converter:**

1. Large quantity of solid waste is converted to manure in a very short period
2. This manure 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 120 kg/batch or 3,000 kg/day & it requires electricity of about 13.5 HP.

No. of batches /day = 3,000/120 = 25

Biodegradable Waste to be converted = 60% of total solid waste generated = 428.4 kg/day

Taking 20% higher = 514.08

No. of batches to convert 514.08 kg/day = 514.08/120 = 4.28 say 4 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 = 6000/25

= 240 INR

Cost for 4 batch/day = 4 × 240/-

= 960/-

Monthly operating cost = 30 × 960

= 28800/-

Population of the project (Residents) = 1206

Per capita cost/month = Monthly operating cost/population of the project (i.e 1206)

= 28800/1206

**= 23.88 INR say 24 INR**

Area proposed for the OWC = 500 Sq.m

## GREEN AREA

Total green area measures 2,065.22 $m^2$ i.e. 10.21% of the plot area (Shelter belt, Avenue plantation and lawn). Evergreen tall and ornamental trees like *Grevillea robusta, Cassia fistula, Bauhinia varieagata,* etc. have been proposed to be planted inside the premises.

**Table 6: Plant Species with Local Names**

| ROADSIDE & PERIPHERAL PLANTATION | | |
|---|---|---|
| **S. No.** | **Botanical Name** | **Common Name** |
| 1. | *Cassia fistula* | Amaltas |
| 2. | *Delonix regia* | Gulmohar |
| 3. | *Bauhinia purpurea* | Kachnar |

| | | |
|---|---|---|
| 4. | *B. variegata* | Kachnar |
| 5. | *Lagerstroemia flosreginae* | Pride of India |
| 6. | *Grevillea robusta* | Silk oak |
| 7. | *Callistemon lanceolatum* | Bottle Brush |
| 8. | *Anthocephalus cadamba* | Kadam |
| 9. | *Polyalthia longifolia* | Ashok |
| 10. | *Putranjiva roxburghii* | Putrajiv |
| 11. | *Sterculea alata* | Coconut Buddha |
| 12. | *Melia azadirachta* | Neem |
| 13. | *Bassia latifolia* | Mahua |
| 14. | *Cassia javancia* | Pink Shower |
| 15. | *Alstonia scholaris* | Devil Tree |
| 16. | *Michelia champaca* | Champak |
| 17. | *Terminalia arjuna* | Arjun |
| 18. | *Ficus retusa* | Ficus |
| 19. | *Saraca indica* | Ashoka |
| 20. | *Casuarina quisetifolia* | Ironwood |
| 21. | *Salix alba* | White Willow |

## DETAIL OF CONSTRUCTION MATERIAL

List of building materials being used at site:

1. Coarse sand
2. Fine sand
3. Stone aggregate
4. Stone for masonry work
5. Cement
6. Reinforcement steel
7. Pipe scaffolding (cup lock system)
8. Bricks
9. CLC fly ash blocks

10. Crazy (white marble) in grey cement
11. P.V.C. conduit
12. MDS, MCBs
13. PVC overhead water tanks
14. 2 1/2'' thick red colour paver tiles
15. PPR (ISI marked)
16. PVC sullage lines
17. S.W. sewer line up to main sewer
18. PVC rain water down take
19. Stainless steel sink in kitchen
20. Joinery hardware- ISI marked

## MATERIALS USED FOR CONSTRUCTION & THEIR U VALUE

| Type of Construction | U values(in W/m2 deg C) |
|---|---|
| **WALLS:** | |
| **Brick:** | |
| Plastered 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 mm | 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 :** | |
| Reinfoced 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 |

## 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

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