

CONCEPTUAL PLAN

1. INTRODUCTION

M/s Balprada Built Pvt. Ltd. is proposed Residential Building “**Hari Nagar Premium Vaatika**” on the total land area measuring **46773.35 Sqm.** at Mauza-Bhusaula, Danapur, Dist-Patna, Bihar. The proposed built up area is **259888.14 Sqm.**

The Project built up area is greater than 1,50,000 sqm. therefore, designated under Category “B” and falls under Item 8 (b) (Township & Area development Project) of the Environmental Impact Assessment (EIA) Notification of September 14, 2006 and its subsequent amendments. The Summary of Land details is attached as **Annexure-VII.**

2. SITE SURROUNDING & CONNECTIVITY

The proposed project is well connected to different villages and towns. It is surrounded by Neora, Mainpura, Muhammadpur Korji habitation & the project is also close proximity to the Patna town within 5 km of the area of proposed project. Site surroundings and Connectivity details of the proposed project are given in **Table-1.**

Table-1: Site Surroundings and Connectivity Details

S. No.	Connectivity & Site Surroundings		
	Description		Distance and Direction
1.	Nearest Railway Station	Danapur Goriya Dera Phulwari Sharif Gandhi Halt	Approx. 2.57 Km towards NNE. Approx. 4.70 Km towards WNW. Approx. 5.68 Km towards ENE. Approx. 7.46 Km towards West.
2.	Nearest Airport	Jai Prakash Narayan International Airport	Approx. 7.0 Km towards ENE.
3.	Nearest Village	Neora Mainpura Muhammadpur Korji	Approx. 2.79 Km towards WNW. Approx. 1.82 Km towards WNW. Approx. 0.74 Km towards NW.
4.	Nearest Highway/Roads	Bhusaula Road NH 139 Dharmpur Road Yadav Lane	Approx. 0.35 Km towards ESE. Adjacent to the Project Site. Approx. 0.32 Km towards WNW. Approx. 0.16 Km towards NW.

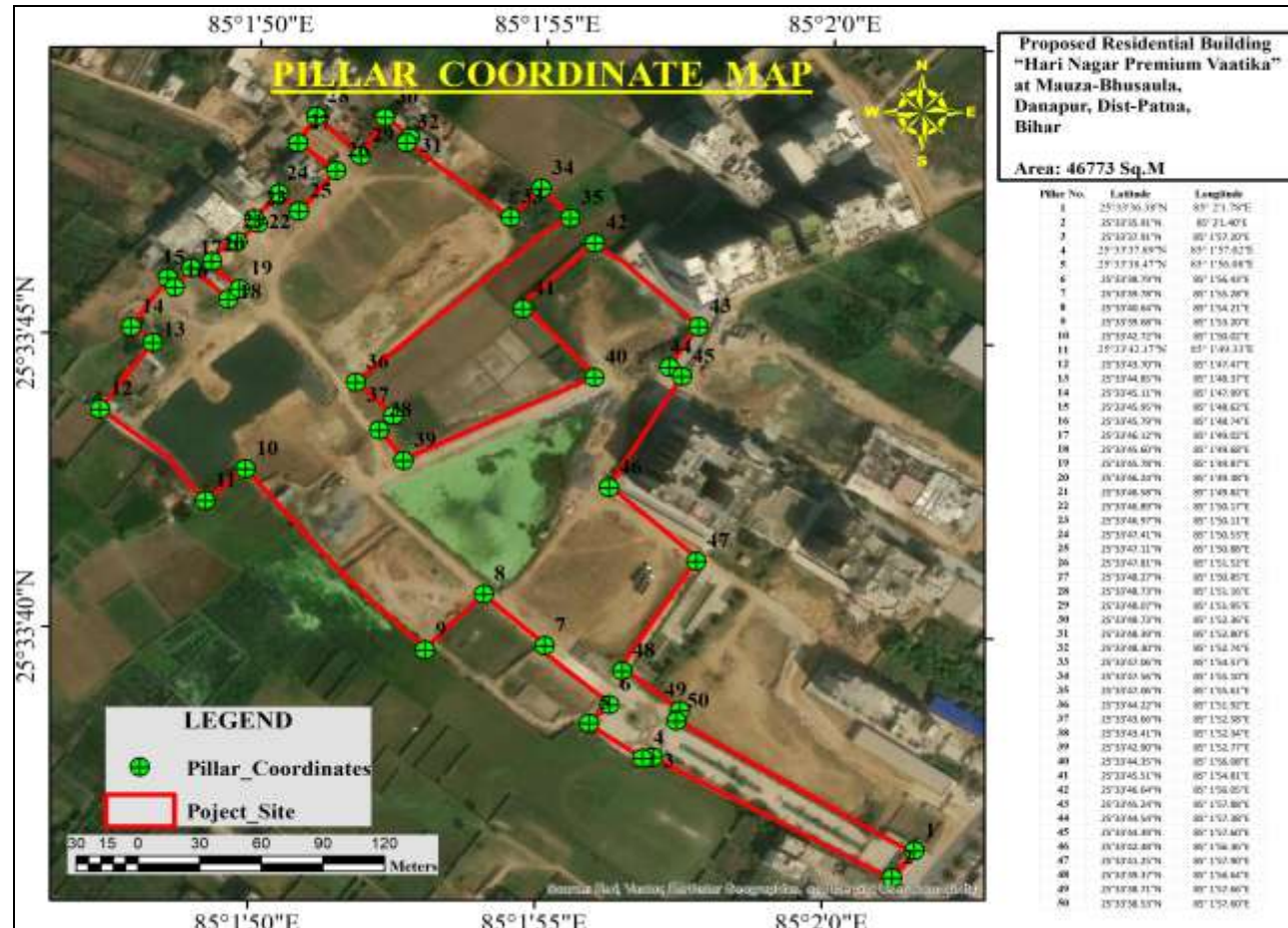
Proposed Residential Building “Hari Nagar Premium Vaatika” at Mauza-Bhusaula, Danapur, Dist-Patna, Bihar by M/s Balprada Built Pvt. Ltd.

5.	Nearest School & College	Nezamia College of Education Silver Valley School Jagat Narayan Lal College	Approx. 1.32 Km towards NW. Approx. 1.76 Km towards NE. Approx. 1.79 Km towards NE.
6.	Nearest Hospital	AIIMS Patna Dhamma Superspeciality Hospital Phulwari Sharif, Patna Miatt Hospital	Approx. 0.91 Km towards ENE. Approx. 1.22 Km towards ENE. Approx. 1.35 Km towards ENE.
7.	Places of worship	Devi Sthan Dharampur Bajrang Bali Temple, AIIMS, Patna Kali Mandir	Approx. 0.36 Km towards North. Approx. 0.87 Km towards East. Approx. 0.90 Km towards ENE.
8.	Water Bodies	Ganga River Punpun River	Approx. 10.0 Km towards NNE. Approx. 8.48 Km towards South.
9.	Zoological garden	Sanjay Gandhi Biological Park	Approx. 8 Km towards ENE.
10.	Nearest Town	Patna City	The project is in Patna.
11.	Defense Installation	Danapur Cantonment	Approx. 8.20 Km towards North.
12.	Routers or facilities used by the public for access to recreation or other tourist, pilgrim areas	Indira Gandhi Planetarium Patna Museum Bihar Museum Buddha Smriti Park Eco Park (Rajdhani Vatika) Chauhan Gali Usri	Approx. 11.46 Km towards ENE. Approx. 11.69 Km towards ENE. Approx. 10.49 Km towards ENE. Approx. 11.65 Km towards ENE. Approx. 9.15 Km towards ENE. Approx. 4.65 Km towards NNW.

Source: Google Earth & Site visit

The Site Location map is shown in **Figure-1**. A Google Map showing the site corner coordinates of the proposed project is shown in **Figure-2**. Topographical map (**Survey of India Topo sheet no No.-G45M15, G45M15, G45N2, G45N3**) of 10 km radius is shown in **Figure 3**.

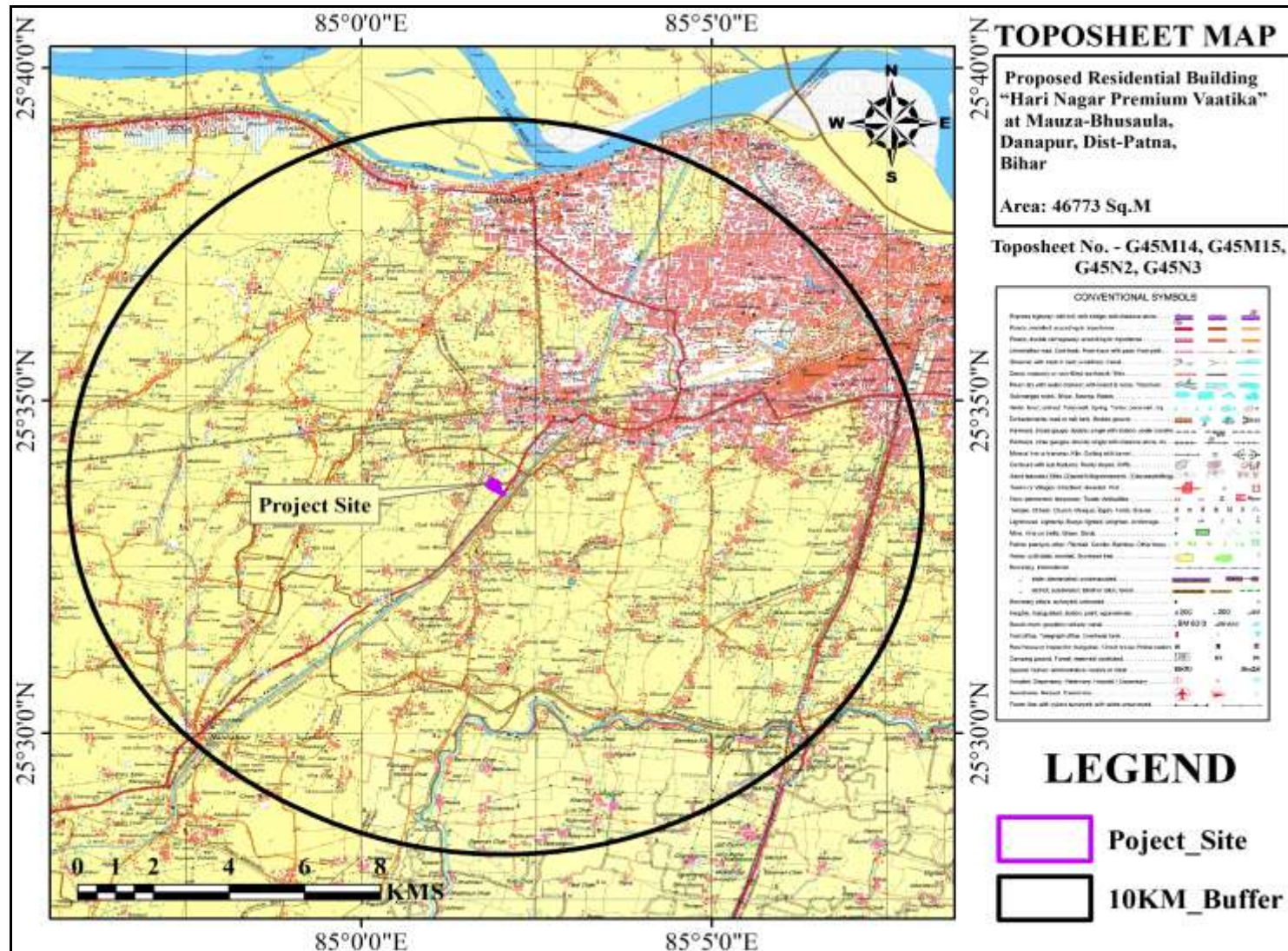
**Proposed Residential Building “Hari Nagar Premium Vaatika” at Mauza-Bhusaula,
Danapur, Dist-Patna, Bihar by M/s Balprada Built Pvt. Ltd.**



Source: Google Map

Figure-2: Pillar Coordinate Map

Proposed Residential Building “Hari Nagar Premium Vaatika” at Mauza-Bhusaula, Danapur, Dist-Patna, Bihar by M/s Balprada Built Pvt. Ltd.



Source: Survey of India

Figure 3: Topographical Map of 10 km radius

3. PROJECT LOCATION AND DESCRIPTION

The Proposed Project Residential Building “Hari Nagar Premium Vaatika” is Located at Mauza-Bhusaula, Danapur, Dist-Patna, Bihar. The coordinates of the project boundary are mentioned below in the **Table-2**.

Table-2: Coordinates of the Project Boundary

No.	Latitude	Longitude
1	25°33'36.38"N	85° 2'1.78"E
2	25°33'35.91"N	85° 2'1.40"E
3	25°33'37.91"N	85° 1'57.20"E
4	25°33'37.89"N	85° 1'57.02"E
5	25°33'38.47"N	85° 1'56.08"E
6	25°33'38.79"N	85° 1'56.43"E
7	25°33'39.78"N	85° 1'55.28"E
8	25°33'40.64"N	85° 1'54.21"E
9	25°33'39.68"N	85° 1'53.20"E
10	25°33'42.72"N	85° 1'50.02"E
11	25°33'42.17"N	85° 1'49.33"E
12	25°33'43.70"N	85° 1'47.47"E
13	25°33'44.85"N	85° 1'48.37"E
14	25°33'45.11"N	85° 1'47.99"E
15	25°33'45.95"N	85° 1'48.62"E
16	25°33'45.79"N	85° 1'48.74"E
17	25°33'46.12"N	85° 1'49.02"E
18	25°33'45.60"N	85° 1'49.68"E
19	25°33'45.78"N	85° 1'49.87"E
20	25°33'46.24"N	85° 1'49.38"E
21	25°33'46.58"N	85° 1'49.82"E
22	25°33'46.89"N	85° 1'50.17"E
23	25°33'46.97"N	85° 1'50.11"E
24	25°33'47.41"N	85° 1'50.53"E
25	25°33'47.11"N	85° 1'50.88"E
26	25°33'47.81"N	85° 1'51.52"E
27	25°33'48.27"N	85° 1'50.85"E
28	25°33'48.73"N	85° 1'51.16"E
29	25°33'48.07"N	85° 1'51.95"E
30	25°33'48.73"N	85° 1'52.36"E

**Proposed Residential Building “Hari Nagar Premium Vaatika” at Mauza-Bhusaula,
Danapur, Dist-Patna, Bihar by M/s Balprada Built Pvt. Ltd.**

31	25°33'48.39"N	85° 1'52.80"E
32	25°33'48.30"N	85° 1'52.74"E
33	25°33'47.06"N	85° 1'54.57"E
34	25°33'47.56"N	85° 1'55.10"E
35	25°33'47.06"N	85° 1'55.61"E
36	25°33'44.22"N	85° 1'51.92"E
37	25°33'43.66"N	85° 1'52.58"E
38	25°33'43.41"N	85° 1'52.34"E
39	25°33'42.90"N	85° 1'52.77"E
40	25°33'44.35"N	85° 1'56.08"E
41	25°33'45.51"N	85° 1'54.81"E
42	25°33'46.64"N	85° 1'56.05"E
43	25°33'45.24"N	85° 1'57.88"E
44	25°33'44.54"N	85° 1'57.38"E
45	25°33'44.39"N	85° 1'57.60"E
46	25°33'42.48"N	85° 1'56.36"E
47	25°33'41.25"N	85° 1'57.90"E
48	25°33'39.37"N	85° 1'56.64"E
49	25°33'38.71"N	85° 1'57.66"E
50	25°33'38.53"N	85° 1'57.60"E

The detailed area statement is given below in **Table-3**.

Table-3: Detailed Area Statement

S. No.	Details	Area	
1	Total Plot area	46773.35	Sqm.
2	Permissible F.A.R	3.5	
3	Total FAR Achieved @ 3.49	163316.17	
4	Total FAR Achieved including LIG/EWS	187078.16	Sqm.
5	Non-FAR Built-up area ie. Balcony, staircase etc ,	17847.67	Sqm.
	Built-up area excluding Basement & Stilt Parking	204925.83	Sqm.
6	Basement Parking Built-up area	39347.16	Sqm
7	Stilt Floor Parking Built-up Area	15615.15	Sqm
8	Total Built-up Area	259888.14	Sqm
9	LIG & EWS BUA requirement.	24497.4255	Sqm
10	LIG & EWS Built-up Area	24972.73	Sqm
12	Parking Provided in Residential Building (Stilt floor + Basement)	54,962.31	Sqm
13	Total Parking area Provided	54962.311	Sqm
14	Permissible Ground Coverage @ 40%	18709.34	Sqm
15	Proposed Ground Coverage @ 28.95 %	13542.22	Sqm
16	Green Belt area Provided @24.86 %	11629.814	Sqm
17	Road Area	11562.288	Sqm

4. DETAIL OF BUILDING BLOCK

The Project envisages construction of Six blocks. Details of Building Blocks are given in

Table 4.

Table 4: Details of Building Blocks

BLOCK	TOWER	No. of Floors	Height of the Building	FAR AREA (SQM)	BUILT UP AREA (SQM)
B1	T1	S+16	Apprx. 54.80 meter	16,162.29	18,071.65
B2	T1 & T3	B+S+17	Apprx. 57.80 mete	28,976.82	32,880.93
B2	T2	B+S+17	Apprx. 57.80 meter	14,714.49	16,130.27
B3	T1 & T4	B+S+17	Apprx. 57.80 meter	23,158.00	25,880.64
B3	T2 & T3	B+S+17	Apprx. 57.80 meter	33,921.89	36,694.27
B4	T1	B+S+14	Apprx 50.80 meter	36,578.79	39,254.66

Proposed Residential Building “Hari Nagar Premium Vaatika” at Mauza-Bhusaula, Danapur, Dist-Patna, Bihar by M/s Balprada Built Pvt. Ltd.

B5(EWS)	T1	B+ S+15	Apprx.47.650 mete	23,707.89	24,972.73
B6	T1	S+16	Apprx 54.80 meter	9,857.99	11,040.69
TOTAL				1,87,078.16	2,04,925.83
Basement Built-up Area					39347.16
Stilt-Floor Built-up Area					15,615.15
Total Built-up Area					2,59,888.14

Table 4: Block Wise Built-up Area Details

Block B1 Tower T1			
AREA	No. of Tower	TOTAL FAR AREA (SQM)	BUA (SQM)
TYPICAL FLOOR (1ST TO 13TH)	1	11982.276	13302.211
TOTAL CIRCULATION (1ST TO 13TH)	1	1685.567	1921.335
TYPICAL FLOOR 14TH FLOOR	1	763.52	847.881
TOTAL CIRCULATION 14TH FLOOR	1	129.659	147.795
TYPICAL FLOOR (15 TO 16TH)	1	1221.919	1356.254
TOTAL CIRCULATION (15 TO 16TH)	1	259.318	295.59
STILT LEVEL	1	120.032	120.032
MUMTY FLOOR	1	0	80.552
TOTAL AREA STATEMENT		16162.29	18071.65

Block B2 Tower T1 & Tower T3			
Area	No. of Tower	Total FAR Area	Built-up Area
T1 AND T3	2	21709.005	24463.89
TOTAL CIRCULATION	2	2590.77	3143.52
LOWER PENTHOUSE	2	960.053	1070.054
LOWER PENTHOUSE CIRCULATION	2	174.972	211.822
UPPER PENTHOUSE	2	680.531	854.807
UPPER PENTHOUSE CIRCULATION	2	174.276	211.126
Podium level (Club House)	2	1423.608	1460.458
STILT LEVEL (Club House)	2	1263.608	1300.458

Proposed Residential Building “Hari Nagar Premium Vaatika” at Mauza-Bhusaula, Danapur, Dist-Patna, Bihar by M/s Balprada Built Pvt. Ltd.

MUMTY FLOOR	2	0	164.794
Total		28976.823	32880.929

Block B2 Tower T2			
AREA	No. of Tower	Total FAR Area	Built-up Area
T2	1	10729.83	11541.27
TOTAL CIRCULATION	1	1586.295	1862.67
LOWER PENTHOUSE	1	470.345	509.888
LOWER PENTHOUSE CIRCULATION	1	105.753	124.178
UPPER PENTHOUSE	1	358.891	464.246
UPPER PENTHOUSE CIRCULATION	1	105.355	123.78
Podium level (Club House)	1	719.008	737.433
STILT LEVEL (Club House)	1	639.008	657.433
MUMTY FLOOR	1	0	109.369
Total		14714.485	16130.267

Block B3 Tower T1&T4			
AREA	No. of Tower	Total FAR Area	Built-up Area
T1 AND T4	2	18498	20187.54
TOTAL CIRCULATION	2	1622.88	2186.73
LOWER PENTHOUSE	2	1233.2	1345.836
LOWER PENTHOUSE CIRCULATION	1	108.192	145.782
UPPER PENTHOUSE	2	822.834	948.462
UPPER PENTHOUSE CIRCULATION	2	125.628	163.218
STILT LEVEL (CLUB HOUSE)	1	747.267	747.267
MUMTY FLOOR	1	0	155.806
TOTAL		23158.001	25880.641

Block B3 Tower T2&T3

Proposed Residential Building “Hari Nagar Premium Vaatika” at Mauza-Bhusaula, Danapur, Dist-Patna, Bihar by M/s Balprada Built Pvt. Ltd.

AREA	No. of Tower	Total FAR Area	Built-up Area
T2 AND T3	2	26395.26	28018.14
TOTAL CIRCULATION	2	3393.24	3927.81
LOWER PENTHOUSE	2	1759.684	1907.686
LOWER PENTHOUSE CIRCULATION	2	226.216	261.854
UPPER PENTHOUSE	2	1240.806	1417.718
UPPER PENTHOUSE CIRCULATION	2	176.912	212.55
STILT LEVEL (CLUB HOUSE)	1	729.775	729.775
MUMTY FLOOR	1	0	218.738
Total		33921.893	36694.271

Block B4 Tower T1			
AREA	TOTAL TOWER	TOTAL FAR AREA (SQM)	BUA (SQM)
TYPICAL FLOOR AREA	1	28058.086	29489.88
TOTAL CIRCULATION	1	5944.946	6937.924
PODIUM LEVEL UNITS	1	1471.044	1644.242
PODIUM LEVEL (club level)	1	508.106	508.106
PODIUM LEVEL CIRCULATION	1	424.639	424.639
STILT LEVEL	1	171.964	171.964
MUMTY FLOOR	1	0	77.903
TOTAL AREA STATEMENT		36578.785	39254.658

Block B5 EWS		
AREA	TOTAL FAR AREA	BUA
EWS	19405.68	20204.685
TOTAL CIRCULATION	4144.365	4508.04
STILT LEVEL	157.844	157.844
MUMTY FLOOR	0	102.161
TOTAL AREA STATEMENT	23707.889	24972.73

Block B6 , Tower T1			
AREA	TOTAL TOWER / TYPE (N)	TOTAL FAR AREA (SQM)	BUA (SQM)
TYPICAL FLOOR AREA	1	8776.808	9662.128
TOTAL CIRCULATION	1	970.48	1189.952
STILT LEVEL	1	110.703	110.703
MUMTY FLOOR	1	0	77.903
TOTAL AREA STATEMENT		9857.991	11,040.69

5. POPULATION DETAIL

Total population of the proposed project will be **8679** which include the population of dwelling units and visitors. Breakup of the population is given in **Table-5**.

Table-5: Calculation of Population

Block	5BHK	4 BHK	3 BHK	2 BHK	1 BHK	Total No. of units	Population
B1			91			91	546
B2	6	141				147	1029
B3	20		300	..		320	1940
B4			90	263		353	1855
B6			32	48		80	240
B5 (EWS/LIG)					570	570	2280
Total						1561	7890

Table-5(a): Calculation of Population

Block	Flat	No. of Units population	Population
Residential Block	1557	4/5/6/7	7890
Visitors	10% of Residential Population		789
Total			8679

6. PARKING DETAIL

The details of parking required and provided is mentioned in following **Table 6**.

Table 6: Parking Details

DESCRIPTION		
Total Far Area Of Residential		187078.16SQM
Total Parking Required @25% Of Total Bua	25.00%	46769.54 SQM
Total Parking Area Provided In Basement (Basement A)	A	36,938.493 SQM
Total Parking Area Provided In Basement (Basement B)	C	2,408.668 SQM
Total Parking Area Provided In Stilt In Block B1		1134.986 SQM
Total Parking Area Provided In Stilt In Block B2		7294.233SQM
Total Parking Area Provided In Stilt In Block B3		2350.453SQM
Total Parking Area Provided In Stilt In Block B4		2702.93SQM
Total Parking Area Provided In Stilt In Block B5		1537.632SQM
Total Parking Area Provided In Stilt In Block B6		594.916S QM
Total Stilt Parking	B	15,615.150 SQM
TOTAL PARKING AREA PROVIDED	D = A + B + C	54,962.311 SQM

BLOCK	TOWER	PARKING 2 WHEELER Stilt	PARKING 2 WHEELER Basement-1	PARKING 4 WHEELER Stilt	PARKING 4 WHEELER Basement- A	PARKING 4 WHEELER Basement-B
B1	T1	0	0	48	100	0
B2	T1 & T3	0	0	176	341	67
B2	T2	0	0	0	0	0
B3	T1 & T4	0	0	90	294	0
B3	T2 & T3	0	0	141	188	0
B4	T1	0	0	0	0	0
B5	T1	325	371	0	0	0
B6	T1	0	0	23	54	0
Sum		325	375	478	977	67
Total		700		1455		67
Total 2 Wheeler + 4 Wheeler Parking				2222		

7. LANDSCAPE DEVELOPMENT

Increasing vegetation in the form of greenbelt is one of the preferred methods to mitigate air pollution. Plants serve as a sink for pollutants, reduce the flow of dust and reduce noise pollution. The site for the proposed buildings is vacant so, no tree cutting is required Calculation of green area for proposed project is given in **Table-7**.

Table-7: Calculation of Green Area

Total Plot Area	46773.35 Sqm.
Landscape area provided @ 24.86 %	11629.8 Sqm.
Total No. of Trees will be Planted @ 1 tree per 80 Sqm. of Plot Area	590 Nos.

8.0 WATER REQUIREMENT, SUPPLY AND DISTRIBUTION

Water Requirement for the proposed project is discussed below.

8.1 Water requirement during Construction phase

Approx. 21 KLD water will be required for domestic as well as for construction purpose. Source of fresh water will be packaged drinking water. Source of construction water is treated water & tanker water supply.

No use of ground water or surface water will be used during the construction activity

- Cement mixing – 05 KLD
- Curing -02 KLD
- Sprinkling -05 KLD
- Domestic purposes – 9 KLD

7.2 Water requirement during operation phase

Water requirement during the operational phase will be met through ground water. The total water requirement for the proposed project has been estimated **~801 KLD**. This includes domestic water requirement, flushing and landscaping. The total fresh water requirement is **~481 KLD** which includes domestic water requirement & Fresh Water for Swimming Pool. The water requirement for flushing and landscaping will be met through treated water from STP. Details of break-up of water requirement are given in **Table-8**.

**Proposed Residential Building “Hari Nagar Premium Vaatika” at Mauza-Bhusaula,
Danapur, Dist-Patna, Bihar by M/s Balprada Built Pvt. Ltd.**

Table-8: Details of Water Requirement

S. No.	Description	Water Balance						Flushing (kld)	Total Wastewater (kld) (80% of domestic +100% Total flushing)
		No. of units / Area in Sqm	Unit Population/Per flat Population	Total Population	Per unit water consumption (lpcd)	Total water required (kld)	Fresh water required (kld)		
1	Main Dwelling Units (Residential)	1561	4 BHK: 7 Person 3 BHK: 6 Person 2 BHK: 5 Person 1 BHK: 4 Person	7890	100 (60+40)	789	473.4	315.60	694
2	Visitors (10% of the residential population)	...	...	789	15 (10+5)	11.84	7.89	3.95	10.26
	Total -I					801	481	319.55	705
	Horticulture	11629.8	5 liter/sqm of Landscape area	...		58			
	STP requirement 20% extra than waste water generated					850			
	Treated water generation @80% of waste water					562			

8.3 Wastewater Generation

The total estimated quantity of wastewater to be generated from proposed project is **~705 KLD**.

Calculation of wastewater generation is shown below in **Table-9**.

Table-9: Calculation of Wastewater Generation

Details	Water (KLD)
Water requirement for domestic purpose	481
Wastewater to be generated from domestic use (@ 80% of domestic water requirement)	385
Water requirement for Flushing Purpose	320
Wastewater to be generated from Flushing (@ 100% of flushing requirement)	320
Total Wastewater generated	705
STP capacity 20% higher than total waste water	~850

Water balance diagram for given in **Figure-5**.

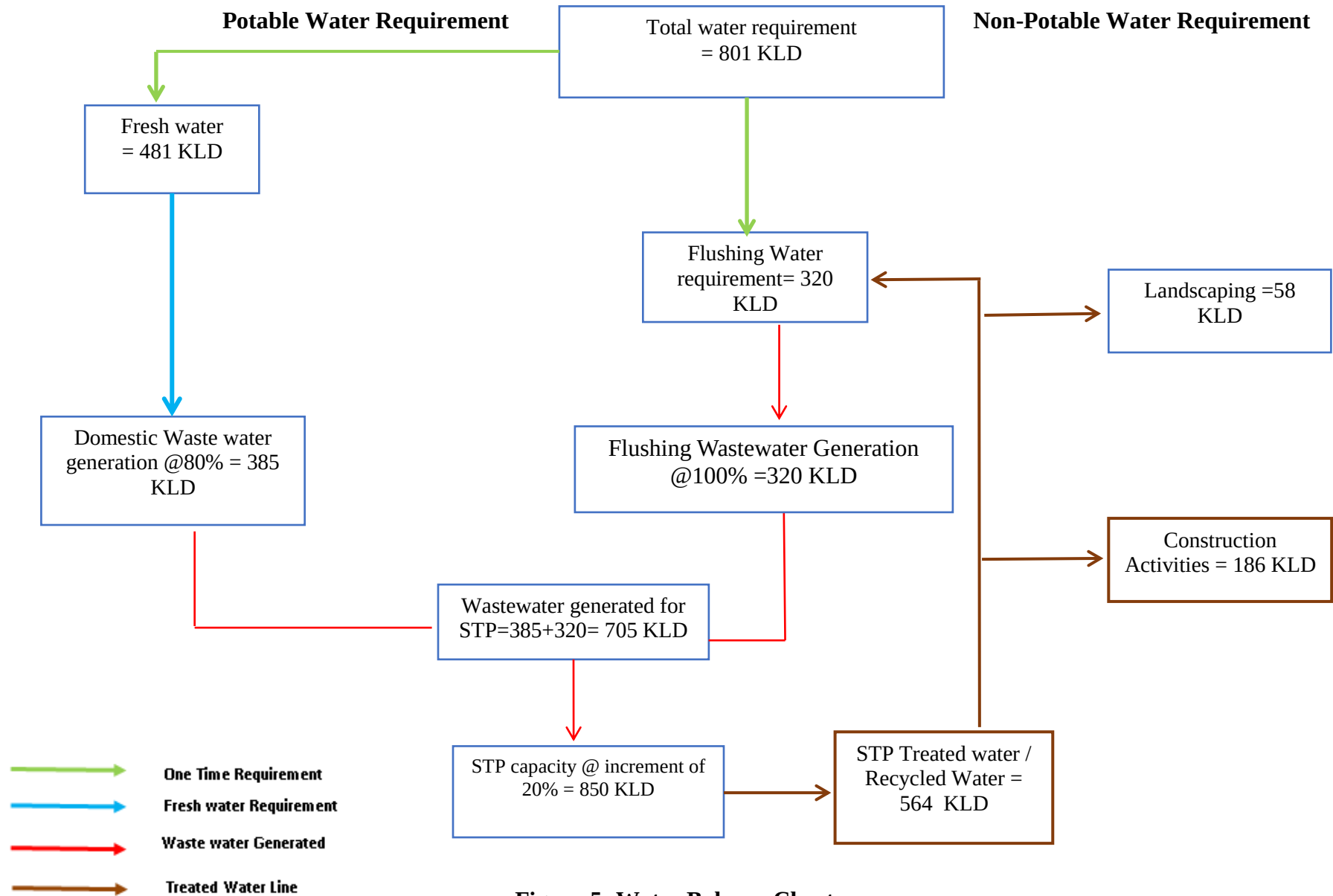


Figure-5: Water Balance Chart

Reuse of Treated Water:

Waste water generated is 705 KLD, which will be treated in the onsite STP of capacity 20% more than the waste water generated i.e., 850 KLD. The treated water available is 564 KLD (@80% of Wastewater) and it will be recycled and re-used for flushing and landscaping purpose.

During the non-monsoon season, treated water will be used in Flushing & landscaping management and during the monsoon season, as there will be no requirement of water for landscaping, and the excess treated water depending upon requirement either will be used in nearby construction site or discharged into the sewer line.

Proposed wastewater Treatment Scheme for 850 KLD: MBBR Technology

Wastewater Treatment Scheme

The waste water generated will be treated in the Sewage Treatment Plan, and the capacity of Sewage Treatment Plant (STP) will be higher of waste water generated i.e., 850 KLD. The proposed STP is based on **Moving Bed Bio Reactor (MBBR)**, MBBR is a process that combines a membrane ultra / micro filtration process and activated sludge process. The MBBR process is used in place of the secondary sedimentation tank and sand filter used for tertiary treatment in the conventional activated sludge process.

Moving Bed Bio Reactor (MBBR)

It is proposed to use activated sludge process working on the principle of extended aeration based on a Fine Bubble Diffused Aeration System. Raw Sewage will flow through a bar screen chamber to an Equalization Tank. The bar screen shall be so designed that it can be cleaned manually from outside the Tank. Two submersible solid handling pumps shall be provided in the Equalization Tank to pump the collected Raw Sewage to the Aeration Tank. An automatic level controller shall be provided in the Equalization Tank to turn the pump off at the low water level in the Tank and to start the pump automatically when water level is high.

Air will be introduced in the Equalization Tank through submerged air diffusers, to prevent the sewage from becoming septic during long retention or low load conditions. The Raw Sewage that comes into the Aeration Tank shall be aerated by using Fine Bubble Diffusers mounted in a grid at the bottom of the tank. Facility will be made to pull up the diffusers for cleaning if necessary.

Air will be supplied to the diffusers by twin lobe rotary air blowers located in the plant room. The aeration system shall be designed in a way so as to achieve complete mixing of the sludge organisms with raw sewage in order to achieve a MLSS of between 3000 – 4000 in the Aeration Tank. From the aeration tank this mixed liquor passes into a Clarifier. The liquid in the clarifier tank is maintained in quiescent condition allowing the solids to settle to the bottom of the Clarifier for collection.

The accumulated solids (Activated Sludge) shall be constantly pumped back into the aeration tank by sludge recycle pumps. This return sludge undergoes further digestion in the aeration tank and also provides the active organism needed to digest the incoming raw sewage.

The Clarifier shall be provided with an overflow weir to collect the treated effluent and a scum baffle shall keep any floating matter from passing out in the final treated water. Treated water from clarifier shall overflow into a Chlorine Contact Tank where hypo chlorite solution shall be added to disinfect the treated water.

Excess sludge from the bottom of the Clarifier shall be wasted into an adjoining aerobic digester cum thickener tank. In this tank sludge shall be aerated. The air shall be shut off periodically and supernatant water will be led back into the Equalization Tank. This way the sludge shall be thickened and its volume shall be reduced. The thickened sludge will be further solidified using a centrifuge or a filter press and the solid cakes will be used as manure in horticulture.

The treated and disinfected water from the Chlorine Contact Tank will be passed through a multigrade Filter, an Activated Carbon Filter and a Softener and then stored in a Treated Sewage Water Tank.

.

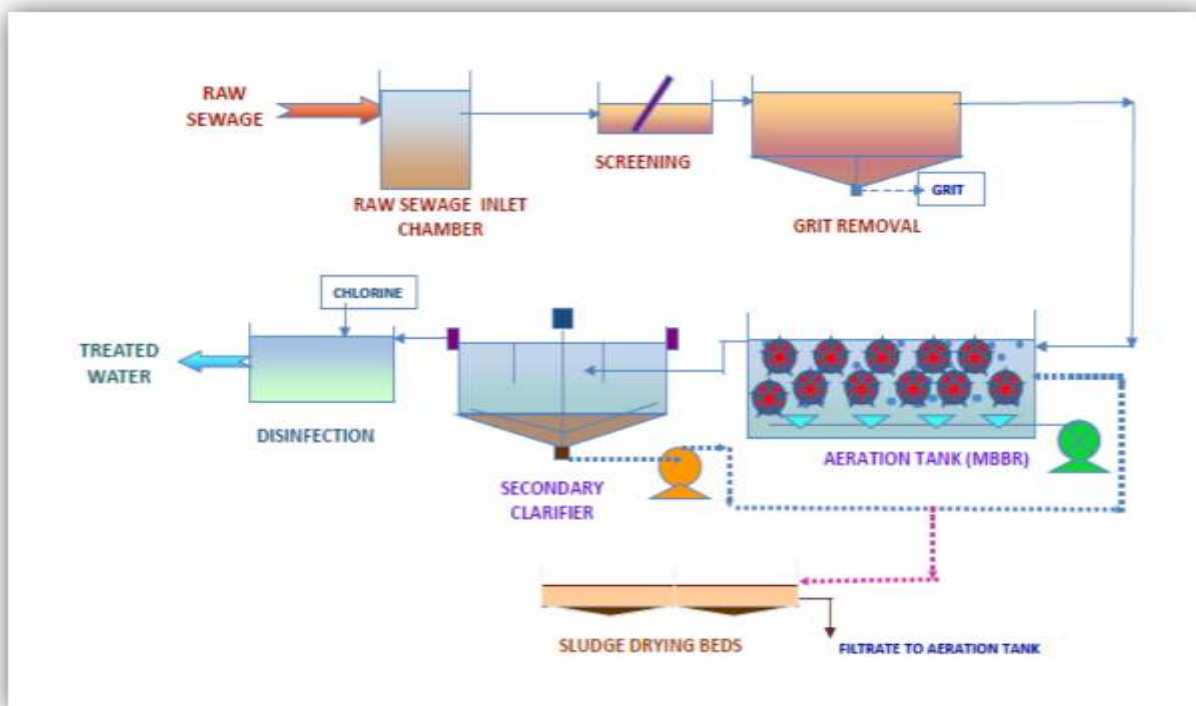


Figure 6: Schematic Diagram of MBBR STP

8. STORM WATER MANAGEMENT

The storm water disposal system for the premises shall be self-sufficient to avoid any collection/ stagnation and flooding of water. Maximum harvesting will be done within the site. Therefore, it has been decided to provide sufficient rain water harvesting at selected locations, which are liable to catch the maximum run-off from the area. Following are some measures for Storm water disposal:

- 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 annual rainfall intensity of 40 mm/hr shall be considered for designing the storm water drainage system.

The entire site is provided with extensive planned drainage system to low lying areas. The arrangement provides appropriate protection to the site against flooding.

10. RAIN WATER HARVESTING

Rainwater harvesting is the activity of direct collection of rainwater. Collected Rainwater will be stored for direct use or for recharging the groundwater. Rain Water Harvesting is the technique through which rain water is captured from the roof and paved surfaces and stored in sub-surface ground water reservoir by adopting artificial recharge techniques.

Advantages:

- ✓ To meet the ever increasing demand for water.
- ✓ To avoid flooding of roads.
- ✓ To augment the ground water storage and control the decline of water table levels.
- ✓ To reduce ground water pollution.
- ✓ To improve the quality of ground water.
- ✓ To reduce the soil erosion.
- ✓ To supplement domestic water requirement during summer, drought etc.
- ✓ Improves the quality of ground water through dilution when recharged to ground water.

As stated above, due to high ground water table, it is not feasible to provide the rain water recharge pits for aquifer recharging but there will be provision of the water sump for the collection of roof top rain water and it will be further used for miscellaneous purposes. The rainwater runoff from the roofs shall be transported through underground pipes to water sumps structures & surface rainwater shall naturally percolate in the underground aquifer through natural filtration.

Table-10: Rainwater Harvesting Calculation

Estimation of Quantum of runoff available through Rain water harvesting (within premises)				
Input Data				Reference
Catchment Area		Value		
1	Rooftop Area of	13542.22	sq-mtr	

Proposed Residential Building “Hari Nagar Premium Vaatika” at Mauza-Bhusaula, Danapur, Dist-Patna, Bihar by M/s Balprada Built Pvt. Ltd.

	Building/shed			
2	Green Belt Area	11629.814	sq-mtr	
3	Open & Paved Area	21601.316	sq-mtr	
	Total	46773.35		
Run off Coefficient, c				
	Rooftop Area of Building/shed	0.85		RWH in India, MoEF&CC, e-book 2016
	Green Belt Area	0.15		
	Paved Area	0.75		
	Open Area	0.15		
				CGWB Patna
Rainfall				
	Average Annual Rainfall	1076	mm/year	
	Hourly Peak Rainfall Intensity, I	45	mm/hour	
	Peak Time taken	15	minutes	
Total Volume of Water to be Captured on Annual Basis				$Q = A * c * I$
	Rooftop Area of Building/shed	12385.71	cu-m/year	
	Green Belt Area	1877.05	cu-m/year	
	Paved Area	17432.26	cu-m/year	
Runoff Calculation for the Peak Rainfall, Q				
	Rooftop Area of Building/shed	129.50	cu-mtr/hour	RWH in India, MoEF&CC, e-book 2016
	Green Belt Area	19.63	cu-mtr/hour	
	Paved Area	182.26	cu-mtr/hour	
	Total	331.38	cu-mtr/hour	
Annual Recharge Potential				IMD
	Recharge Potential	31695.03	cu-m/year	
	Rainy Season	June-Sep		
Design of Recharge Structure for Peak Flow				
Calculation for One Pit				
	Diameter of Pit	3.5	mtr	
	Depth of the Pit	3	mtr	
	Volume of the Pit	28.86	cu-mtr	
Number of Pits Required to store the peak discharge		11.5		
Rain water harvesting Pits provided		12		

Number of RWH Pits Proposed = ~12

11. POWER REQUIREMENT

The total electrical load demand has been estimated to be ~8350 KW. The source of power will be supplied by State Electricity Board.

In case of power failure, 4 DG sets of each of capacity of 5 x 1500 KVA, 1 x 1010 KVA & 1 x 380KVA, Total 8890 KVA of DG sets will be provided as power back-up. The DG sets are located in the basement and will be air cooled.

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

Calculation of DG Stack Height:

$$H = h + 0.2 \sqrt{\text{(capacity of DG in KVA.)}}$$

Where:

H = Total height of stack in meter.

h = Height of the building in meters where the generator set is installed.

KVA = Total generator capacity in the set of KVA.

For DG set of 1500 KVA

$$H = h + 0.2 \sqrt{1500}$$

$$H = h + 0.2 \times 38.73$$

$$H = h + 8$$

We suggest 8 meter above the max. Height of the building

For DG set of 1010 KVA

$$H = h + 0.2 \sqrt{1010}$$

$$H = h + 0.2 \times 31.78$$

$$H = h + 6$$

We suggest 6 meter above the max. Height of the building

For DG set of 380 KVA

$$H = h + 0.2 \sqrt{380}$$

$$H = h + 0.2 \times 19.49$$

$$H = h + 4$$

We suggest 4 meter above the max. Height of the building

12. SOLID WASTE GENERATION AND MANAGEMENT

The project will adopt a systematic approach for solid waste collection and disposal. Solid waste generated from the project will be collected properly and will be managed as per Solid Waste Management Rules, 2026. Following solid waste generation rate has been considered as given in **Table-11**.

Table 11: Solid waste Generation details

Solid waste Generation details							
S. No.	Category of Solid Waste	Waste Generation Rate	Formula	Total Population	Waste Generated	Bio-degradable	Non-biodegradable
1	Residential Refuse	0.3 to 0.6 kg/cap/day	Total Population*0.45	7890	3550.5	1420.2	2130.3
2	Visitor (10% of the residential Population)	0.1 to 0.2 kg/cap/day	Total Population*0.1	789	78.9	31.56	47.34
	Total			8679	3629	1452	2178

Source: Manual on Municipal Solid Waste Management, published by Central Public Health and Environmental Engineering Organization (CPHEEO), Ministry of Urban Development, Government of India.

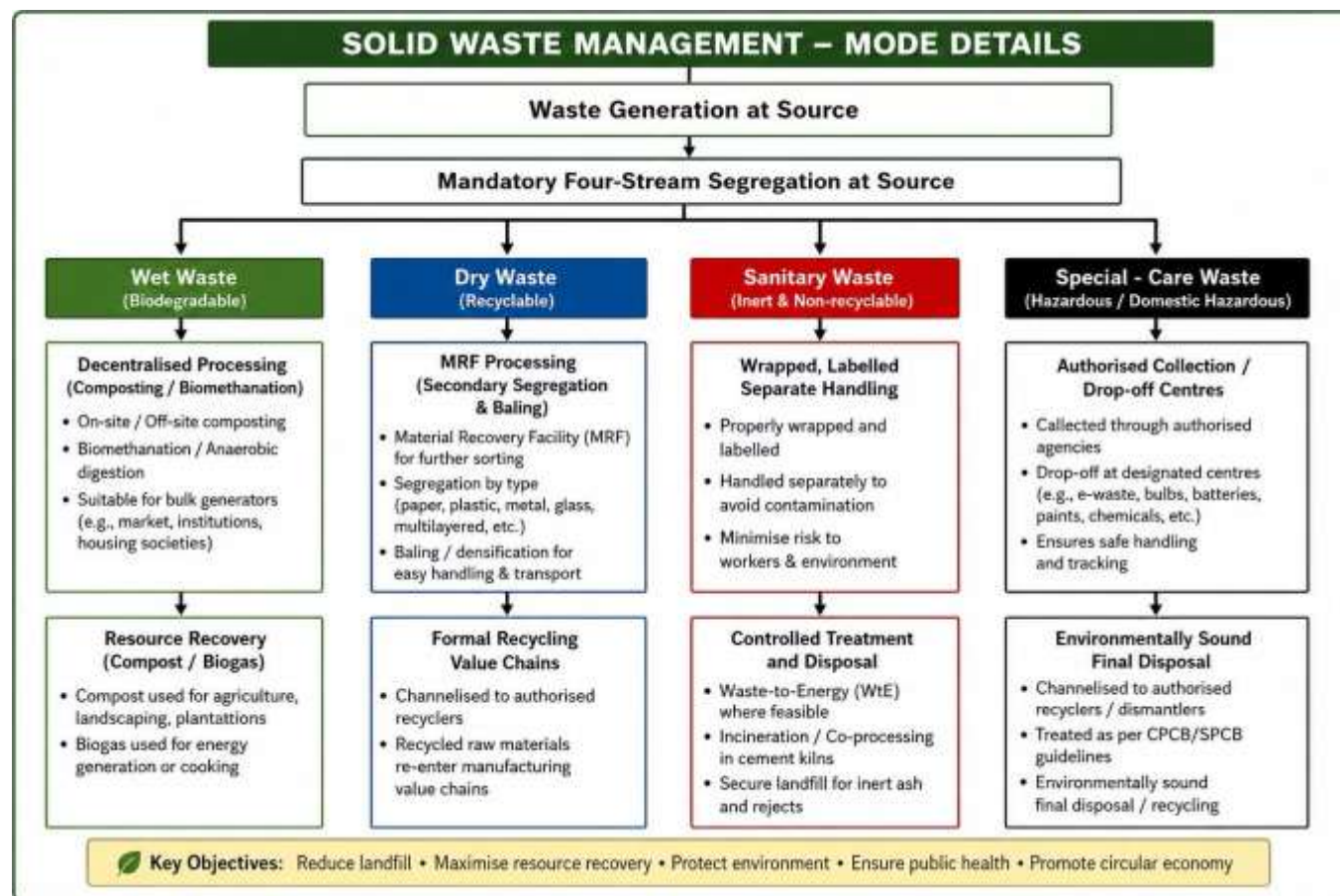


Figure-8: Solid Waste Management during Operation Phase

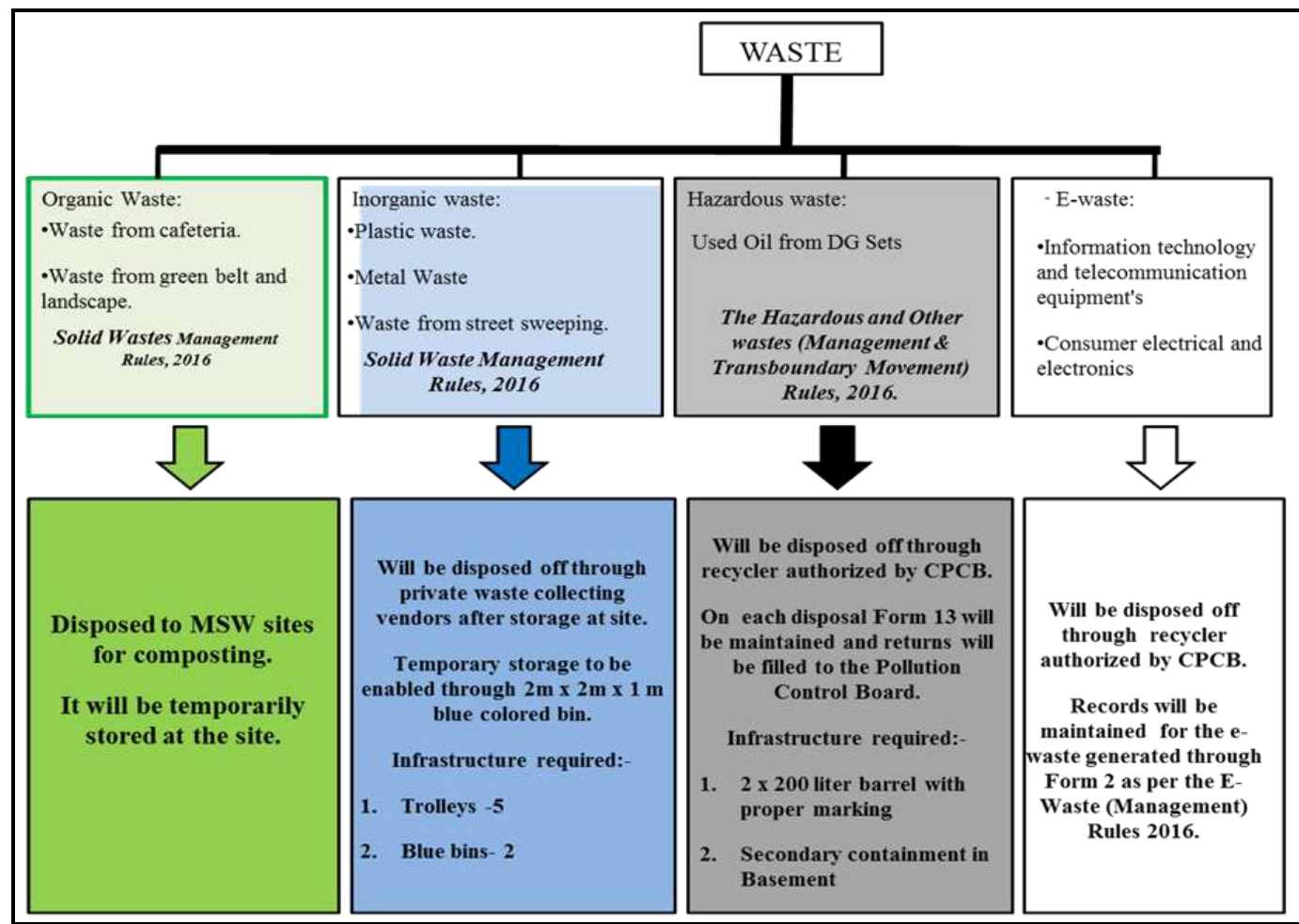


Figure-9: Hazardous Waste Management Plan

13. FIRE FIGHTING SYSTEM

The Fire Fighting will be designed as per the recommendations of the National Building Code of India: Part 4 Fire and Life safety: 1997. The building has been classified under Group-C: Institutional Building, Sub Division (C-1) in the National Building Code 2016.

The fire-fighting system has been designed considering the following codes, manual and guidelines;

- National Building Code of India (NBC)
- As per requirement of fire officer/local fire approving authorities; and
- As per Indian Standard Code for Fire Protection (IS Codes)

14. DETAIL OF CONSTRUCTION MATERIAL

List of building materials will be used at site:

- Sand 5315079 Cu. Ft.
- Stone aggregate(10 MM)- 1622497 Cu. Ft.
- Stone aggregate(20 MM)- 2433746 Cu. Ft.
- Cement(50 Kg/BAG)-1118964 BAG
- Bricks-23777984.575
- Steel- 10490 Ton

PLY- 507585 SFT Finishing materials like tiles, sanitary fixtures, etc. shall be stored in closed rooms..

16. Occupational Health and Safety (during construction)

The Management of the project has committed for the health and safety of workers as under;

- The management declares its intention and commitment with all relevant statutory requirements in regard to environment, health and safety of workers.
- The management has assigned the responsibility at different levels as:

Project Manager : For all the workers/employees.

Supervisor : For casual and daily/unskilled workers.

The management will ensure the occupational health and safety, at the site during construction, by adopting following practices;

- a) Every responsible effort will be made to provide and maintain safe and healthy working conditions, environment, and system of work for all employees.
- b) It will also endeavor of the project proponent to ensure that surrounding environment is not adversely affected by the work activity.
- c) The working environment would be healthy and co-operative.
- d) The prevention of accidents or accident hazards leading to personal injury or damage of equipment/property is recognized as essential as an integral part of efficient operations.
- e) Every employee will follow safety rules/regulations, operating procedures/safe work method

design to protect people and equipment from risk of injury or damage to property.

- f)** The project will endeavor to adequately train all employees suitably equip them to perform their duties in a safe and effective way.
- g)** Every employee will discharge his personal responsibility, and shall co-operate and actively participate in maintaining and improving safety standards.
- h)** A primary health care centre will be provided within the campus. Besides, there is a multi-specialty private hospital (on panel of the institute) just opposite to the institute entrance.
- i)** A doctor will be appointed for health checkup of workers at regular intervals and related records shall be maintained. A doctor and a hospital will be empanelled for attending off site health problems of the workers.
- j)** First Aid kits will be kept ready and available to the workers, in case of emergencies, company will provide fastest possible medical aid. Staff will be adequately trained for this.
- k)** Adequate supply of clean drinking water, neat and clean toilets and washing facilities will be provided at the site.
- l)** Proper ventilation, wherever required, shall be provided in the work areas.
- m)** Proper safety and protections, steps and guards shall be provided at all required places.
- n)** Suitable safety instructions will be displayed in writing (including that in vernacular language) for all critical areas and working conditions.
- o)** A vehicle/ambulance will be specifically positioned at the site for emergency evacuation of workers in case of any health problem/accident.