BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI
O. A. No. 404 OF 2025

IN THE MATTER OF:

RAM KISHORE YADAV ...APPLICANT

VERSUS

MINISTRY OF ENVIRONMENT,
FORESTS & CLIMATE CHANGE & ORS. ...RESPONDENTS

INDEX FOR VOLUME-II

S.NO	PARTICULARS	PAGES
3.	**ANNEXURE-R1** A copy of the Environmental Impact Assessment (EIA) Report submitted vide Letter dated 21.04.2022.	201 – 399

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D/8495/2018

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PLACE: NEW DELHI
DATE: 19.12.2025

Air Pollutants upon discharge to atmosphere pass through a number of mechanisms, which include diffusion and transportation leading to dispersion. These mechanisms are governed by the local atmospheric conditions. All these result in the necessity to collect the meteorological parameters like ambient temperature, wind speed, wind direction, and other weather conditions (relative humidity, atmospheric pressure etc.), which will be ultimately used for the prediction of the ground level concentrations of the air pollutants through mathematical modeling.

3.4.3 AMBIENT AIR QUALITY

The baseline air quality study was done to assess the existing air quality of the area. This will also be useful for assessing the conformity to standards of the ambient air quality during the operation after the project.

3.4.3.1 AMBIENT AIR MONITORING

(A) Selection of Sampling Locations:

Ambient air monitoring was carried out on monthly basis in the surrounding areas of the project site to assess the ambient air quality. To know the ambient air quality of the study area, air quality survey has been conducted at 8 locations over a period of pre-monsoon season i.e. March 2021 to May 2021. Major air pollutants viz, Particulate Matter (PM_{10}), $PM_{2.5}$, Sulphur Dioxide (SO_2), Nitrogen Dioxide (NO_2), Carbon Monoxide (CO) represents the basic air pollutants in the region for Ambient Air Quality Monitoring (AAQM). The ambient air quality monitoring stations is given in **Table- 3.7** and depicted as **Figure- 3.5**

Table3.7: Ambient Air Quality Monitoring Locations

CODE	LOCATION	DISTANCE	DIRECTION	LATITUDE	LONGITUDE
A1	Project Site	-	-	28° 26' 44.653" N	77° 6' 49.741" E
A2	Open Scrub Near DLF Phase 5	0.65	SE	28° 26' 28.685" N	77° 7' 5.118" E
A3	Near Emaar The Palm Spring	0.55	SW	28° 26' 37.817" N	77° 6' 27.221" E
A4	Near Gwalpahari	2.25	ESE	28° 26' 24.196" N	77° 8' 9.049" E
A5	Sector 54	2.48	SSW	28° 25' 28.903" N	77° 6' 23.472" E
A6	Near Arjungarh	1.87	NE	28° 27' 31.612" N	77° 7' 31.259" E
A7	Near DLF Phase 5	1.49	NNW	28° 27' 14.200" N	77° 6' 39.368" E
A8	Near Qutab Plaza	2.41	NNW	28° 27' 42.618" N	77° 6' 25.230" E

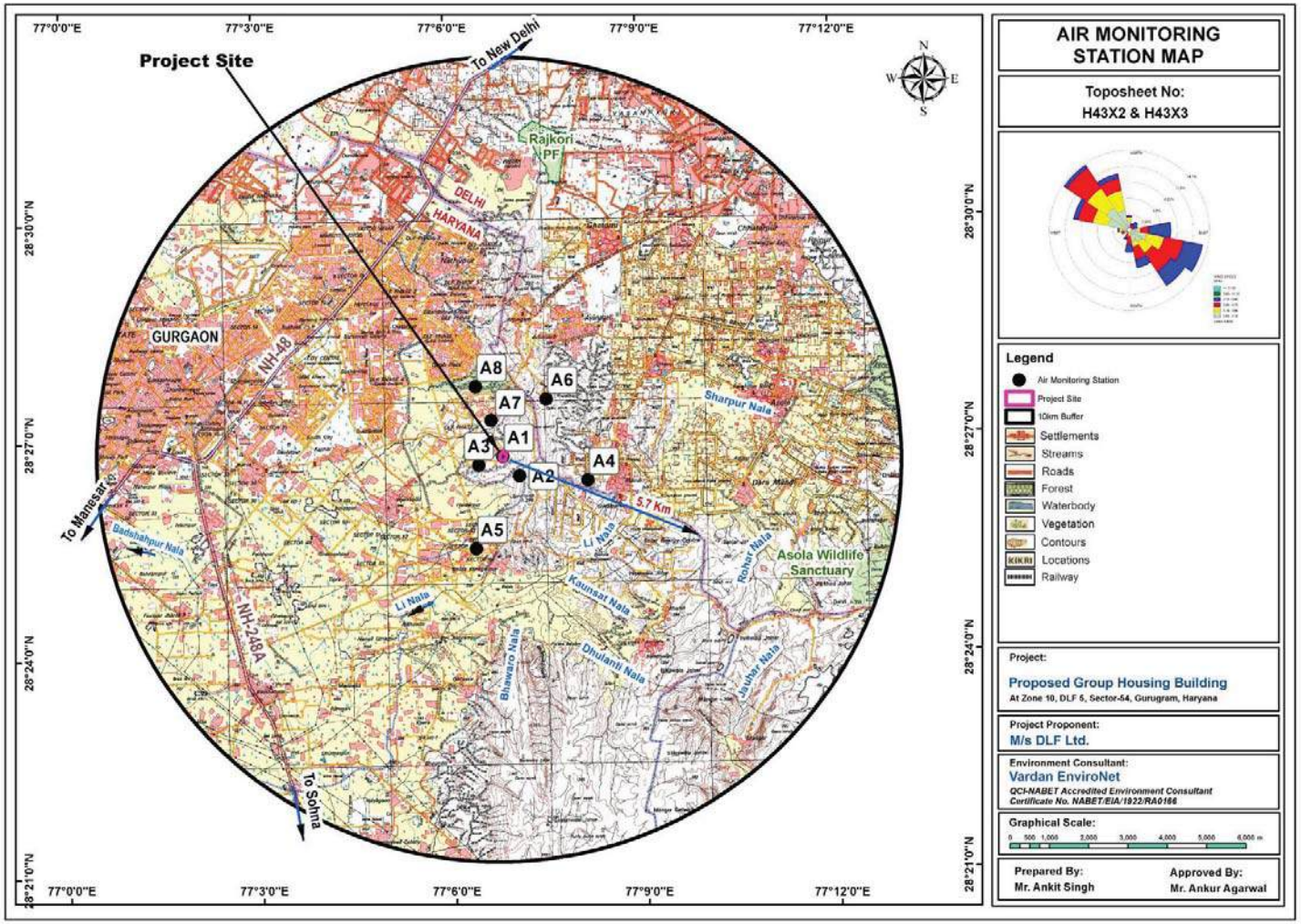


Figure- 3.5: Toposheet map showing Air Monitoring Location

(B) Parameters, Frequency and Monitoring Methodology

Ambient Air quality monitoring was conducted in respect of the following parameters:

- Particulate Matter (PM_{10})
- Particulate Matter ($PM_{2.5}$)
- Sulphur Dioxide (SO_2)
- Nitrogen Dioxide (NO_2)
- Carbon Monoxide (CO)

Ambient air quality monitoring was conducted over 3 month i.e. from December 2021 to February 2022 at a frequency of twice a week at each station adopting a 24-hours schedule. The sampling equipment was placed at a height of 3 to 3.5 meters above ground level at each monitoring station, thus negating the effects of wind blow ground dust. The equipment was placed at open space free from trees and vegetation which otherwise act as a sink of pollutants resulting in lower levels in monitoring results. At locations close to internal roads, the equipment was placed at least 10 m away from such roads to avoid influence of traffic exhaust emissions.

Table-3.8: Methodology for Ambient Air Quality Monitoring

Parameter	Measurement Methods
PM_{10}	Gravimetric
$PM_{2.5}$	Gravimetric
SO_2	Colorimetric (EPA modified West and Gaeke Method)
NO_2	Colorimetric (Arsenite modified Jacobs and Hochheiser Method)
CO	Gas Chromatography

(C) Monitoring Results

Monitoring station-wise minimum and statistical analysis (minimum, maximum, arithmetic mean) for measured levels of PM_{10}, $PM_{2.5}$, SO_2, NO_2 and CO in study area for the monitoring period are shown parameter wise in **Table-3.9.**

Table-3.9: Results of Ambient Air Quality Analysis of Period December 2021-February 2022)

Locations	Parameters	PM_{10}	$PM_{2.5}$	NO_2	SO_2	CO
Project Site (A1)	Minimum	125.00	67.20	21.00	8.00	0.83
	Maximum	135.00	74.00	29.90	12.80	1.20
	Average	129.53	70.37	26.36	9.91	0.97
	98 % tile	134.84	73.84	29.80	12.64	1.19
	Limit	**100.00**	**60.00**	**80.00**	**80.00**	**4.00**
Open Scrub Near DLF Phase-5 (A2)	Minimum	105.10	62.00	20.00	6.10	0.60
	Maximum	118.00	68.00	25.50	9.00	0.92
	Average	111.25	64.80	22.88	7.81	0.74
	98 % tile	117.74	67.79	25.45	8.95	0.90
Near Emaar Palm Spring (A3)	Minimum	120.20	66.20	24.20	6.70	0.75
	Maximum	130.10	72.10	29.00	10.50	1.06
	Average	125.41	68.62	26.45	8.40	0.86
	98 % tile	130.05	72.05	28.79	10.45	1.04
Near Gwalpahari (A4)	Minimum	98.90	52.80	21.80	5.90	0.55
	Maximum	120.40	69.40	27.90	8.00	0.86
	Average	114.07	65.83	25.79	6.69	0.68
	98 % tile	120.20	69.20	27.75	7.95	0.86
Sector-54 (A5)	Minimum	130.00	70.00	25.00	8.30	0.80
	Maximum	140.50	75.50	30.50	12.90	1.10
	Average	136.07	73.25	27.78	10.53	0.92
	98 % tile	140.45	75.45	30.45	12.80	1.08
Near Arjun garh (A6)	Minimum	115.50	65.30	20.80	5.10	0.41
	Maximum	125.20	70.20	27.30	7.80	0.85
	Average	120.34	67.65	25.48	6.48	0.66
	98 % tile	125.05	70.05	27.30	7.75	0.82
Near DLF Phase 5(A7)	Minimum	85.40	46.20	17.30	5.00	0.50
	Maximum	95.60	57.50	25.70	6.80	0.65
	Average	89.90	50.72	22.22	5.95	0.57
	98 % tile	95.55	56.83	25.46	6.75	0.65
Near Qutub Plaza(A8)	Minimum	88.80	49.80	18.80	14.10	0.53
	Maximum	98.40	59.50	26.30	19.40	0.75
	Average	93.96	54.92	22.82	16.43	0.65
	98 % tile	98.30	59.45	26.20	19.35	0.75

(i) Particulate Matter ($PM_{2.5}$)

The 24-hourly maximum and minimum PM2.5 level varied station-wise is 75.50 µg/m to 46.20 µg/m for the monitoring period 1st December 2021 to 28th February, 2022. Overall in all cases in the study area the 24-hourly average values of $PM_{2.5}$ observed, which indicates that the $PM_{2.5}$ concentration at maximum value are exceeding by NAAQ standard at all monitoring locations. This is because of heavy traffic on NH-48.

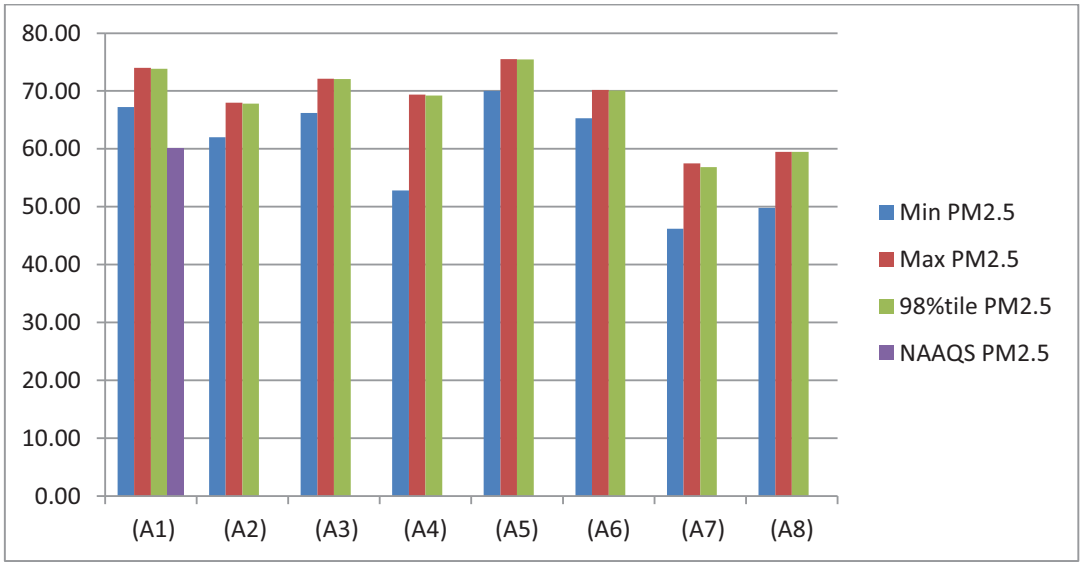


Figure-3.6: Graph showing concentration of $PM_{2.5}$ µg/m^3

(ii) Particulate Matter (PM_{10})

The 24-hourly maximum and minimum PM10 level varied station-wise is 135.00 µg/m to 85.40 µg/m for the monitoring period 1st December 2021 to 28th February, 2022. Overall in all cases in the study area the 24-hourly average values of PM_{10} observed, which indicates that the PM_{10} concentration at maximum value are exceeding by NAAQ standard at all monitoring locations. This is because of heavy traffic on National Highway-48.

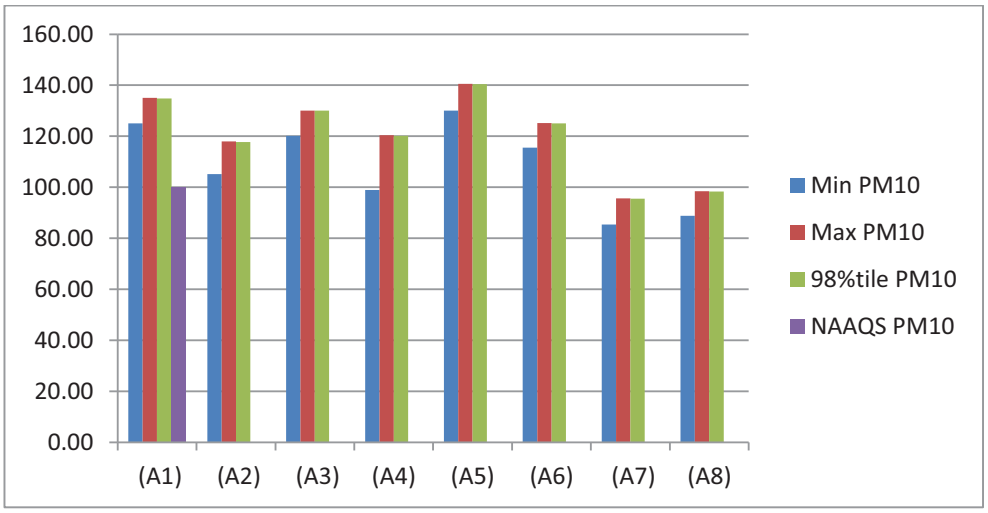


Figure-3.7: Graph showing concentration of PM_{10} µg/m^3

(iii) Sulphur Dioxide (SO_2)

The 24-hourly maximum and minimum SO2 level varied station-wise is 19.40 µg/m to 5.00 µg/m for the monitoring period 1st December 2021 to 28th February, 2022. Overall in all cases in the study area the 24-hourly average values of SO_2 observed were below the limit of 80 µg/m^3 for Residential, Rural and Other areas as stipulated in the National Ambient Air Quality Standards.

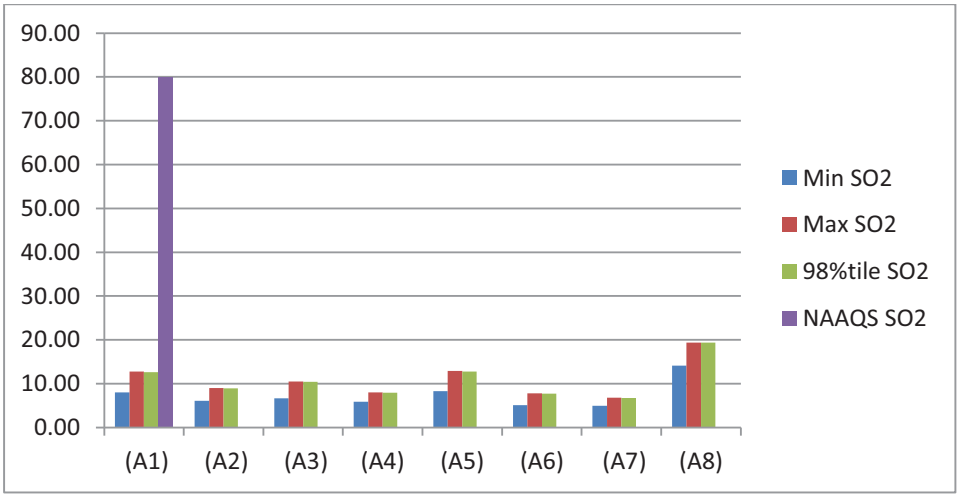


Figure-3.8 Graph showing concentration of SO_2 µg/m^3

(iv) Nitrogen Dioxide (NO_2)

The 24-hourly maximum and minimum NO2 level varied station-wise is 30.50 µg/m to 17.30 µg/m for the monitoring period 1st December 2021 to 28th February, 2022. Overall in all cases in the study area the 24-hourly average values of NO_2 observed were below the limit of 80 µg/m^3 for Residential, Rural and Other areas as stipulated in the National Ambient Air Quality Standards.

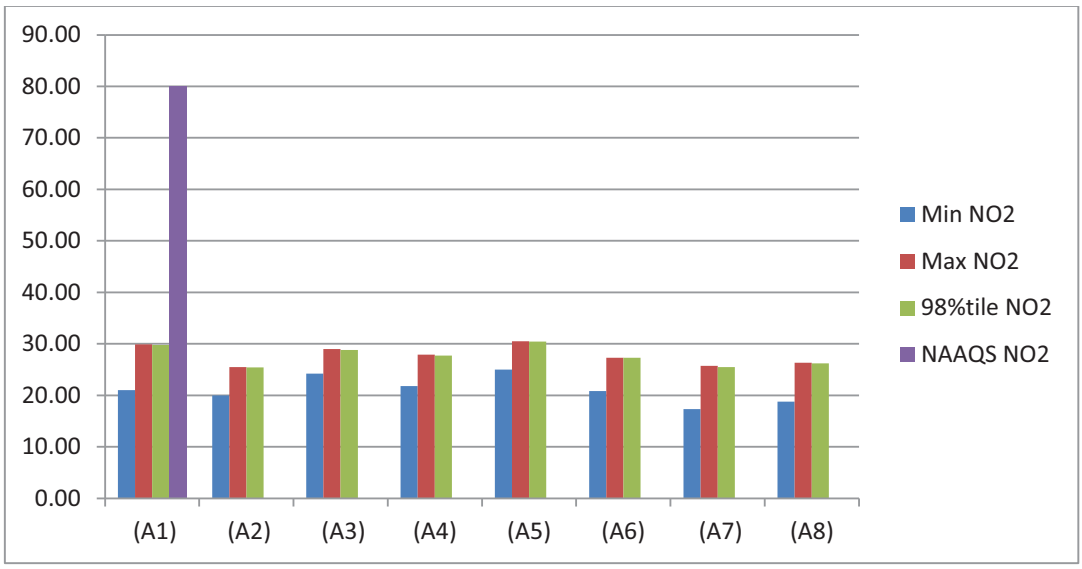


Figure-3.9: Graph showing concentration of NO_2 µg/m^3

(v) Carbon Monoxide (CO)

The 1-hourly maximum and minimum CO level varied station-wise is 1.20 mg/m3 to 0.41 mg/m3 for the monitoring period 1st December 2021 to 28th February, 2022.Overall in all cases of the study area, the 8 hourly average values of CO observed were below the limit of 4 mg/m^3 for Residential, Rural and Other areas as stipulated in the National Ambient Air Quality Standards.

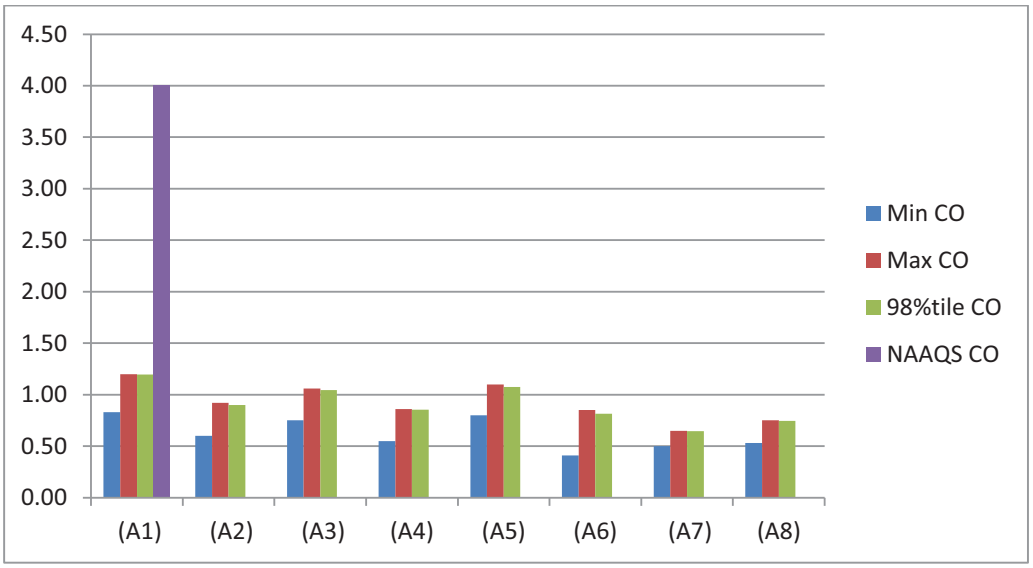


Figure-3.10: Graph showing concentration of CO µg/m^3

3.7.1.4 3.5 WATER ENVIRONMENT

Water quality assessment is one of the essential components of EIA study. Such assessment helps in evaluating the existing health of water body and suggesting appropriate mitigation measures to minimize the potential impact from development projects.

3.5.1 GROUND WATER QUALITY

Water quality of groundwater has been studied in order to assess proposed water-uses in construction, drinking, cooling and horticulture purpose. The water quality was monitored at 8 locations within 10 km of the proposed project. List of Ground water sampling location is given in **Table-3.10** and depicted in **Figure- 3.11**. All Ground water samples are analyzed as per IS-10500:1991(Drinking Water Specification of BIS). The results of the ground water samples analyzed are given in **Table-3.11.**

Table-3.10: Ground Water Sampling Location

CODE	LOCATION	DISTANCE	DIRECTION	LATITUDE	LONGITUDE
GW1	Dlf Phase 5	0.8	W	28° 26' 46.056" N	77° 6' 19.653" E
GW2	Village Wazirabad	2.61	WSW	28° 26' 13.681" N	77° 5' 19.406" E
GW3	Near Dlf Phase 5	3.16	NNW	28° 27' 36.572" N	77° 6' 21.091" E
GW4	Near Arjungarh	2.05	NNE	28° 27' 39.176" N	77° 7' 31.215" E
GW5	Near Gwalpahari	2.66	ESE	28° 26' 10.386" N	77° 8' 40.129" E
GW6	Sector 55	1.81	S	28° 25' 18.619" N	77° 6' 40.962" E
GW7	Village Qadirpur	6.05	SSW	28° 23' 37.968" N	77° 6' 7.698" E
GW8	Village Bandhwari	5.86	SE	28° 24' 4.818" N	77° 9' 0.561" E

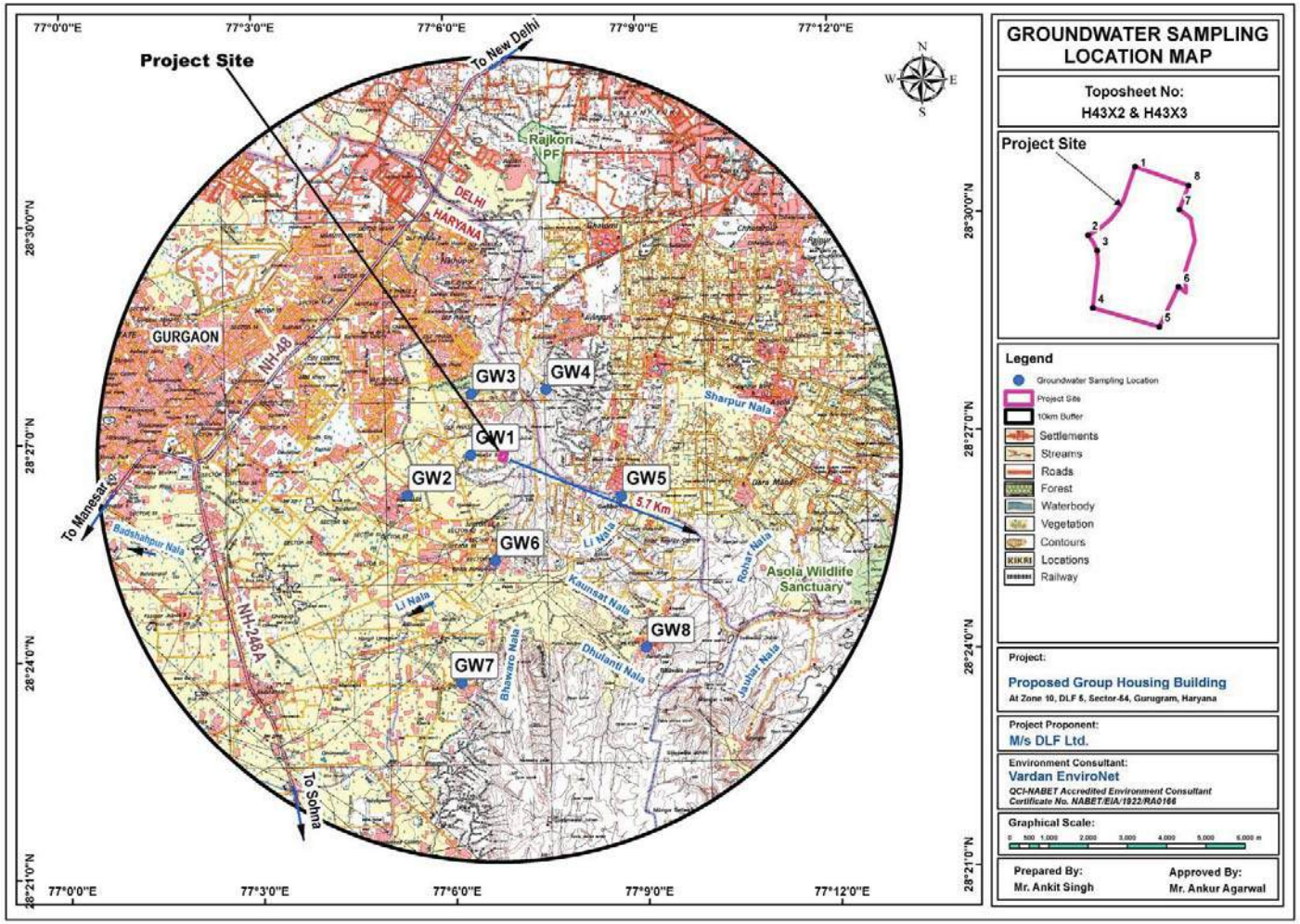


Figure 3.11: Water Sample Collection Locations

Table-3.10: Ground Water Analysis Result

S. No.	Parameter	Test-Method	Unit	Result							
				DLF Phase 5	Wazirabad	Near DLF Phase 5	Near Arjungarh	Gwalpahari	Sector-55	Qudirpur	Bandhwari
1	pH (at 25ºC)	APHA (22nd Edition)2012, 4500-H+ B	--	7.87	7.79	7.72	7.69	7.64	7.59	7.55	7.50
2	Colour	APHA (22nd Edition)2012, 2120 B	Hazen	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
3	Turbidity	APHA (22nd Edition)2012, 2130 B	NTU	*BDL (**DL 1.0 NTU)	*BDL (**DL 1.0 NTU)	*BDL (**DL 1.0 NTU)	*BDL (**DL 1.0 NTU)	*BDL (**DL 1.0 NTU)	*BDL (**DL 1.0 NTU)	*BDL (**DL 1.0 NTU)	*BDL (**DL 1.0 NTU)
4	Odour	APHA (22nd Edition)2012, 2150 B	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
5	Taste	APHA (22nd Edition)2012, 2160 B	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
6	Total Hardness as CaCO3	APHA (22nd Edition)2012, 2340 C	mg/l	661.00	642.00	617.00	597.00	582.00	546.00	520.00	500.00
7	Calcium as Ca	APHA (22nd Edition)2012, 3500 Ca B	mg/l	211.12	198.22	195.57	192.87	184.27	180.69	160.41	150.11
8	Alkalinity as CaCO3	APHA (22nd Edition)2012, 2320 B	mg/l	313.10	307.00	298.00	294.00	276.00	270.00	259.00	250.00

S. No.	Parameter	Test-Method	Unit	Result							
				DLF Phase 5	Wazirabad	Near DLF Phase 5	Near Arjungarh	Gwalpahari	Sector-55	Qudirpur	Bandhwari
9	Chloride as Cl	APHA (22nd Edition)2012, 4500-Cl- B	mg/l	210.02	217.52	203.23	194.58	190.90	174.25	164.19	157.47
10	Cyanide as CN	APHA (22nd Edition)2012, 4500 CN- D	mg/l	*BDL(**DL 0.02 mg/l)	*BDL(**DL 0.02 mg/l)	*BDL(**DL 0.02 mg/l)	*BDL(**DL 0.02 mg/l)	*BDL(**DL 0.02 mg/l)	*BDL(**DL 0.02 mg/l)	*BDL(**DL 0.02 mg/l)	*BDL(**DL 0.02 mg/l)
11	Magnesium as Mg	APHA (22nd Edition)2012, 3500 Mg B	mg/l	32.62	35.83	31.36	28.14	29.71	23.13	29.11	30.49
12	Total Dissolved Solids	APHA (22nd Edition)2012, 2540 C	mg/l	891.00	867.00	826.00	775.00	753.00	715.00	677.00	659.00
13	Sulphate as SO4	APHA (22nd Edition)2012, 4500 E	mg/l	157.00	140.00	132.18	110.25	109.22	106.58	102.55	100.10
14	Fluoride as F	APHA (22nd Edition)2012, 4500-F- D	mg/l	0.92	0.75	0.69	0.65	0.61	0.53	0.48	0.41
15	Nitrate as NO3	IS 3025 (P-34) 2003	mg/l	33.21	30.47	27.46	27.12	30.99	24.63	20.78	28.79
16	Iron as Fe	APHA (22nd Edition)2012, 3500-Fe B	mg/l	0.56	0.48	0.33	0.28	0.42	0.26	0.29	0.21
17	Aluminium as Al	APHA (22nd Edition)2012, 3111 B	mg/l	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)

S. No.	Parameter	Test-Method	Unit	Result							
				DLF Phase 5	Wazirabad	Near DLF Phase 5	Near Arjungarh	Gwalpahari	Sector-55	Qudirpur	Bandhwari
18	Boron	APHA (22nd Edition)2012, 4500B C	mg/l	*BDL(**DL 0.01 mg/l)	*BDL(**DL 0.01 mg/l)	*BDL(**DL 0.01 mg/l)	*BDL(**DL 0.01 mg/l)	*BDL(**DL 0.01 mg/l)	*BDL(**DL 0.01 mg/l)	*BDL(**DL 0.01 mg/l)	*BDL(**DL 0.01 mg/l)
19	Total Chromium as Cr	APHA (22nd Edition)2012, 3111 B	mg/l	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)
20	Conductivity	APHA 22nd Edition, 2510 B	µS/cm	1371	1334	1270	1193	1158	1100	1042	1014
21	Phenolic Compounds	APHA (22nd Edition)2012, 5530 C	mg/l	*BDL(**DL 0.0004 mg/l)	*BDL(**DL 0.0004 mg/l)	*BDL(**DL 0.0004 mg/l)	*BDL(**DL 0.0004 mg/l)	*BDL(**DL 0.0004 mg/l)	*BDL(**DL 0.0004 mg/l)	*BDL(**DL 0.0004 mg/l)	*BDL(**DL 0.0004 mg/l)
22	Mineral Oil	Clause 6 of IS:3025(Part 39)	mg/l	*BDL(**DL 0.05 mg/l)	*BDL(**DL 0.05 mg/l)	*BDL(**DL 0.05 mg/l)	*BDL(**DL 0.05 mg/l)	*BDL(**DL 0.05 mg/l)	*BDL(**DL 0.05 mg/l)	*BDL(**DL 0.05 mg/l)	*BDL(**DL 0.05 mg/l)
23	Anionic Detergents as MBAS	Annex K of IS 13428, IS 3025 (P-68)	mg/l	*BDL(**DL 0.05 mg/l)	*BDL(**DL 0.05 mg/l)	*BDL(**DL 0.05 mg/l)	*BDL(**DL 0.05 mg/l)	*BDL(**DL 0.05 mg/l)	*BDL(**DL 0.05 mg/l)	*BDL(**DL 0.05 mg/l)	*BDL(**DL 0.05 mg/l)
24	Zinc as Zn	APHA (22nd Edition)2012, 3111 B	mg/l	2.33	2.19	1.96	1.88	1.94	1.79	1.54	1.12
25	Copper as Cu	APHA (22nd Edition)2012, 3111 B	mg/l	0.42	0.38	0.31	0.19	0.17	0.11	0.14	0.10
26	Manganese as Mn	APHA (22nd Edition)2012,	mg/l	*BDL(**DL 0.01	*BDL(**DL 0.01	*BDL(**DL 0.01	*BDL(**DL 0.01	*BDL(**DL 0.01	*BDL(**DL 0.01	*BDL(**DL 0.01	*BDL(**DL 0.01

S. No.	Parameter	Test-Method	Unit	Result							
				DLF Phase 5	Wazirabad	Near DLF Phase 5	Near Arjungarh	Gwalpahari	Sector-55	Qudirpur	Bandhwari
		3111 B		mg/l)	mg/l)	mg/l)	mg/l)	mg/l)	mg/l)	mg/l)	mg/l)
27	Cadmium as Cd	APHA (22nd Edition)2012, 3111 B	mg/l	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)
28	Lead as Pb	APHA (22nd Edition)2012, 3111 B	mg/l	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)
29	Selenium as Se	APHA (22nd Edition)2012, 3111 B	mg/l	*BDL(**DL 0.001 mg/l)	*BDL(**DL 0.001 mg/l)	*BDL(**DL 0.001 mg/l)	*BDL(**DL 0.001 mg/l)	*BDL(**DL 0.001 mg/l)	*BDL(**DL 0.001 mg/l)	*BDL(**DL 0.001 mg/l)	*BDL(**DL 0.001 mg/l)
30	Arsenic as As	APHA (22nd Edition)2012, 3111 B	mg/l	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)
31	Mercury as Hg	APHA (22nd Edition)2012, 3111 B	mg/l	*BDL (**DL 0.0005 mg/l)	*BDL (**DL 0.0005 mg/l)	*BDL (**DL 0.0005 mg/l)	*BDL (**DL 0.0005 mg/l)	*BDL (**DL 0.0005 mg/l)	*BDL (**DL 0.0005 mg/l)	*BDL (**DL 0.0005 mg/l)	*BDL (**DL 0.0005 mg/l)
32	Total Coliform	IS 1622,1981(Reaffirmed 2003)	MPN/ 100ml	<2	<2	<2	<2	<2	<2	<2	<2
33	E. Coli	IS 1622,1981(Reaffirmed 2003)	MPN/ 100ml	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent

3.5.2 SURFACE WATER QUALITY:

Table-3.12: Surface Water Sampling Location

CODE	LOCATION	DISTANCE	DIRECTION	LATITUDE	LONGITUDE
SW1	Pond Near Central Plaza Mall	1.4	WSW	28° 26' 26.819" N	77° 5' 55.851" E
SW2	Pond Near Mandi Village	2.17	ENE	28° 27' 6.080" N	77° 8' 4.730" E
SW3	Pond Near Sukhrali Village	5.82	NW	28° 28' 32.180" N	77° 3' 48.710" E
SW4	Pond Near Ghitorni Village	6.07	NNE	28° 29' 39.707" N	77° 8' 24.514" E
SW5	Pond Near Dera Mandi Village	6.54	ESE	28° 26' 6.600" N	77° 10' 45.710" E
SW6	Pond Near Bhaundsi Village	7.8	SSW	28° 22' 41.048" N	77° 5' 31.767" E
SW7	Pond Near Badshahpur	9.87	SW	28° 23' 14.040" N	77° 2' 18.720" E

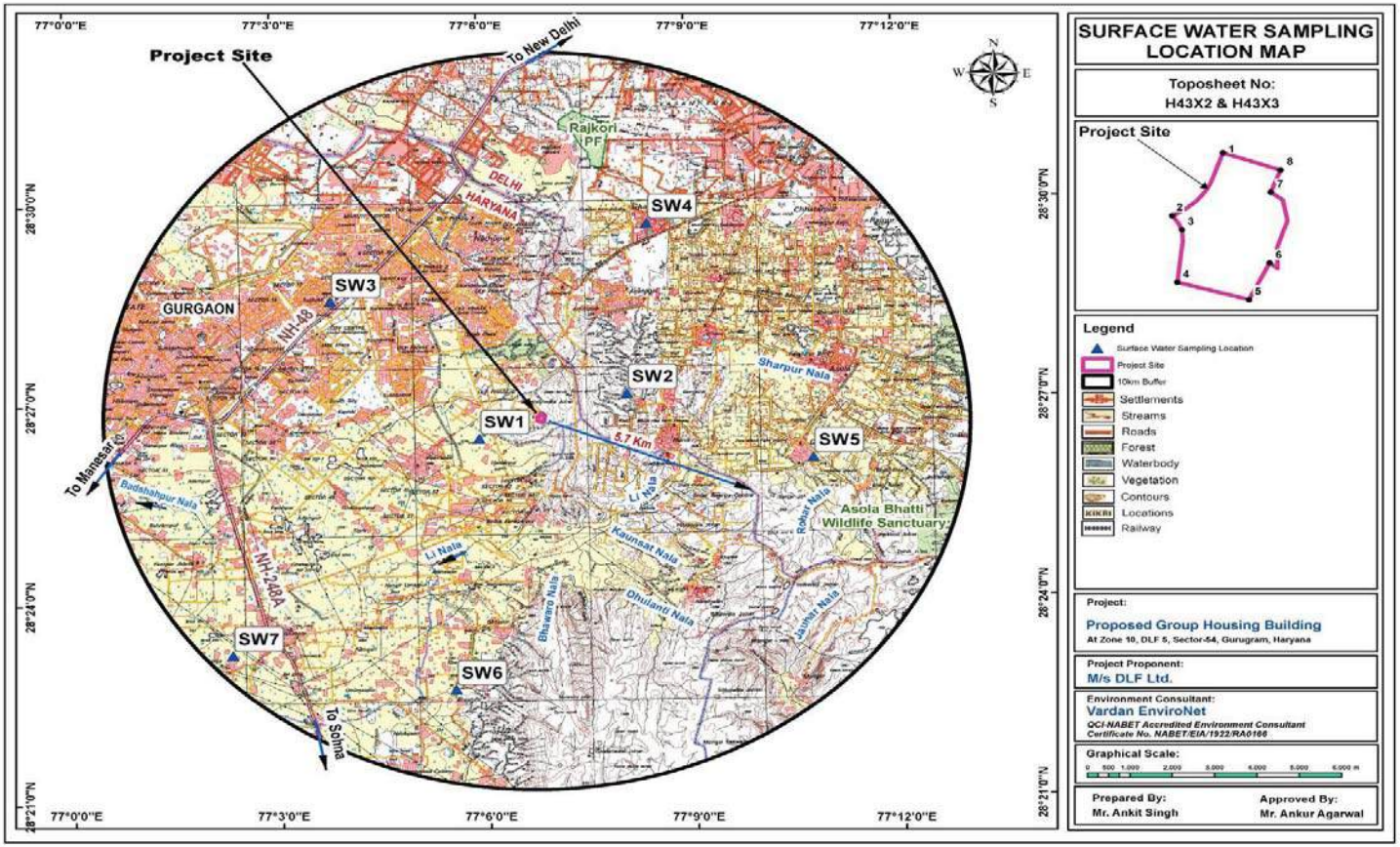


Figure 3.12: Surface Water Sample Collection Locations

Table-3.13: Surface Water Analysis Result of Period

S. No	Parameter	Test-Method	Unit	Result						
				Pond Near Central Plaza Mall	Pond Near Mandi Village	Pond Near Sukhrali Village	Pond Near Ghitorni	Pond Near Dera Mandi Village	Pond Near Bhaundsi	Pond Near Badshahpur
1	pH (at 25ºC)	APHA 22nd Edition, 4500-H+B	--	7.78	7.81	7.68	7.76	7.60	7.58	7.52
2	Colour	APHA 22nd Edition, 2120 B	Hazen	6.0	6.0	6.0	10.00	3.0	6.0	10.00
3	Turbidity	APHA 22nd Edition, 2130 B	NTU	23.00	25.00	22.00	26.00	28.00	20.00	32.00
4	Odour	APHA 22nd Edition, 2150 B	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
5	Total Hardness as CaCO3	APHA 22nd Edition, 2340 C	mg/l	761.82	711.52	707.42	718.84	721.24	689.00	658.21
6	Calcium as Ca	APHA 22nd Edition, 3500 Ca B	mg/l	229.51	214.42	204.53	231.62	232.52	204.20	189.62
7	Alkalinity as CaCO3	APHA 22nd Edition, 2320 B	mg/l	541.70	538.00	511.82	530.52	538.41	516.00	495.52
8	Chloride as Cl	APHA 22nd Edition, 4500-	mg/l	314.82	321.51	318.91	320.21	215.00	187.82	180.85

S. No	Parameter	Test-Method	Unit	Result						
				Pond Near Central Plaza Mall	Pond Near Mandi Village	Pond Near Sukhrali Village	Pond Near Ghitorni	Pond Near Dera Mandi Village	Pond Near Bhaundsi	Pond Near Badshahpur
		Cl- B								
9	Residual free Chlorine	APHA 22nd Edition, 4500 Cl-B	mg/l	*BDL(**DL 0.15mg/l)	*BDL(**DL 0.15mg/l)	*BDL(**DL 0.15mg/l)	*BDL(**DL 0.15mg/l)	*BDL(**DL 0.15mg/l)	*BDL(**DL 0.15mg/l)	*BDL(**DL 0.15mg/l)
10	#Cyanide as CN	APHA 22nd Edition, 4500 CN-D	mg/l	*BDL(**DL 0.02 mg/l)	*BDL(**DL 0.02 mg/l)	*BDL(**DL 0.02 mg/l)	*BDL(**DL 0.02 mg/l)	*BDL(**DL 0.02 mg/l)	*BDL(**DL 0.02 mg/l)	*BDL(**DL 0.02 mg/l)
11	Magnesium as Mg	APHA 22nd Edition, 2340 B	mg/l	45.97	42.90	47.90	34.25	34.29	43.62	44.98
12	Total Dissolved Solids	APHA 22nd Edition, 2540 C	mg/l	1339.00	1352.00	1300.00	1334.00	1170.00	1063.00	1029.00
13	Total Suspended solids	APHA 22nd Edition,2540 D	mg/l	52.00	56.00	48.00	50.00	60.00	47.00	68.00
14	Dissolved Oxygen	APHA 22nd Edition,4500	mg/l	6.2	6.3	6.6	6.4	5.8	6.3	6.2
15	Sulphate as SO4	APHA 22nd Edition, 4500 E	mg/l	188.00	185.00	179.00	180.00	178.00	160.35	154.00
16	Fluoride as F	APHA 22nd Edition, 4500-F- D	mg/l	0.25	0.24	0.32	0.25	0.26	0.29	0.32

S. No	Parameter	Test-Method	Unit	Result						
				Pond Near Central Plaza Mall	Pond Near Mandi Village	Pond Near Sukhrali Village	Pond Near Ghitorni	Pond Near Dera Mandi Village	Pond Near Bhaundsi	Pond Near Badshahpur
17	BOD (3 Days at 270C)	IS 3025,P-44,1999 (R-2003)	mg/l	14.00	17.00	15.00	13.00	12.00	11.00	16.00
18	COD	APHA 22nd Edition, 5220 B	mg/l	48.00	60.00	56.00	46.00	44.00	40.00	56.00
19	Conductivity at 25^{0} C	APHA 22nd Edition, 2120 B	µS/cm	2.06	2.07	2.00	2.05	1.80	1.64	1.58
20	Nitrate as NO3	IS 3025 (P-34) 1988	mg/l	34.56	38.82	31.41	33.24	36.51	30.60	29.24
21	Sodium as Na	APHA 22nd Edition,3500 Na B	mg/l	195.00	220.00	145.00	210.00	145.00	120.00	117.00
22	Potassium as K	APHA 22nd Edition, 3500 K B	mg/l	6.3	6.2	6.0	8.3	5.6	6.8	16.3
23	Iron as Fe	APHA 22nd Edition, 3500-Fe B	mg/l	0.34	0.31	0.37	0.56	0.31	0.32	0.26
24	Aluminium as Al	APHA 22nd Edition, 3111 B	mg/l	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)
25	Boron	APHA 22nd Edition, 4500B	mg/l	0.31	0.24	0.29	0.33	0.24	0.18	0.19

S. No	Parameter	Test-Method	Unit	Result						
				Pond Near Central Plaza Mall	Pond Near Mandi Village	Pond Near Sukhrali Village	Pond Near Ghitorni	Pond Near Dera Mandi Village	Pond Near Bhaundsi	Pond Near Badshahpur
		C								
26	Chromium as Cr	APHA 22nd Edition, 3111 B	mg/l	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)
27	Phenolic Compounds	APHA 22nd Edition, 5530 C	mg/l	*BDL(**DL 0.0004mg/l)	*BDL(**DL 0.0004mg/l)	*BDL(**DL 0.0004mg/l)	*BDL(**DL 0.0004mg/l)	*BDL(**DL 0.0004mg/l)	*BDL(**DL 0.0004mg/l)	*BDL(**DL 0.0004mg/l)
28	#Mineral Oil	Clause 6 of IS:3025(Part 39)	mg/l	*BDL(**DL 0.05 mg/l)	*BDL(**DL 0.05 mg/l)	*BDL(**DL 0.05 mg/l)	*BDL(**DL 0.05 mg/l)	*BDL(**DL 0.05 mg/l)	*BDL(**DL 0.05 mg/l)	*BDL(**DL 0.05 mg/l)
29	#Anionic Detergents as MBAS	APHA 22nd Edition, 5540 C	mg/l	*BDL(**DL 0.05 mg/l)	*BDL(**DL 0.05 mg/l)	*BDL(**DL 0.05 mg/l)	*BDL(**DL 0.05 mg/l)	*BDL(**DL 0.05 mg/l)	*BDL(**DL 0.05 mg/l)	*BDL(**DL 0.05 mg/l)
30	Zinc as Zn	APHA 22nd Edition, 3111 B	mg/l	2.31	2.19	2.11	2.55	1.91	1.75	1.86
31	Copper as Cu	APHA 22nd Edition, 3111 B	mg/l	0.48	0.41	0.38	0.49	0.28	0.22	0.37
32	Manganese as Mn	APHA 22nd Edition, 3111 B	mg/l	*BDL(**DL 0.01 mg/l)	*BDL(**DL 0.01 mg/l)	*BDL(**DL 0.01 mg/l)	*BDL(**DL 0.01	*BDL(**DL 0.01 mg/l)	*BDL(**DL 0.01 mg/l)	*BDL(**DL 0.01 mg/l)

S. No	Parameter	Test-Method	Unit	Result						
				Pond Near Central Plaza Mall	Pond Near Mandi Village	Pond Near Sukhrali Village	Pond Near Ghitorni	Pond Near Dera Mandi Village	Pond Near Bhaundsi	Pond Near Badshahpur
							mg/l)			
33	Cadmium as Cd	APHA 22nd Edition, 3111 B	mg/l	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)	*BDL(**DL 0.002 mg/l)
34	Total Coliform	IS 1622,1981(Reaffirmed 2003)	MPN/100 ml	1600	1600	1600	900	900	1600	1600
35	Fecal Coliform	IS 1622,1981(Reaffirmed 2003)	MPN/100 ml	900	900	900	500	500	900	900

Note: - *BDL-Below Detection Limit, **DL- Detection Limit

#These parameter are not covered in our NABL scope.

3.5.3 INTERPRETATION

- The pH value of drinking water is an important index of acidity or alkalinity. pH value of ground water and surface water sample vary from 7.50 to 7.87 & 7.52 to 7.81 respectively which is well within the specified standard of 6.5 to 8.5. The pH of the ground water is slightly alkaline in nature.
- Electrical Conductivity levels were observed in ground water and surface water samples are in the range of 1014 to 1371-µS/cm & 1580-2070-µS/cm respectively. Total dissolved solids ranges from 677 to 891-µg/l in ground water and 1029 to 1352-µg/l in surface water which is found within the permissible limit.
- The total hardness is an important parameter of water quality. The hardness values in ground water of the study area ranges between 500 to 661 mg/l and in surface water ranges between 658.21 to 761.82 mg/l which is well within the permissible limit. The calcium and magnesium values in ground water of the study area are well within the specified desirable limit of Indian drinking water standard.
- The chloride values in ground water of the study area ranges between 157.47 to 217.52 mg/l which is well within the desirable limit.
- No biological and metallic contamination has been found in any of the ground water sample of the study area. Whereas all the almost surface water bodies having the sewage contamination are not safe to use.

Overall the parameters in water samples were well within the desirable limit of Indian Standard IS: 10500-2012. At project site the TDS is within the desirable limit but total hardness is found slightly above the desired limit of Indian Standard IS: 10500-2012 but well within the permissible limit of Indian Standard IS: 10500-2012. No metallic and bacterial contamination was found in the ground water samples. Overall ground water quality of the study area good and found within the drinking water standard.

3.7.1.5 3.6 NOISE ENVIRONMENT

Any unpleasant sound is classified as noise pollution. Sound possesses three definite properties: intensity, frequency and duration. Intensity is the loudness of a sound or the pressure which exerts through the ear. It is measured in decibels dB (A). In assessing noise, an empirical measure called "dBA" indicates damage to hearing. The higher the dB (A) number, the greater is the risk of damage to hearing.

Loud noise may adversely affect people in many ways. For example noise may impede with sleep, speech, communication and can cause annoyance and other physiological problems. Occupational noise exposure, is also the most common cause of Noise-Induced Hearing Loss (NIHL), threatens the hearing of individuals exposed to noise pollution for longer periods of time, at a less intense level. For example, repeated exposure to noise pollution at a construction site can cause NIHL to the construction workers, an effect that cannot be reversed.

Major sources of noise pollution during the construction and operational phases of the site will be from construction equipment and diesel generator sets respectively.

3.6.1 AMBIENT NOISE QUALITY

Noise attributed to roads depends on factors such as traffic intensity, the type and condition of the vehicles plying on the road, acceleration/deceleration/gear changes by the vehicles depending on the level of congestion and smoothness of road surface (IRC: 104-1988). High noise levels are a concern for sensitive receptors, i.e., hospitals, educational institutions, etc.

The Central Pollution Control Board has specified ambient noise levels for different land uses for day and night times and is given in **Table 3.14.** Importance was given to the timing of exposure and areas designated as sensitive.

Table- 3.14: National Ambient Noise Level Standards

Area Code	Category	Limits in Decibels (dB A)	
		Day Time	Night Time
A	Industrial	75	70
B	Commercial	65	55
C	Residential	55	45

Source: Central Pollution Control Board, New Delhi

Note: Daytime: 6 P.M., Night-time: 10 PM to 6 AM;

Noise monitoring study is carried out at 8 locations within study area including project site. All land use is considered while preparation of monitoring plans. List of the Noise level monitoring stations is given below in **Table 3.15.**

Table-3.15: Noise Monitoring Stations

CODE	LOCATION	DISTANCE	DIRECTION	LATITUDE	LONGITUDE
N1	Project Site	-	-	28° 26' 44.653" N	77° 6' 49.741" E
N2	Open Scrub near Haiderpur	1.1	SE	28° 26' 23.647" N	77° 7' 19.603" E
N3	Near Emaar The Palm Spring	0.91	W	28° 26' 46.056" N	77° 6' 19.653" E
N4	Near Gwalpahari	2.12	ESE	28° 26' 24.196" N	77° 8' 9.049" E
N5	Sector 54	2.5	SW	28° 25' 28.610" N	77° 6' 20.160" E
N6	Near Arjungarh	1.98	NNE	28° 27' 39.176" N	77° 7' 31.215" E
N7	Near Dlf Phase 5	1.33	NW	28° 27' 18.523" N	77° 6' 18.302" E
N8	Near Qutab Plaza	1.71	NNW	28° 27' 36.572" N	77° 6' 21.091" E

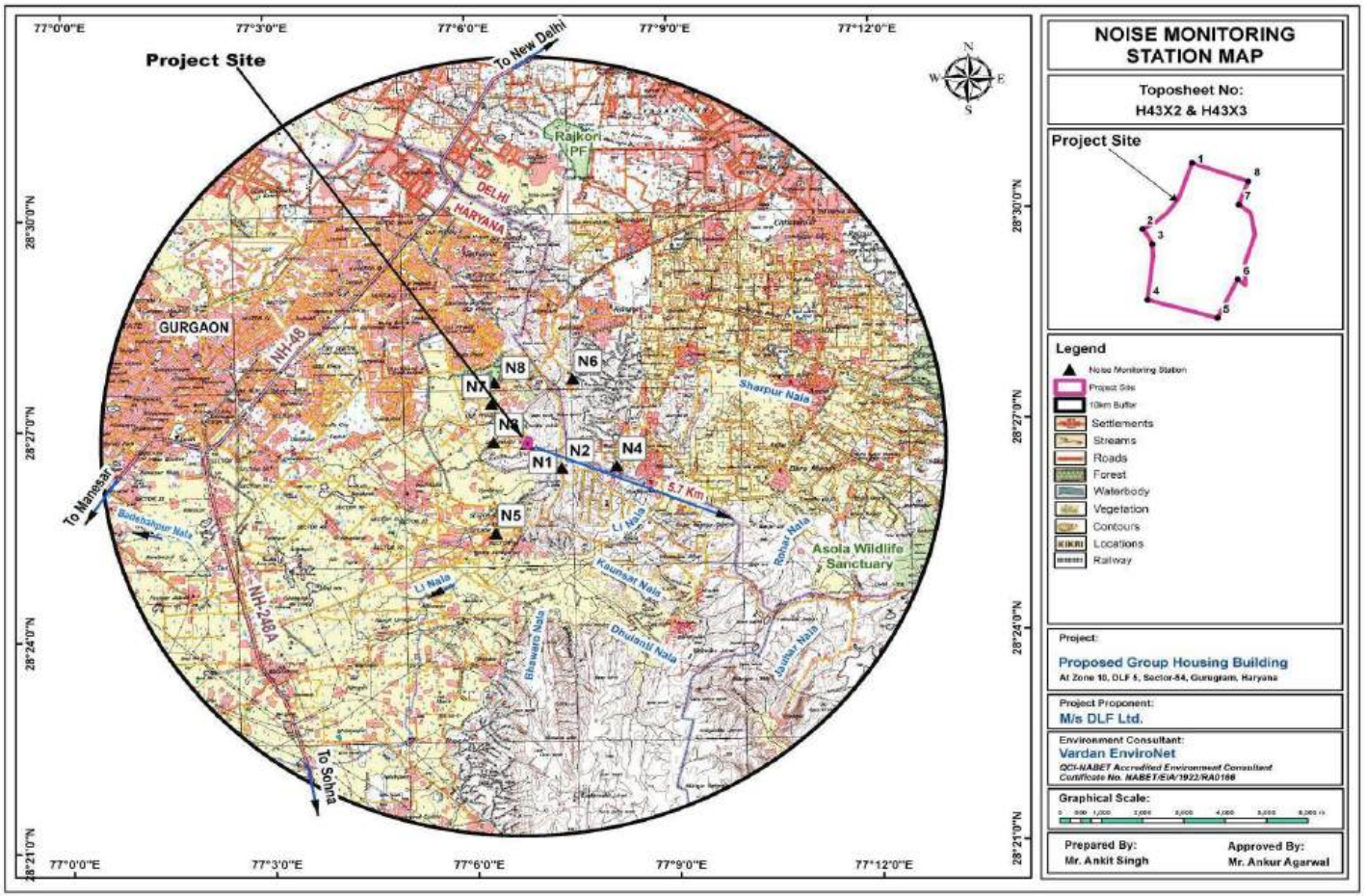


Figure- 3.13: Toposheet map showing Noise Monitoring Location

Table-3.16: Noise Monitoring Results

Code	Location	Day Time Leq dB(A)	Night Time Leq dB(A)	National Standard Day Time Leq dB(A)	National Standard Night Time Leq dB(A)
N1	Project Site	52.97	41.82	55	45
N2	Open Scrub near Haiderpur	53.55	42.69	55	45
N3	Near Emaar Palm Spring	52.75	43.5	55	45
N4	Near Gwalpahari	51.96	41.93	55	45
N5	Sector 54	50.82	43.16	55	45
N6	Near Arjungarh	49.52	40.15	55	45
N7	Near DLF Phase 5	51.22	41.26	55	45
N8	Near Qutab Plaza	50.38	39.96	55	45

3.7 ECOLOGICAL ENVIRONMENT

The baseline study for existing ecological environment was carried out during pre-monsoon season. A phased and consultative approach was followed to carry out ecological assessment. Successive phases of the assessment include:

(i) Secondary data collection through desktop review of available literature and

(ii) Onsite data collection for determining vegetation and wildlife in the study area and

(iii) Reconnaissance survey

3.7.1 SECONDARY DATA COLLECTION

An extensive desktop review of available published literature (books, websites, scientific papers, articles etc.) was conducted. The Forest Working Plans of the Gurgaon Forest Divisions was also referred for secondary information. Additional information was sourced from the project proponent, governmental institutions and local residents of the survey-area. The secondary data was appropriately supplemented by a field survey for primary data collection.

3.7.1.1 Forest Cover

The forest cover of the Haryana state is 1,587 KM^2, which constitutes 3.59% of the geographical area. Very dense forest accounts for 3 Km^2, moderately dense forest 523 Km^2 and open forest 1,061 Km^2, whereas scrub covers 165 Km^2 (Figure-3.14). The recorded forest area of Haryana is 1559 Km2, which is 3.53% of the geographical area of the state.

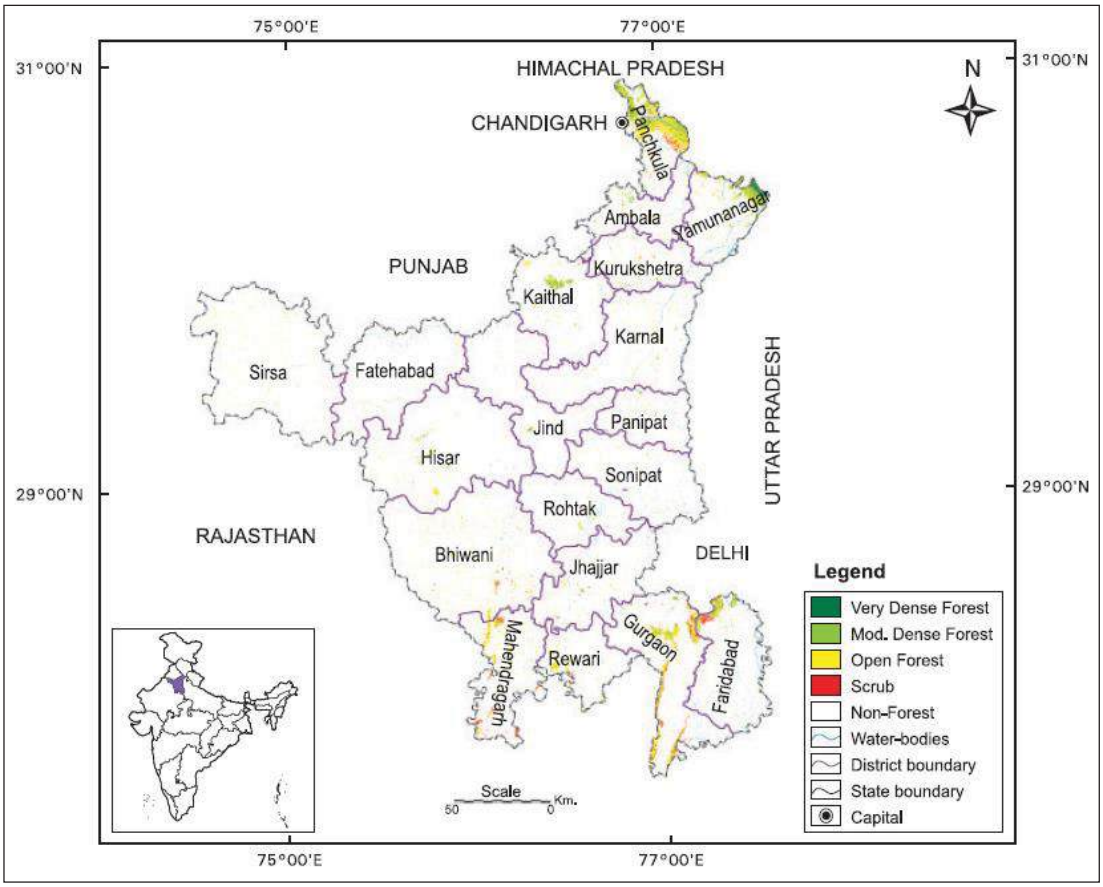


Figure: 3.14: Forest Cover Map of Haryana

3.7.1.2 Forest Types:

As per Champion and Seth's classification the Forests in the study area of are classified into the following forest types:

5B/C2 - Northern Dry Mixed Deciduous Forest

Floristic composition: *Cassia fistula, Diospyros tomentosa, Acacia catechu, Anogeissus latifolia, Bombax ceiba, Albizzia lebbeck, Albizzia procera, Acacia nilotica, Acacia modesta, Bauhinia variegate, Syzygium cumini, Mangifera indica, Ehretia laevis, Phoenix Spp., Morus alba, Terminalia tomentosa, Boswellia serrata, Aegle marmelos, Bauhinia racemosa, Bauhinia purpurea, Ficus glomerata, Grewia elastic, Mallotus philippensis* and *Shorea robusta* etc.

5/DS1 –Dry Deciduous Scrub

The crop is open with less tree cover. *Diospyros tomentosa, Acacia leucophloea, Butea monosperma, Premna barbata, Cassia fistula, Anogeissus latifolia,* and *Lannea grandis.*

3.7.2 Reconnaissance Survey:

To get an overview of the overall ecological setting of the project area, a reconnaissance survey of the project locations was carried out including upstream and downstream areas of the project. The survey was focused on evaluating existing vegetation profile of the site and its surroundings.

3.7.3. Onsite Data Collection:

3.7.3.1Objectives:

The objectives of this study were as follows:

- To collect Baseline data for the study along with a description of the existing terrestrial, wetland and aquatic vegetation.
- To assess scheduled species in the proposed site (Rare, endangered, critically endangered, endemic and vulnerable).
- To identify locations and features of ecological significance.
- To identify Impact of proposed project before, after and during development phase

Table: 3.17: Mode of data collection and parameters considered during the Survey

S. No.	Aspect	Data	Mode of Data collection	Parameters monitored	Remarks
1.	Terrestrial Biodiversity	Primary data collection	By field survey	Floral and Faunal diversity	**For Floral Diversity:** Random survey, sapling survey/forest inventory, walking transect, collection and identification with the help of relevant literature. **For Faunal Diversity:** direct and indirect sampling, walking transect, point sampling and nest sampling etc. and identification with the help of relevant literature.
2.		Secondary data collection	From authentic sources like Forests department of Haryana and available published literatures from ZSI, BSI etc.	Floral and Faunal diversity and study of vegetation, forest type, importance etc.	Data collected from the working plan of the region, forest types from the authentic literature of Champion & Seth.
3.	Aquatic Biodiversity	Primary data	By field survey	Floral and Faunal diversity	**For Plankton Study-** Lackey's drops method and light microscope **For other aquatic-** Random survey, opportunistic observations
4.		Secondary	From authentic	Floral and	Desktop literature

		data collection	sources like Forests department of Haryana.	Faunal diversity and study of vegetation, forest type, importance etc.	review to indentify the representative spectrum of threatened species, population and ecological communities.

In order to understand the composition of the vegetation, most of the plant species could be identified in the field itself whereas in case of the species that could not be identified an herbarium specimen of some flowers were collected without uprooting the plant itself and in addition their photographs were also taken for identification Later with the help of available published literature and floras of the region.

3.7.3.2 Taxonomic Diversity:

During the surveys, an inventory of different plant groups found in the study area was prepared. In the study area 62 species of plants were recorded. These include 29 trees, 09 shrubs, 19 species of herbs & grasses and 05 species of climbers. List of Plant Species (trees, shrubs, grasses and climbers) is given in **Table 3.18**.

Table: 3.18: Floral Diversity of the study area

Sr. No.	*Botanical Name*	*Family*	*Common Name*
TREES			
1.	*Acacia catechu*	Mimosaceae	Kher
2.	*Acacia leucophloea*	Mimosaceae	Khejada
3.	*Acacia nilotica*	Mimosaceae	Babool
4.	*Aegle marmelos*	Rutaceae	Bel, Bel patra
5.	*Albizia procera*	Mimosaceae	Castar
6.	*Albizzia lebbek*	Fabaceae	Seerash
7.	*Anogeissus latifolia*	Combretaceae	Dhok, Dhawda
8.	*Azadirachta indica*	Meliaceae	Neem
9.	*Bauhinia racemosa*	Fabaceae	Astara
10.	*Bauhinia variegate*	Fabaceae	Kachnar
11.	*Bauhinia purpuria*	Fabaceae	Kachnar

12.	*Bombax ceiba*	Bombacaceae	Semal
13.	*Butea monosperma*	Fabaceae	Palash, Chola
14.	*Cassia fistula*	Caesalpiniaceae	Baram, Amaltas
15.	*Cordia dichotoma*	Boraginaceae	Gundi
16.	*Diospyros tomentosa*	Ebenaceae	Kinnu
17.	*Ehretia laevis*	Boraginaceae	Chamror
18.	*Eucalyptus cameldulensis*	Myrtaceae	Nilgiri
19.	*Ficus benghalensis*	Moraceae	Bargad
20.	*Ficus religiosa*	Moraceae	Pipal
21.	*Leucaena leucocephala*	Fabaceae	Subabul
22.	*Mangifera indica*	Anacardiaceae	Aam
23.	*Morus alba*	Moraceae	Tut
24.	*Phyllanthus emblica*	Euphorbiaceae	Awala, Amla
25.	*Phoenix sylvestris*	Arecaceae	khajur
26.	*Syzygium cumini*	Myrtaceae	Jamun
27.	*Terminalia arjuna*	Combretaceae	Kahu
28.	*Terminalia bellirica*	Combretaceae	Bahera
29.	*Terminalia tomentosa*	Combretaceae	Sadad
SHRUBS			
30.	*Agave sp.*	Asparagaceae	
31.	*Calotropis gigantea*	Apocynaceae	Aak
32.	*Carissa opaca*	Apocynaceae	Karora
33.	*Carissa spinarum*	Apocynaceae	Karonda
34.	*Jatropha curcas*	Euphorbiaceae	Rantanjot
35.	*Lantana camara*	Verbenaceae	Lantana
36.	*Murraya koenigii*	Rutaceae	Kari patta
37.	*Ziziphus mauritiana*	Rhamnaceae	Ber
38.	*Ziziphus xylopyrus*	Rhamnaceae	Ghatabor
HERBS			
39.	*Cyanotis sp.*	Commelinaceae	Gadahpurna
40.	*Boerhavia diffusa*	Nyctaginaceae	
41.	*Datura metel*	Solanaceae	Kaladhatura
42.	*Mimosa pudica*	Fabaceae	Chhuimui paudha
43.	*Cassia tora*	Fabaceae	Chirota
44.	*Gymnema sylvestre*	Asclepiadaceae	Girmala
45.	*Euphorbia hirta*	Euphorbiaceae	Dudh ghas
46.	*Sida rhombifolia*	Malvaceae	Atibala
47.	*Sida cordifolia*	Malvaceae	Bala
48.	*Sida acuta carpinifolia*	Malvaceae	Mamas

49.	*Parthenium hysterophorus*	Asteraceae	Congress grass
50.	*Tribulus terrestris*	Zygophyllaceae	Gokhru
51.	*Xanthium strumarium*	Compositae	Chota Dhtura
52.	*Ocimum basilicum*	Lamiaceae	Van Tulsi
53.	*Cynodon Dactylon*	Poaceae	Dhub
54.	*Saccharum spontaneum*	Poaceae	Kaans
55.	*Dichanthium annulatum*	Poaceae	Seenkha
56.	*Rubia cordifolia*	Rubiaceae	Majith
57.	*Tridax procumbens*	Asteraceae	Ghamra
CLIMBERS			
58.	*Cuscuta reflexa*	Convolvulaceae	Amarbel
59.	*Smilax macrophylla*	Smilacaceae	Ramdatun
60.	*Acacia pennata*	Mimosaceae	Biswal
61.	*Tinospora cordifolia*	Menispermaceae	Gudbel, Geloy
62.	*Vitis latifolia*	Menispermaceae	Pani bel

3.7.3.3 Lower Plant Species Distribution in Study Area

Pteridophytes: The pteridophytes noted within study area are *Adiantum philippense* of Pteridaceae family, known as Hamsapadi in Hindi and *Lygodium microphyllum* of Lygodiaceae family known as climbing fern. Both the species have medicinal value to cure many diseases.

3.7.3.4 Rare Threatened and Endangered Species:

None of the plant species reportedly found in the study area falls under any of the IUCN Red list of Threatened Species Version 2014.3.

3.7.4 Faunal Diversity

To prepare a detailed report on the status of wildlife biodiversity in 10 km radial area (Study Area) around the proposed Project affected area to assess the impacts due to construction and operational activity and evolve suitable mitigation measures to protect and conserve wildlife biodiversity following components were studied:

a) Wildlife survey (diversity)
b) Habitat study (feeding, breeding, roosting areas)
c) Distribution of birds
d) Rare & Endangered species of fauna

e) Specific local characteristics of biodiversity in study area

3.7.4.1 Methodology for Faunal Study

A linear transect of 1 km each was chosen for sampling at each site. Each transect was trekked for 1.5 h for sampling of animals through the following methods. For sampling butterflies, the standard 'Pollard Walk' method was employed and all the species were recorded daily. Voucher specimens of the species that could not be identified in the field were collected using of a butterfly net besides photographing them. For sampling birds, 'point sampling' along the fixed transect (foot trails) was carried out. All the species of birds were observed through a binocular and identified with the help of field guides and photographs. For sampling mammals, 'direct count on open width (20m) transect' was used. In addition, information on recent sightings/records of mammals by the villagers and locals was also collected. In case of reptiles mainly lizards were sampled by 'direct count on open width transects'.

3.7.4.2 Status of Fauna

All three sites of the projected affected area are completely covered with grasses and have no major faunal diversity. Therefore we prepared a complete checklist of fauna from project affected area and surrounding of project affected area. The list of fauna along with their relative abundance, global and national conservation priority status recorded during the survey is given in the **Table 3.19 to Table 3.20**.

Table No.3.19: Checklist of Mammals

Common Name	Scientific Name	Status
Jackal	*Canis aureus* [LC]	Schedule-II
Palm Squirrel	*Funambulus pennantii* [LC]	Schedule-IV
Nilgai	*Boselaphus tragocamelus* [LC]	Schedule-III
Common Langur	*Semnopithecus entellus* [LC]	Schedule-II
Monkey	*Rhesus Macaques* [LC]	Schedule-II
Wild Boar	*Sus scrofa* [LC]	Schedule-III
Hare	*Lepus nigricollis* [LC]	Schedule-IV
[VU] = VULNERABLE, [LC] = LEAST CONCERN		

Table 3.20: List of Birds

Family	Scientific Name	Status
1. Podicipitidae	*Tachybaptus ruficollis* [LC]	Schedule-IV
2. Pelecanidae	*Pelecanus onocrotalus* [LC]	Schedule-IV

Family	Scientific Name	Status
3. Phalacrocoracidae	*Phalacrocorax niger* [LC]	Schedule-IV
	Phalacrocorax carbo [LC]	Schedule-IV
	Anhinga melanogaster [NT]	Schedule-IV
4. Ardeidae	*Ardeola grayii* [LC]	Schedule-IV
	Ardea cinerea [LC]	Schedule-IV
	Ardea purpurea [LC]	Schedule-IV
	Butorides striatus [LC]	Schedule-IV
	Nycticorax nycticorax [LC]	Schedule-IV
	Bubulcus ibis [LC]	Schedule-IV
	Casmerodius albus [LC]	Schedule-IV
	Egretta garzetta [LC]	Schedule-IV
5. Ciconidae	*Mycteria leucocephala* [NT]	Schedule-IV
	Ciconia episcopus [VU]	Schedule-IV
	Ephippiorhynchus asiaticus [NT]	Schedule-IV
6. Threskiornithidae	*Threskiornis melanocephalus* [NT]	Schedule-IV
	Pseudibis papillosa [LC]	Schedule-IV
7. Anatidae	*Tadorna ferruginea* [LC]	Schedule-IV
	Sarkidiornis melanotos [LC]	Schedule-IV
	Dendrocygna bicolor [LC]	Schedule-IV
8. Rallidae	*Amaurornis phoenicurus* [LC]	Schedule-IV
	Gallinule chloropus [LC]	Schedule-IV
9. Charadriidae	*Vanellus indicus* [LC]	Schedule-IV
	Pluvialis fulva [LC]	Schedule-IV
	Charadrius dubius [LC]	Schedule-IV
	Tringa tetanus [LC]	Schedule-IV
10. Alcedinidae	*Ceryle rudis* [LC]	Schedule-IV
	Alcedo atthis [LC]	Schedule-IV
	Halcyon smymensis [LC]	Schedule-IV
11. Passeridae	*Passer domesticus* [LC]	Schedule-IV
12. Corvidae	*Corvus spledens* [LC]	Schedule-V
13. Phoenicopteridae	*Phoenicopterus roseus* [LC]	Schedule-IV
[NT] = NEAR THREATENED, [VU] = VULNERABLE, [CR] = CRITICAL ENDANGERED, [LC] = LEAST CONCERN		

Table 3.21: List of Butterflies

S. No.	Family/Species	Relative abundance
	PIERIDAE	
1.	Common Emigrant, *Catopsilia crocale*	Common
2.	Common Grass Yellow, *Eurema hecabe*	Very Common
	NYMPHALIDAE	
1.	Common Leopard, *Phalantha phalantha*	Fairly Common
2.	Lemon Pansy, *Precis lemonias*	Common
3.	Great Eggfly, *Hypolimnas bolina*	Common
4.	Common Castor, *Ariadne merione*	Uncommon
5.	Plain tiger, *Danaus chrysippus*	Common
6	Danaid Eggfly, *Hypolimnas misippus*	Common

3.7.4.3 Endemic Fauna of the Study Area

No Schedule I under Wildlife Protection Act, 1972 has been reported during the field visit from the 10 km radius buffer zone.

Photograph1.1: Photographs of Aves

White-throated Kingfisher, *Halcyon smyrnensis*

Amaurornis phoenicurus

	
Threskiornis melanocephalus	*Indian Skimmer*
	
Red Wattled Lapwing, *Vanellus indicus*	*Tachybaptus ruficolis*

3.7.4AQUATIC BIODIVERSITY

There is many small and big water bodies situated in Buffer zone of proposed residential project some water bodies are human made but some small and big water bodies are natural. This water bodies are very rich for aquatic diversity of Pteridophytes i.e. *Marsilea minuta, Azola pinnata, Isoetes panchananai, I. Coromanelina, Solvinia auriculata* and *Equisetum ramosissimum*.

3.7.5 AGRICULTURAL STATUS OF STUDY AREA

The major crops of study area are as follows:

Cereals	Wheat, Rice, Pulses, Jowar
Oilseeds	Soybean, Niger, Mustard
Vegetables	Green Peas, Cauliflower, Okra, Tomato, Potato, Egg Plant, Onion, Gourd
Fruits	Guava, Orange

Spices	Garlic, Coriander, Ginger

3.7.6 LOCATION OF NATIONAL PARK/SANCTUARIES

3.7.6.1 Asola Bhatti Wildlife Sanctuary

Asola Bhatti Wildlife Sanctuary located in the National Capital Territory of Delhi is spread over an area of 19.57 square km and Sanctuary is located between 280 23'00'' N to 280 30'00'' N latitude and 77o 11 '00'' E to 77o 17' 00'' E longitudes. Asola Bhatti Wildlife Sanctuary shares its boundary with the State of Haryana in Eastern, Southern and South-Western directions and this notification is for notifying the Eco-sensitive Zone around the Asola Bhatti Wildlife Sanctuary of National Capital Territory of Delhi.

The flora and fauna represent rich biological significance of this Sanctuary and the faunal diversity is represented by 17 species of mammals, around 201 species of resident and migratory birds, 12 species of reptiles, 5 species of amphibians, 63 species of butterflies and 05 species of dragonflies, and important species found in the protected area are Nilgai (*Boselaphus tragocamelus*), Jungle cat (*Felis chaus*), small Indian Civet (*Viverricula indica*), Mongoose (*Herpestes auropunctatus*), Jackal (*Canis aureus*), Indian porcupine (*Hystrix indica*), five striped palm squirrel (*Funambulus pennantii*), Cheetal (*Acinonyx jubatus*) etc.

The aforesaid sanctuary consists of a mixture of indigenous and exotic species of Flora and is known to harbor around 83 species of trees, around 30 species of shrubs, around 95 species of herbs, around 18 species of grasses and around 4 species of sedges;The native flora includes various species of Acacia such as *Acacia nilotica, Acacia leucophloea, Acacia catechu, Acacia senegal, Acacia modesta, Butea monosperma, Cassia fistula, Salvadora persica* and in the small boulder hillocks a few scattered trees of *Anogeissus pendula* are also found; some other trees found in the area include *Dalbergia sissoo*, *Ficus religiosa*, *Morus indica*, *Azadirachta indica*, *Pongamia pinnata* etc.

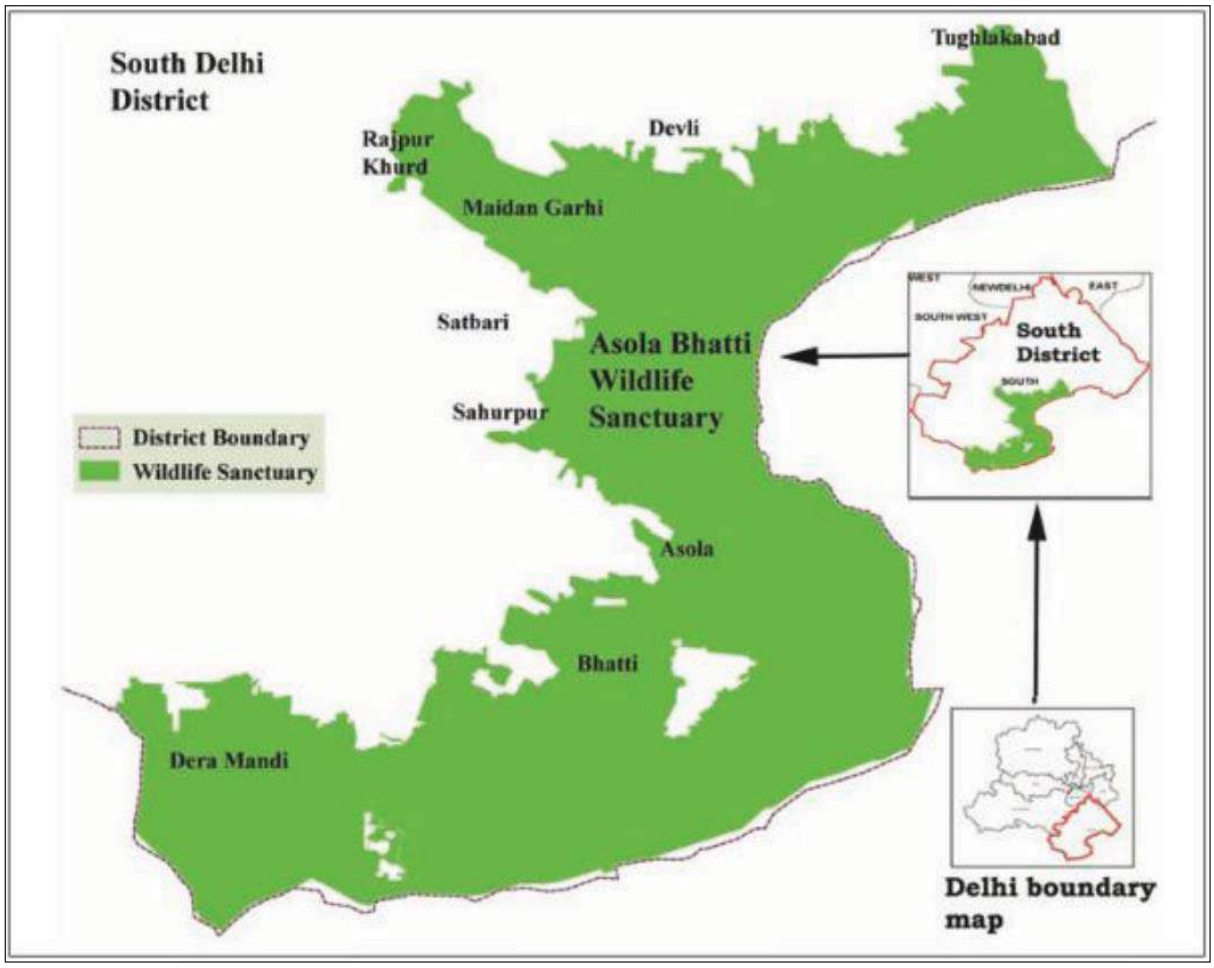


Figure 3.15 Map Showing the area and location of Asola Bhatti Wildlife Sanctuary

CONCLUSION:

Based on frequency of sightings, 7 species, namely, white breasted kingfisher, *Halcyon smyrnensis*; White Breasted Water Hen, *Amaurornis phoenicurus*; Common Moorhen, *Gallinula chloropus*; Black Wing Stilt, *Himantopus himantopus*; Red Wattled lapwing, *Vanellus indicus*; Cattle Egret, *Bubulcus ibis* and Indian Pond Heron, *Ardeola grayii* were 'common wetland' bird species of Sultanpur National Park Najafgarh wetland and Bassi Wetland. Black neck Stork, *Ephippiorhynchus asiaticus*; Black Headed Ibis, *Threskiornis melanocephalus*; Cotton Pygmy Goose, *Nettapus coromandelianus;* Sarus Crane, *Grus antigone;* Common Red Shank, *Tringa tetanus* and Yellow Crowned Woodpecker, *Dendrocopos mahrattensis* were among the most

'uncommon' species and Pied king fisher, *Ceryle rudis* and Coppersmith Barbet, *Megalaima haemacephala* were 'rarely sighted' bird species.

& New Delhi

3.8 SOCIO-ECONOMIC ENVIRONMENT

Any developmental activity exerts a direct impact on the socio-economic environment of the region. Usually, the beneficial impacts such as better job opportunities, improved education, communication, energy, housing, health, transportation facilities etc. outweighs the adverse impacts, if any.

The study of socio-economic component of environment is incorporating various facets, viz. demographic structure, availability of basic amenities such as housing, education, health and medical services, occupation, water supply, sanitation, communication and power supply, prevailing diseases in the region as well as features such as places of tourist attraction and monuments of archaeological importance. The study of these parameters helps in identifying predicting and evaluating the likely impacts due to project activity in the surrounding region.

3.8.1 The Baseline Status

The latest available data has been complied to generate the existing socio-economic scenario of the study area. Information on socio-economic profile was collected from the **Primary Census Abstract CD 2011** including the population details of the region.

Village

The basic unit for rural areas is the revenue village which has definite surveyed boundaries. The revenue village may comprise of one or more hamlets but the entire village is treated as one unit for presentation of data.

Study Area

The study area was defined as an area within 10 km radius around the project site which includes total 40 villages are from Gurugram and Sohna tehsil of Gurugram District of Haryana state and Vasant Vihar Tehsil of South west Delhi and Haus Khas tehsil of South Delhi.

The Socio-Economic Status of the study areas is mentioned below and the villages surveyed are enlisted in **Table No.3.23**

Demographic Structure

Demographic structure of the study area was estimated for the selected parameters as households, population, sex ratio, scheduled caste, scheduled tribes, literacy from **primary census abstract, CD 2011**. The summarized demographic structure of the study area is presented in **Table No. 3.24**, while the details of the parameters of demographic structure village wise within the 10 km radius are shown in **Table No. 3.25.**

DEMOGRAPHIC PROFILE OF THE STUDY AREA

- Total number of households in the study area is about 174399
- Total population of about 755762 with male population about 421146(55.72%) and female population is 334616(44.27%).
- The average family size i.e persons per family are about 4.3 in the study area.
- Out of the total population, the population of children within the age of 0-6 age-group in study area is about 97186 (12.85%)
- Sex ratio (No. of females per 1000 males) is 794 in study area which indicates that females are less in number than their male counterpart in rural and urban area.
- Child Sex ratio is 857 in study area i.e no.of female child per 1000 male child.

The graphical presentation of the distribution of population is given in fig below:

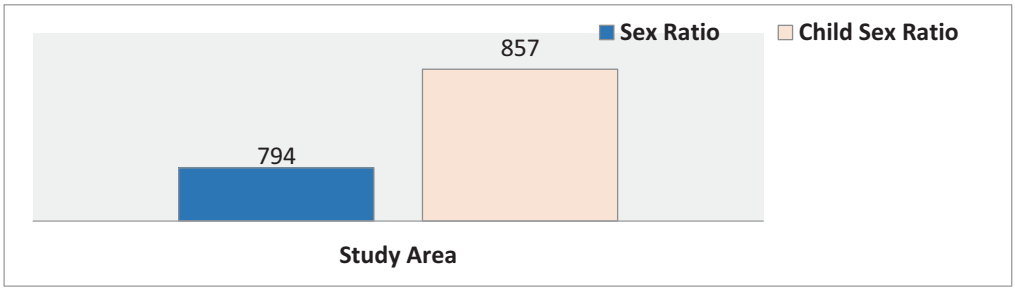


FIG.3.16 REPRESENTING THE RATIO OF POPULATION IN THE STUDY AREA

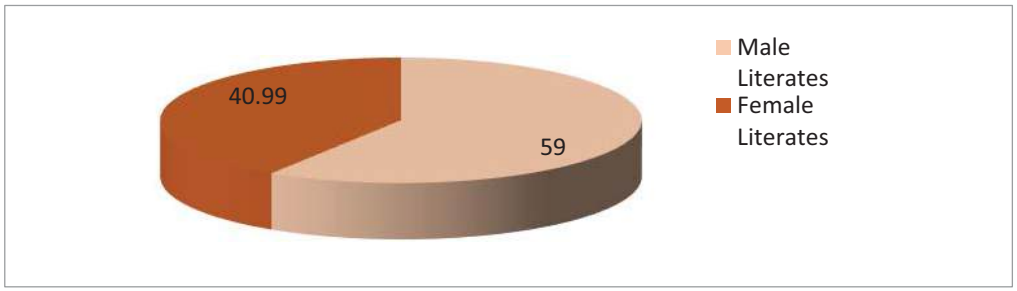


FIG.3.17 REPRESENTING THE LITERACY RATE IN THE STUDY AREA

Occupational Pattern/ Economic Resource Base

'Work' has been defined as participation in any economically productive activity. Such participation may be physical or mental. Persons on leave and under training are also treated as workers. However, rent receivers and pensioners are not treated as workers.

Total Workers

Occupational pattern of the villages and urban area within 10 km is given in **Table No. 3.26**. Occupational pattern of any region mainly depends upon its economically active group i.e. the working populations involved in different economically productive activities. The total workers further categorized as main worker, marginal and the non-working population.

The workers coming under the main and marginal workers category are cultivators, agricultural labors and those engaged in live stock, forestry, fishing, hunting, and plantations, orchards and allied activities, mining and quarrying, manufacturing, processing, servicing and repairs in

household industry, construction trade and commerce, transport, storage & communication, and other services

Different types of workers in total worker population may be classified as –

A. Main Workers

Main workers are those who have worked for a major part of the year (i.e. at least six months or 183 days). Main activity of a person who was engaged in more than one activity was reckoned in terms of time disposition Out of the total population 272739 (36.08%) in study area. Main workers are further classified into 4 categories viz., cultivators, agricultural laborers and household workers and other main workers.

Cultivators

For purposes of the Census a person is classified as cultivator if he or she is engaged in cultivation on land owned or held from government or held from private persons or for payment in money, kind or share. The person who is engaged either as employer, single worker or family worker in cultivation of land is recognized as a cultivator. Cultivation involves ploughing, sowing, harvesting and production of cereals and millet crops such as wheat, paddy, jowar, bajra, ragi, etc., and other crops such as sugarcane, tobacco, ground-nuts, tapioca, etc., and pulses, raw jute and kindred fiber crop, cotton, cinchona and other medicinal plants, fruit growing, vegetable growing or keeping orchards or groves, etc. Cultivation does not include the following plantation crops–tea, coffee, rubber, coconut and betel-nuts (areca).

In the study area the cultivator population in study area is about 3874(1.42%).

Agricultural Laborers

Persons working on land owned by others for wages or share in the yield have been treated as agricultural laborers. Out of the total main worker category the agricultural laborers population in study area in rural area is 4043(1.48%).

Laborers in Household Industry

The laborers engaged in household activity are quite low in all the study area. Among the total main worker only 8167(2.99%) workers from rural area are engaged in Household activity.

Other Workers

All main workers i.e. those who have been engaged in some economic activity during the last one year and who are neither cultivators nor agricultural laborers or household industry workers are classified as other main workers. The type of workers that come under this category includes factory workers, plantation workers, those in trade, commerce, business, transport, construction, political or social works, all government servants, municipal employees, teachers, priests, entertainers, artists etc. The other worker category can be seen higher in study area in rural area which is about 256655 (94.10%) of study area.

B. Marginal Workers

Marginal workers are those who have worked any time in the year for less than six months or 183 days but have not worked for a major part of the year. The population of marginal workers within the study area comprises of only about 17460(2.31%).

C. Non-Workers

Non-Workers are those who have not worked any time at all in the year. Non-workers constitute householders, students, dependents, retired persons etc.

The economy of the study area is primarily based on agriculture. The agriculture sector has thus absorbed a major portion of the working force.

The categories of main workers, marginal workers & non workers are complementary to each other. Therefore, in areas where the proportion of main workers & marginal workers are high, the proportion of non-workers would be naturally low. At present main workers category outweighs the marginal and non-workers in the study area.

The proportion of female main worker population is high as compared to their male worker counterpart because in general rural areas offer more opportunities for men & women to work in agriculture & animal husbandry etc. In view of the labor-intensive nature of agricultural economy, a large number of women are required to participate in work especially during the peak seasons of agricultural operations like sowing & harvesting which are to be carried out in a

short span of time covering large areas in each village. The non-worker population in rural area is observed to be about 465563(61.60%) of the study area.

It is observed that maximum population in study area are engaged in other activity while maximum non-worker can be seen in the study areas as the employment opportunities are less in the rural areas.

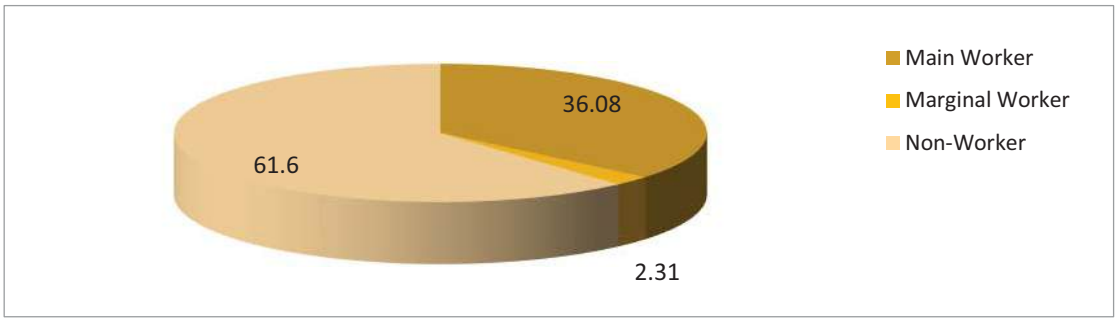


FIG.3.18 REPRESENTING THE OCCUPATIONAL STRUCTURE OF THE RURAL AREA

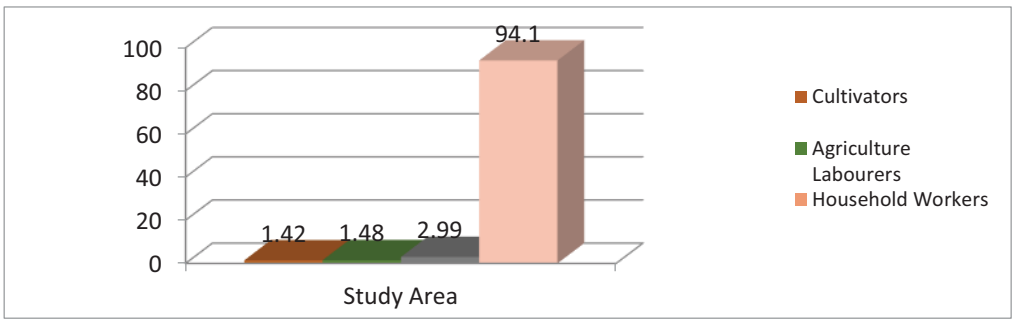


FIG. 3.19 CATEGORY OF MAIN WORKERS IN THE RURAL AREA

Infrastructure Resource Base

The details of infrastructure resources base of the study area with reference to education, medical facility, water supply, post and telegraph, transportation, communication facility, power supply, existence of nearest town etc. The details of infrastructure facility within the 10 kms radius of the project site are given in **Table No. 3.22.**

TABLE 3.22 INFRASTRUCTURE FACILITIY NEAR THE PROJECT SITE

Particulars	Villages
Educational Facility	Govt. Model Sanskriti Primary School
	Government Girls School Sarswati Kunj II, Wazirabad
	Government Model Sanskriti Senior Secondary School, Sushant Lok Phase I, Sector 43
	Government Senior Secondary School Chakkarpur, Sector 28
	Government Primary School DLF Phase IV, Sector 43
	Govt. Sr Sec. Scgool, Bandhwari, Haryana
	Government Senior Secondary School Boys Civil hospital Ward 3, Gurugram
	Government School Samaspur
	Government High School, Mehrauli Sector-5
	Girls govt. School, Sukrali Sector-15
	Government school Tijara sector 57
	Govt. Sr Sec. School, Bandhwari, Haryana
	Government Middle School Gurgaon Tigra
	Govt School, Block G, Wazirabad, Sector 52
	Sarvodaya Bal Vidyalaya, Fatehpur Beri
	Priyadarshini Sarvodya Kanya Vidyalya - Fatehpur Beri

Medical Facility Near Project Site	Sanar International Hospital
	Government hospital, Fatehpur Beri
	Uphc Chanderlok -Government Hospital Pwo Appartments, Sector 43, Gurugram Government Hospital, Wazirabad
	Shri Ram Memorial Hospital, DLF City Phase III, Sector 24, Gurugram
	Civil hospital, Mehrauli-Gurgaon Rd
	CGHS Wellness Centre, Sector 5, Gurugram
	Government Hospital, Kadarpur Rd, Badshahpur
Railway Station	Gurugram Railway Station

Cultural and Aesthetic Attributes

As such no culturally and aesthetically important places are located within the 10 km of the study area.

Health Status

Health of the people is not only a desirable goal, but it is also an essential investment in human resources. As per the National Health Policy (1983), Primary Health Care has been accepted as main instrument for achieving this goal of development and strengthening rural health infrastructure through a three-tier system, viz., Primary Health Center (PHCs), Primary Health Subcentres (PHS) and Community Health Centers have been established to provide heath care facility not only to the resident population of the concerned villages but also to the neighboring villages.

Primary Health Centers - PHC is the first contact point between village community and the Medical Officer. The PHCs were envisaged to provide an integrated curative and preventive health care to the rural population with emphasis on preventive and promotive aspects of health

care.

Primary Health Sub-Centers - Sub-Centers are assigned tasks relating to interpersonal communication in order to bring about behavioral change and provide services in relation to maternal and child health, family welfare, nutrition, immunization, diarrhea control and control of communicable diseases programmes.

Community Health Centre - Community Health Centre (CHCs) are being established and maintained by the State Government under MNP/BMS programme. As per minimum norms, a CHC is required to be manned by four medical specialists i.e. Surgeon, Physician, Gynecologist and Pediatrician supported by 21 paramedical and other staff.

Lack of building, shortage of manpower and inadequate provision of drug supplies are hampering the operation of these units. The standards to be met according to National Rural Health Care System are given below:

Population	Medical Facility & Infrastructure	Personnel
3000-5000	1 Sub centre (Contact Unit of PHC and Community)	1 Health Worker (Female)/ Auxiliary Nurse Midwives & 1 Health Worker (Male)
20,000-30,000	1 PHC (Unit of 6 Sub-Centers)- 6 beds	Medical officers & 14 Paramedical Staff
80,000-1,20,000	Community Health Centre (Referral Unit-4 PHCs)- 30 Bedded Hospital	Medical superintendent

Source: National Rural Health Care System in India (2005-12)

As per the District Statistical Abstract 2018-19 the number of medical Centres in Gurugram District is given in Table below:

District	Hospitals	CHC	PHC	Dispensaries	Primary Health Sub-centre	Total
Gurugram	– 5	– 3	– 15	– 3	– 76	102

*CHC=Community Health Centre

PHC= Primary Health Centre

It is attributed from the data that different health problems are reported which could be attributed to improper sanitation, lack of health awareness among the people and lack of health-related infrastructure facilities.

Socio-economic Survey

In order to access and evaluate likely impacts arising out of any development projects on socio economic environment, it is necessary to gauge the apprehensions of the people in the study areas.

I. Methodology applied for selection of sample & data collection

The methodology which is applied for primary source of data collection i.e. gathering data through field survey for socio-economic environment is depicted below:

A Sampling Method

A judgmental and purposive sampling method was used for choosing respondents of various sections of the society i.e. Sarpanch, adult males and females, teachers, medical practitioners, businessmen, agriculture laborers, unemployed group etc. Judgmental and purposive sampling method includes the right cases from the total population that helps to fulfill the purpose of research needs.

B Data Collection Method

For the process of data collection through primary source certain methods are used among that are:

Field Survey and Observations

Field survey and observations is made at each sampling village and the socioeconomic status of that region is studied. Visits are made at hospitals, primary health centers and sub-centers to know the health status of the region. Various governmental organizations such as statistical department, department of census operations are visited to collect the population details of that region.

Interview Method

Structured interview method is used to collect data regarding the awareness and opinion from the samples selected of the various socio- economic sections of the community. Structured interviews involve the use of a set of predetermined questions that includes fixed and alternative questions. The questionnaire mainly highlights the parameters such as income, employment and working conditions, housing, food, water supply, sanitation, health, energy, transportation and communication, education, environment and pollution to assess the standard of living of that particular region and general awareness, opinion and expectation of the respondents about the proposed project. Interview method helps to collect more correct and accurate information as the interviewer is present during the field survey.

Socio-economic survey was conducted in the villages within the study areas located in all directions with reference to the project site. 8 areas were surveyed from study area.

The respondents were asked for their awareness / opinion about the proposed project which is an important aspect of socio-economic environment, viz. job opportunities, education, health care, housing, transportation facility and economic status.

The salient observations recorded during socio economic survey in the study areas are depicted below:

- Maximum workers in rural and the urban area are engaged in other activity which may include service and business

- Most of the villages have Primary School (PS), Middle School (MS) and Secondary school while very few have senior secondary schools. Further education villagers go to Gurugram.
- The main source of drinking water supply is through Hand Pump and Tap water facility is available in very few villages. But majority of respondents expressed unsatisfactory opinion regarding the availability of drinking water facility.
- Two wheelers, auto rickshaws & bus facility are the main mode of transportation used by natives in the study area. Metro station is at quite near and accessible from the project site.
- Power supply is available in mostly all the sampling villages. Street lights are also available in all villages Power supply is available for 11-12 hours a day for domestic purpose.

TABLE No. 3.23 LIST OF THE VILLAGES FOR FIELD SURVEY OF SOCIO-ECONOMIC ENVIRONMENT

Sr. No.	Villages
1.	Gurgaon (M Corp.) WARD NO.-0025
2.	Daultabad (OG) WARD NO.-0034
3.	Naya Behram Pur (OG) WARD NO.-0036
4.	Nurpur Jharsa(165)
5.	Bandhwari(79)
6.	Sambhalka (CT)
7.	Fateh Pur Beri (CT)
8.	Gadai Pur

TABLE No. 3.24 SUMMARIZED DEMOGRAPHIC STUCTURE OF THE STUDY AREA

SR.NO.	PARAMETER	STUDY AREA
1.	No. of Villages & Urban Area	40
2.	Households	174399
3.	Household Ratio	4.3
4.	Total Population	755762
5.	Male Population (%)	421146(55.72%)
6.	Female Population (%)	334616(44.27%)
7.	Population (0-6 Years %)	97186(12.85%)
8.	Sex Ratio	794
9.	Child Sex Ratio	857
10.	Scheduled Caste %	81945(10.84%)
11.	Literates %	566752(74.99%)
12.	Male Literates	334397(59.00%)
13.	Female Literates	232355(40.99%)
14.	Main Workers %	272739(36.08%)
• Cultivators (%)		3874(1.42%)
• Agricultural Labourers (%)		4043(1.48%)

• Household Labourers (%)		8167(2.99%)
• Other Workers (%)		256655(94.10%)
15.	Marginal Workers %	17460(2.31%)
16.	Non-Workers %	465563(61.60%)

Source: Primary Census Abstract Census 2011, Haryana & Delhi

IMPACT ON SOCIO-ECONOMIC ENVIRONMENT

Critically analyzing the existing environmental status of the socio-economic profile and visualizing the scenario with the project, the impacts of the project would be varied and will generate both positive and negative impacts of the proposed project in the region are stated below.

Positive Impacts

- There will be growth in indirect jobs and business opportunities to the local and surrounding people such as contractors, transporters and raw material suppliers etc. due to the proposed development in the area. Local laborers from nearby area are being employed during the construction phase.
- Demands of community services and commercial development also create additional employment for the poor strata of society by way of security guard, driver, maid/servant, sweeper, gardener etc
- Health facility will also be improved with the development of the project.
- Commercials as well as daily need shops will increase in the study areas as there will be inflow of population due to the project
- Improvement is safety, security, banking and fire-fighting facility
- The project envisages bringing various other communities to the area and thereby

enabling rapid enhancement of an urban environment.

- The sanitation and the aesthetic environment of the village would also improve with the coming of the project.

Negative Impacts

- Due to the proposed project activity, influx of population may increase during the construction phase. This may lead to strain on infrastructure facilities in the area as well as increase in population at local level. However, this impact is only for the short duration and temporary in nature
- Vehicular traffic and construction activities may create noise pollution
- Proposed development may have a significant impact on the community's ability to accommodate new residents and adapt to changes in the social environment for existing surrounding residents

Mitigations Measures

- Project proponent should take appropriate steps to keep environment clean and healthy during construction phase
- Provision of adequate drinking water, toilet and bathing facilities should be made available on project site
- Water shall be sprinkle/spread to suppress dust during construction phase to control air pollution and thereby avoid adverse health impact
- Proper living condition with appropriate facilities for residential labours should be provided
- Proper Training and awareness programme should be carried out so that the workers understand the importance of wearing the personal protective equipments.
- The colony management collectively will need a pool of watchmen, gardeners, sweepers, plumbers, fitters, STP operators, lift operators and solid waste collectors. Preference should be given to local people for all this.

TABLE NO. 3.25 DEMOGRAPHIC STRUCTURE OF THE STUDY AREA (RURAL)

Sr.No.	Villages	Households	Total Population	Male Population	Female Population	Population 0-6 Years	Scheduled Caste	Literates
Haryana State								
Gurugram District								
Gurugram Tehsil								
1.	Gurgaon (M Corp.) WARD NO.-0025	5421	20398	11011	9387	2168	761	16530
2.	Gurgaon (M Corp.) WARD NO.-0026	5924	21746	13352	8394	3123	1455	13490
3.	Gurgaon (M Corp.) WARD NO.-0027	3921	14895	8134	6761	1246	165	12603
4.	Gurgaon (M Corp.) WARD NO.-0028	5650	23106	12467	10639	2418	1664	18461
5.	Gurgaon (M Corp.) WARD NO.-0029	5747	23114	14089	9025	2962	3085	17160
6.	Gurgaon (M Corp.) WARD NO.-0030	6733	28036	15607	12429	3082	1611	22765
7.	Gurgaon (M Corp.) WARD NO.-0031	7085	32348	17641	14707	4731	2481	23847
8.	Gurgaon (M Corp.) WARD	7348	31584	16584	15000	3980	2236	24968

	NO.-0032							
9.	Gurgaon (M Corp.) WARD NO.-0033	8329	39699	21438	18261	5664	5781	29488
10.	Daultabad (OG) WARD NO.-0034 (Rural MDDS CODE:645584)	1054	5913	3113	2800	773	1054	4395
11.	Ghata (OG) WARD NO.-0035 (Rural MDDS CODE:645585)	349	2128	1112	1016	354	144	1440
12.	Naya Behram Pur (OG) WARD NO.-0036 (Rural MDDS CODE:645586)	229	1509	785	724	235	0	1028
13.	Gurgaon (M Corp.) WARD NO.-0003	10001	45861	24262	21599	6106	8263	34873
14.	Gurgaon (M Corp.) WARD NO.-0004	9595	43754	22696	21058	4839	2858	35469
15.	Gurgaon (M Corp.) WARD NO.-0006	7709	35958	19252	16706	4691	2907	26634
16.	Gurgaon (M Corp.) WARD NO.-0017	3809	13586	7288	6298	1756	215	10778

17.	Nurpur Jharsa(165)	227	1133	595	538	143	84	851
18.	Dhumaspur(86)	124	664	353	311	106	54	435
Total		**89255**	**385432**	**209779**	**175653**	**48377**	**34818**	**295215**
Sohna Tehsil								
19.	Gual Pahari(77) Part	369	2257	1180	1077	377	316	1499
20.	Balola(78)	165	1121	602	519	193	0	721
21.	Bandhwari(79)	634	4104	2216	1888	643	799	2612
22.	Ulhawas(83) Part	329	2284	1232	1052	399	334	1535
23.	Kadarpur(84)	1019	6372	3378	2994	1110	1104	3894
Total		**2516**	**16138**	**8608**	**7530**	**2722**	**2553**	**10261**
Vasant Vihar								
24.	NDMC (Part) WARD NO.-0008	6584	26715	15458	11257	2244	2348	22361
25.	NDMC (Part) WARD NO.-0009	6863	30124	16063	14061	2635	4533	24764
26.	Malik Pur Kohi alias Rang Puri (CT) WARD NO.-0144	5412	23726	12961	10765	3400	3447	17946
27.	DMC (U) (Part) WARD NO.-0172	8921	34761	17939	16822	3528	1417	27396

28.	Ghitorni (CT) WARD NO.-0174	2928	14893	8302	6591	2112	1603	11056
29.	Rajokri (CT)	4430	19148	10640	8508	2691	3869	13898
30.	Sambhalka (CT)	3912	17076	9639	7437	2614	2565	11980
31.	Kapas Hera (CT)	21370	74073	50123	23950	9642	6503	54435
Total		**60420**	**240516**	**141125**	**99391**	**28866**	**26285**	**183836**
South Delhi District								
Hauz Khas Tehsil								
32.	Aya Nagar (CT)	6757	33123	17916	15207	4767	3637	25201
33.	Jona Pur (CT)	2028	10635	5847	4788	1647	2583	7088
34.	Fateh Pur Beri (CT)	1581	8861	4780	4081	1253	935	6310
35.	Dera Mandi (CT)	3156	16725	8998	7727	2621	3832	11063
36.	Bhati (CT)	3727	18864	10114	8750	3182	2301	10231
37.	Asola (CT)	2502	13275	7160	6115	1954	3032	9411
38.	Gadai Pur	661	3027	1659	1368	324	880	2167
39.	Satberi	1218	6076	3448	2628	879	954	4241
40.	Shahur Pur	578	3090	1712	1378	594	135	1728
Total		**22208**	**113676**	**61634**	**52042**	**17221**	**18289**	**77440**
Grand Total		**174399**	**755762**	**421146**	**334616**	**97186**	**81945**	**566752**

Source: Primary Census Abstract 2011, Haryana & Delhi

TABLE NO.3.26 OCCUPATIONAL STRUCTURE OF THE STUDY AREA

Sr.No.	Villages	Total Main Workers	Main Workers				Marginal Workers	Non-Workers
			Cultivators	Agricultural Laborers	Household Laborers	Other Workers		
Haryana State								
Gurugram District								
Gurugram Tehsil								
1.	Gurgaon (M Corp.) WARD NO.-0025	8384	25	45	264	8050	315	11699
2.	Gurgaon (M Corp.) WARD NO.-0026	9698	35	151	183	9329	1161	10887
3.	Gurgaon (M Corp.) WARD NO.-0027	6909	8	11	312	6578	276	7710
4.	Gurgaon (M Corp.) WARD NO.-0028	9403	38	59	308	8998	350	13353
5.	Gurgaon (M Corp.) WARD NO.-0029	9135	62	90	229	8754	622	13357
6.	Gurgaon (M Corp.) WARD NO.-0030	11641	22	28	298	11293	287	16108
7.	Gurgaon (M Corp.) WARD NO.-0031	10303	76	100	442	9685	466	21579
8.	Gurgaon (M	11381	37	80	630	10634	332	19871

	Corp.) WARD NO.-0032							
9.	Gurgaon (M Corp.) WARD NO.-0033	11768	52	349	499	10868	1213	26718
10.	Daultabad (OG) WARD NO.-0034 (Rural MDDS CODE:645584)	1427	266	272	18	871	33	4453
11.	Ghata (OG) WARD NO.-0035 (Rural MDDS CODE:645585)	453	205	5	35	208	126	1549
12.	Naya Behram Pur (OG) WARD NO.-0036 (Rural MDDS CODE:645586)	349	66	83	10	190	20	1140
13.	Gurgaon (M Corp.) WARD NO.-0003	14681	106	108	456	14011	587	30593
14.	Gurgaon (M Corp.) WARD NO.-0004	14504	20	92	736	13656	593	28657
15.	Gurgaon (M Corp.) WARD NO.-0006	11796	45	112	636	11003	360	23802
16.	Gurgaon (M Corp.) WARD	6054	32	34	151	5837	531	7001

	NO.-0017							
17.	Nurpur Jharsa(165)	401	62	7	56	276	23	709
18.	Dhumaspur(86)	158	51	16	13	78	8	498
Total		**138445**	**1208**	**1642**	**5276**	**130319**	**7303**	**239684**
Sohna Tehsil								
19.	Gual Pahari(77) Part	412	50	12	4	346	193	1652
20.	Balola(78)	239	186	17	0	36	0	882
21.	Bandhwari(79)	876	387	33	13	443	191	3037
22.	Ulhawas(83) Part	619	254	5	18	342	109	1556
23.	Kadarpur(84)	1655	1014	197	97	347	1589	3128
Total		**3801**	**1891**	**264**	**132**	**1514**	**2082**	**10255**
Delhi								
South West Delhi District								
Vasant Vihar Tehsil								
24.	NDMC (Part) WARD NO.-0008	10992	10	61	350	10571	588	15135
25.	NDMC (Part) WARD NO.-0009	11610	34	67	139	11370	542	17972
26.	Malik Pur Kohi alias Rang Puri (CT) WARD NO.-0144	7368	6	32	159	7171	282	16076

27.	DMC (U) (Part) WARD NO.-0172	13602	29	91	492	12990	1037	20122
28.	Ghitorni (CT) WARD NO.-0174	4595	65	132	128	4270	374	9924
29.	Rajokri (CT)	5795	180	165	162	5288	727	12626
30.	Sambhalka (CT)	5539	18	86	96	5339	285	11252
31.	Kapas Hera (CT)	38331	34	128	326	37843	1786	33956
Total		**97832**	**376**	**762**	**1852**	**94842**	**5621**	**137063**
South District								
Hauz Khas Tehsil								
32.	Aya Nagar (CT)	10073	30	49	234	9760	443	22607
33.	Jona Pur (CT)	3140	63	416	54	2607	172	7323
34.	Fateh Pur Beri (CT)	2377	66	69	96	2146	190	6294
35.	Dera Mandi (CT)	4073	65	162	59	3787	325	12327
36.	Bhati (CT)	5292	40	167	100	4985	726	12846
37.	Asola (CT)	3800	65	327	235	3173	278	9197
38.	Gadai Pur	1202	30	156	65	951	96	1729
39.	Satberi	1908	35	22	46	1805	175	3993
40.	Shahur Pur	796	5	7	18	766	49	2245

Total	**32661**	**399**	**1375**	**907**	**29980**	**2454**	**78561**
Grand Total	**272739**	**3874**	**4043**	**8167**	**256655**	**17460**	**465563**

Source: Primary Census Abstract 2011, Haryana & Delhi

3.9 Traffic Study

Traffic study measurements were performed at NH-48, NH-248A, NH-148A, SH-15A and MDR-137 to assess impact on local transport infrastructure due to this project.

Table-3.27: Transportation Distribution within project site

Name of National/state Highway and MDR	Direction		Traffic Distribution
	Up	Down	%
NH-48	Delhi	Jaipur	35
NH-248 A	Gurgaon	Sohna	20
NH-148A	Gurgaon	Delhi	20
SH-15A	Gurgaon	Farukhnagar	15
MDR-137	Gurgaon	Faridabad	10

Traffic data collected continuously for 24 hours by visual observation and counting of vehicles under three categories, *viz*., heavy motor vehicles, light motor vehicles and two/three wheelers. As traffic densities on the roads are high, two skilled persons were deployed simultaneously at each station during each shift- one person on each of the two directions for counting the traffic. At the end of each hour, fresh counting and recording was undertaken. Total numbers of vehicles per hour under the three categories were determined.

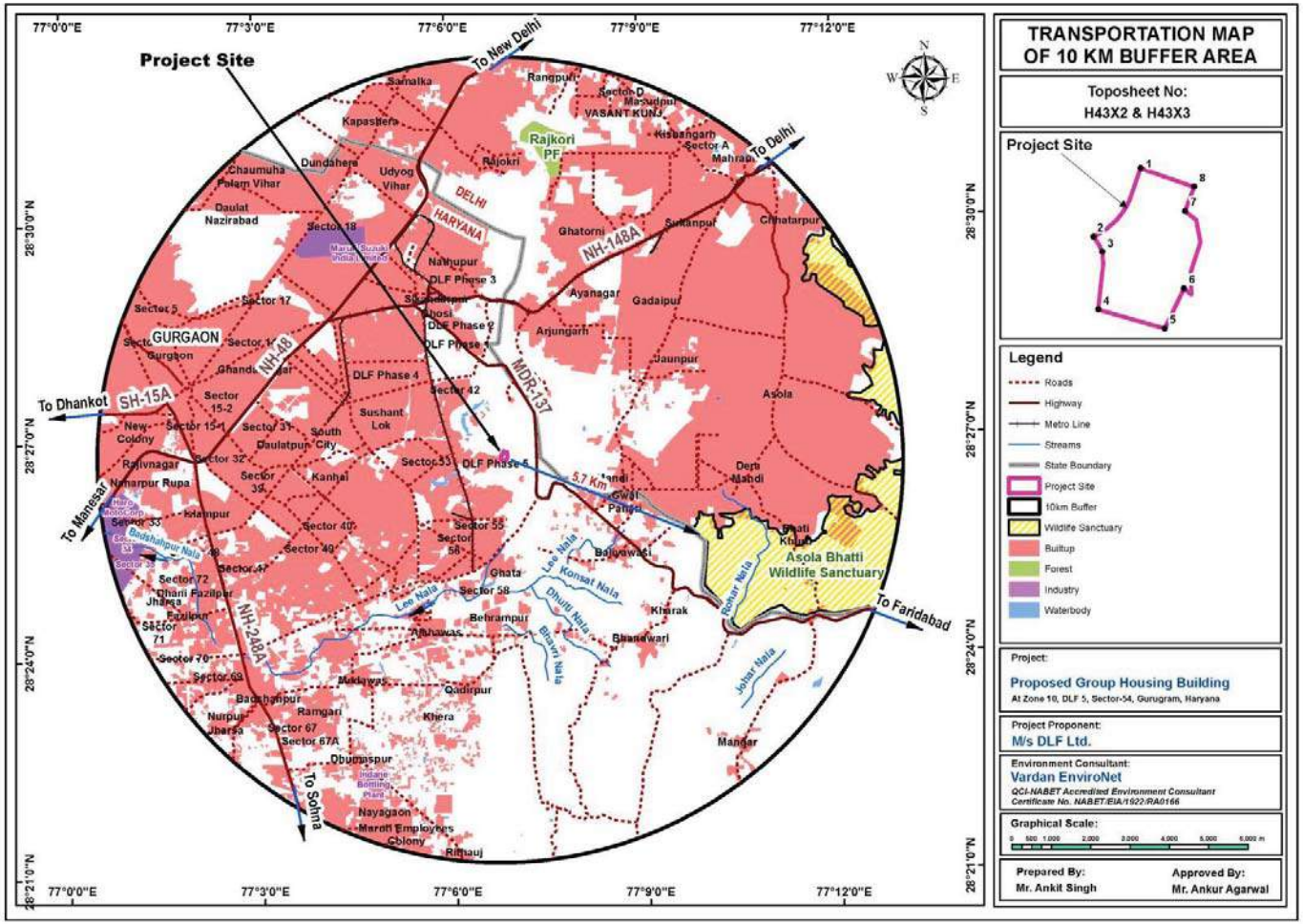


Figure- 3.20: Transport Map of Project site

Table-3.28: No. of Vehicles per Day

S.No.	Vehicles Distribution	Number of Vehicles Distribution/ Day					(PCU Factor)	Total Number of Vehicle in PCU/Day					Total Number of Vehicle (PCU)/Hour				
		MDR-137	NH-148 A	NH-248A	NH-48	SH-15A		MDR-137	NH-148 A	NH-248A	NH-48	SH-15A	MDR-137	NH-148 A	NH-248A	NH-48	SH-15A
1	Cars	6000	7200	7100	9000	6500	**1**	**6000**	7200	7100	9000	6500	250	300.00	295.83	375.00	270.83
2	Buses	730	1220	1005	1450	980	**3.7**	**2701**	4514	3718.5	5365	3626	112.5417	188.08	154.94	223.54	151.08
3	Trucks	220	430	380	6500	250	**3.7**	**814**	1591	1406	24050	925	33.91667	66.29	58.58	1002.08	38.54
4	Two Wheelers	3400	4410	4120	6500	4000	**0.75**	**2550**	3307.5	3090	4875	3000	106.25	137.81	128.75	203.13	125.00
5	Three Wheelers	1200	1950	1520	3000	1340	**2**	**2400**	3900	3040	6000	2680	100	162.50	126.67	250.00	111.67
	Total	**11550**	**15210**	**14125**	**26450**	**13070**			**20512.5**	**18354.5**	**49290**	**16731**	**602.7083**	**854.7**	**764.8**	**2053.8**	**697.1**

Table-3.29: Existing Traffic Scenario and LOS

Road	V (Volume in PCU/hr.)	C (Capacity in PCU/hr.)	Existing V/C Ratio	LOS
NH-48	2054	5400	0.380	**B**
NH-248 A	765	5400	0.142	**A**
NH-148 A	855	3600	0.237	**B**
SH-15A	697	3600	0.194	**A**
MDR-137	603	3600	0.167	**A**

Note: The existing level may be "Excellent" for NH-248A, MDR-137 & SH-15A and "Very Good" for NH-48 & NH-248A.

Table-3.30: Standard LOS values

V/C	LOS	Performance
0.0-0.2	A	Excellent
0.2-0.4	B	Very Good
0.4-0.6	C	Good/ Average/ Fair
0.6-0.8	D	Poor
0.8-1.0	E	Very Poor

*According to IRC percentage composition of vehicle type in traffic stream is considered 10 % and above for the analysis of traffic load study due to the proposed project.

4

ANTICIPATED ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

4.1 INTRODUCTION

The potential receptors of environmental and social impacts in project development are mostly the ambient air quality, ambient noise level, soil, water and solid waste management. Following section summarizes the potential impacts on the physical, natural and socio-economic impacts triggered by the project activities. The extent of impacts depends primarily on the environmental management practices that would be adopted during the facility operation. The various environmental and social parameters have been investigated to identify the impacts that are likely to occur during the development, construction and operation periods of this project.

Residential project will be developed and constructed gradually in the time span of 3 to 4 years. In development phase, basic infrastructure facilities like internal roads, rainwater harvesting tank, storm water drainage, street lighting etc. will be developed.

For proper evaluation and assessment of the environmental impacts due to development and construction and functional phase of project, understanding to the various activities associated with the project is essential. Various activities related to the project would be different, in terms of nature during the development, construction and functional phase.

The impact identification and prediction process aims to:

- Identify potential source or cause of impact throughout the life of project.
- Characterize the potential impacts affecting a target or receptor (physical, human and socio-economic).
- Assess the potential of changing the likely-hood of impact through Environmental Management Plan (EMP).

Prediction of the impacts due to the development, construction and functional activities encompass the development process to be undertaken during construction and functional phases. For each category of environmental receptor (such as, ambient air quality, water quality, soils, land, etc.) the potential impacts of activities during development, construction and functional phases and magnitude of the impacts have been assessed and discussed in detail in following sub

sections. In each case, cognizance has been taken to mitigation measures inherited in the development, construction and functional phase. The baseline status of the environment at the site and the surrounding study area has been quantified and presented in chapter-3.

4.2 ANTICIPATED IMPACTS ON LAND ENVIRONMENT AND ITS MITIGATION MEASURES

4.2.1 LAND USE AND AESTHETICS

Proposed development on the project site includes development of green area at various levels which would enhance the overall aesthetics of the area. Thus, positive impact is anticipated on the land use pattern and aesthetics of the area.

4.2.2 TOPOGRAPHY AND GEOLOGY

The activity during the construction phase would involve excavation work and leveling of site. Since the site is a plain land, the topography as well as geology is not anticipated to change due to project. No additional stresses will be imposed by the project on these parameters and hence no significant impacts are expected.

4.2.3 SOIL

(A) IMPACTS DURING CONSTRUCTION PHASE OF THE PROJECT

Impact on soil owing to the project construction activity includes soil erosion, compaction, physical and chemical desegregations and pollution of soil. Erosion of soil may occur on account of removal of vegetation and large-scale excavation activity for construction.

Use of heavy machinery and storage of material compact the soil. Compaction of soil as well as mixing of construction material with soil would also lead to reduced infiltration of water, decrease in permeability and increased runoff. Both physical and chemical desegregations of soil would occur during the construction phase. Physical desegregations would occur due to excavation of different layers of soil and subsequent mixing of different layers and would lead to disruption of soil structure. Chemical desegregations and pollution of soil would be on account

of spillage of oil from vehicles used for transportation of construction material and from the building material used for construction purposes.

MITIGATION MEASURES:

- The top soil will be stripped from excavation areas (approx. 15 cm) and stockpiled for later reuse in landscaping in covered sheds. It is estimated that topsoil will be preserved at site for use in landscaping.
- Remaining soil should be stored separately from top soil and shall be used for filling the site. Site is below the adjacent road level. Thus most of the soil will be used for filling purpose
- Site should be cleaned on daily basis. Debris and raw material which may pollute the soil should be stored on the paved surfaces
- HSD should be stored on paved surface and drains should be provided around such surfaces so as to drain out the spillage.
- Paints, solvents, wood preservatives, pesticides, adhesives and sealants shall be stored-in sealed containers, labelled, and disposed of as required by the Hazardous and Other Wastes (Management and Trans-boundary Movement) Rules, 2016.
- Dustbins should be provided at the site and labour hutment area for collection of the waste. Municipal waste from labour camp either should be composted in pit at site or should be disposed off through authorized vendor.

(B) IMPACTS DURING OPERATION PHASE OF THE PROJECT

Soil can be contaminated by leaching of waste water into the soil, dumping of municipal solid waste in open land and due to spillage of used oil from Diesel Generator Set. Soil erosion may also occur during the rainy season.

MITIGATION MEASURES:

- Carefully designed landscaped areas and plantation will be maintained during the operation phase of the project.

- All solid and other wastes from the project will be properly collected, stored and disposed. An integrated solid waste management plan will be developed.
- Wastewater will be treated, disinfected and reused for various activities like flushing, horticulture and cooling etc.
- Storm water will be used to recharge the aquifer after filtration of silt and sand and also be utilized for project water requirements.
- The entire site area will be well paved and thus there will be no leaching of any substances in case of spills.

4.3 ANTICIPATED IMPACTS ON AIR ENVIRONMENT AND ITS MITIGATION MEASURES

4.3.1 IMPACTS DURING CONSTRUCTION PHASE OF THE PROJECT

The Construction phase would have the following types of impacts on the air environment:

i. Fugitive Dust Emission
ii. Gaseous Emission

Sources of Fugitive Dust Emission is due to movement of vehicle and land preparation activities, loading and un-loading of construction materials. The building material carrying vehicles as well as the construction machinery generate emissions and pollute the environment. Dust includes brick and silica dust, wood dust from joinery and other woodworking and from earthmoving and other vehicle movements within the site. Construction machineries pose a special threat to air quality. Source of Gaseous emission during construction phase would be DG sets.

MITIGATION MEASURES:

Dust Suppression: The most cost-effective dust suppressant applied to mitigate airborne dust is water, because of its efficiency as well as ready availability. Water can be applied using handheld sprays and automatic sprinkler systems (Anti-smog gun) depending on the location. Thus, Fugitive dust will be controlled by sprinkling of water at the site. While, for control of gaseous emission from the DG sets, wet scrubber will be installed. Apart from this adequate stack height of DG sets would also be maintained as per the CPCB norms. During the installation

of heights of DG Sets the conditions specified in The Environment Protection Act, 1986 third amendment rules 2002, vide GSR 489 (E), dated 9th July,2002 at serial no. 96 shall be complied with.

Emission Control from Construction Equipment's: Construction equipment and heavy transport vehicles shall meet emission standards like Bharat Stage –III/Stage-IV requirements for vehicles. The operation and maintenance of all vehicles, equipment's deployed on site by different contractors would be regulated and effectively monitored. The Pollution under Control (PUC) certification will be ensured for proper O&M of vehicles.

Improved Maintenance: The other measures to reduce the air pollution on site are:

- On-Road- Inspection should be done for black smoke generating machinery.
- Promotion of use of cleaner fuel would be done.
- Vehicles having pollution under control certificate would be allowed to ply.
- Use of covering sheet to prevent dust dispersion at buildings and infrastructure sites, which are being constructed.
- Use of covering sheets should be done for trucks to prevent dust dispersion from the trucks, implemented by district offices.
- Reducing the speed of a vehicle to 20 kmph can reduce emissions by a large extent.
- Speed bumps would commonly be used to ensure speed reduction.

Material Storage: Care would be taken to keep all material storages adequately covered and contained so that they are not exposed to situations where winds on site could lead to dust / particulate emissions. Fabrics and plastics for covering piles of soils and debris is an effective means to reduce fugitive dust.

4.3.2 IMPACTS DURING OPERATION PHASE OF THE PROJECT

The Operation phase would have the following types of impacts on the air environment:

i. Smoke from DG sets
ii. Smoke from Resident's vehicles

Diesel Generator sets will be the major source of air pollution as the emission of SO_2, NO_2 and Hydrocarbons will be done. DG sets will run during power failure as power back-up. Smoke

from resident's vehicles may be the source of air pollution during the operation phase of the project.

MITIGATION MEASURES:

- Height of DG sets stack will be maintained as per the guidelines prescribed by CPCB to disperse the air pollutants in the air.
- The Pollution under Control (PUC) certification will be ensured for the vehicles coming in the project premises at regular basis.

4.3.3 AIR EMISSIONS AND DISPERSION MODELING:

Air quality modeling is carried out for two main sources of air pollution from residential project These include emissions from DG Sets and vehicles. The modeling for DG Set emissions is carried out in ISCST3 model; whereas, CALINE4 model is used for modeling vehicular emissions. The details of modeling are presented in following sections.

4.3.3.1 Emission from DG Sets

DG Sets will be used fulfilling emergency power requirements. The various DG Set parameters used for modeling gaseous emission are presented in Table below.

Table 4.1: Parameters used for modeling gaseous emission

Stack Attached to	Capacity KVA	Stack Exhaust, nm3/s	Fuel Used	PM10 g/s	SO2 g/s	NOx g/s	CO g/s	PM2.5
1 -DG Set	1000	0.305865	HSD	0.003222	0.080556	0.292004	0.04588	0.001289
1 -DG Set	1250	0.305865	HSD	0.004028	0.100694	0.292004	0.04588	0.001611
3 -DG Set	2000	0.305865	HSD	0.006444	0.161111	0.292004	0.04588	0.002578

Note: In the absence of specific $PM_{2.5}$ emission limit, the emission rate of $PM_{2.5}$ is calculated based on the maximum composition of $PM_{2.5}$ recorded during ambient air monitoring.

4.3.3.2 Emissions from Vehicles

The other sources likely to be affecting the pollutant concentrations in project area would be emission from vehicles during operation phase. Carbon Monoxide is the major pollutant in vehicular emissions. The various parameters used for modeling CO emission from vehicles are presented in Table below.

Table 4.2: Parameters used for modeling CO emission from vehicles

Nos. of Vehicles using (per hour)	CO Emission Rate(g/km)
161	3.01

*based on maximum 1,615 nos. of 4-wheelers parking spaces used between 8am to 8pm

4.3.3.3 Meteorological Data

The meteorology of the project area plays very important role in dispersion of pollutants and buildup of pollution within the atmosphere. In the present study, one season (December 2021 – February 2022) meteorological data has been used for modeling emission from loading activity in ISCST3 model. The meteorological conditions used for modeling emission due to transportation in CALINE4 model is presented in Table below.

Table 4.3: Meteorological Data used for Modeling in CALINE4

Wind Speed (m/s)	Wind Direction (°)	Atmospheric Stability Class	Wind Direction Standard Deviation (°)	Ambient Temperature (°C)	Mixing Height (m)
1	Calculated by Model	D	10	20	500

4.3.3.4 Results

The ISCST3 model (Lakes Environmental AERMOD View) was setup to predict the incremental ground level concentration (GLC) of PM_{10}, $PM_{2.5}$, NO_2, SO_2 and CO generated due to operation DG Sets. Point sources were setup to resemble DG Sets. Receptors were fixed at baseline monitoring stations as well as in uniform polar grid up to 10 km radius from project. The model was run for **Worst-Case Scenario** i.e. 24-hour operation of DG sets. Similarly, Line Source was

used to predict the incremental GLC of CO due to vehicular emissions in **Worst-Case Scenario**, in which worst-case wind angle is calculated by the model.

The predicted maximum incremental GLC of PM_{10}, $PM_{2.5}$, NO_2, SO_2 and CO were found as **0.00983µg/m³, 0.00794µg/m³, 0.0631µg/m³, 0.0994µg/m³ and 0.0000049 mg/m³**respectively at project site. The predicted incremental GLC and predicted cumulative GLC at baseline air quality monitoring locations are presented in **Table 4**.

Table 4.4 – Predicted GLC at Ambient Air Quality Monitoring Stations

Location	Village	Max Baseline Concentrations					Predicted GLC – AERMOD					Cumulative GLC				
		PM10	PM2.5	Nox	SO2	CO	PM10	PM2.5	Nox	SO2	CO	PM10	PM2.5	Nox	SO2	CO
		($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	(mg/m^3)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	(mg/m^3)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	(mg/m^3)
A1	Project Site	135	74	29.9	12.8	1.2	0.00983	0.00794	0.0631	0.0994	0.0000049	135.00983	74.00794	29.9631	12.8994	1.2000049
A2	Open Scrub Near Dlf Phase 5	118	68	25.5	9	0.92	0.01908	0.00841	0.29654	0.35854	0.000017	118.01908	68.00841	25.79654	9.35854	0.920017
A3	Near Emaar The Palm Spring	130.1	72.1	29	10.5	1.06	0.00656	0.00281	0.10408	0.12595	0.0000059	130.10656	72.10281	29.10408	10.62595	1.0600059
A4	Near Gwalpahari	120.4	69.4	27.9	8	0.86	0.00729	0.00312	0.11575	0.13991	0.0000065	120.40729	69.40312	28.01575	8.13991	0.8600065
A5	Sector 54	140.5	75.5	30.5	12.9	1.1	0.00233	0.001	0.0369	0.04479	0.000002	140.50233	75.501	30.5369	12.94479	1.100002
A6	Near Arjungarh	125.2	70.2	27.3	7.8	0.85	0.00393	0.00168	0.06228	0.07531	0.0000035	125.20393	70.20168	27.36228	7.87531	0.8500035
A7	Near Dlf Phase 5	95.6	57.5	25.7	6.8	0.65	0.01531	0.00482	0.1761	0.213	0.00001	0.0111	0.0111	0.0111	0.0111	0.0111
A8	Near Qutab Plaza	98.4	59.5	26.3	19.4	0.75	0.00885	0.00381	0.14017	0.1694	0.0000079	98.40885	59.50381	26.44017	19.5694	0.7500079

Interpretation of Results

- The baseline concentrations for PM_{10} and $PM_{2.5}$ are already exceeding the prescribed NAAQ standards. The incremental concentration of PM_{10} and $PM_{2.5}$ in worst-case scenario at all 8 ambient air quality locations are nominal.
- The baseline concentrations for NO_2 andSO_2 are within the prescribed NAAQ standards. The incremental concentration for NO_2 and SO_2 in worst-case scenario at all 8 ambient air quality locations nominal and the cumulative concentrations will meet the prescribed standards in operation phase of the project.

4.3.3.5 Conclusion

- From the results of ISCST3 model, it is concluded that the maximum cumulative concentrations of PM_{10} and $PM_{2.5}$ will not meet the prescribed standards; whereas the maximum cumulative concentrations of NO_2 and SO_2 due to project is expected to be comply with the prescribed NAAQ standards.
- The modeling results are based on emergency scenario in which 24-hour operation DG Sets is modeled in summer season. It is expected that during other seasons and under normal operating conditions, the concentration values will be much lower than the results obtained in modeling. Hence, it can be safely concluded that the project would not have any significant impact on air quality in the project region.
- The impact due to vehicular emission in project would be negligible.

4.3.3.6 Mitigation Measures

The following mitigation measure are proposed in order to prevent any planned / unplanned accidental impacts on air quality –

- DG Set shall be purchased from manufacturer complying with CPCB / MoEF&CC guidelines.

- The emissions from the stacks shall be monitored regularly for concentration of PM_{10} and $PM_{2.5,}$ SO_2 and NO_2. Sampling port shall be provided in the stacks according to CPCB guidelines.
- BS-IV or higher quality diesel shall be used for operating DG Sets
- Greenbelt development has been done within the project area

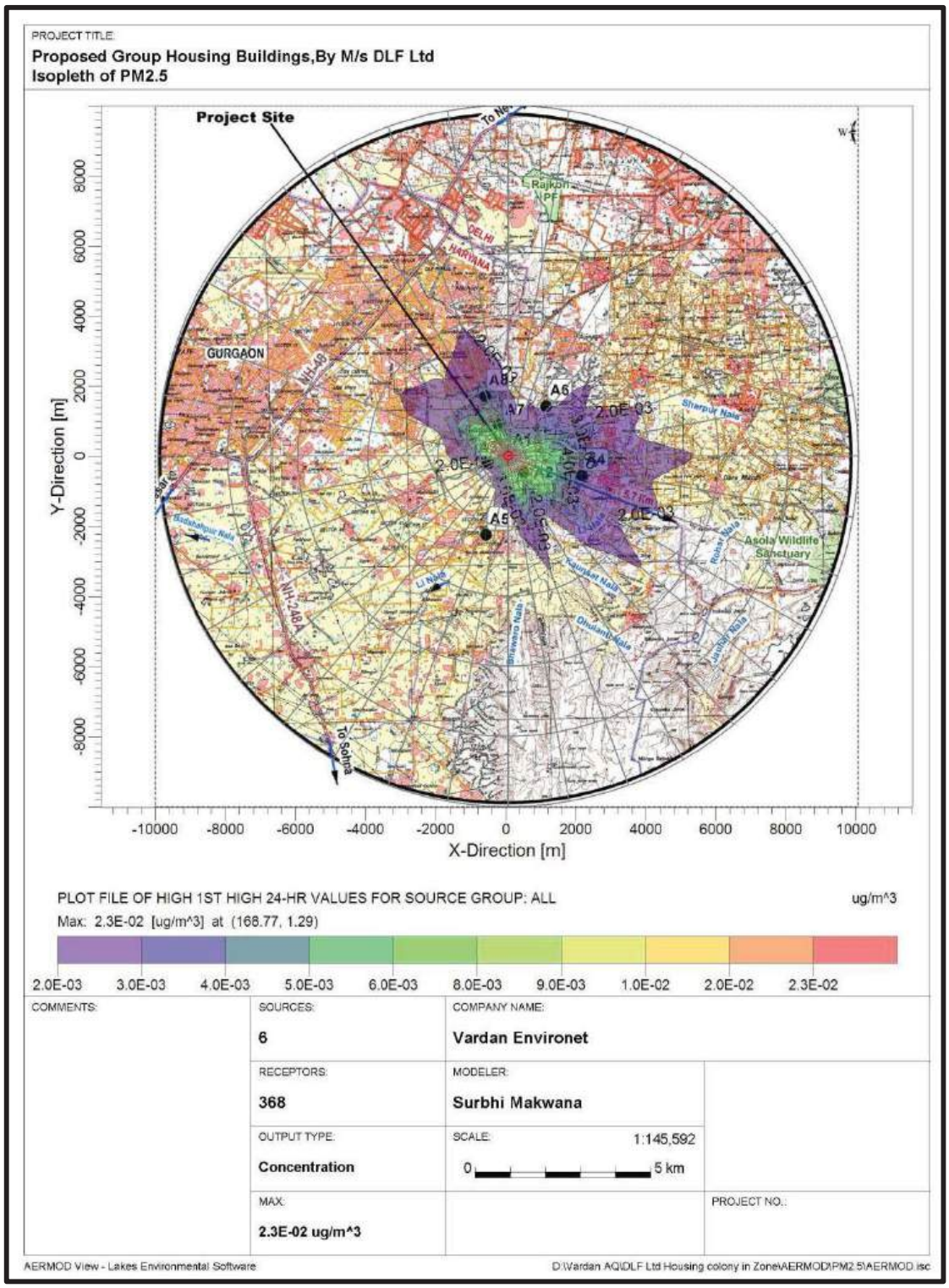


Fig 4.1: GLC map of $PM_{2.5}$

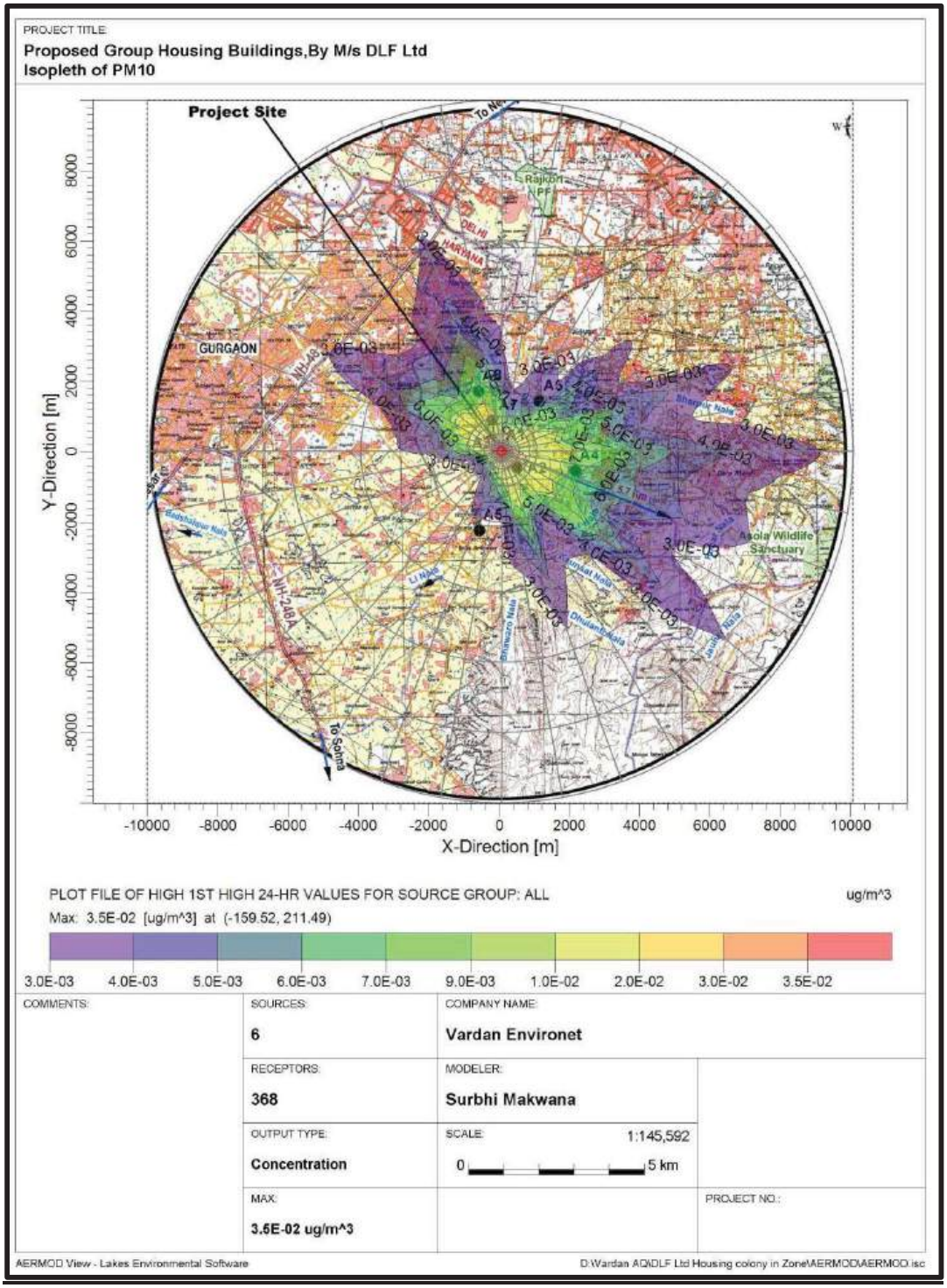


Fig 4.2: GLC map of PM_{10}

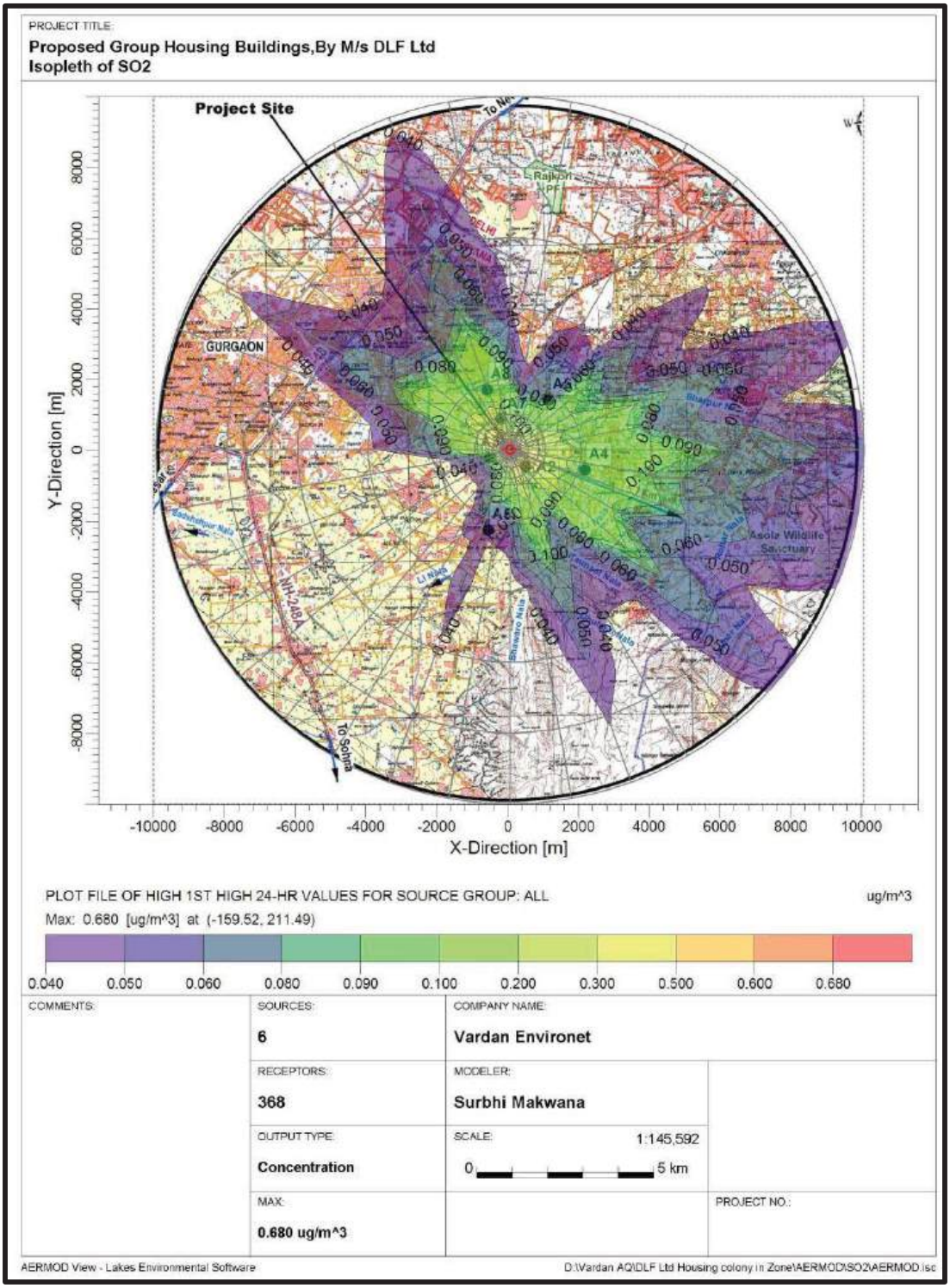


Fig 4.3: GLC map of So_2

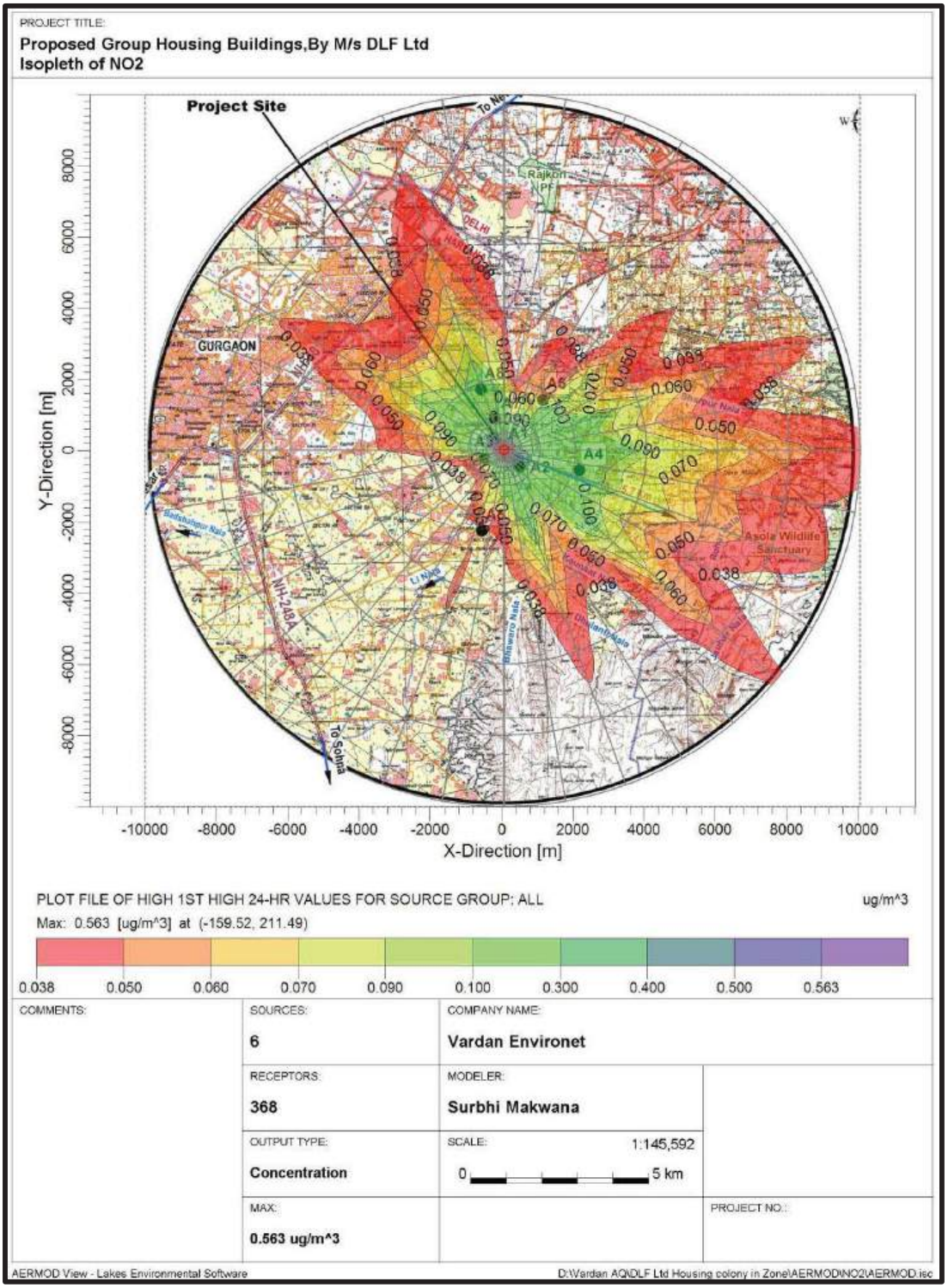


Fig 4.4: GLC map of No_2

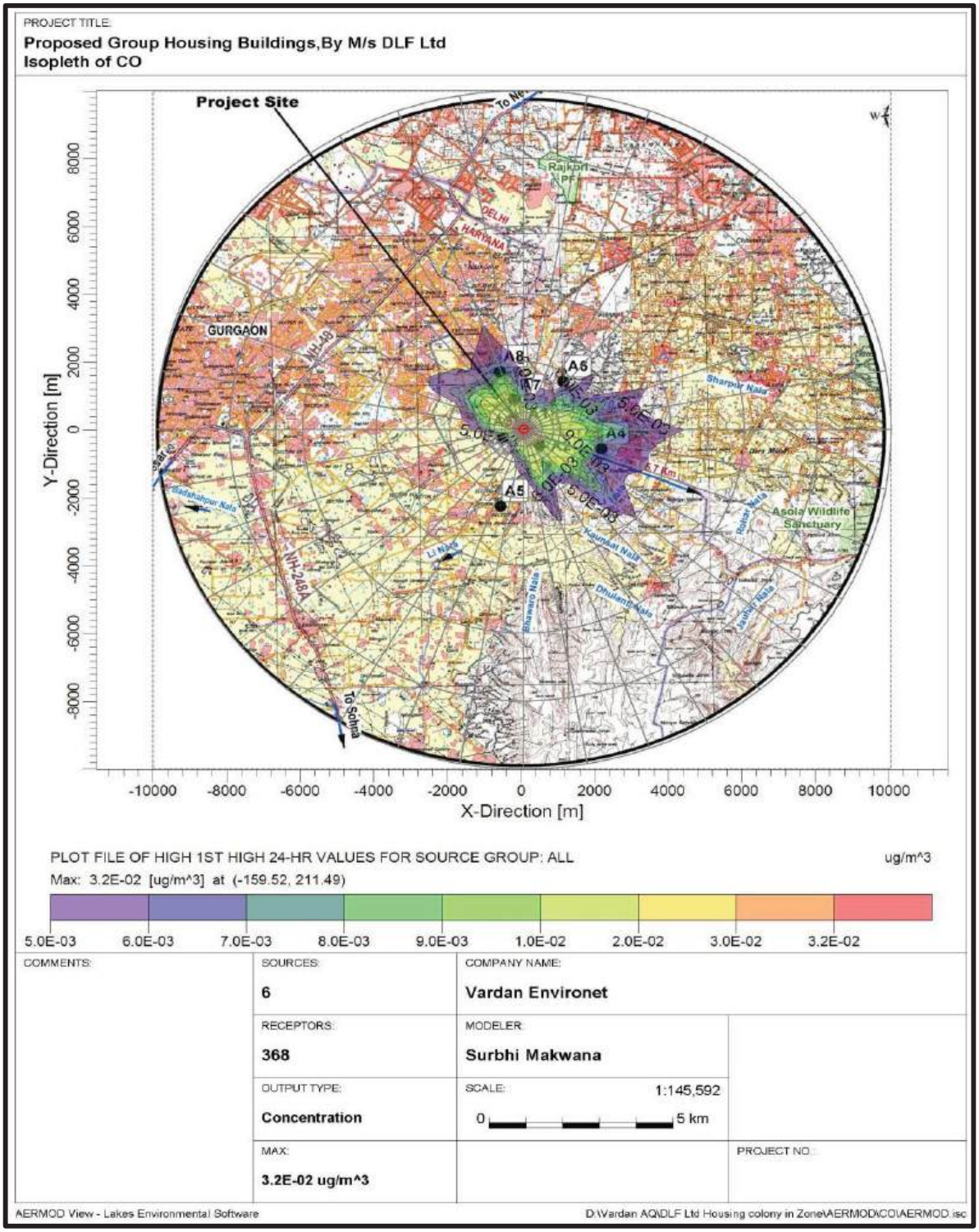


Fig 4.5: GLC map of CO

4.4 ANTICIPATED IMPACTS ON NOISE ENVIRONMENT AND ITS MITIGATION MEASURES

4.4.1 IMPACTS DURING CONSTRUCTION PHASE OF THE PROJECT

Construction equipment's, transportation activities, operation of DG sets and work on construction site at night are the main source of noise pollution during the construction phase of the project.

MITIGATION MEASURES:

Provision of Noise Barrier: All around the construction activity area on the site periphery, about 3 meter high barrier (temporary) shall restrict the noise impact from the ground level construction activity by about 10 dB(A).

Proper Maintenance of Construction Equipment/Vehicles: Proper operation and maintenance of heavy equipment as well as transport vehicles shall also ensure lower noise emissions.

Restriction of Time for Construction Work: The heavy construction and transport activities shall be restricted to daytime operation when the background noise levels are high so that impacts like sleep disturbance during the night time are avoided.

Occupational & Passive Protection: Personal protective equipment's (PPEs) like Ear plugs, ear muffs, etc. will be provided to the workers who are handling high noise equipment or stone cutting operations shall protect them from high noise exposure.

4.4.2 IMPACTS DURING OPERATION PHASE OF THE PROJECT

During operational phase, the following sources of noise pollution are expected:

- Diesel generator operations,
- Increase in transport noise from within the site from nearby roads.

MITIGATION MEASURES:

Provision of Enclosures for DG Sets: As regards DG sets, these shall be provided with acoustic enclosures ensuring maximum outside noise level of 70-75 dB (A) at 1.0 m distance. Even if all DG sets are housed separately, the total resultant maximum sound pressure level of the DG sets operating together would not be more than 75 dB (A) by the addition of sound intensities, based on equation used for calculating cumulative noise.

$L_{eq,T} = 10 \log\{1/n \sum_{i=1}^{n} 10^{Li/10}\}$

Where, Li = levels observed at an equally spaced sources during interval T.

It is pertinent to mention here that DG sets will be used as power back up units and it is anticipated that they shall operate only during power failure. However, as they will be acoustically enclosed, no impacts are expected on the outside community.

Provision of Adequate Structural Foundation to Minimize Vibration: The DG sets foundation will be made up of heavy weight inertia concrete block. The generator will be mounted on Cushy Foot mounting and the concrete block will be isolated from the adjoining floor. Thus no vibration impacts are expected from the DG sets.

Control of Noise from Road Traffic: Trees with heavy foliage planted on both sides of carriage way help slightly muffle the noise provided; the foliage extends for a considerable distance of 30 m or above.

Green Belt Development: Vegetation buffers can minimize the level of increase in Noise level of the area. Greenbelt shall be developed comprising of trees as per the guidelines.

ANTICIPATED IMPACTS ON WATER ENVIRONMENT AND ITS MITIGATION MEASURES

4.5.1 IMPACTS DURING CONSTRUCTION PHASE

During Construction Phase, the impact on water environment is in two ways:

- Use of water
- Discharge of wastewater

Construction activities for the project can have non-significant impact on the water environment. Potential impacts on the surface and ground water quality have been discussed as under:

Wastewater from Site Development and Construction Activity: Wastewater generation during site development and construction like from the construction areas, stockpiles of construction materials and wastes, etc. mainly containing high suspended solids.

Wastewater Generation from Site Workshop: The repair and maintenance of construction equipment's/ transport vehicles, DG Sets, and washing of vehicles on-site may also generate wastewater containing oil and grease (though only in minimal quantities as normally these activities are not undertaken on-site).

Toilets and Washing area: Domestic wastewater is generated from the temporary toilets, washing areas, drinking water points, etc. constructed for the construction workers and other staff on-site.

MITIGATION MEASURES:

Substantial quantities of water would be used in the construction activities to meet the domestic requirement of construction personnel. Stagnant pools of water may promote breeding of mosquitoes and generally create in sanitary conditions. However, suitable drainage network would be made to ensure proper drainage of wastewater from the construction sites, so that such water do not form stagnant pools nor aggravate soil erosion. With regard to water quality, wastewater from construction activities would mostly contain suspended impurities.

Under good construction practices, construction wastewater shall be collected in construction pits and reused in construction activities e.g. wastewater from stone cutting, cleaning, curing, etc. Thus, no significant impacts are expected on water quality in the project area due to generation of this wastewater.

The impact of the surface runoff (from the stockpiles, construction areas, etc.) is not expected to be significant except during the rainy season. To mitigate any impacts, garland drains and soak

pits (for collection and reduction in the runoff) would be constructed around the stockpiles of materials and wastes (till they are used/ moved off-site). It would be ensured that construction materials and wastes stockpiles are moved on a periodic basis to prevent any stockpiles.

Regarding the construction workers, employment preference would be given to local construction workers of the nearby areas. Thus, no major settlements i.e. any labour camps/colonies, etc. would be established on-site. Temporary offices would be constructed at the site for the office staffs only and hence there would be minimal domestic wastewater generation, which would be treated through conventional treatment methods like soak pit etc.

4.5.2 IMPACTS DURING OPERATION PHASE

Wastewater Generation from Domestic Activities: Wastewater would be generated as sewage from the domestic activities of the residents. A large number of pollutants occur in waste water, which includes suspended and dissolved solids consisting of inorganic and organic matter, nutrients, oil and grease and pathogenic micro-organisms.

During the operation phase of the project, wastewater generation from domestic use and storm water during rainy season will have the main impact on water environment.

MITIGATION MEASURES:

Scheme for Ground Water Recharge: Ground water will be recharge within the project premises by adopting the rain water harvesting tank. Rainwater harvesting is the activity of direct collection for optimum utilization of the rain water. Rain water collected can be stored for direct use or can be re-charged into the ground water. The main aim of this technique is to minimize flow of rain water through drain/nallah to the river without any use.

Rainwater would be diverted from the rooftop, paved and green area to rain water harvesting tank in the project. The process of rain water harvesting in the project area would consist of diverting the rainwater into the de-silting tank to remove silts/inorganic impurities. The outflow of the de-silting tank will be taken into the harvesting tank.

Table-4.5: Rainwater Harvesting Calculation

S. No.	Type of Surface	Catchment's Area (m^2) [A]	Runoff Coefficient [C]	Rainfall Intensity m/hr[I]	Discharge (Run Off) [Q=CIA] m^3/hr
1.	Rooftop Area	6369.381	0.9	0.09	**515.92**
2.	Green Area	9195.995	0.2	0.09	**165.53**
3.	Road & Paved Area (including parking area)	15087.941	0.7	0.09	**950.54**
	Total	**30,653.317**			**1631.99**

Taking 20 minutes retention time, total volume of storm water 1631.99×0.33 = 538.55 m^3

Taking the effective diameter and depth of a Recharge pit 4 m and 2.8 m respectively,
Volume of twin bore Recharge pit ($2\times\pi r^2 h$) = ($2\times3.14\times2\times2\times2.8$) = 70.33 m^3
Hence No. of pits required = 538.55/70.33 = 7.65, Say 8 Pits.

Total **8 nos.** of Rain Water Harvesting pits are being proposed for artificial rain water recharge within the project premises.

We will provide digital water level recorder (DWLR) at the RWH pits.

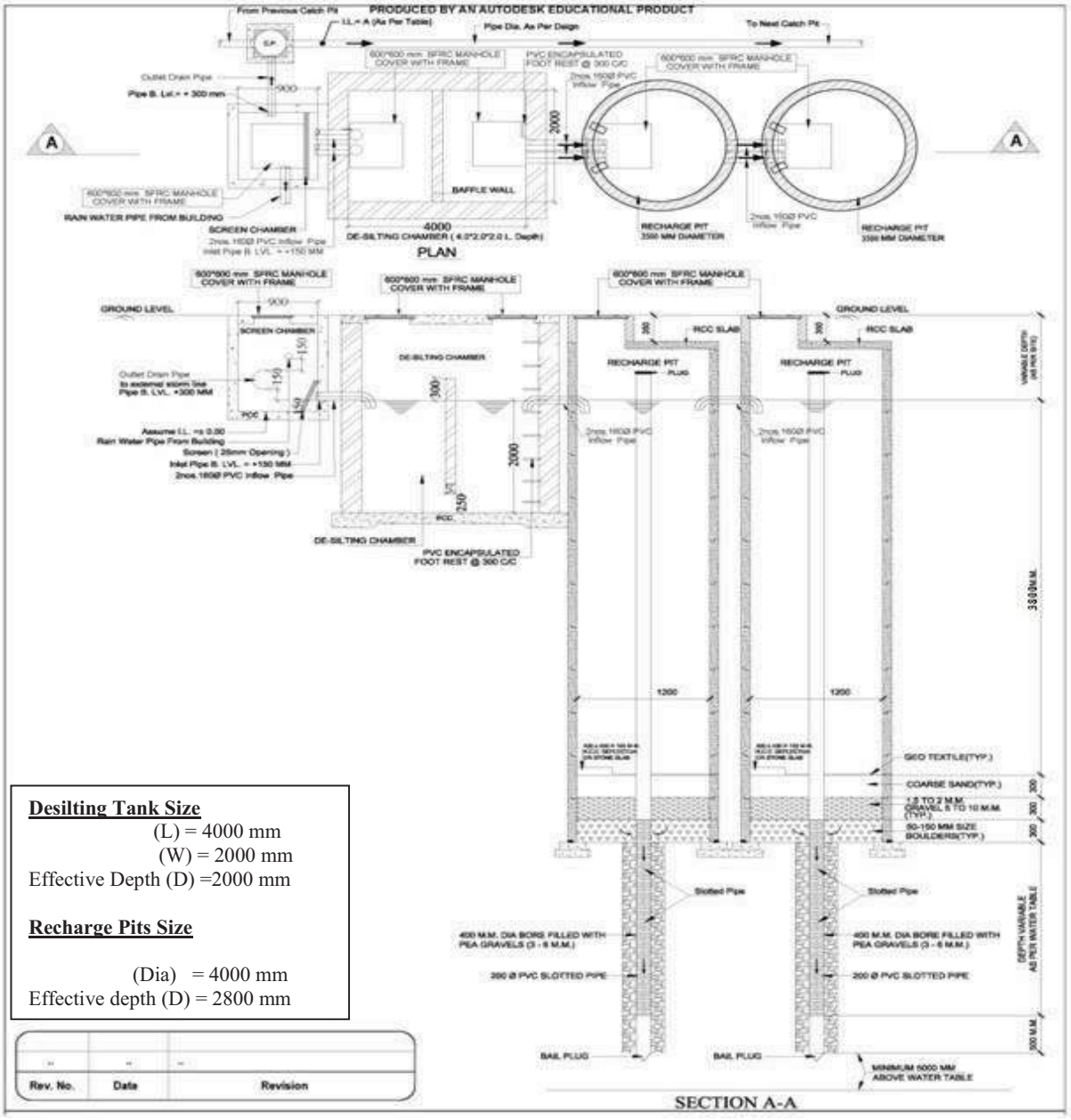


Figure-4.6: Rain Water Harvesting Pit Design

ANTICIPATED IMPACTS ON BIOLOGICAL ENVIRONMENT AND ITS MITIGATION MEASURES

There would not be any impact on the Biological Environment from the project during construction and operation phase.

4.5 ANTICIPATED IMPACTS ON SOCIO-ECONOMIC ENVIRONMENT AND ITS MITIGATION MEASURES

4.7.1 IMPACTS DURING CONSTRUCTION PHASE

Possibility of direct and indirect employment opportunity would be increased due to development of the project. Local labour from nearby areas will be preferred for construction work. Hence, development of the project has positive impacts on the surroundings of the project site.

4.7.2 IMPACTS DURING OPERATION PHASE

Critically analyzing the existing environmental status of the socio-economic profile and visualizing the scenario with the project, the impacts of the project would be varied and will generate both positive and negative impacts of the proposed project in the region are stated below.

Positive Impacts

- There will be growth in indirect jobs and business opportunities to the local and surrounding people such as contractors, transporters and raw material suppliers etc. due to the proposed development in the area. Local laborers from nearby area are being employed during the construction phase.
- Demands of community services and commercial development also create additional employment for the poor strata of society by way of security guard, driver, maid/servant, sweeper, gardener etc
- Health facility will also be improved with the development of the project.
- Commercials as well as daily need shops will increase in the study areas as there will be inflow of population due to the project

- Improvement is safety, security, banking and fire-fighting facility
- The project envisages bringing various other communities to the area and thereby enabling rapid enhancement of an urban environment.
- The sanitation and the aesthetic environment of the village would also improve with the coming of the project.

Negative Impacts

- Due to the proposed project activity, influx of population may increase during the construction phase. This may lead to strain on infrastructure facilities in the area as well as increase in population at local level. However, this impact is only for the short duration and temporary in nature
- Vehicular traffic and construction activities may create noise pollution
- Proposed development may have a significant impact on the community's ability to accommodate new residents and adapt to changes in the social environment for existing surrounding residents

Mitigations Measures

5 Project proponent should take appropriate steps to keep environment clean and healthy during construction phase

6 Provision of adequate drinking water, toilet and bathing facilities should be made available on project site

7 Water shall be sprinkle/spread to suppress dust during construction phase to control air pollution and thereby avoid adverse health impact

8 Proper living condition with appropriate facilities for residential labours should be provided

9 Proper Training and awareness programme should be carried out so that the workers understand the importance of wearing the personal protective equipments.

10 The colony management collectively will need a pool of watchmen, gardeners, sweepers, plumbers, fitters, STP operators, lift operators and solid waste collectors. Preference should be given to local people for all this.

10.4 SOLID WASTE AND ENVIRONMENT

4.8.1 IMPACTS DURING CONSTRUCTION PHASE

The site is a barren land therefore there would not be any demolition activity on the site. The average quantity of waste generated during construction phase at the project site would be inert waste, mainly comprising of clay, sand, gravel, brick, concrete, concrete block, asphalt, pipes, conduits, steel waste etc.

MITIGATION MEASURES:

A major portion of the waste (particularly the wasted construction material) would be used at the project site for internal leveling, internal road construction etc. if found feasible. Waste management plan would be prepared suggesting maximizing the reuse of recyclable wastes, safe disposal of non-reusable wastes from the site to reduce the impact to insignificant levels.

Disposal of excess earth that is unearthed due to the construction activity would be properly undertaken. Waste recycling plans would be developed for construction work, prior to beginning construction activity. Handling of waste material requires special precautions such as personal protective equipment and special procedures to prevent the injury. Proponent would operate safe methods for waste collection, storage, and disposal operations in a manner to protect the health and safety of personnel, minimize environmental impact and promote material recovery and recycling.

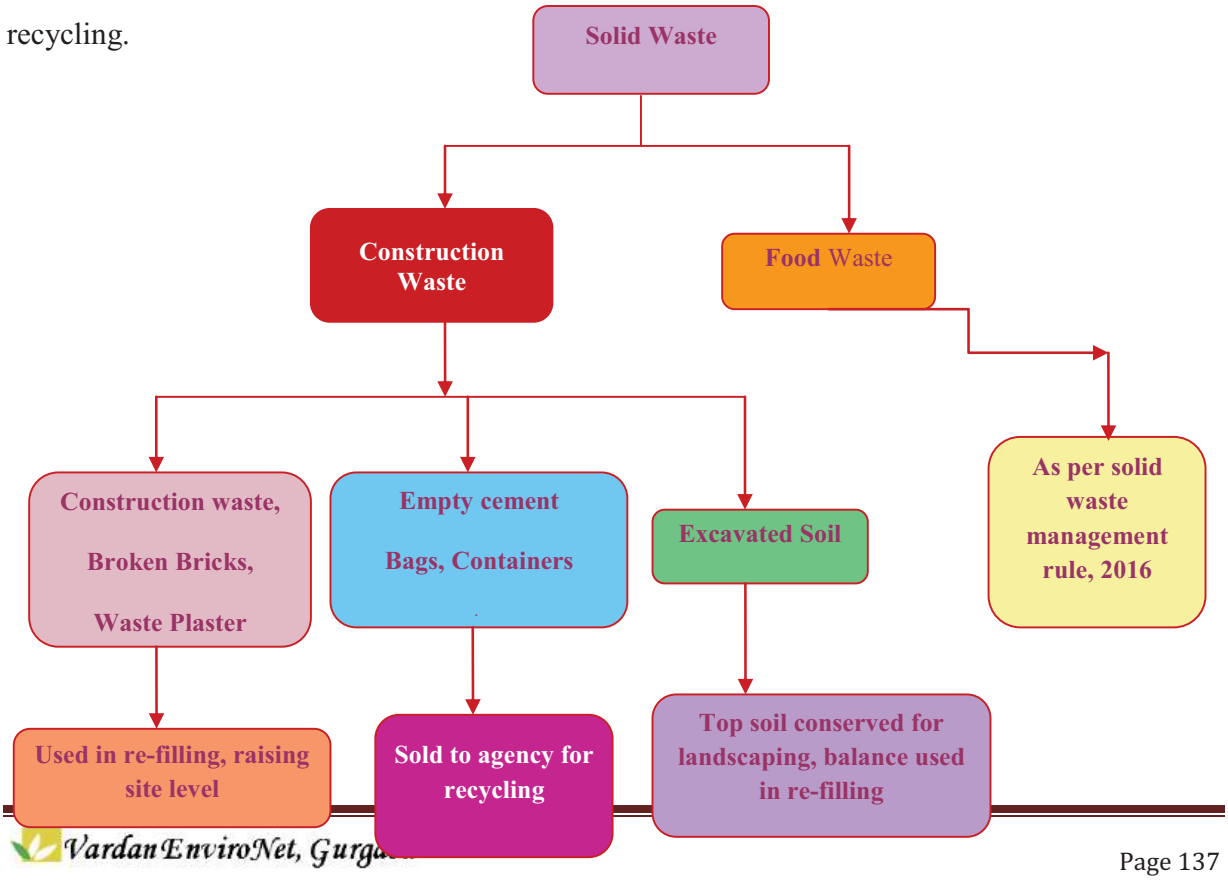


Figure- 4.7: Solid Waste Management Scheme during Construction Phase

4.8.2 IMPACTS DURING OPERATION PHASE

Municipal Solid Waste: The domestic solid waste will be generated from the project pertain two categories, Bio-degradable and Non-biodegradable.

E-Waste: Discarded batteries, television, computer, radio etc. will be generated in the form of e-waste from the project.

Hazardous Waste: The project is expected to generate the following categories of hazardous wastes:

- Used Oil (Category 5.1, as per Schedule-1 of the Rules) - from DG sets
- Oil Contaminated Wastes (Category 5.2, Schedule-1) - from cleaning of DG sets, maintenance operations, etc.

MITIGATION MEASURES:

Municipal Solid Waste: Following arrangements will be made at the site in accordance to Municipal Solid Wastes (Management and Handling) Rules, 2000 and amended Rules, 2008.

1 Collection and Segregation of waste

1. Door to door collection system will be provided for collection of domestic waste in colored bins.
2. Separate colored bins will be provided for dry recyclables and bio-degradable waste.
3. Adequate number of colored bins (Green and Blue bins for bio-degradable and non-biodegradable respectively) is proposed to be provided.
4. Litter bin will also be provided in open areas like parks etc.

2 Treatment of waste

Bio-Degradable wastes

1. Bio-degradable waste will be treated in Organic Waste Converter and the compost used as manure.
2. STP sludge is proposed to be used for horticulture as manure.

3. Horticultural Waste is proposed to be composted and will be used for gardening purposes.

Recyclable wastes

1. Grass Recycling – The cropped grass will be spread on the green area. It will act as manure after decomposition.
2. Recyclable wastes like paper, plastic etc. will be sold off to recyclers.
3. Hazardous wastes such as waste oil will be sold off to authorized recyclers. Buy back arrangement will be made for batteries.

3 Disposal

The Municipal Solid Waste Management will be conducted as per the guidelines of Municipal Solid Wastes (Management and Handling) Rules, 2000 and amended Rules, 2008. The inert non-recyclable wastes will be disposed through government approved agency for land filling. A solid waste management scheme is depicted in the following figure for project during operation phase.

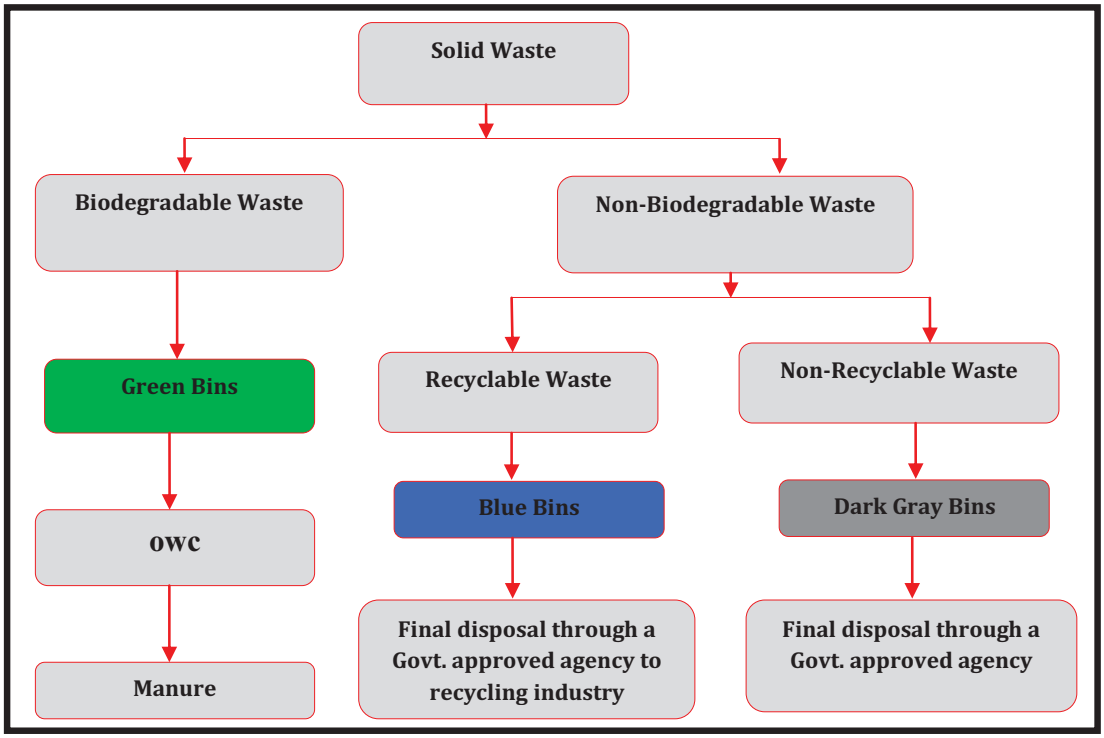


Figure- 4.8: Solid Waste Management Scheme during Operation Phase

E-Waste: The E-waste disposal would be done with the help of Authorized local Vendor. At the site proper segregation and storage of the waste would be done. The disposal plan would be developed to follow the environmental norms set by the regulatory body as SPCB/CPCB/MOEF and/or any other relevant authorities. Overall it would be ensured that all waste fractions are appropriately recycled/ disposed of through authorized recyclers/ re-refiners/ contractors. Records would be kept regarding amount and characteristics of all types of wastes.

Hazardous Waste: Hazardous wastes would be stored in secured places with adequate secondary containment and labelling (in *Form-8*) as per The Hazardous Wastes (Management, Handling and Transboundary Movement) Rules 2008. Appropriate records of hazardous wastes generation and disposal (in *Form-3*, *Form-4*, *Form-9, Form-13 etc.*) shall be maintained as per the requirements of MoEF's Rule.

The used oil and oil-contaminated wastes shall be disposed of through authorized recyclers/re-refiners. Any other hazardous wastes, generated on-site, shall be sold only to authorized contractors.

4.9 Traffic Impact Analysis:

During Construction Phase

Table 4.6: no of vehicles during construction phase

S.No.	Mode of Transporation	No.of Vehicles Used/Day	PCU Factor	PCU/Day	PCU/hr
1	Tankers	5	5	25	2.5
2	Trucks	4	3.7	14.8	1.48
4	Car	10	1	10	1
5	Two-Wheelers	20	0.75	15	1.5
6	Three-wheelers	15	2	30	3
	Total	**50**		94.8	9.48

*** Construction activity time period has been taken as 10 hr. /day and on that basis above PCU/hr. calculated.**

Table 4.7: Modified Traffic Scenario and LOS during construction phase

Road	Increased PCU's- State/National highway	Increased Volume (V)	Capacity (C)	Modified V/C Ratio	LOS
NH-48	35% of 9 = 3.15	2054+3.15 = 2057.15	5400	0.381	**B**
NH-248 A	20% of 9 = 1.8	765+1.8 = 766.8	5400	0.142	**A**
NH-148A	20% of 9 = 1.8	855+1.8 = 856.8	3600	0.238	**B**
SH-15A	15% of 9 = 1.3	697+1.8 = 698.8	3600	0.194	**A**
MDR-137	10% of 9 = 0.9	603+0.9 = 603.9	3600	0.168	**A**

Table 4.8: During Operation Phase

S.No.	Mode of Transporation	No.of trips/Day	PCU Factor	PCU/Day	PCU/hr
1	Car	1615	1	1615	67.29
2	Two-Wheelers	450	0.75	337.5	14.06
3	Three-wheelers	30	2	60	2.50
	Total	**2095**		**2012.5**	**83.85**

*Probable maximum 10% traffic will be move at hourly basis on existing road (NH-8, NH-248A, NH-148A, SH-15A & MDR-137)

Table 4.9: Modified Traffic Scenario and LOS during Operation Phase

Road	Increased PCU's- State/National highway	Increased Volume (V)	Capacity (C)	Modified V/C Ratio	LOS
NH-48	35% of 84= 29.4	2054+29.4 = 2083.4	5400	0.386	**B**
NH-248 A	20% of 84 = 16.8	765+16.8 = 781.8	5400	0.145	**A**
NH-148A	20% of 84 = 16.8	855+16.8 = 871.8	3600	0.242	**B**
SH-15A	15% of 84 = 12.6	697+12.8 = 709.8	3600	0.197	**A**
MDR-137	10% of 84 = 8.4	603+8.4 = 611.4	3600	0.170	**A**

Conclusion

During Construction Phase

Not much impact on local transport during construction phase, as 50 vehicles will be required for transport of construction materials and other transportation activities. The LOS value from the project remain same i.e. LOS value for NH-248A, SH-15A and MDR-137 will remain same as Excellent, NH-48 & NH-148A will remain same as 'Very Good' So the additional load on the carrying capacity of the concern roads is not likely to have major affect.

During Operation Phase

The V/C ratio is found out to be 0.380 on NH-48, 0.142 on NH-248A, 0.237 on NH-148A, 0.194 on SH-15A and 0.167 on MDR-137 the project will result in a modified V/C ratio during construction phase to be 0.381 on NH-48, 0.142 on NH-248A, 0.238 on NH-148A, 0.194 on SH-15A and 0.168 on MDR-137, and during operation phase to 0.386 on NH-48, 0.145 on NH-248A, 0.242 on NH-148A, 0.197 on SH-15A and 0.170 on MDR-137. Thus the additional load on the carrying capacity of the concern roads is not likely to have any significant adverse effect

4.10. IMPACT MATRIX

Various activities from the proposed scheme are likely to have some impacts on the environmental constituents during its construction as well as functional phase. The impact assessment matrix is given in **Table 4. 10** reveals the impact associated with each activity of the project on various environmental parameters during construction and function phase respectively before any mitigation measures are implanted.

Table 4.10: Impact Matrix

Environmental Parameters	Nature of Potential Impacts during Construction and Operational							
	Local	Regional	Short Term	Long Term	Reversible	Irreversible	Adverse	Beneficiaries
Topography	√							

Drainage	√							
Soil	√							
Water Resources	√	√	√		√		√	
Water Quality	√			√				
Land Use	√			√		√		√
Air Quality	√	√		√	√		√	
Noise	√	√			√		√	
Flora	√					√		√
Fauna	√					√		√
Employment	√	√		√		√		√
Aesthetic	√	√		√		√		√

5.1 TRANSPORTATION

Transport is an activity which affects humans and the natural environment to a very great extent. It is nevertheless vital for both the development of society as a whole as well as for the mobility of the individual.

5.1.1 ANTICIPATED IMPACTS

The project site is located in the developing area of the Gurgaon where road network and infrastructure facilities already exist. The project area is well connected to network of roads. The distance and direction of nearest highway, railway station and airport are given below:

Table 5.1: Connectivity to project site

S. NO.	DETAIL	DISTANCE
1.	NH-148A	3.5 Km
2.	NH-48	5.5 Km
3.	Gurgaon Railway station	11 Km.
4.	Indira Gandhi International Airport	10.3 km

It will be ensure that the vehicles used for building construction material must have Pollution under Check (PUC) certificate and are in good condition during the construction phase of the project. The vehicles will be temporarily parked inside the project premises for loading and unloading activities of building material. No public place will be used for parking of vehicles.

5.1.2 PARKING FACILITIES DURING OPERATION PHASE

Adequate provision will be made for resident's parking at the proposed project site. There shall also be provision of 6 M wide internal roads not to disturb the traffic and allow smooth movement at the site.

5.1.3 TRAFFIC CIRCULATION PLAN

The project will have access through the existing Sector road connecting the NH-148A & NH-48. Internal roads of adequate width and separate entries and exits will be provided for smooth

and one-way movement of traffic. Traffic circulation, entry and exits are shown in the enclosed traffic layout plan including surface parking & traffic circulation plan. The increase in traffic due to the project is marginal compared to the existing high volume of traffic in the area and therefore the impact will be marginal. Adequate traffic management measures have been proposed to manage the traffic within and outside the site.

5.1.4 VEHICLE EMISSION CONTROLS AND ALTERNATIVES

During the construction phase of the project, it will be ensure that vehicles must be "PUC" certified and properly maintained to reduce the emission.

Adequate footpaths and pedestrian ways would be provided at the site to encourage non-polluting methods of transportation.

5.2 BUILDING MATERIAL AND TECHNOLOGIES

The choice of building material plays an important role in terms of energy efficiency of the building. The manufacture of building materials should also be assessed to ensure the use of environment friendly and recycled/ recyclable construction materials. The U-values of the roof, external wall and glazing of the building will meet the requirements as specified in the Energy Conservation Building Code (ECBC), applicable for group housing buildings is given in the Table 5.1 below:

Table- 5.2: Thermal Characteristics of the Building Envelope

S. No.	Building Material Proposed with U & R Values	'R' Values (in Sq m. Deg C/ Watts)	'U' Values (in Watts/ Sq m. Deg C)
1.	WALL ACC block wall (230 mm thick), both side thick sand cement plaster (12-18mm) with insulation	1.284	0.688
2.	ROOF 150 mm RCC slab with cement creed 30, polyurethane foam 20mm, concrete 20mm & clay tiles	1.038	0.81

5.2.1 WALL

Conventionally, sun burnt clay bricks are cemented in the construction of walls. The strength of these construction materials cannot be compromised which will otherwise pose a threat to the life and property of the occupants. However, presently, materials with similar properties like ACC blocks are easily available that are made of waste products, thereby reducing the waste burden and conserving natural resources.

Though most of the construction materials to be used are conventional, energy efficient building materials, if available locally, will be used as specified in the Energy Conservation Building Code. 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.

Following low-energy/ recycled material based finishes/products will be used in the exteriors (paving etc.) and interiors (flooring, doors/ windows, frames, interior wood finishes, paneling, false ceiling etc.), which use low-energy materials and products and industrial waste/ recycled products and minimize the use of wood as a natural resource.

- Use of ready mix concrete containing fly ash or PPC which contains fly ash
- Use of PPC (which contains minimum 15% of fly ash) in mortar and plaster
- Use of PPC or fly ash based paving blocks/ tiles and pre-cast elements
- Composite wood products such as hardboards, block-boards, plywood etc. made from recycled wood scrap & dusts.
- Fibrous gypsum plaster boards made from industrial wastes
- Finished concrete flooring, ceiling tiles, ceramic tiles etc. which are made from low embodied energy products & recycled materials or from resource efficient finishes.

5.2.2 ROOF

The conventional material used for roofing is RCC, as it is suitable for longer spans. The constituents of RCC, i.e. cement, sand, aggregate and steel are energy intensive materials and high embodied energy content.

Alternately, it is proposed to use lightweight synthetic aggregates such as fly ash based aggregates, which is suitable for manufacture of brick, blocks, and is good substitute for clinker and natural aggregates. When pre-cast/aerated cellular concrete walling blocks and roofing slabs are used in multi- storied structures, they reduce the weight, resulting in a more economical design. They have high rating to fire resistance and provide better insulation and thus improved energy efficiency. These are manufactured by the aerated cellular concrete manufacturing process.

5.2.3 SUPER STRUCTURE

Structural frame of building comprises of footing, columns, beams and lintels, over which the envelope of building is supported. A variety of metals are used in buildings, but the major building material used structurally is steel. Steel has a high-embodied energy and recyclable content, as well as scrap value. Aluminum forms the second most common material used for roofing sheets, window frames, and cladding systems, which has the highest recyclable content. Hence, bulk of the metal needs for the building shall be met by steel and aluminum.

The choice of cement will be

- Use of fly ash and/or blast furnace slag concrete-The amount of cement used in concrete can be reduced by replacing a portion of the cement with coal fly ash (waste material from coal burning power plants) and/or GGBF (ground granulated blast furnace) slag in conventional mixes.
- Recycled aggregates Recycled aggregates include crushed concrete, brick or other masonry waste can also be used in conventional mixes.
- Lightweight concrete

5.2.4 INTERNAL ROADS AND OPEN AREAS

Roads and open areas consist of compound walls, grills, roads, sidewalks, parking lots, drains, curbs, landscaped areas, street furniture, tree covers, and flowerbeds.

In line with environment friendly design it is proposed to provide:

- Permeable (porous) paving will be provided wherever feasible to control surface water run-off by allowing storm water to infiltrate the soil and return to the ground water. The traffic areas will however continue to be impermeable.
- Use of suitable material fencing, grills, tree covers and benches and even in internal road lights and green landscaped areas.

5.2.5 TECHNOLOGIES

The area under study falls in Zone-IV, according to the Indian Standard Seismic Zoning Map. Suitable design will be made and modern technology will be adopted while strengthening the structure to mitigate the seismic impacts. All applicable guidelines will also be followed in this regard to ensure safety of the building and its residents. The project will use updated technology in the plant, machineries, equipment's both during construction and operation of the project.

5.2.6 EQUIPMENT AND MACHINERIES

All the machinery will be of highest standard of reputed make and will comply with national/international standards that take care of air and noise pollution control/ vibration control. Therefore, no significant impact due to operation of machinery is anticipated. The DG set will be of enclosed type to comply with the noise level standard and will be provided with suitable stack height as per norm during construction.

During construction, personal protective equipment (PPE) will be provided to all construction workers by the contractors as required under the health & safety norms. Training and awareness about the safety norms will be provided to all involved in construction activities.

At operation stage, DG room will be provided with acoustic lining / treatment to insure 25 dB (A) insertion loss as per the regulations. Adequate exhaust mufflers will be provided as per norms to limit the noise. Monitoring of emissions from DG sets and ambient air quality will be carried out as per norms.

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 are designed as per the latest National Building Code. The approvals in this regard will be obtained prior to installation of the fire protection equipment's.

5.2.7 RESOURCE CONSERVATION THROUGH ENVIRONMENT FRIENDLY TECHNOLOGY

To reduce the ecological footprint of the proposed development, use of recycled material for construction and conserving natural resources is of primary importance. In this light, the use of recyclable building materials has been proposed for various building materials. It is also proposed to reuse building components, minimization of construction wastes etc.

The project is also committed towards conservation of water. This includes use of treated wastewater, rainwater harvesting, provision of low water flow fixtures and raising awareness on means of water conservation. The need for water conservation in the face of impending water crisis cannot be overemphasized. The project will follow a three pronged management for water resource viz: water resource development, minimize use of water and recycle wastewater generated within the site. Dual plumbing will be provided to reduce the freshwater demand of the project. The wastewater from site will be treated in the existing STP and recycled for toilet flushing and landscaping / greenery.

The water demand is proposed to be brought down by the use of water efficient fixtures, implement best management practices for water in both group housing and horticultural activities. An important means for achieving this is spreading awareness to the occupants for generating water conservation awareness. Various types of sensor based technologies along with low flow devices will be used for urinals, taps in wash basins.

In order to conserve the water resources from surface run off a detailed storm water drainage system is designed to collect the storm water / rainwater and rainwater harvesting tank is proposed to recharge the groundwater. The rainwater collected from the rooftop and other paved areas within the project area will be conveyed into the rainwater harvesting system consisting of Desilting-cum-filter chamber, Oil & grease separator. The solid waste generated from the proposed project will be segregated at source into biodegradable and non-biodegradable components and collected in separate bins. Both biodegradable and non-biodegradable waste will be sold to authorized vendors for recycling of non-biodegradable wastes and disposal of biodegradable waste. Dewatered/ dried sludge from STP will be used as manure in horticulture.

5.3 ENERGY CONSERVATION

To achieve conservation of energy, appropriate design of a building is of paramount importance. Accordingly, it is proposed to incorporate the guidelines of Eco-Niwas Samhita 2018 for the infrastructure of proposed Group Housing buildings project.

The concept of passive solar design emphasizes architectural design approaches that minimize building energy consumption by integrating conventional energy-efficient devices, such mechanical and electrical pumps, fans, lighting fixtures, and other equipment, with passive design elements, such as building sitting, an efficient envelope, appropriate amounts of fenestration, increased day lighting design, and thermal mass. The basic idea of passive solar design is to allow daylight, heat, and airflow into a building only when beneficial.

Efforts will be taken for energy conservation using passive solar architecture wherever it is possible. Passive solar design refers to use/ prevent the sun's energy for the heating and cooling of living spaces. Projections etc. will be provided for shading of summer sunlight to reduce the heat influx into the building and thus reduce the air conditioning loads. Shading options wherever available will be used for energy saving. The energy efficient features for the project are as given below:

- Maximum utilization of natural light
- CFL & T-5 lighting fixtures in common areas and Truelite fluorescent lamps in basements
- Use of solar lights in street and landscaping
- Energy efficient motors and pumps
- Appropriate design to reduce heat gain and loss
- Roof-top thermal insulation
- Glazing Glass to reduce the U value as far as possible.
- External glazing will be below 60% of the total vertical surface as per ECBC.

5.3.1 USE OF RENEWABLE ENERGY

The electrical supply is largely dependent on thermal power plants that are largely responsible for consumption of natural resources. It is of paramount importance to shift focus on other renewable sources of energy to achieve sustainable development in the energy sector. Taking full cognizance of the availability of natural sunlight and technology, the project proposes the use of solar energy to reduce the power demand of the project. Solar energy will be used to meet various energy requirements of the project such as:

- Solar street lights and solar landscape lights
- Minimum of 20% hot water requirement shall be met by solar water heating systems

5.3.2 OTHER ENERGY SAVING MEASURES

1. CFC Free Equipment, A.0 units with CFC Free environment friendly refrigerant shall be installed to protect ozone layer.
2. Building envelope shall be designed to reduce heat intake from outside. Wall, Roof & Glass U value shall be as per the ECBC guide lines to save energy.
3. Lighting power densities shall be 20% less than the IGBC base line to save energy compared to base building.
4. Energy metering shall be provided at any four of the below mentioned load for continuous monitoring and enhance the performance of the building. This will add one credit point in IGBC Certification.
    - Air conditioning
    - Internal lighting
    - External lighting
    - Grey water pumping
    - Landscape water pumping
5. Captive Power Generation: DG set shall be ISI Rated and certified by Central Pollution Control Board (CPCB) for emission and noise compliance. (One credit point in IGBC Certification).
6. Energy saving measures in other appliances & equipment.

7. Level controllers in overhead water tank shall be provided to avoid overflow of water and waste of energy.
8. All pumps shall be ISI rated and shall be of minimum 60% efficiency.
9. LED lamps shall be provided in all display /exit sign boards to save energy.
10. Provision of 20% Solar PV panel with LED Street lighting for the external area with 50% based on conventional LED Street lighting would result in possible savings.
11. Provision of LED lightings over T5 Fluorescent lightings will result in 20% -30% monthly Energy Savings.
12. Using induced jet fans system with secondary mechanical fans for car park mechanical ventilation which would optimize the ceiling space and the overall floor to floor ceiling height for other M&E Services. Ceiling space would appear less congested & very much neater without massive network of ventilation ducts.
13. Use of regenerating motors for lifts would result in 5% to 10% in energy saving

5.4 EFFECTIVE CONTROLS AND MANAGEMENT SYSTEMS

It is proposed to establish a Management System that will comprise modern equipment's as well as an efficient team of maintenance staff. Each tower as well as common area will be provided with fire alarm as well as water sprinklers. All essential services such as lifts and water supply will be provided with power back up. A security system for the entire Group Housing project will be provided comprising intercom facility, closed circuit camera to the entrance. The resident's vehicles will be provided with identification stickers while visitors' vehicles will be monitored through security guards at the entrances.

The project further proposes tree plantations and landscaping development. The plants not only serve various direct environmental facilities, but also have indirect positive environmental impacts such as reduction in overall energy use in buildings.

6

ENVIRONMENTAL MONITORING PROGRAM

6.1 INTRODUCTION

The purpose of the monitoring program is to ensure that the specified mitigate measures defined in the EMP are complied with and leads to the desired benefits for the target area and its population. To ensure the effective implementation of the EMP and gauge the efficiency of the mitigation measures, monitoring shall be undertaken both during the construction and operation period of the project.

6.2 PERFORMANCE INDICATORS (PIS)

The physiochemical components are of particular significance to the project to compare with the surrounding environment on pre-project and post-project development. The parameters are as listed below:

- Air quality
- Water quality
- Noise levels
- Solid waste Management

Of these, the following are selected as the Performance Indicators (Pis) and shall be monitored, since these are well known and comparative data series exist:

- Air quality
- Noise levels
- Water quality
- Flora

To ensure the effective implementation of the mitigation measures and environmental management during construction and operation phase of project, it is essential that an effective Environmental Monitoring Plan be designed and followed as given in Table 6.1 & 6.2.

(A) AMBIENT AIR QUALTIY (AAQ) MONITORING

Ambient air quality parameters recommended for monitoring with regard to constructional activities are PM, CO, SO_2, and NO_2. Monitoring shall be carried out twice a week for three month in each season during construction phase in accordance to the National Ambient Air Quantity Standards. The locations with the pollution parameters to be monitored are detailed out in the Environmental Monitoring Plan **(Table-6.1).**

(B) WATER QUALITY MONITORING

The physical and chemical parameters recommended for analysis of water quality relevant to project will be as mentioned in IS 10500: 2012. The location, duration and the pollution parameters to be monitored and the responsible institutional arrangements are given in the Environmental Monitoring Plan.

(C) GREEN AREA DEVELOPMENT

The green area development will be monitored during the construction and operation phase. The main indicator will be survival rate of grasses and plants.

(D) SOIL QUALITY

Soil quality will be monitored and compared with the Baseline soil quality generated before the start of construction.

(E) NOISE MONITORING

The measurements of noise levels will be carried out at all designated locations in accordance to the ambient Noise Standards formulated by MoEF as given. Noise level will be monitored on twenty-four hourly bases. Noise should be recorded at "A" weighted frequency using a slow time response mode of the measuring instrument. The measurement location, duration and the noise pollution parameters to be monitored are detailed in the Environmental Monitoring Plan **(Table-6.1).**

An environmental monitoring program is important as it provides useful information and helps to:

- Verify the predictions on environmental impacts presented in this study,
- Assist in detecting the development of any unwanted environmental situation, and thus, provides opportunities for adopting appropriate control measures, and
- Evaluate the performance and effectiveness of mitigation measures proposed in the EMP and suggest improvements in management plan, if required,
- Satisfy the legal and statutory obligations.

The monitoring plan during construction phase and operational phase including number, location of monitoring stations, frequency of sampling and parameters to be covered is summarized in **Table-6.1** and **Table-6.2.** The monitoring will be the responsibility of EMC. The monitoring program during operational phase will be done under the supervision of the Site Engineer at the project site. Monitoring will be carried out by recognized laboratories.

Table-6.1: Environmental Monitoring Plan for Construction Phase

Source	Monitoring Location	Parameters to be Monitored	Monitoring Frequency
Ambient Air Quality	At 1 location at boundary of the project site	PM_{10},$PM_{2.5}$, SO_2,NO_2 and CO	Twice a year or as per conditions of EC
Ambient Noise	At 1 location at boundary of the project site.	Day & Night equivalent noise level	Twice a year or as per conditions of EC
Groundwater	At 1 location nearest to the Project site	As per standards	Twice a year or as per conditions of EC
Soil	At 1 location outside the Project site	As per standards	Twice a year or as per conditions of EC

Table-6.2: Environmental Monitoring Plan for Operation Phase

Source	Monitoring Location	Parameters to be Monitored	Monitoring Frequency
DG set emissions	DG stacks	TPM, SO_2, NO_2 and CO	Twice a year or as per conditions of EC or as per requirement of SPCB
DG set noise	At 0.5 m distance from DG enclosure/ DG room	Noise level	Twice a year or as per conditions of EC or as per requirement of SPCB
Sewage Treatment Plant	Inlet and Outlet of STP	pH, BOD, Suspended Solid, Oil & Grease	Twice a year or as per conditions of EC or as per requirement of SPCB
Ambient Air Quality	At 2 locations (one inside the project site and one at boundary of the project site along predominant wind direction)	PM_{10}, $PM_{2.5}$, SO_2, NO_2 and CO	Twice a year or as per conditions of EC or as per requirement of SPCB
Ambient Noise	At 2 locations (one inside the project site and one at boundary of the project site nearest to residential area)	Day and night equivalent noise level	Twice a year or as per conditions of EC or as per requirement of SPCB

6.3 DATA MANAGEMENT

The monitoring shall be carried out through MoEF/ NABL approved laboratory. All results shall be maintained at the project site and submitted to the SPCB as per the reporting requirements in the Environmental Clearance.

6.4 REPORTING SCHEDULES

The monitoring during construction and operation phase will be carried out as per the monitoring program mentioned in the EMP. The monitoring program during operation phase will be under the supervision of the Building Manager/ Site Engineer at the project site. Monitoring will be get carried out by recognized laboratories. The results of the analysis shall be intimated to the project head. Any anomaly in test results shall be verified into and proper corrective actions shall be undertaken.

6.5 ENVIRONMENT MANAGEMENT CELL

The composition of the Environment Management Cell and responsibilities of its various members are given in **Table-6.3:**

Table-6.3: Environment Management Cell

S. No.	Level &Person	Proposed Responsibility
1.	Corporate Level Environment Department	• Environmental policy and directions. • Overall responsibility for environment management and decision making for all environmental issues. • Ensuring legal compliance and interaction with regulatory agencies.
2.	Project Level (Construction) Site in-charge	• Environmental management & pollution control during construction phase. • Installation of pollution control facilities and implementation of the conditions of Environmental Clearance and Consent to Establish. • Environmental monitoring during construction stage. • Secondary responsibility for ensuring legal compliance

3.	Project Level (Operation) Building Manager	• Environmental management and operation & maintenance of pollution control facilities during operation phase • Environmental monitoring during operation phase • Secondary responsibility for environment management and decision making for all environmental issues • Secondary responsibility for ensuring legal compliance and

A complaint register shall also be maintained to note any complaints from the staff and visitors of the Group Housing project or any other stakeholder. Corrective actions taken against the complaints shall also be noted.

7

ADDITIONAL STUDIES

7.1 INTRODUCTION

This chapter broadly looks at various aspects related to disaster management and natural resource conservation.

7.2 RISK ASSESSMENT AND DISASTER MANAGEMENT PLAN

Group Housing colony project encompasses the lives of large number of people. It also involves installation of various structures and machineries that meet the comfort and needs of its population but may also pose serious threat to the occupants in case of an accident. It is thus considered necessary to carry out a risk assessment and disaster management plan for the project.

7.2.1 Risk Assessment

Real estate sector is associated with several hazards that pose impacts on employees & surrounding area necessitating adequate implementation of Safety and health measures. Risk Assessment tool enables to enhance preparedness action to be taken well in advance.

7.2.2 Hazard Identification (HAZID):

Group Housing buildings project encompasses the lives of a large number of people. It also involves installation of various structures and machineries that meet the comfort and needs of its population but may also pose serious threat to the occupants in case of an accident. It is thus considered necessary to carry out a risk assessment and disaster management plan for the project. Major Risks involved in Construction of Residential Project are following:

1. Fall Hazard due to work at height
2. Hazard due to confined space work
3. Occupational Health Hazards
4. Failure of Heavy Machinery during Operation phase.
5. Slip
6. Trip
7. Fire
8. Electrical Hazards
9. Natural Hazards
10. Site/slope failure in Excavation work

7.2.3 Mitigation measures for Identified Hazards:

Table 7.1 Identified Hazards and their Mitigation Measure

HAZARDS ASSOCIATED WITH ACTIVITIES CONTROL/MITIGATION MEASURES	
(During Construction & Operation)	
Manual Handling	
- Strains and sprains due to incorrect lifting - Too heavy loads - Twisting - bending - Repetitive movement - Body vibration.	- Exercise/warm up - get help when needed - control loads - rest breaks/no exhaustion - no rapid movement /twisting/ bending / repetitive movement - Good housekeeping.
Falls - Slips – Trips	
- Falls on same level - falls to surfaces below - poor housekeeping - slippery surfaces - uneven surfaces - poor access to work areas - climbing on and off plant -unloading materials into excavations Wind - falling objects.	- Good Housekeeping - tidy workplace - guardrails, handholds, harnesses, hole cover, - hoarding, no slippery floors/trip hazards - clear/ safe access to work areas - egress from work areas - dust/water controlled - PPE.
Fire	
- flammable liquids/Gases like LPG, - Diesel Storage area and combustible building materials - poor housekeeping - grinding sparks - Open flames, absence of Fire hydrant network.	-Combustible/flammable materials properly stored/used - good housekeeping - fire extinguishers made available & Fire hydrant Network with reserve Fire water (As per NFPA Code) -Emergency Plan in case of Fire or collapse of structure.
Absence Of Personal Protective	
Equipment - Lack of adequate footwear - head protection - hearing/eye protection - respiratory protection - gloves - Goggles.	- Head/face - footwear - hearing/eye - skin - respiratory protection provided - training - maintenance
Defective or wrong Hand Tools	

- Wrong tool - defective tool - struck by flying debris - caught in or on - missing guards	- Right tool for the job - proper use of tools - good condition/ maintenance guards - isolation/ proper demarcation of work space - eye/face protection - flying debris controlled
Electricity	
- Electrocution - overhead/underground services - any leads damaged or poorly insulated - temporary repairs -no testing and tagging - circuits overloaded - Non-use of protective devices.	- Leads good condition and earthed - no temporary repairs - no exposed wires - good insulation - no overloading - use of protective devices - testing and tagging - no overhead/ underground services
Scaffolding	
- Poor foundation - lack of ladder access insufficient planking - lack of guardrails and toe boards - insufficient ties or other means - All scaffolds incorrectly braced or stabilized to prevent overturning.	- All scaffolds correctly braced and stabilized - 3:1 height to base ratio - firm foundation, plumb and level - ladder access provided and used - proper platform (3 planks/675 mm) - planks secured - guardrails and toe boards - 900mm to 11,00mm high, within 200mm of Working face, mid-rail.
Ladders	
- Carrying loads - not secured against dislodgement - defective ladders - not sufficient length - wrong positions - Incorrectly placed (angles, in access ways, vehicle movements).	- Secured against movement or footed - ladders in good condition - regularly inspected - extend 1m above platform - 4:1 angle - out of access ways, vehicle movements - not carrying loads - 3 points of contact - no higher than 3rd step down - use for access only, not working platforms
Excavations	

- Trench collapse - Material falling in undetected - underground services - falls -hazardous atmosphere struck by traffic and mobile plant.	- Soil stability known - no water accumulation - existing services known - material 600mm from edge - clear of suspended loads - hardhats/PPE - ladders - public protection – atmospheric testing - traffic controls - Emergency Plan.
Gas Cutting and Welding	
- Fire - welding flash, burns, fumes, electrocution in wet conditions - flashback in oxygen set, leaking cylinders, acetylene cylinders lying down - Poorly maintained leads.	- Welding flash and burns controlled with PPE and shields - fumes controlled with ventilation and PPE (in good condition and properly positioned),Gas cylinders be kept upright & secured position (properly tied) - Combustible materials to be kept at secured place to avoid fire & Fire Extinguishers to be kept in fire prone area with training to people for its use.
Noise	
- Unknown noise levels - known noise levels over 85 decibels	- Levels below 85 decibels - Proper protection.
Falling Material	
- Fall during carrying/Lifting materials -dislodged tools and materials from overhead work areas.	- Materials to be secured - kept away from edge - toe boards - Use of hard hats.
Craneage & Lifts	
- Display of carrying capacity i.e. load (No. Of person), incorrectly slung, defective lifting equipment, unsecured loads, craning in close proximity to building people and plant - falls - falling materials.	- Periodic testing by competent authority - correctly slung/secured loads, lifting equipment good condition - use of proper hand signals - falls while unloading controlled.
Visitors Presence at site	

- Falls - struck by dropped materials - road accidents - insufficient hoarding or fencing - pedestrian access past site - Mechanical plant movement on and off site.	- Sufficient hoarding - fencing and barricades - safe pedestrian access past site traffic management for loading and delivery - Construction separated from occupied areas of projects.

7.2.4 Mitigation Measure for LPG Leakage

1. The affected area should be evacuated and cordoned off immediately
2. Initiate an Emergency Response Team for LPG leakage.
3. Shut down the main valves in the gas bank.
4. Ensure that only concerned personnel are present in the affected area and all other personnel and visitors are moved to the nearest assembly points.
5. Rescue trapped personnel, also check if any personnel are unconscious in the area and immediately move them outside and provide first aid. Ambulance should be summoned to take injured personnel to the nearest hospital.
6. Personnel in the nearby buildings to close all doors and windows to prevent entry of the leaked gas.
7. Source of leakage to be traced and isolated from all the other areas. And if required use pedestal fans to bring down the gas concentration.
8. In case of a fire follow the instructions in case of fire.

7.2.5 Mitigation Measure in case of Fire

1. Required response during in the event of a fire should be described in signs located in the lobby.
2. On sighting a fire, it should be immediately informed to the environment manager giving the exact location and type of fire in detail.
3. Initiate the Emergency Response Team for fires.
4. If the fire is small, engage in extinguishing the fire using the nearest fire extinguisher.
5. Guide the Emergency Response Team staff to the emergency assembly point.
6. The Emergency Response Team should immediately inform the nearest dispensary and security force. If required a fire tender should be summoned.
7. The response team should immediately move to the point of fire and take all necessary steps to stop the fire. If the fire is not controllable and spreads then the manager in charge should inform the district authorities and call for external help.
8. The Emergency Response Team will provide immediate relief to the injured residents at the scene of incident. Any injured persons should be evacuated on priority to the dispensary or one of the nearest hospitals based on their condition.

Instructions for occupants

1. Get out of buildings as quickly and as safely as possible.

2. Use the stairs to escape. When evacuating, stay low to the ground.
3. If possible, cover mouth with a cloth to avoid inhaling smoke and gases.
4. Close doors in each room after escaping to delay the spread of the fire.
5. If in a room with a closed door.
6. If smoke is pouring in around the bottom of the door or if it feels hot, keep the door closed.
7. Open a window to escape or for fresh air while awaiting rescue.
8. If there is no smoke at the bottom or top and the door is not hot, then open the door slowly.
9. If there is too much smoke or fire in the hall, slam the door shut.
10. Stay out of damaged buildings.
11. Check that all wiring and utilities are safe.

7.2.6 Recommendation for Fire Fighting Facilities

All the fire extinguisher system will be controlled by the Security Department. Safety department will consist of qualified safety manager, safety officer and supporting staff.

- ✓ Portable fire extinguishers
- ✓ Fire Buckets
- ✓ Fire Hydrants-Hose Reels
- ✓ Smoke detectors
- ✓ Wet Risers,
- ✓ Automatic Sprinkler system
- ✓ Alarm System

Table no: 7.2 General recommendations for Fire Fighting Facilities

S. No.	Name of site	Type of Extinguisher
1	Cable galleries	CO_2 Type
2	High voltage panel	CO_2 & Foam type, Dry chemical powder
3	Control rooms	CO_2 & Foam type, Dry chemical powder
4	MCC rooms	CO_2 & Foam type, Dry chemical powder
5	Pump Houses	CO_2 & Foam type, Dry chemical powder
6	Guest houses and offices	Dry chemical powder, foam type
7	Godowns, Lubrication rooms,	Foam type

Personal Protective Equipment (PPE) used during Construction Phase

Personal Protective equipment's kept onsite are made readily available to plant personnel. **Table7.3** shows the lists of recommended Personal Protective equipment's (PPE) onsite.

Table 7.3: Summary of Recommended Personal Protective Equipment According to Hazard

	Workplace Hazards	Suggested PPE
Eye and face protection	Flying particles, molten metal, gases or vapors, light radiation	Safety glasses with side-shields, protective shades, etc.
Head protection	Falling objects, inadequate height clearance, and overhead power cords	Plastic helmets for top and side impact protection
Hearing protection	Noise	Hearing protectors (ear plugs or ear muffs)
Foot protection	Failing or rolling objects, points objects. Corrosive or hot liquids	Safety shoes and boots for protection against moving and failing objects, liquids and chemicals
Hand protection	Hazardous materials, cuts or lacerations, vibrations, extreme temperatures	Gloves made of rubber or synthetic material (Neoprene), leather, steel, insulation materials, etc.
Respiratory protection	Dust, fogs, fumes, mists, gases, smokes, vapors	Facemasks with appropriate filters for dust removal and air purification (chemical, mists, vapors and gases). Single or multi-gas personal monitors, if available
	Oxygen deficiency	Portable or supplied air (fixed lines). Onsite rescue equipment
Body / leg protection	Extreme temperatures, hazardous materials, biological agents, cutting and laceration	Insulating clothing, body suits, aprons etc. of appropriate materials
Work at Height	Fall/ slip/ Trip Hazard	Safety Harness, Safety Belt, safety shoes, Jackets, Lanyards, Slings

7.2.7 Natural Hazards in Gurgaon District

The district has been traditionally vulnerable to different disasters on account of its unique geo-climatic condition. The following are the hazards that have a probability of occurrence in Gurgaon district, based on the history of their occurrence and geo-climatic condition

1. Earthquake
2. Industrial/chemical Accident
3. Fire
4. Road/ Rail Accidents
5. Hailstorms, Thunderstorm, Dust
6. storm & Fog
7. Wind storm

Earthquake

Earthquakes may cause a number of phenomena, including ground motion, surface faulting, ground failure, and liquefaction. An earthquake's magnitude reflects an earthquake's strength. Damage to buildings generally begins to occur at magnitude six, while an earthquake above magnitude seven may be a major disaster if it occurs near a populated area. Above a map prepared by Bureau of Material and Technology Promotion Council and printed in Vulnerability Atlas -2nd Edition indicates that Gurgaon district falls in seismic zone IV which, is considered to be facing highest danger of earthquakes in India after the Zone-V. This makes the area liable to MSK intensity of—VIII.

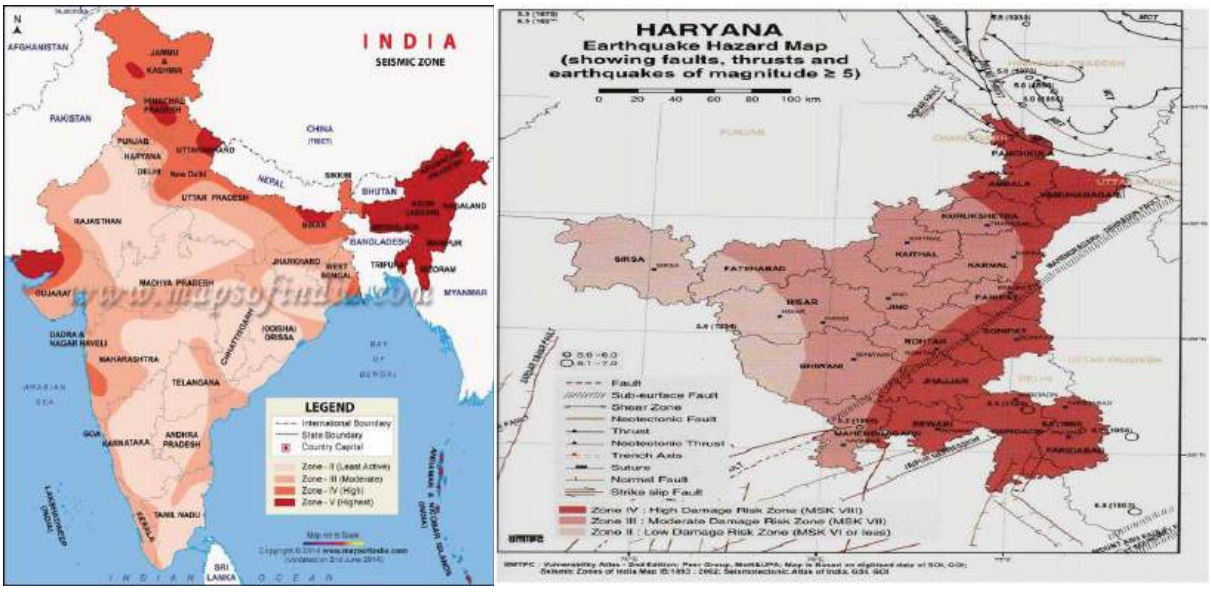


Figure No: 7.1. Earth Quake Zonation Map

Emergency recovery plan has been considered by the emergency management team as per the situation and site conditions as follows in **Table No 7.5.** Earthquakes usually give no warning at all. Consider following in Pre & Post Disaster Phases.

Before the earthquake:

✓ Always keep the following in a designated place: bottled drinking water, nonperishable food, and first-aid kit, torch-light and battery-operated radio with extra batteries.

✓ Teach family members how to turn off electricity, gas, etc.

✓ Identify places in the house that can provide cover during an earthquake.

✓ It may be easier to make long distance calls during an earthquake.

✓ Identify an out-of town relative or friend as your family's emergency contact. If the family members get separated after the earthquake and are not able to contact each other, they should contact the designated relative/friend. The address and phone number of the contact person/relative should be with all the family members.

✓ Safeguard your house

✓ Consider retrofitting your house with earthquake-safety measures \Reinforcing the foundation and frame could make your house quake resistant. You may consult a reputable contractor and follow building codes.

✓ Kutcha buildings can also be retrofitted and strengthened.

During quake:

✓ Earthquakes give no warning at all. Sometimes, a loud rumbling sound might signal

✓ Its arrival a few seconds ahead of time. Those few seconds could give you a chance

✓ To move to a safer location. Here are some tips for keeping safe during a quake.

✓ Take cover. Go under a table or other sturdy furniture; kneel, sit, or stay close to the

✓ Floor. Hold on to furniture legs for balance. Be prepared to move if your cover moves.

✓ If no sturdy cover is nearby, kneel or sit close to the floor next to a structurally sound

✓ Interior wall. Place your hands on the floor for balance.

✓ Do not stand in doorways. Violent motion could cause doors to slam and cause serious injuries. You may also be hit be flying objects.

✓ Move away from windows, mirrors, bookcases and other unsecured heavy objects.

✓ If you are in bed, stay there and cover yourself with pillows and blankets

✓ Do not run outside if you are inside. Never use the lift.

✓ If you are living in a kutcha house, the best thing to do is to move to an open area

✓ Where there are no trees, electric or telephone wires.

If outdoors:

✓ Move into the open, away from buildings, streetlights, and utility wires. Once in the open, stay there until the shaking stops.

✓ If your home is badly damaged, you will have to leave. Collect water, food, medicine, other essential items and important documents before leaving.

✓ Avoid places where there are loose electrical wires and do not touch metal objects that are in touch with the loose wires.

✓ Do not re-enter damaged buildings and stay away from badly damaged structures.

If in a moving vehicle:

✓ Move to a clear area away from buildings, trees, overpasses, or utility wires, stop, and stay in the vehicle. Once the shaking has stopped, proceed with caution.

✓ Avoid bridges or ramps that might have been damaged by the quake.

After the quake:

✓ Here are a few things to keep in mind after an earthquake. The caution you display in

✓ The aftermath can be essential for your personal safety.

✓ Wear shoes/chappals to protect your feet from debris

✓ After the first tremor, be prepared for aftershocks. Though less intense, aftershocks

✓ Cause additional damages and may bring down weakened structures. Aftershocks

✓ Can occur in the first hours, days, weeks, or even months after the quake.

✓ Check for fire hazards and use torchlight's instead of candles or lanterns.

✓ If the building you live in is in a good shape after the earthquake, stay inside and listen for radio advises. If you are not certain about the damage to your building, evacuate carefully. Do not touch downed power line.

✓ Help injured or trapped persons. Give first aid where appropriate. Do not move seriously injured persons unless they are in immediate danger of further injury. In such cases, call for help.

✓ Remember to help your neighbors who may require special assistance-infants, the elderly, and people with disabilities.

✓ Listen to a battery-operated radio for the latest emergency information.

✓ Stay out of damaged buildings.

✓ Return home only when authorities say it is safe. Clean up spilled medicines, bleaches or gasoline or other flammable liquids immediately. Leave the area if you smell gas or fumes from other chemicals. Open closet and cupboard doors cautiously.

✓ If you smell gas or hear hissing noise, open windows and quickly leave the building.

✓ Turn off the switch on the top of the gas cylinder.

✓ Look for electrical system damages - if you see sparks, broken wires, or if you smell burning of amber, turn off electricity at the main fuse box. If you have to step in water to get to the fuse box, call an electrician first for advice.

✓ Check for sewage and water lines damage. If you suspect sewage lines are damaged, avoid using the toilets. If water pipes are damaged, avoid using water from the tap.

✓ Use the telephone only for emergency calls.

✓ In case family members are separated from one another during an earthquake (a real possibility during the day when adults are at work and children are at school), develop a plan for reuniting after the disaster. Ask an out of state / district relative or friend to serve as the "family contact". Make sure everyone in the family knows the name, address, and phone number(s) of the contact person (s).

Table 7.4: Emergency Preparedness for Earthquake

Step	Activity	Action By
Preparedness	• Constitute Emergency Response Team • Identify ECC, if the identified ones are damaged • Control centers to be equipped with ❖ Alarming ❖ Communication facilities ❖ Emergency vehicles/ equipment ❖ List of emergency contacts & suppliers ❖ Medical facilities	Plant Key Person

Action during effective period	• Do not panic. Raise alarm • Avoid standing near to windows, external walls • Stand near the columns or duck under sturdy furniture. • Assemble at emergency assembly point as there may be aftershocks	Individual(s)
Action after effective Period (Establish Emergency Control Center. Site Main Controller to direct all activities)	• Assess situation and initiate shut down of plants (if required) • Initiate search & rescue (if required) • Evacuation of people. • Recovery/ Rehabilitation Work • Medical care for the injured. • Supply of food and drinking water. • Temporary shelters like tents, metal sheds etc. • Repairing lines of communication and information. • Restoring transport routes • Take head count • Activate emergency plan as situation demands • Assess damage	Main Controller, Incident Controller, Site Incident Controller, , Coordinators – Fire & Security, Safety, Material and Medical

Storm

The contingency actions during storm shall be based on the weather forecasts obtained from meteorological stations and the local meteorological department. Some of the important actions to be carried out are as follows:

Prior to Storm

- ✓ Communication with the local meteorological department.
- ✓ Maintain distances from storm in order to execute preparatory actions in a shorter time.
- ✓ Considering the consequences about the emergency might have on operations and personnel.
- ✓ Review all operations carefully to ensure that systems in jeopardy are taken care of or shut down.
- ✓ Ensure the readiness of first aiders, emergency vehicles, medical Centre, medicines etc.
- ✓ Metallic sheets, loose materials, empty drums and other light objects shall be properly secured.

- ✓ Flush the drainage systems.

During Storm

- ✓ Remain calm.
- ✓ Avoid going outdoors.
- ✓ Do not seal the office completely as the suction created by the difference in atmospheric pressure inside and outside can rip open a window or door by breaking window glass panes.

After the Storm

- ✓ Do not touch electric lines.
- ✓ Stay away from the disaster area.
- ✓ Take special precautions in driving vehicles since the under-pavement could cave in due to the weight of automobile.

Extreme temperatures in District

Hailstorms, Thunderstorm, Dust storm & Fog April to June is the period with the highest incidence of thunderstorms and dust storms. Violet squalls (Andhis) often company such storms. Some of the thunderstorms do not give any appreciable rain, but others often accompanied with heavy rain and occasional hail. Thunderstorms also occur in the winter months in association with passing western disturbances. Fogs sometimes dense occur in the cold season.

7.3 DISASTER MANAGEMENT PLAN

7.3.1 INTRODUCTION TO THE TERM "DISASTER"

The term "Disaster" refer to extensive damage of property and serious disruption both inside, outside the work system and its surrounding that can be natural or human interfered. Emergency may be caused by a number of different factors, e.g. plant failure it will normally manifest itself in three basic forms viz fire, explosion or toxic release and requires the assistance of emergency control services to handle mass devastation effectively.

7.3.2 NEED OF DISASTER MANAGEMENT

The aim of Disaster management plan is concerned with preventing accidents through following guidelines of good design practice, operation, maintenance and inspection, by which it is possible to

reduce the risk of an accident. Since it is known to all it is not possible to eliminate entire risk since, absolute safety is not achievable.

After Assessing and quantifying the possible scenarios, consequence analysis approach to emergency preparedness and emergency planning delineates Disaster Management Plan for both on-site and off-site. These plans are needed to be implemented in the event of a disaster.

7.3.3 Emergency planning and Response procedure

The Emergency Response Plan is plan for dealing with emergencies are implemented immediately whenever there is a fire, explosion, or release of a hazardous substance that threatens human health or the environment. The emergency response plan is reviewed and immediately amended whenever:

- ✓ The plan fails in an emergency
- ✓ The list of emergency contacts change
- ✓ The list of emergency equipment changes

The facility changes in its design, construction, operation, maintenance, or other circumstances in a way that increases the potential for fire, explosions, or release of a hazardous substance

7.3.4 Incident Response Plan

It is the Frame work of addressing the emergency situation arises due to failure scenario.

- ✓ Incident Response Plan(IRP) and Emergency Preparedness Plan
- ✓ Incident Response Team (IRT)
- ✓ Emergency Response Team (ERT)
- ✓ Crisis Management Team (CMT)

7.3.5 Onsite Disaster Management Plan

Disaster management plan are prepared with an aim of taking precautionary step to control the hazard propagation, avert disaster, take action after the disaster which limits the damage to the minimum and follow the on-site emergency planning.

7.4 Onsite Emergency Plans

The onsite emergency is an unpleasant situation that causes extensive damage to plant personnel and surrounding area and its environment due to in operation, maintenance, design and human

error. Onsite plan will be applied in case of new Project activity. Following point are taken into consideration:

- ✓ To identify, assess, foresee and work out various kinds of possible hazards, their places, potential and damaging capacity and area in case of above happenings.
- ✓ Review, revise, redesign, replace or reconstruct the process, plant, vessels and control measures if so assessed.
- ✓ Measures to protect persons and property of Construction machinery in case of all kinds of accidents, emergencies and disasters
- ✓ To inform people and surroundings about emergency if it is likely to adversely affect them

7.5 Off-Site Emergency Planning

The off-site emergency plan is an integral part of any hazard control system. It is based on those accidents identified by the works management, which could affect people and the environment outside the works. Thus, the off-site plan follows logically from the analysis that took place to provide the basis for the on-site plan and the two plans therefore complement each other. The roles of the various parties that may be involved in the implementation of an off-site plan are described below. The responsibility for the off-site plan will be likely to rest either with the works management or with the local authority. Either way, the plan must identify an emergency coordinating officer who would take overall command of the off-site activities. Consideration of evacuation may include the following factors:

- ✓ In the case of a major fire but without explosion risk (e.g. an oil storage tank), only houses close to the fire are likely to need evacuation
- ✓ If fire is escalating very fast it is necessary to evacuate people nearby as soon as possible

In acute emergency people are advised to stay indoors and shield themselves from the fire.

7.5.1 Organization

Organizational details of command structure, warning systems, implementation procedures, emergency control centres include name and appointments of incident controller, site main controller, their deputies and other key personnel involved during emergency.

7.5.2 Communications

Identification of personnel involved, communication centre, call signs, network, list of telephone numbers.

7.5.3 Special Emergency Equipment

Details of availability and location of heavy lifting gear, specified fire-fighting equipment, fireboats etc.

7.5.4 Voluntary Organizations

Details of Voluntary organizations, telephone numbers nearby of hospitals, Emergency helpline, resources etc. are to be available with chief authorities.

7.6 Non-governmental Organizations (NGO)

NGO's could provide a valuable source of expertise and information to support emergency response efforts. Members of NGOs could assist response personnel by performing specified tasks, as planned during the emergency planning process.

- ✓ Evacuation of personnel from the affected area
- ✓ Arrangements at rallying posts and parking yards
- ✓ Rehabilitation of evacuated persons

7.6.1 Chemical information

Details of the hazardous substances (MSDS information) and a summary of the risks associated with them will be made available at respective site.

7.6.2 Meteorological information

There is to be arrangements for obtaining details of weather conditions prevailing at before the time of accident and weather forecasts updates.

7.6.3 Humanitarian Arrangements

Transport, evacuation centres, emergency feeding, treatment of injured, first aid, ambulances, temporary mortuaries.

7.6.4 Public Information

- ✓ Dealing with the media-press office
- ✓ Informing relatives, etc.

7.6.5 Assessment

✓ Collecting information on the causes of the emergency

✓ Reviewing the efficiency and effectiveness of all aspects of the emergency plan.

7.6.6 Role of local authority

Local Authorities like Panchayat, Sabha, Samity, municipalities can help in combating emergency situation after assessing the impact scenario in rescue phase.

7.6.7 Role of police

The police are to assist in controlling of the accident site, organizing evacuation and removing of any seriously injured people to hospitals.

✓ Co-ordination with the transport authorities, civil defence and home guards

✓ Co-ordination with army, navy, air force and state fire services

✓ Arrange for post mortem of dead bodies

✓ Establish communication centre with easy contact with ECC

7.6.8 Role of Fire Brigade

The fire brigade shall be organized to put out fires and provide assistance as required during emergency.

7.6.9 Media

✓ The media is to have ready and continuous access to designated officials with relevant information, as well as to other sources in order to provide essential and accurate information to public throughout the emergency and to avoid commotion and confusion

✓ Efforts are made to check the clarity and reliability of information as it becomes available, and before it is communicated to public

✓ Public health authorities are consulted when issuing statements to the media concerning health aspects of chemical accidents

✓ Members of the media are to facilitate response efforts by providing means for informing the public with credible information about accidents involving hazardous substances

7.6.10 Role of health care authorities

✓ Hospitals and doctors shall be ready to treat all type of injuries to causalities during emergency.

✓ Co-ordinate the activities of Primary Health Centres and Municipal Dispensaries to ensure required quantities of drugs and equipment's

✓ Securing assistance of medical and paramedical personnel from nearby hospitals/institutions

✓ Temporary mortuary and identification of dead bodies

7.6.11 Emergency Contact No of Statutory Bodies/ District/Local Bodies

Table 7.5 Emergency contact No. of DCs, Gurgaon, Haryana

S. No	District	Office /fax No	Residence	Mobile
1	Gurgaon	0124-2325500 FAX-2320508	2303333	9999810000

Table 7.6: Details of SSP/SP's of Gurgaon District Haryana

S. No	Name District	Mobile	Office No	Residential No	Fax No
1	SP, Gurgaon.	9999981802	2222166	2223025	
			2223292	2573659	

7.7 Occupational Health and Safety during Construction Phase

7.7.1 The Occupational Health Surveillance Program:

A team of qualified doctors and nurses will visit periodically for health checkup of all the workers, team and its record will be maintained properly.

7.7.2 Impact on Human Health

This project will have an impact on the human health due to sand/bajri, increased dust, creation of breeding grounds for disease vectors, population influx which might introduce new diseases in the area, and inadequate sanitation facilities may result in severe health Impact. Following measures can be taken to eradicate Impact of the project

7.7.3 Implementation of Occupational Health and Safety Measures

Occupational Health & Safety measures result in improving the conditions under which workers are employed and work. It improves not only their physical efficiency, but also provides protection to their life and limb. Management will consider the following safety measures:

- Safety clauses in contract order

- Dedicated safety team
- Inspection and maintenance of equipment's and accessories
- Pre placement and periodic health check up
- Removal of unsafe conditions and prevention of unsafe acts
- Detailed analysis of each and every incident
- To provide standard PPEs and ensure its uses for mining safety
- Periodic inspection by internal and external safety experts
- Celebrations of various safety events for awareness
- Medical facilities & first aid boxes will be established in the mine premises.
- Pits, Sumps, openings in floor etc. which may be a source of danger, will be either securely covered or securely fenced. Securely fencing a pit means covering or fencing it in such a way that it ceases to be a source of danger.
- Health Awareness Programs and camps will be organized
- The mine workers will be provided all necessary PPE, especially dust masks for their safe guard from dust, Ear Plugs/Ear Muffs for noise, boots etc. and measures for other hazards.
- Under initial vocational training, the workers will be given training related to all safety and health aspects.

7.8 CONCLUSION

Development Activity for Group Housing Project does involve hazardous scenario with risk of worker and Employees during Construction phase. Appropriate safety measure to carry out work safely will be implemented. Administrative and Supervisory control will be implemented. Management procedures like Permit to work, Mock drills, Training & Skill development etc. will be taken care off.

7.9 NATURAL RESOURCES CONSERVATION

The project will lead to utilization of various natural resources. As an environmentally responsible corporate, the developers endeavor to conserve these resources by good management, treatment, recycling, reuse with the help of new technology for minimization of wastages and effective usage of

resources.

7.9.1 CONSERVATION OF WATER

The project will use treated water from nearby common STP of DLF during construction phase and DLF Water tanks supply during operation phase of the project. Following means are proposed to be adopted for conservation of this life sustaining resource:

The water will be supplied by DLF water tanks for the proposed project.

- **Minimum Use of Water**

o To further minimize the use of available freshwater, various low flow fixtures may be provided such as Low flow flushing systems, sensor based fixtures, waterless urinals, and tap aerators. Awareness will also be spread amongst the residents on the following lines:

o Timely detection and repair of all leakages;

o Turning off tap while brushing teeth;

o Turning off faucets while soaping and rinsing clothes;

o Using automatic washing machine only when it is fully loaded;

o Watering of lawn or garden during the coolest part of the day (early morning or late evening, hours when temperature and wind speed are lowest. This reduces losses due to evaporation.

o Planting of native and/or drought tolerant grasses, ground covers, shrubs and trees. Once fully grown, they need not to be watered frequently.

o Avoiding over watering of lawns. Good rains eliminate the need for watering for more than a week.

o Setting sprinklers to water the lawn or garden only, not the street or sidewalk;

o Avoiding installation or use of ornamental water features unless they recycle the water and avoiding running them during drought or hot weather;

o Installation of high-pressure, low-volume nozzles on spray washers;

o Replacement of high-volume hoses with high-pressure, low-volume cleaning systems

o Equipping spring loaded shutoff nozzles on hoses;

o Installation of float-controlled valve on the make-up line, closing filling line during operation, provision of surge tanks for each system avoid overflow;

o Washing vehicles less often, or using commercial car wash that recycles water;

- **Rainwater Harvesting**

The increased hard surface of Group Housing project increases the rainwater/storm water runoff as compared to the otherwise barren land. It is proposed to harvest this rainwater run-off that will recharge the groundwater resource while reducing the burden of storm water management of the area and eventually natural water bodies. Apart from the open spaces, it is proposed to harvest the roof top rainwater. The storm water will be treated through an oil and grease trap and allowed to flow through layers of sand and gravel for filtration prior to reaching the water table, to avoid any possibility of groundwater contamination.

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

- Avoid excavation during monsoon season.
- Care would be taken to avoid soil erosion.
- Community toilets shall be constructed on the site during construction phase and the wastewater will be channelized to the septic tank in order to prevent wastewater from entering the water bodies to prevent surface and ground water contamination by oil/grease, leak proof containers would be used for storage and transportation of oil/grease. The floors of oil/grease handling area would be kept effectively impervious.
- Collection and settling of storm water, prohibition of equipment wash downs, and prevention of soil loss and toxic release from the construction site will be adhered to minimize water pollution.
- Most of the storm water produced on site will be harvested for ground water recharge. Thus proper management of this resource is a must to ensure that it is free of contamination. A detailed Storm Water Management Plan will be developed which will consider the sources of storm water. The plan will incorporate best management practices which will include the following:
- Regular inspection and cleaning of storm drains.
- Installation of clarifiers or oil/ water separators system of adequate capacity around parking areas and garages as per requirement.
- Cover waste storage areas.
- Avoid application of pesticides and herbicides before wet season.
- Conducting routine inspections to ensure cleanliness.
- Preparation of spill response plans, particularly for fuel and oil storage areas.

- Provision of silt traps in rain water harvesting system.
- Good housekeeping in the above areas.

7.9.2 ENERGY CONSERVATION

Efforts will be taken for energy conservation using passive solar architecture wherever it is possible. Passive solar design refers to use/ prevent the sun's energy for heating and cooling of living spaces. Projections etc. will be provided for shading of summer sunlight to reduce the heat influx into the building and thus reduce the air conditioning loads. The principles of energy conservation will also be embedded in the proposed buildings through use of energy efficient fixtures, maximum availability of natural light, ventilation and use of solar energy for Street lighting.

Energy Efficient Features: The energy efficiency features of the project are:

- Maximum utilization of natural light
- CFL & T-5 lighting fixtures in the common areas and True lite fluorescent lamps in basements
- Use of solar lights in street and landscaping
- Minimum of 20% hot water requirement shall be met by solar water heating systems
- Energy efficient motors and pumps
- Appropriate design to reduce heat gain and loss
- Roof-top thermal insulation
- Glazing Glass to reduce the U value as far as possible.
- External glazing will be below 60% of the total vertical surface as per ECBC.

7.10 SOLID WASTE

Solid waste shall be generated both during construction and operation phase.

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

- Construction yards are proposed for storage of construction materials.
- The excavated material such as soil 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 buildings project.

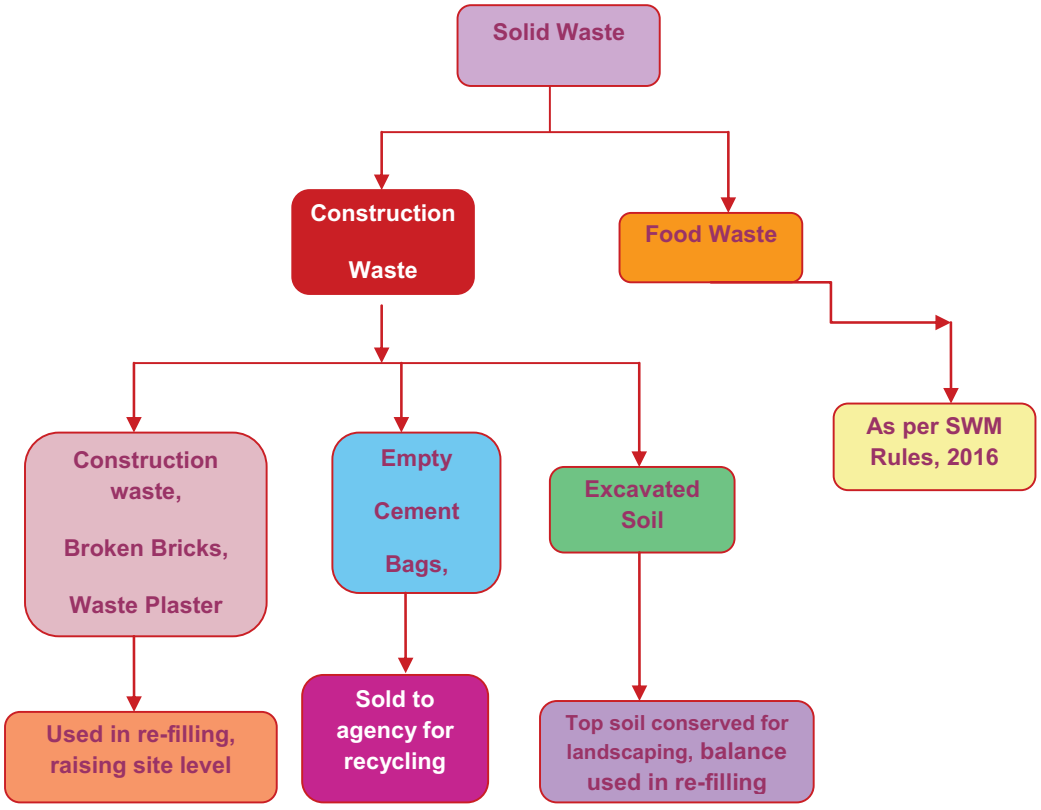


Figure-7.2: Solid Waste Management Scheme during Construction Phase

During the operation phase, waste will generate from Dwelling Units, Visitors. The solid waste generated from the project shall be mainly domestic waste and estimated quantity of the waste shall be approx. **2,069 kg per day** (@ 0.5 kg per capita per day for residents & EWS & religious building population, @ 0.15 kg per capita per day for the visitor population, @ 0.3 kg per capita per day for the staff members, commercial and community population, Following arrangements will be made at the site in accordance to Solid Wastes Management Rules, 2016 and disposed through Govt. approved vendor in accordance with Bio Medical Waste (Management & Handling) Rules, 2016.

Table 7.7: Calculation of Solid Waste Generation

S.No	Unit Type	Population	Rate(Kg/Cap/Day)	Waste Generated
1	Main Dwelling Units	3640	0.5	1820
2	Service Personnel units	104	0.5	52
3	Community Building	300	0.3	90.00
4	Security & Maintenance staff	100	0.3	30.00
5	Visitors	364	0.15	54.60
6	Horticulture waste(2.272 Acre)	0.2 kg/acres/day	2.272	0.45
7	Sludge from STP	294	7.51 % of waste water	22.08
	Total			2069.13
				Say 2069 kg/day

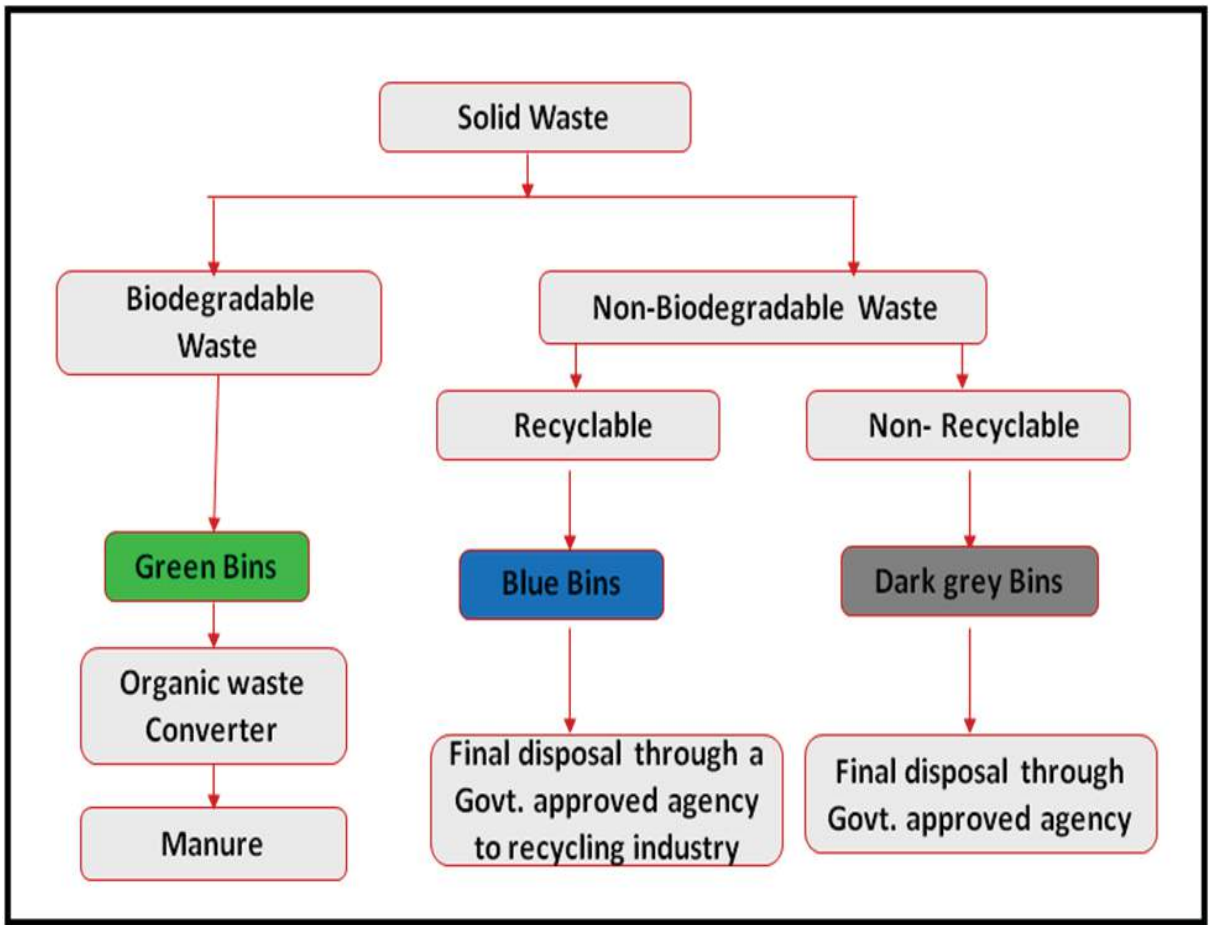
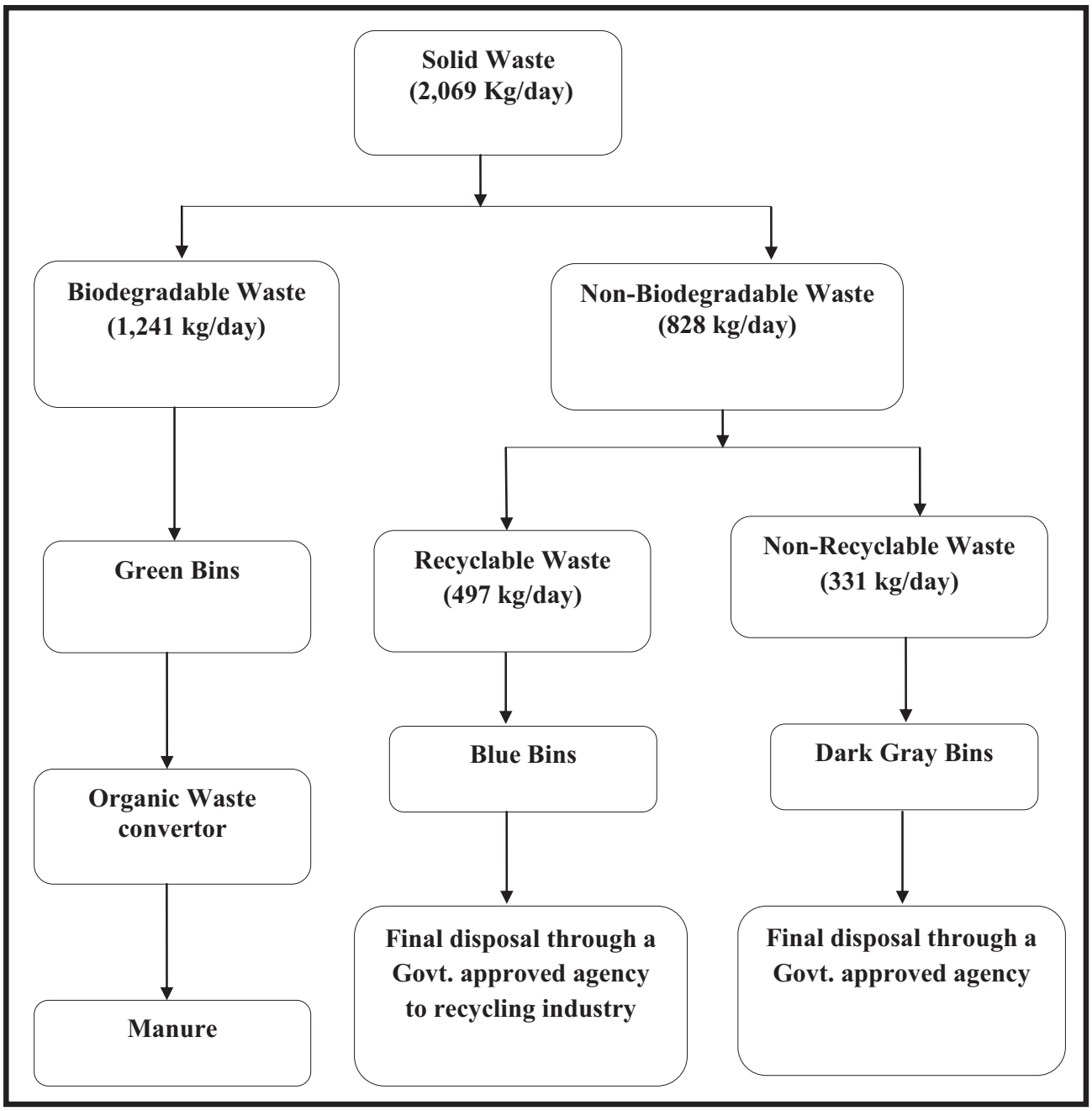


Figure-7.3: Solid Waste Management Scheme during Operation Phase



Note: we will be abide by plastic & E-waste management rule 2016

Figure 7.4: Solid Waste Management Scheme during Operation Phase

Organic waste Management by automatic composting machine:

- Decentralized waste management solution aesthetically designed just take less than a single car park space for a 250 kg unit capable to treat wet waste generated.
- It reduces labor cost because of safe handling system, as no pathogens generated due to operations in high temperature thereby reducing health risks significantly.
- Very fast Waste to manure processing duration i.e. 1-3 days in comparison of traditional composting methods
- No transport cost as machine can operate at on site without any multi-step process by just provide input, plug and start operation
- Designed to keep rodents at bay so cleanest technology with negligible odour.
- Life span 25-30 years and AMC to ensure 24X7 days of uninterrupted operation
- Microbes present within incubator feed on the organic matter and convert in to compost.
- Moisture content and temperature automatically regulated using sensors at the bottom of the tank whenever organic waste is added.
- Fully aerobic digestion is facilitated by the periodic and intermittent rotation of the mixing blades (no crushing/grinding) to maximize microbe activation
- The final decomposition is done by specialized thermophilic microbes which thrive in high temperature and high acidic or salty atmospheres.
- The final product in the form of compost can be used as manure in to landscape area management.
- The wet waste reduced in volume by 90 % and 100 kg waste converted in to 10-15 kg compost which can be removed in 10-15 days and expenditure to process per kg of waste is less than 01 INR
- The output compost from OWC can be mixed with soil in the ratio of 1:10 before using as manure
- Care to be taken to only moisten the waste and not make it dripping wet.
- Clear the compost once it reaches the red level because excess compost might spoil the machine by entering the motor assembled.
- A buffer of 3-6 days on composting of pure garden waste necessarily to be taken due to direness of such waste in comparison of other food waste.

Technical Specification

Operation	Fully Automatic
Output	Organic Manure
Installation Requirements	Almost Plug and Play. Vent to be connected outdoors or storm water lines. No need of water inlet. Water may be required, only to clean the machine externals and any pilled waste.
Control Systems	PLC Based
Composting Tank	SS
Housing	M.S with Powder coating or SS panels as a variant
Input / Output	Door for waste input Separate door for getting out compost
Heater	Insulated oil heating chamber or Heating pads as a variant

Other Features	• Provided with waste overload function • Indicators for Power mode, heater & power saving mode • Stainless steel (SS304) shaft & mixing blades • Safety feature: Internal mixing blades automatically stop when hopper door is opened (in auto mode) • Can be run in auto mode or manual mode • Internal shaft turns and sends out compost, when the compost door is opened
Doors	Separate door for waste input & separate door for compost removal
Preferred Location for installation	Can be a garden, area adjacent to garden, car park, preferably with a connection to the drainage
Life of the Machine	Expected around 25 years
Capacity Available	1. 1,250 Kg/day 2. 500 Kg/day 3. 250 Kg/day 4. 150 Kg/day 5. 100 Kg/day 6. 40 Kg/day
Required Capacity	Ideally should be 20 % higher capacity of OWC to be selected as per estimated volume of wet/organic waste.
Proposed Capacity	20% more than OW Organic Waste = 1,241 Kg Final OWC = 1,241 + 248 (20% of 1,241) = 1,489 Kg i.e. Total 2 nos. of Organic waste converters of capacity 1,500 Kg/day (1×1,250 Kg/day+1× 250Kg/day)

Following arrangements will be made at the site in accordance to Solid Waste Management Rules, 2016.

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. Separate colored bins will be provided for dry recyclables and bio-degradable waste.
3. For institutional waste collection, adequate number of colored bins (Green and Blue bins for bio-degradable and non-bio-degradable respectively) are proposed to be provided.
4. Litter bin will also be provided in open areas like parks etc.

7.10.1 Treatment of waste

Bio-Degradable wastes

1. Bio-degradable waste shall be disposed-off as per Solid Waste Management Rules, 2016

Recyclable wastes

1. Grass Recycling – The cropped grass will be spread on the green area. It will act as manure after decomposition.
2. Recyclable wastes like paper, plastic etc. will be sold off to recyclables.
3. Hazardous wastes such as waste oil will be sold off to authorized recyclers. Buy back arrangement will be made for batteries.

7.10.2 Disposal

The Municipal Solid Waste Management will be collected as per the guidelines of Municipal Solid Wastes (Management and Handling) Rules, 2000 and amended Rules, 2016. The inert non-recyclable wastes will be disposed through government approved agency for land filling.

8

PROJECT BENEFITS

8.1 GENERAL

M/s DLF Limited proposes a proposed **Group Housing Buildings project in zone 10, DLF-5, Sector– 54 District Gurugram, Haryana**. Total Plot area of the project is 30,653.317 m^2 / 7.574 Acres (which is part of Phase-V Group Housing Scheme of 476.6015 Acres). The project site is connected through sector roads. The nearest highway is NH-148A which is ~3.5 Km away from the project site towards North direction and NH-48 which is ~5.5 Km away from the project site towards NW direction and nearest railway station is Gurgaon Railway Station at a distance of ~11 Km from project site in NW direction. Nearest airport is Indira Gandhi International Airport at a distance of ~10.3 Km from the project site in North direction. There are many educational institutions and colleges in nearby area and around the project site. The salient features of the project will include:

- Rain Water Harvesting
- Fire Fighting System
- Emergency Alarm System
- Advanced fire protection system
- Solid waste management
- Backup power Supply

8.2 PHYSICAL INFRASTRUCTURE

The Proposed Group Housing Buildings project will help in meeting the growing residential need for people; it also provides state-of-the-art apartments and modern terms of comfort and safety of its residential units. Care will be taken to provide the occupants and visitors with necessary facilities as power, water supply, parking spaces, and landscaping, wide internal roads that are safe and secure.

8.3 SOCIAL INFRASTRUCTURE

The Proposed Group Housing Buildings project of this scale sets in an overall development of the region, maintenance of existing roads, power supply and water supply, since a large Construction generally brings the focus of the development authorities in the locality.

8.4 ECONOMIC BENEFITS

The project will have positive impact on the local economy in a convenient way. The construction phase of the project will engage a large number of construction workers, whether skilled, semi-skilled or unskilled. The workers will also be ensured welfare facilities such as drinking water, sheds for resting, medical facilities.

In meeting the day-to-day and recreational demands of the residents of the site, the region is also likely to develop a number of shopping and amusement facilities, thereby, further stimulating the local economy.

9

9.0 General

As per EIA Notification dated 14th September, 2006, the chapter on the "Environment cost benefit analysis" is applicable only if the same is recommended at the scoping stage.

As per ToR points issued by SEIAA, Haryana vide letter no: SEIAA (137)/HR/2022/733 dated 08/04/2022.

10

ENVIRONMENTAL MANAGEMENT PLAN

10.1 STRUCTURE OF EMP

Environmental Management Plan (EMP) is the key to ensure a safe and clean environment. The desired results from the environmental mitigation measures proposed in the project may not be obtained without a management plan to assure its proper implementation & function. The EMP envisages the plans for the proper implementation of mitigation measures to reduce the adverse impacts arising out of the project activities. EMP has been prepared addressing the issues like:

- Pollution control / mitigation measures for abatement of the undesirable impacts caused during the construction and operation stage
- Institutional set up identified/recommended for implementation of the EMP
- Post project environmental monitoring program to be undertaken
- Expenditures for environmental protection measures and budget for EMP

10.2 ENERGY CONSERVATION PLAN

Project involves energy consumption for various purposes. Measures are proposed to minimize the energy requirement and are listed below.

- Orientation is building is such that it allows natural lightning and ventilation
- Overhangs, pergolas and façade are provided to control the direct sun heat
- Over-deck insulation will be provided to provide insulation to the building
- Provision of false ceilings
- Usage of AAC blocks in building construction
- Painting wall with white color heat reflecting paint
- Vertical plantation will be carried out
- Usage of fly ash bricks, hollow bricks and fly ash mix cement for construction purpose. Usage of excavated soil and construction debris within the project site as filling material

- Usage of locally available construction material
- Provision of solar water heater
- Lightning in common area will be LED based. Solar lights will be provided in ration of 1:3
- Common lights will be shut down to 50% after 10:pm when traffic movement is drastically reduced
- All internal lighting shall be BEE star rated. All internal lightning will be CFL or T5 lamps based
- Direction signage, based on LED shall be powered by solar.

10.3 ENVIRONMENT MANAGEMENT PLAN

An EMP consists of a set of mitigation, monitoring and institutional measures applicable to design, construction and operation (Post construction) stages. The major components of EMP are:

- Implementation of mitigation measures for mitigation of potentially adverse impacts
- Monitoring during project implementation and operation
- Integration of EMP with project planning and implementation framework
- Implementation schedule

The EMP has been designed considering regulatory and other requirements to ensure minimal disturbance to the baseline environmental conditions in the project area. EMP for both construction and operation phase of the project is defined with respect to activities which may have an impact on the environment and society. The mitigation measures, as proposed in Chapter 4**,** will be implemented under the overall supervision of project proponent. Additional best practices and management plan for various concern areas are defined in the Sections below.

10.4 GREEN BELT MANAGEMENT PLAN

Total green area measures **9,195.995 m^2** i.e. **30 %** of the plot area which will be area under landscaping. Evergreen, native species will preferably be planted at the project site. Native species are adapted to natural conditions and also requires less aftercare and maintenance. Trees

with large & round canopy will be planted. Plantation will act as noise buffer and will provide surface for dust settlement. Green belt development plan for the area is given below

Green Belt development Plan

All the developments are associated with the pollution of one or more environmental component. Plants are the natural sink of that pollution. Plants help in abatement of the pollution and restore the degraded environment. Green belt lowers down the air pollution by providing a surface to settle down or by absorbing the pollutants, attenuate noise level and uses the waste water. Phyto-remediation is one of the most successful available technologies of restoring the degraded environment. For this project area of **9,195.995 m^2** i.e. **30 %** is proposed to be put under green cover.

Selection of Plant Species for Green Belt Development

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

- Species should be fast growing and providing optimum penetrability with minimal maintenance. Perennial, evergreen & fast growing trees
- Species should be wind-firm and deep rooted
- Indigenous and locally available species will be planted
- Trees with high foliage density, leaves with larger leaf area and hairy on both the surfaces. Round, thick & spreading canopy is preferred for peripheral green belt and oblong canopy for road side plantation
- Ability to withstand conditions like inundation and drought
- Soil improving plants (Nitrogen fixing rapidly decomposable leaf litter)
- Bird and insect attracting tree species
- Tolerant to climatic conditions of the area and with less water requirement & after care will preferable be planted. Species tolerance to air pollutants like SO_2 and NO_2 should be preferred

- Plantation trees with ornamental foliage & shrubs with fragrant flowers will enhance scenic beauty of the area. Attractive appearance with good flowering and fruit bearing
- Plantation should be such that it maintains ecological & hydrological balance of the region.

After Care and Monitoring

Plants grown will be monitored for first three years. Nutrients will be supplemented and the juveniles provided protection. Following measures will be taken:

- Adequate nutrient supply will be maintained by providing manure timely
- Absence of water stress
- Construction of the protection wall all around to protect from animals and outsiders from damage

Regular inspection of the site will be kept. Record keeping of number of saplings planted and surviving will be kept. Regular pruning of road side trees will be done as per requirement. Weeding will be carried out along with regular manuring & watering.

10.5 ENVIRONMENTAL MANAGEMENT BUDGET

The budget provisions have been kept in the project cost towards the environmental protection, control & mitigation measures and implementation of the EMP, both during the construction and operation phase.

11

SUMMARY AND CONCLUSION

11.1 INTRODUCTION

M/s DLF Limited proposes a proposed Group Housing Buildings in zone 10, DLF-5, Sector– 54 District Gurugram, and Haryana. The Proposed Group Housing buildings would include residential dwelling units, Service Personnel unit, and community building. The Plot area of the project is 30,653.317 m^2 /7.574 Acres (which is part of Phase-V Group Housing Scheme of 476.6015 Acres.) As per EIA Notification this project falls in schedule 8 'b' of category 'B'. Thus, EIA study has been done for this project to get Environmental Clearance from SEIAA, Haryana. The project site has been earmarked for the residential land use according to Gurgaon Master Plan 2031.

11.2 PROJECT DESCRIPTION

This project is located at Sector–54, District-Gurugram, Haryana. The GPS Co-ordinates of the project site ranges from 28º 26' 40.694" N & 77º 6' 46.727" E to 28º 26' 49.285" N & 77º 6' 52.873" E which is covered by Survey of India toposheet no. H43X3, H43X2 of 1:50,000 scale.

The nearest highway is NH-148A which is ~3.5 Km away from the project site towards North direction and NH-48 which is ~5.5 Km away from the project site towards NW direction and nearest railway station is Gurgaon Railway Station at a distance of ~11 Km from project site in NW direction. Nearest airport is Indira Gandhi International Airport at a distance of ~10.3 Km from the project site in North direction.

11.2.1 SALIENT FEATURES OF THE PROJECT

Salient features of the Group Housing buildings are given in table below:

Table-11.1: Salient features of the Proposed Project

S.No.	Particular	Total Area(Sqm.)
1.	**Total Plot Area**	**30,653.317 (7.574 Acres)**
2.	**Proposed Ground Coverage**	**6,369.381**
3.	Proposed Residential FAR (Including Community Building)	1,43,937.510
4.	**Total FAR (Residential+ Community Building)**	**1,43,937.510**
5.	Mumty Machine Room	1,112.604
6.	Stilt area	2,700.018
7.	Meter Room & Guard Room	18.000
8.	Surface Staircase	38.175
9.	Stairs	3,460.908
10.	Basement	82,110.783
11.	**Non FAR (Mumty Machine Room+ Stairs Area & Stilt Area+ Meter Room & Guard Room+Basement+ Surface Stairscase)**	**89,440.488**
12.	**Built up Area (FAR+Non FAR)**	**2,33,377.998**
13.	Green Area (30% of plot area)	9,195.995

***FAR = Floor Area Ratio**

Silent Features

S. No.	Particulates	Total
1	**Total Population**	4,508
2	**Total Water Requirement**	391 KLD
3	**Total Fresh Water Requirement**	255 KLD
4	**Total Wastewater Generated**	294 KLD
5	**Solid Waste Generation. Kg/day**	2,069 kg/day
6	**Maximum Building Height (meters)**	109.350
7	**No. of DG Set**	5 DG sets of tota capacity 8,250 KVA (3×2000 KVA + 1×1250 KVA+ 1×1000 KVA).
8	**Total Power Requirement & Source**	5,874 KW (DHBVN)
9	**No. of Block**	4 nos
10	**Main Dwelling Units**	520
11	**Service personnel units**	52
12	**No. of Floors**	S+ 33
13	**No. of Basement**	4 nos
14	**Parking provided**	1,615 ECS

The baseline environmental status was assessed based on primary and secondary data collected either through in-site field observation or obtained from agencies such as Irrigation Department, India Meteorological Department (IMD), Central Ground Water Board, Geological Survey of India, State Ground Water Department, State Pollution Control Board, Census of India and Local Forest Department, Non-Governmental Agencies. The baseline status established from analysis of secondary and primary data and predicted impacts are discussed below. The mitigation measures are also provided along with.

11.3 LAND ENVIRONMENT

- The land use pattern of the study area is mainly water bodies, agriculture, residential, barren land, grass land and open scrub. The site falls under Gurgaon master plan-2031. When awarded to the project proponent, the land was a barren land.
- The project will be developed as per the provisions of the Gurgaon master plan, 2031. The construction phase of any construction project poses the threat of soil contamination and soil erosion, mainly during the construction phase. The estimated solid waste generation during operation phase is **2,069 kg/ day.**

- During Construction phase, excavation related work will be avoided during the monsoons and site clearing will be carried out for specific areas being developed. All wastes from site will be regularly removed and disposed/sold. An efficient solid waste management is proposed comprising door-to-door waste collection, segregation of solid waste management facility within the site, and their disposal. Solid waste will be disposed by sale of recyclable wastes to vendors.

11.4 WATER ENVIRONMENT

The water requirement during construction phase will be met by treated water from nearby STP. A combination of efficient water management to reduce water consumption, reuse of treated wastewater to reduce freshwater demand and rainwater harvesting to replenish groundwater is proposed to have a positive bearing on the water environment of the region. Total wastewater will be in onsite STP proposed by the proponent.

11.5 AIR ENVIRONMENT

During construction phase, the major concern of air pollutant are $PM_{2.5}$, PM_{10} as impacts of other emissions such as SO_2 & NO_2 will not be significant because the nature of sources is such that the emissions are distributed spatially as well as temporal. Monitored average $PM_{2.5}$, PM_{10} level exceeded NAAQS at all the eight locations. The levels of $PM_{2.5}$, PM_{10}, NO_2, SO_2 and CO at all eight locations were within the standards prescribed by NAAQS. Thus dust emissions from construction activities shall require comprehensive mitigation measures and best construction practices.

- Adequate stack heights will be proposed for DG sets above the ground to provide for sufficient dispersion of pollutants. Water sprinklers will be used to suppress dust during construction. During the operation phase, green belt and green area development is proposed to restrict and absorb air pollutants.

11.6 NOISE ENVIRONMENT

Noise levels were observed at eight locations within the study area. Level of background noise monitored at all locations was within the prescribed CPCB limits {55 dB (A) and 45 dB (A) for daytime and night time respectively}.

The noise emitted from heavy duty construction equipment's during construction period being high shall require occupational preventive measures and temporary noise barriers for noise attenuation. The construction period being about Four to Five year (approx.) duration, will require significant mitigation measures such as restricted loud noise activities to daytime, provision of PPEs and acoustic enclosures for DG set.

In the operation phase, noise pollution will be checked through acoustic enclosures of DG sets and green belt plantation.

11.7 BIOLOGICAL ENVIRONMENT

No tree cutting is involved in the project. Additionally, there will be avenue plantations, peripheral plantation and shrub plantation will be done. The landscaping will include native species that will reduce pollution and improve aesthetics and micro-climate of the region. Total green area measures **9,195.995 m^2** i.e. **30 %**. Evergreen tall and ornamental shrubs Delonix pulcherima, Plumeria alba , Largerstroemia indica etc and trees like Cassia fistula , Maduca latifolia , Bassia latifolia have been proposed to be planted inside the premises. Parks will also be developed by the management.

11.8 SOCIO-ECONOMIC ENVIRONMENT

The project will generate employment opportunities for both skilled and unskilled workers in the vicinity, which will produce multiple effects on the life and economy of the local people and the infrastructure will be improved of nearby area from the project. Thus, the project is beneficial from socio-economic point of view.

11.9 ENERGY EFFICIENCY

Various provision are made to reduce the energy efficiency of the building , such as use of solar energy, provision of low energy fixtures, design features to maximize sunlight and use of materials to improve energy efficiency.

11.10 OTHERS

Resource Conservation: A concerted effort is made towards resource conservation by way of using recycled building materials, reduced water consumption and improving energy efficiency of the building.

Indoor Air Quality: Special attention will be given to maintaining indoor air quality through use of low VOC paints, provision of adequate ventilation, proper storage of chemical and cleaning materials.

Safety: A network of manned security gates, security men, closed circuit TV and intercom facilities are proposed to ensure safety of the occupant. The buildings will also be provided with adequate fire tenders, fire alarms and water sprinklers.

11.11 ENVIRONMENTAL MANAGEMENT PLAN

- Adequate environmental management measures will be incorporated during the entire planning, construction and operating stages of the project to minimize any adverse environmental impact and assure sustainable development of the area.
- For the effective and consistent functioning of the campus, an Environmental Management System (EMS) will be established at the site including an Environmental Management cell for implementation of the EMP and monitoring plan, training and awareness, audits and maintenance of records.
- The total estimated cost of the proposed project is Rs.1076 Crores.
- Based on the environmental assessment, the associated potential adverse environmental impacts can be mitigated to an acceptable level by adequate implementation of the measures as stated in the EIA and the EMP. Some of the benefits from the project are:

- Use of solar energy for street lighting
- Use of AAC blocks (containing approx. 33% flyash)
- Use of steel manufactured from recycled content.
- Provide permeable paving to control surface water runoff
- Rainwater harvesting
- Meet all requirements for buildings in moderate earthquake prone areas.

- Provision of fire alarms and water sprinklers.
- Provision of welfare schemes to workers.
- Extending educational and healthcare facilities to the local people.
- Commitment to engaging local people and businessmen for maintenance and repair work.

Hence, it may be concluded that the project will have significant positive economic and social impact on the local community apart from meeting the housing needs of the occupants, without bearing any significant adverse environmental impact.

12

DISCLOSURE OF CONSULTANT

Vardan EnviroNet *"NABET approved EIA Consultant"* having its registered office at *Plot No. 82A, Sec.-5, IMT Manesar, Gurugram-122051(Haryana)*, is an organization of Senior State and Central Government retired Officers from various departments like Pollution Control Board, Mines & Geology Department, Town & Country Planning Department and various Research Institutes who have decades of experience in the field of environment, planning, sustainability, pollution control, mining, industries and research. The team also comprises of young, dynamic and progress driven Environment Engineers, Civil Engineers, IT Specialists, Field Engineers, Chemists, Microbiologists, Geologists, GIS experts and EHS auditors.

Vardan EnviroNet is established by experienced environmental and related experts and provides specialized services in the field of Environment and pollution control for all types of Industries like **Mining, Distilleries, Sugar Industry, Highways, Railways, transport terminals, mass rapid transport systems, Building and large construction projects including shopping malls, multiplexes, commercial complexes, housing estates, hospitals, institutions, Townships and Area development projects** and other related fields.

Our transparent and professional approach, commitment to excellent quality and service, timely deliveries have contributed to create a name in the field of environment. Our operations are spread in five different states in North India Region viz Haryana, Punjab, Rajasthan, Uttar Pradesh, and Himanchal Pradesh.

Vardan EnviroNet has its own Environmental Laboratory named "Vardan EnviroLab" at plot no. 82A, Sec. 5, IMT Manesar, Gurgaon (Haryana) approved by National Accreditation Board for Testing and Calibration Laboratories, Govt. of India (NABL). This OHSAS 18001 Certified and NABL approved Environmental Laboratory provides Analytical Laboratory Services of various elements and environmental parameters.

Core Business Services: -

We offer a diverse range of services in the field of environment like: -

1. Environment Impact Assessment
2. Environment Clearance from Ministry of Environment and Forests, SEIAA/ SEAC.
3. Environmental Compliances of MoEF/Pollution Control Board and other Government/Non-Government agencies
4. Environment monitoring, sampling and testing – ambient air, water, soil, stack emission, noise through in-house NABL accredited environment laboratory

5. Mine Exploration, Preparation of Pre-Feasibility/ Feasibility Reports for mineral deposits, Reserve and resource estimation, assessment of life of mine, Preparation of Mine Plan, Scheme of Mining, Progressive Mine Closure Plan, Final Mine Plan
6. Remote Sensing, GIS based mapping, Satellite mapping and Land use preparation
7. Legal advisory services for all environment related issues
8. Environment Health & Safety audits
9. Clearance from National Board of Wild Life
10. Eco-Sensitive Zone clearances
11. Consent to Establish/Operate from SPCB
12. Forest Clearance and Diversion of Forest Land from Forest Department
13. Airport Authority of India clearances

Accreditations and Certifications:

Vardan EnviroNet ***Address:*** *Plot No. 82A, Sec.-5, IMT Manesar, Gurugram-122051(Haryana)*
• *NABET* Accredited EIA Consultants Organization from Quality Council of India (QCI) **(Certificate from NABET for accreditation has been enclosed as Annexure)**
• *ISO 9001* Certified

Vardan EnviroLab ***Address:*** *Plot No. 82A, Sec.-5, IMT Manesar, Gurugram-122051(Haryana)*
• *National Accreditation Board for Testing and Calibration Laboratories (NABL) as per ISO/IEC 17025:2005*
• *Rajasthan Pollution Control Board (RPCB)* approved
• *OHSAS 18001* Certified

DLF LIMITED
DLF Galway Tower, R Block, DLF City, Phase-III, Gurgaon-122002
Tel.: +91-124-439d005 Fax: +91-124-4769292

Date: 10.03.2022

To,
The Member Secretary,
State Environment Impact Assessment Authority,
Bays No.:-55-58, Paryatan Bhawan,
1st Floor, Sector-2, Panchkula Haryana

Sub: Demand Draft for the Scrutiny fees for Application for Terms of Reference (ToR) for the Proposed Group Housing Buildings in Zone 10, DLF 5, at Sector-54, Gurugram, and Haryana is being developed by **M/s DLF Ltd.**

Ref: Haryana Government Gazette Notification dated 14.10.2021.

Dear Sir,

In regards to the above mentioned subject and reference, we are submitting the Demand draft of the scrutiny fees for the Proposed Group Housing Buildings in Zone 10, DLF 5, at Sector-54, Gurugram, and Haryana is being developed by M/s DLF Ltd. The estimate cost of our project is more than 100 Cr. Hence, we are submitting Demand draft of Rs. 2 lakh (Rupees Two Lakh Fifty Only). **Demand Draft (original) dated 09.03.2022 vide DD No.520455 is enclosed as Annexure.**

We request you to kindly process our application for issuance of Terms of Reference (ToR) for our above mentioned project at the earliest.

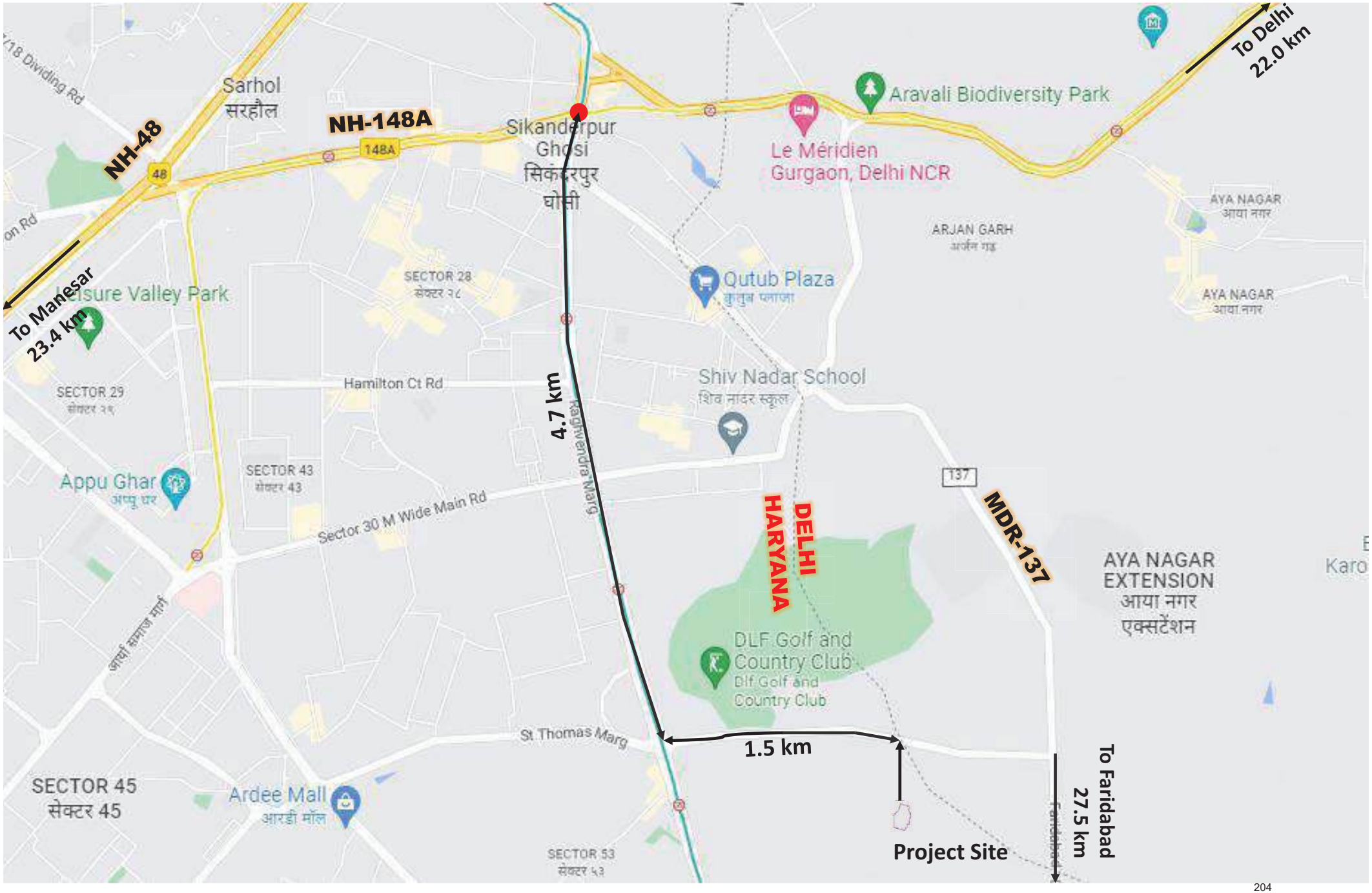
M/s DLF Ltd

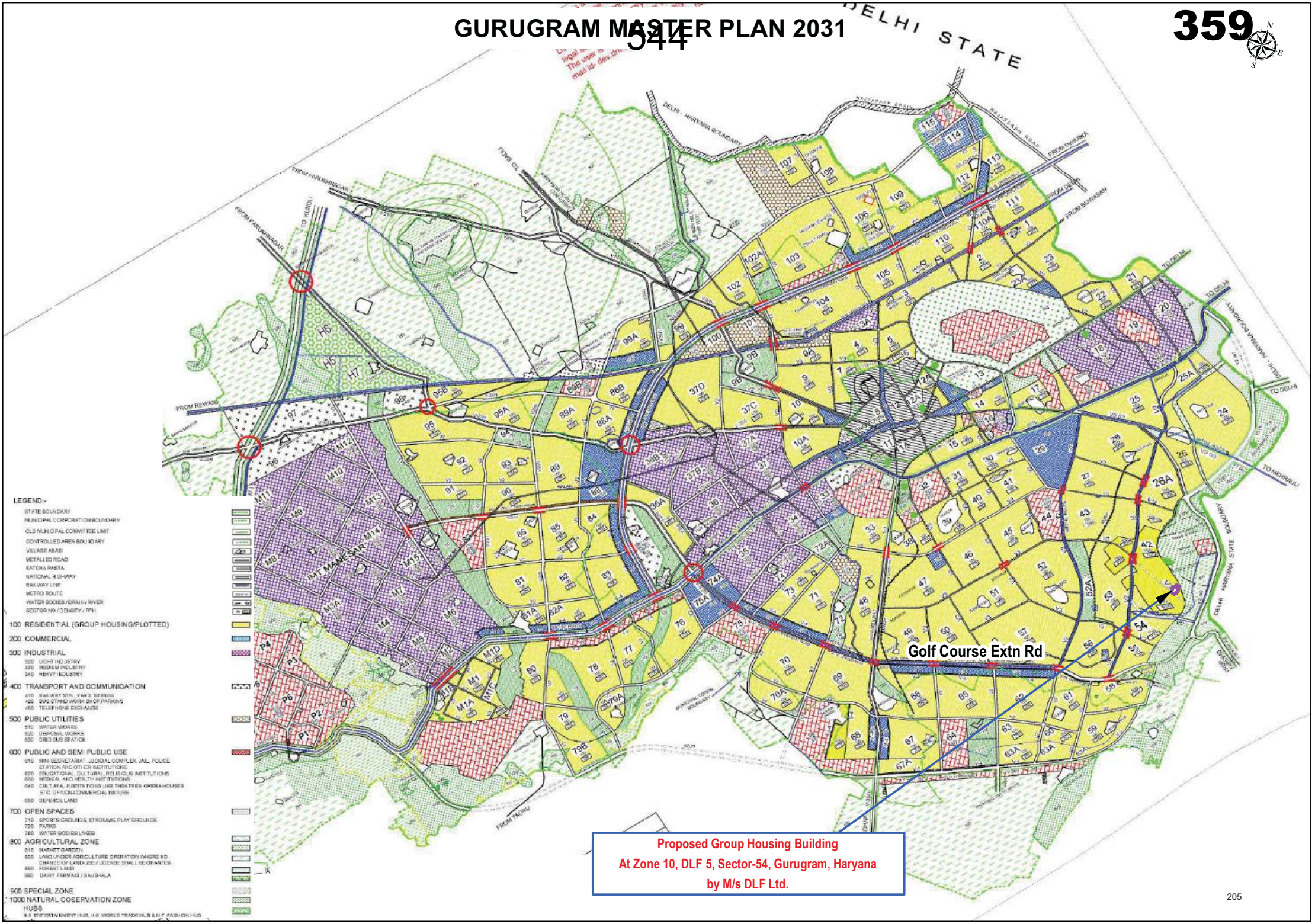
(Authorized Signatory)
DLF Limited

Authorised Signatory

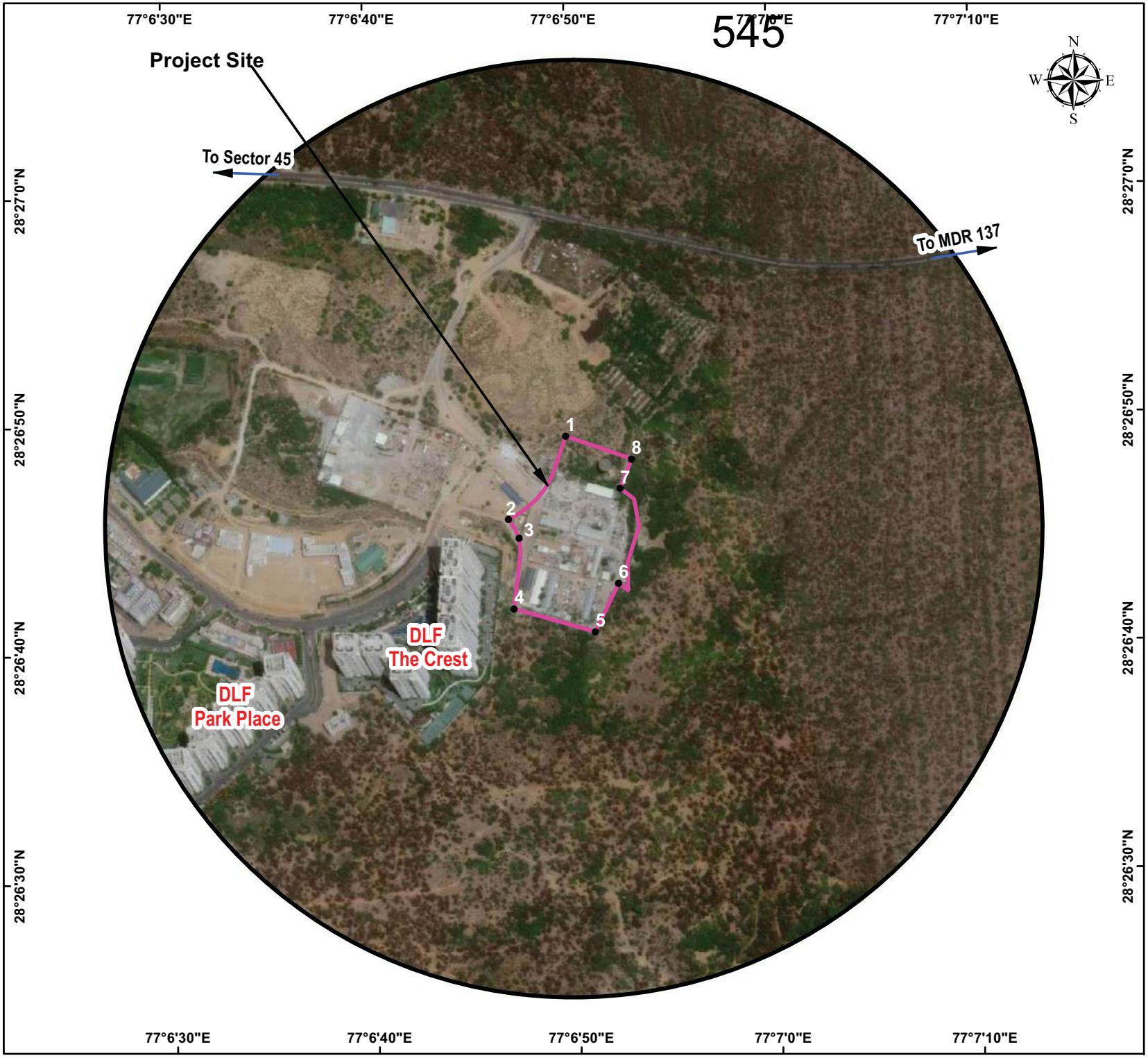
Received
Receipt No.
Date 21/03/2022

Location Map of Proposed Group Housing Building by M/s DLF Ltd.





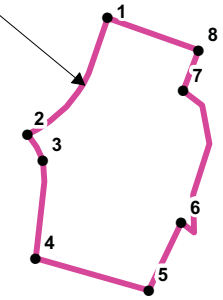
Proposed Group Housing Building
At Zone 10, DLF 5, Sector-54, Gurugram, Haryana
by M/s DLF Ltd.



GOOGLE EARTH IMAGERY OF 500M BUFFER AREA

Toposheet No:
H43X2 & H43X3

Project Site



Legend

- Co-ordinate
- Project Site
- 500m Buffer

POINT	LATITUDE	LONGITUDE
1	28° 26' 49.285" N	77° 6' 49.638" E
2	28° 26' 45.675" N	77° 6' 46.727" E
3	28° 26' 44.842" N	77° 6' 47.251" E
4	28° 26' 41.765" N	77° 6' 46.926" E
5	28° 26' 40.694" N	77° 6' 50.944" E
6	28° 26' 42.805" N	77° 6' 52.141" E
7	28° 26' 46.954" N	77° 6' 52.299" E
8	28° 26' 48.234" N	77° 6' 52.873" E

Project:
Proposed Group Housing Building
At Zone 10, DLF 5, Sector-54, Gurugram, Haryana

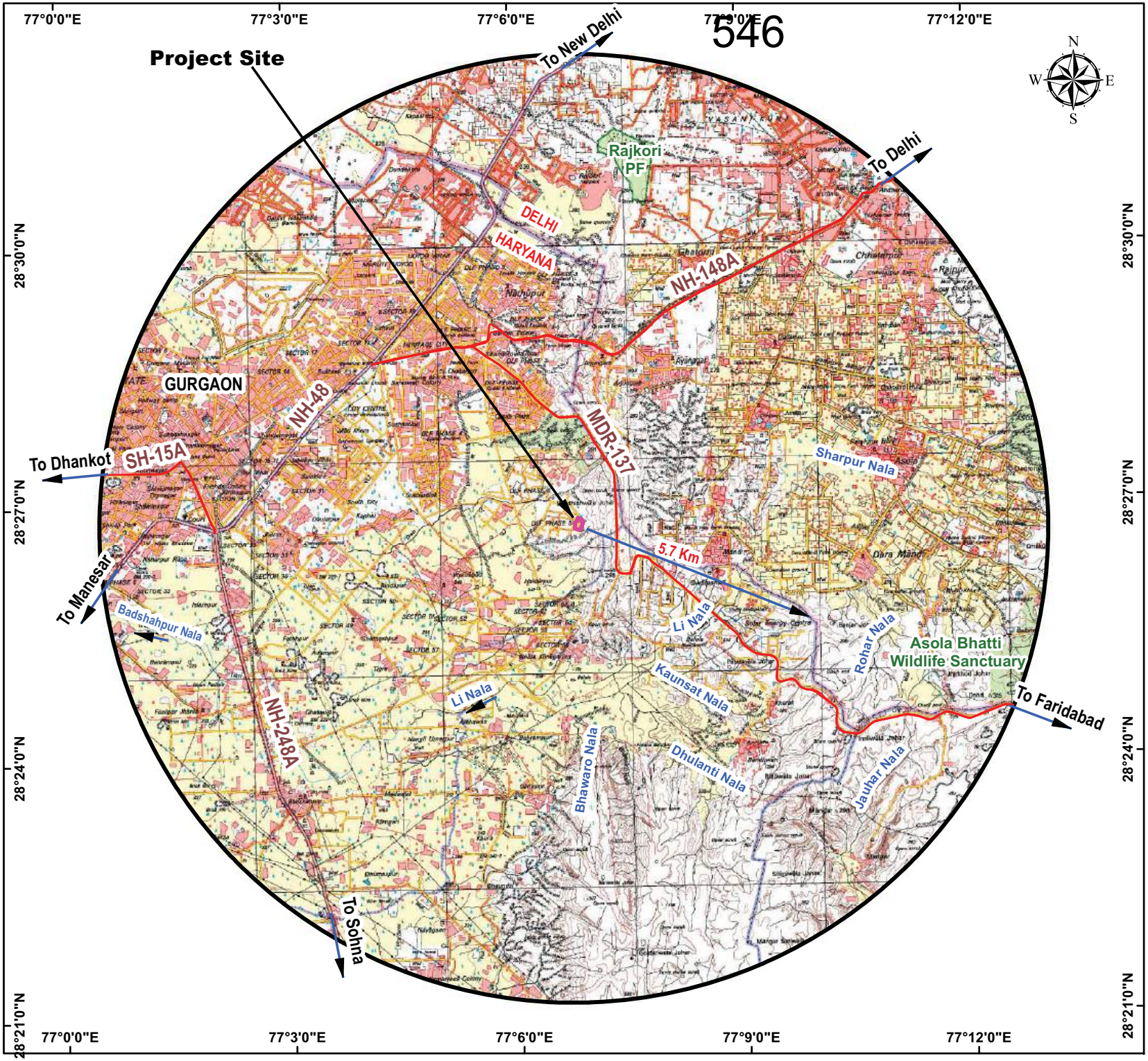
Project Proponent:
M/s DLF Ltd.

Environment Consultant:
Vardan EnviroNet
QCI-NABET Accredited Environment Consultant
Certificate No. NABET/EIA/1922/RA0166

Graphical Scale:
0 30 60 120 180 240 300 360 m

Prepared By:
Mr. Ankit Singh

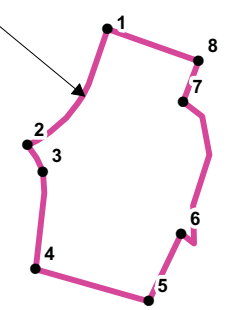
Approved By:
Mr. Ankur Agarwal



TOPOGRAPHICAL MAP OF 10KM BUFFER AREA

Toposheet No:
H43X2 & H43X3

Project Site



Legend

- Project Site
- 10km Buffer
- Settlements
- Streams
- Roads
- Forest
- Waterbody
- Vegetation
- Contours
- Locations
- Railway

Project:
Proposed Group Housing Building
At Zone 10, DLF 5, Sector-54, Gurugram, Haryana

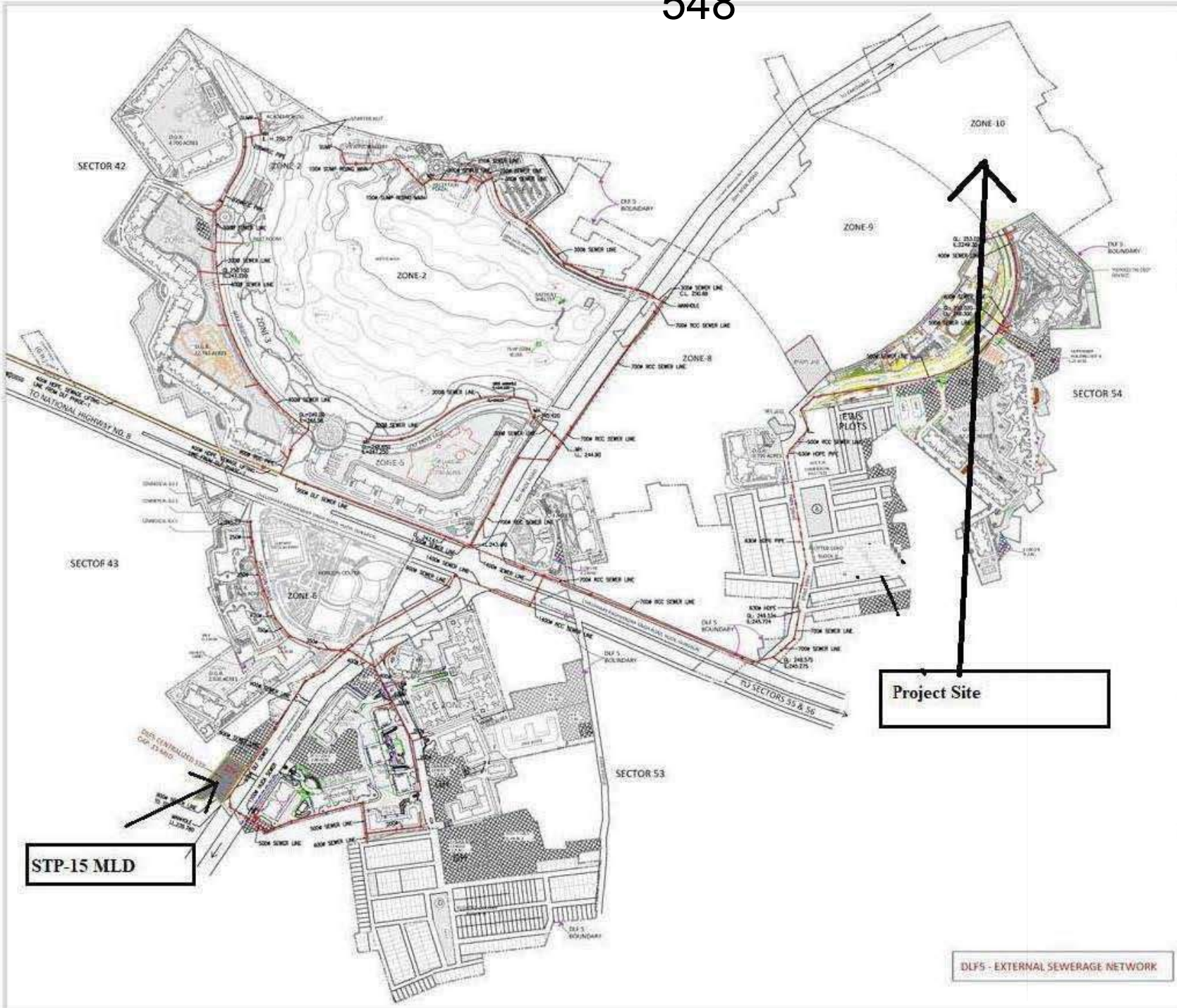
Project Proponent:
M/s DLF Ltd.

Environment Consultant:
Vardan EnviroNet
QCI-NABET Accredited Environment Consultant
Certificate No. NABET/EIA/1922/RA0166

Graphical Scale:
0 500 1,000 2,000 3,000 4,000 5,000 6,000 m

Prepared By:	Approved By:
Mr. Ankit Singh	Mr. Ankur Agarwal

SITE PHOTOGRAPHS



DLF

NOTES:-

S.No.	Revision	Date	Remarks

LEGEND

* LICENCED LAND SHOWN AS :
* OTHERS LAND SHOWN AS :

N

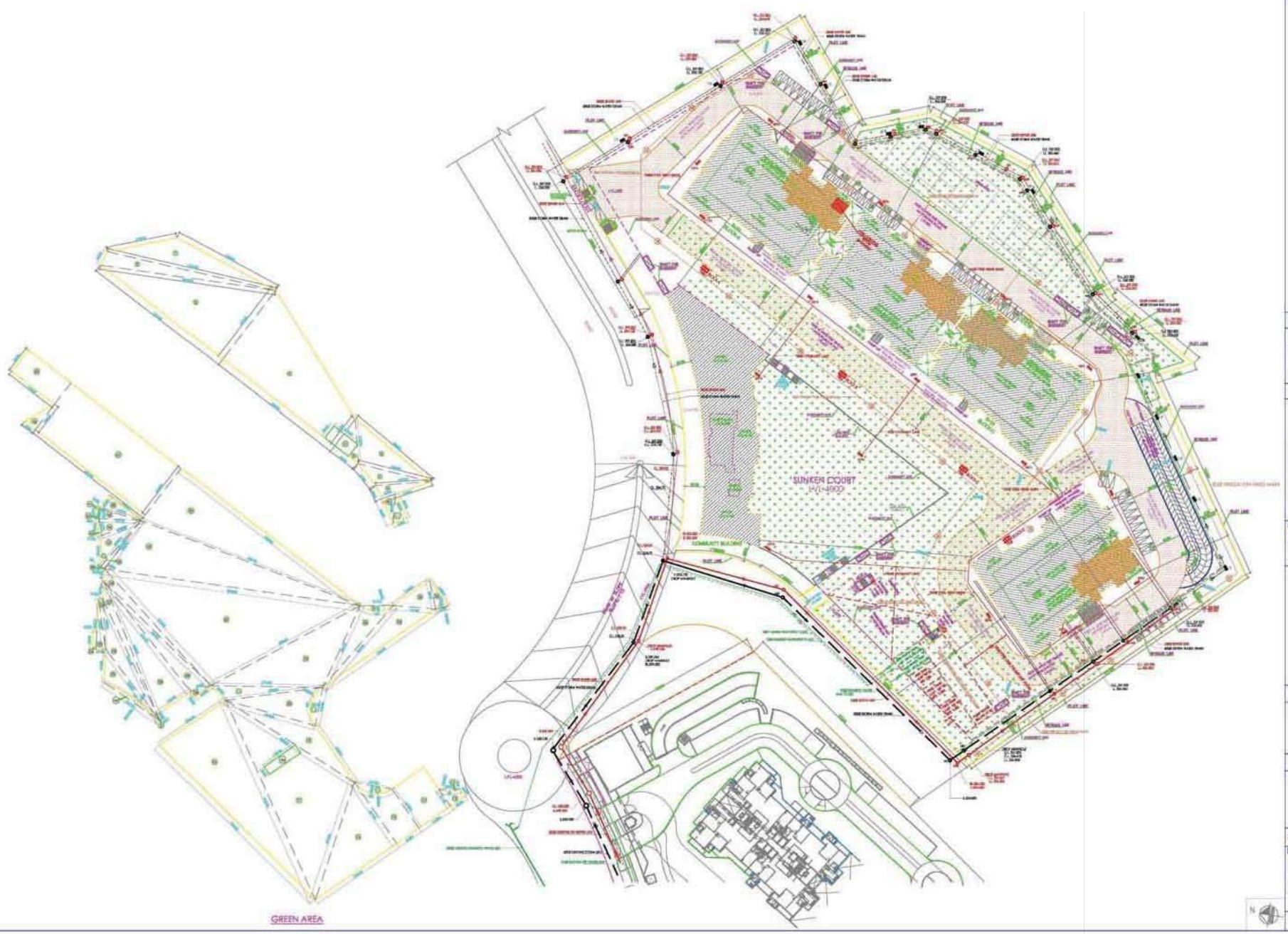
DLF LIMITED

SHOPPING MALL, ARJUN MARG, PHASE-I
DLF CITY, GURGAON, HARYANA
PIN - 122 002

DATE : MAY, 2017
SCALE : 1 : 4000
DWG NO. : DLF5/PH1/SW-01

SITE PLAN SHOWING EXTERNAL SEWERAGE NETWORK
OF GROUP HOUSING SCHEME
OF AN AREA OF 476.4265 ACS.
IN DLF 5, GURGAON

DLF5 - EXTERNAL SEWERAGE NETWORK



Note :-

1. BUILDING WILL BE DESIGN (STRUCTURES) AS PER RELEVENT IS CODES FOR EARTH QUAKE RESISTANCE.
2. BUILDING IS HAS AUTOMATIC SPRINKLER SYSTEM ON ALL FLOORS.

LEGEND:-

Project:

PROPOSED GROUP HOUSING BUILDINGS IN PART OF DLF 5, SECTOR-54, GURUGRAM.

Associate Architects

RSMS ARCHITECTS

RSMS ARCHITECTS PVT. LTD.
69,Nora Niwas Bhawani Kunj
(Behind D2), Vasant Kunj,
New Delhi-110070.
Tel.: 011-26898616,26898617
www.rsms-arch.com

OWNER: DLF

DLF LIMITED
THE SHOPPING MALL,DLF
QUTAB ENCLAVE(PHASE-I)
GURGAON, HARYANA 122002

OWNER'S SEAL & SIGNATURE

ARCHITECTS SEAL & SIGNATURE

FEB.-2022. | Scale : 1:400

Drawing Title:- LANDSCAPE PLAN

Drawing No:- S7-02

DLF5

FORM BR-V (A2)
[See Code 2.1 (1) (vii)]

Certificate of conformity to rules and structural safety for all buildings for all buildings except as stated in Form BR-V (A1).

Certificate to be submitted along with the building application in Form BR-1 duly signed by the Architect and Structural Engineer and the Proof Consultant.

Details of the building for which the certificate is issued:
Group Housing Buildings in part of DLF 5, Sector 54, Gurugram.

Name of the owner/Project	: DLF Limited
Complete address of the owner	:DLF Shopping Mall 3rd Floor, Arjun Marg, DLF City, Phase-I, Gurgaon-122002, Haryana, India

A.	**Building Plan:**	
(i)	Name of Architect	: Ardamanjit Singh Sandhu
(ii)	Council of Architect Registration No.	:CA/90/12848, valid upto 31-12-2030.
(iii)	Complete Address	:69,Nora Niwas Bhawani Kunj, Behind D2,Vasant Kunj, New Delhi-110070
(iv)	Email	: ardamanjit.sandhu@rsms-arch.com
(v)	Mobile No	:9810791652

B.	**Structural Design**	
(i)	Name of Engineer	: Ramesh Kumar Singh
(ii)	Qualification and experience	: M. tech (Structure), 24 Yrs.
(iii)	Complete Address	:24A, Ground floor, dda flatsPocket-1, Sector-10, Dwarka, New Delhi -110075
(iv)	Email	: space_rksingh@rediffmail.com
(v)	Mobile No.	: 9810307651

Certificate

It is hereby certified that the plans submitted in Form BR-1 for the building detailed above, are in accordance with the Code and the approved zoning plan of the plot. The structure has been designed in accordance with the provisions of the National Building Code and the relevant Bureau of Indian Standard Codes (with latest amendments) including Bureau of Indian Standard Codes for structures resistant to earthquakes and other natural hazards. The local soil conditions, its load bearing capacity and the underground water table etc. have been kept in view while designing the same.

Dated_____

Signature of Owner

(No digital signature is required)
Mobile no.
E-mail

Signature of Architect

Ramesh Kr Singh.

Signature of Structural Engineer

Er.R.K.Singh
M.Tech(Structure)
Regd. No.M-084(IASE)

The structure design has been checked and has been found to be in order. The design is in accordance with the provisions of the National Building code and the relevant Bureau of Indian Standard Codes (with latest amendments) including Bureau of Indian standard codes for structures resistant to earthquake and other natural hazards. The local soil conditions, its load bearing capacity and the underground water table etc. have been kept in view while designing the same.

Date: 15/02/2022

Signature of Proof Consultant along with Mob. No. & E-mail

B.K. SINGH
H-6/316, Agganwal Tower, N.S.P., Delhi-34
M: 1259332-0
M.E., M.TECH (Structure)

Mob.No - 9811038352
e-mail - ablscog@gmail com.

Indian Association of Structural Engineers

Certificate of Membership

Issued for Group Housing
at DLF-5 Sector-54
Gurgaon

RAMESH KUMAR SINGH

Has Been Elected

MEMBER

Of The

Indian Association of Structural Engineers

on 16 June 2006

with

Er. R.K. Singh
M.Tech(Structure)
Regd. No. M-084(IASE)

* All its associated rights and privileges
* Membership Number M-084
* Valid up to 31st March 2022

President

Sr. No.: DEG/SOET/PG/2016/499

Roll No.: 13CVP10P

NCU

THE NORTHCAP UNIVERSITY

(FORMERLY ITM UNIVERSITY, GURGAON)

Established under Haryana Legislature Act No. 25 of 2009
as amended vide Haryana Legislature Act No. 1 of 2016
Approved by UGC under Section 2(f) & Notification no. F 8-4/2010(CPP-1/PU) dt 26.08.2015

Ramesh Kr Singh
Er. R.K. Singh
M.Tech (Structure)
Regd. No. M-084(IASE)

Issued for Grxp Housing
Import & DLP-5 Sector-54
Gurgaon (Haryana)

मास्टर ऑफ टेक्नॉलॉजी

(सिविल इंजीनियरिंग - स्ट्रक्चरल इंजीनियरिंग)

प्रमाणित किया जाता है कि रमेश कुमार सिंह सुपुत्र जवाहर सिंह एवम् गंगिया देवी को विश्वविद्यालय द्वारा निर्धारित अर्हताओं को मई 2016 में सफलतापूर्वक पूरा करने पर प्रथम श्रेणी में सिविल इंजीनियरिंग - स्ट्रक्चरल इंजीनियरिंग में मास्टर ऑफ टेक्नॉलॉजी की उपाधि प्रदान की जाती है। 10 अंकीय मापक्रम में इनका संचित कोटि अंक माध्य 7.17 है।

उपाधि प्रदान करने की तिथि 20 दिसम्बर 2016

Master of Technology

(Civil Engineering - Structural Engineering)

Ramesh Kr Singh

Ramesh Kumar Singh son of Jawahar Singh & Gangiya Devi is awarded the degree of Master of Technology in Civil Engineering - Structural Engineering having successfully completed the requirements of the said degree in May 2016 in First Class with Cumulative Grade Point Average of 7.17 on a 10 point scale. Conferred on this day the 20 December 2016.

Busaram..

कुल सचिव
Registrar

कुलपति
Vice Chancellor

FORM LC - V
(See Rule 12)
HARYANA GOVERNMENT
TOWN AND COUNTRY PLANNING DEPARTMENT

Licence No. 181 of 1995.

1. This licence has been granted under the Haryana Development and Regulation of Urban Areas Act, 1975 and the Rules made thereunder to M/s Vikalpa Agro Industries (P) Ltd., DLF Centre Sansad Marg New Delhi,, for setting up of a group housing/plotted colony at village Wazirabad District Gurgaon.

2. The particulars of land wherein the aforesaid colony is to be set up are given in the schedule annexed hereto and duly signed by the Director, Town and Country Planning, Haryana.

3. The licence is granted subject to the conditions:-

a) That the group housing/plotted colony is laid out to conform to the approved layout plan and development works are executed according to the designs and specifications shown in the approved plan.

b) That the conditions of the agreements already executed are duly fulfilled and the provisions of Haryana Development and Regulation of Urban Areas Act, 1975 and Rules made thereunder are duly complied with.

c) That the demarcation plan of the colony area is submitted before starting the development works in the colony for approval of the zoning plan.

d) The EDC rates are under review and are likely to be finalised shortly. The difference in rates shall be payable alongwith 18% interest per annum from the date of grant of licence. The coloniser shall also submit further 25% bank guarantee of additional amount of EDC.

e) The density of population shall not exceed 250 PPA and ground coverage shall be limited to 25% in the Group Housing area. Special care to maintain the green character of the area and accordingly sufficient provisions for greenary, trees and open green spaces shall be made.

f) The Commercial area shall not exceed 6.5 % of the net planned area of the group housing area. Besides this, an additional area of 1% of the net planned Group Housing area shall be allowed for cultural, recreational and amusement activities, which do not have a predominently commercial

DTCP (HR)

content like cultural centre, art musuem, ice skating rink and other such items to be decided by the Director, Town and Country Planning, Haryana Commercial area in the plotted area shall be governed by the existing provisions in this regard.

g) One of the 18 meters wide internal road would be connected to the 30 meters wide proposed road along the foot-hills in Sector 42 and 26 A.

h) Policy decisions taken by the Govt. regarding provision of Fire Protection measures in the buildings shall be abided by.

4. That the portion of Sector/Master plan road which shall form part of the licenced area, shall be transferred free of cost to the Government in accordance with Section 3(3) (a) (iii) of the Haryana Development and Regulation of Urban Areas Act, 1975.

5. The licence for the Group Housing Area is valid upto 26-12-2000 and for plotted area upto 26-12-1997 .

Dated 29-12-1995

(R.S. GUJRAL)
Director,
Town and Country Planning,
Haryana, Chandigarh.

Endst. No. 5DP-95/ 15831 Dated: 29-12-95

A copy alongwith a copy of schedule of land is forwarded to the following for information and necessary action:-

1. M/s Vikalpa Agro Industries (P) Ltd. DLF Centre Sansad Marg New Delhi, alongwith a copy of agreement.
2. Chief Administrator, HUDA, Panchkula;
3. Addl. Director, Urban Estates, Haryana Panchkula;
4. Chief Engineer, HUDA, Manimajra;
5. Superintending Engineer, HUDA, Gurgaon alongwith copy of agreement.
6. Land Acquisition Officer, Gurgaon;
7. Senior Town Planner, Gurgaon;
8. Senior Town Planner (Enforcement), Panchkula;
9. District Town Planner, Gurgaon; and
10. Accounts Officer, O/O D.T.C.P. Haryana, Chandigarh alongwith copy of agreement.

District Town Planner (Hq) M,
for Director, Town and Country Planning,
Haryana, Chandigarh

To be read with Licence No 131 of 1995

DETAILS OF LAND OF M/S VIKALPA AGRO INDUSTRIES PVT LTD

LAND AT VILLAGE	KHASRA NOS.		AREA BIGHA-BISWA-BISWANSI
WAZIRABAD	2051		3 - 16 - 00
	2052/1		0 - 09 - 00
	2102	2-18	
	2103	2-3	
	2052/2	3-3	
	2053/1	0-7	
		8-11	
	1/5 share		1 - 14 - 00
	2032/4		0 - 04 - 00
	2033/2		0 - 13 - 16
	2035/3		0 - 17 - 10
	2044/4		1 - 05 - 11
	2043/6		0 - 03 - 06
	2046/1		1 - 13 - 00
	2047/1		1 - 19 - 03
	2037/4		0 - 12 - 10
	2038/6		1 - 05 - 10
	2050/2		2 - 13 - 18
	273		1 - 10 - 00
	Total :		18 - 17 - 04
	or say :		11.787 Acres

DIRECTOR
Town & Country Planning
Haryana, Chandigarh

129/95

FORM LC - V
(See Rule 12)
HARYANA GOVERNMENT
TOWN AND COUNTRY PLANNING DEPARTMENT

Licence No. 129 of 1995.

1. This licence has been granted under the Haryana Development and Regulation of Urban Areas Act, 1975 and the Rules made thereunder to M/s Pracheen Krishi Udyog Ltd., DLF Centre Sansad Marg New Delhi,, for setting up of a group housing plotted colony at village Wazirabad District Gurgaon.

2. The particulars of land wherein the aforesaid colony is to be set up are given in the schedule annexed hereto and duly signed by the Director, Town and Country Planning, Haryana.

3. The licence is granted subject to the conditions:-

a) That the group housing plotted colony is laid out to conform to the approved layout plan and development works are executed according to the designs and specifications shown in the approved plan.

b) That the conditions of the agreements already executed are duly fulfilled and the provisions of Haryana Development and Regulation of Urban Areas Act, 1975 and Rules made thereunder are duly complied with.

c) That the demarcation plan of the colony area is submitted before starting the development works in the colony for approval of the zoning plan.

d) The EDC rates are under review and are likely to be finalised shortly. The difference in rates shall be payable alongwith 18% interest per annum from the date of grant of licence. The coloniser shall also submit further 25% bank guarantee of additional amount of EDC.

e) The density of population shall not exceed 250 PPA and ground coverage shall be limited to 25% in the Group Housing area. Special care to maintain the green character of the area and accordingly sufficient provisions for greenary, trees and open green spaces shall be made.

f) The Commercial area shall not exceed 6.5 % of the net planned area of the group housing area. Besides this, an additional area of 1% of the net planned Group Housing area shall be allowed for cultural, recreational and amusement activities, which do not have a predominently commercial

DTCP (HR)

content like cultural centre, art musuem, ice skating rink and other such items to be decided by the Director, Town and Country Planning, Haryana Commercial area in the plotted area shall be governed by the existing provisions in this regard.

g) One of the 18 meters wide internal road would be connected to the 30 meters wide proposed road along the foot-hills in Sector 42 and 26 A.

h) Policy decisions taken by the Govt. regarding provision of Fire Protection measures in the buildings shall be abided by.

4. That the portion of Sector/Master plan road which shall form part of the licenced area, shall be transferred free of cost to the Government in accordance with Section 3(3) (a) (iii) of the Haryana Development and Regulation of Urban Areas Act, 1975.

5. The licence for the Group Housing Area is valid upto 28.12.2002 and for plotted area upto 28.12.1997.

Dated: 29.12.1995

(R.S. GUJRAL)
Director,
Town and Country Planning,
Haryana, Chandigarh.

Endst. No. 5DP-95/ 15781 Dated: 30.12.95

A copy alongwith a copy of schedule of land is forwarded to the following for information and necessary action:-

1. M/s Pracheen Krishi Udyog Ltd. DLF Centre Sansad Marg New Delhi, alongwith a copy of agreement.
2. Chief Administrator, HUDA, Panchkula;
3. Addl. Director, Urban Estates, Haryana Panchkula;
4. Chief Engineer, HUDA, Manimajra;
5. Superintending Engineer, HUDA, Gurgaon alongwith copy of agreement.
6. Land Acquisition Officer, Gurgaon;
7. Senior Town Planner, Gurgaon;
8. Senior Town Planner (Enforcement), Panchkula;
9. District Town Planner, Gurgaon; and
10. Accounts Officer, O/O D.T.C.P. Haryana, Chandigarh alongwith copy of agreement.

District Town Planner (Hq) M,
for Director, Town and Country Planning,
Haryana, Chandigarh

To be read with Licence No 129 of 1995

DETAILS OF LAND OF M/S PRACHEEN KRISHI UDYOG LIMITED

LAND AT VILLAGE	KHASRA NOS.		AREA BIGHA-BISWA-BISWANSI
WAZIRABAD	2003/1		6 - 0
	2026/1		0 - 15
	2085	3-16	
	2088	1-0	
	2090	1-01	
	2092	0-10	
	2094	1-07	
	2095	1-03	
	2098	0-11	
	2100	2-04	
	2087	1-14	
		13-06	
	1/75 share		0 - 3 - 10
	2047/2		1 - 11 - 17
	2046/2		1 - 06 - 07
	2048		3 - 07 - 00
	2049		4 - 04 - 00
	2013		0 - 17 - 00
	2014		1 - 01 - 00
	2015		1 - 11 - 00
	2016		1 - 19 - 00
	2020		0 - 17 - 00
	2021		1 - 0 - 0
	2019/1		1 - 03 - 10
	2022/1/1		2 - 09 - 00
	2059/1/1		0 - 9 - 2
	2059/1/3		1 - 0 - 9
	2099/2		0 - 2 - 2
	2305/2		0 - 4 - 17
	334/1		0 - 2

Total Area Purchased [illegible] Share [illegible] Associate Companies

DTCP (HR)

DIRECTOR
Town & Country Planning
Haryana, Chandigarh

LIC. No. 129 of 1995

2

334/2	
335	1-6
336	1-9
337	1-12
342	2-3
343/1	0-9
344/2	0-9
	0-19
	8-7

600/3343 share 1 - 10 - 00

Total : 31 - 13 - 14

or say : 19.803 Acres

Total Area Purchased balance
Share Owned by Other
Associate Companies

DIRECTOR
Town & Country Planning
Haryana, Chandigarh

FORM LC-V
(See Rule 12)
HARYANA GOVERNMENT
TOWN AND COUNTRY PLANNING DEPARTMENT

Licence No. 52 of 1996.

1. This licence has been granted under the Haryana Development & Regulation of Urban Areas Act, 1975 & the Rules made thereunder to M/s. Sunrise Land & Housing Co. Ltd., DLF Centre Sansad Marg, New Delhi for setting up of a group housing colony at village Wazirabad, District Gurgaon.
2. The particulars of land wherein the aforesaid colony is to be set up are given in the Schedule annexed hereto and duly signed by the Director, Town and Country Planning, Haryana.
3. The licence is granted subject to the conditions :-
   a) That the group housing/plotted colony is laid out to conform to the approved layout plan and development works are executed according to the designs and specifications shown in the approved plan.
   b) That the conditions of the agreements already executed are duly fulfilled and the provisions of Haryana Development and Regulation of Urban Areas Act, 1975 and Rules made thereunder are duly complied with.
   c) That the demarcation plan of the colony area is submitted before starting the development works in the colony and for approval of the zoning plan.
   d) The density of population shall not exceed 250 PPA and ground coverage shall be limited to 25% in the Group Housing area. Special care to maintain the green character of the area and accordingly sufficient provisions for greenary, trees and open green spaces shall be made.
   e) The Commercial area shall not exceed 6.5% of the net planned area of the group housing area. Besides this, an additional area of 1% of the net planned Group Housing area shall be allowed for cultural, recreational and amusement activities, which do not have a predominently commercial content like cultural centre, art musuem, ice skating rink and other such items to be decided by the Director, Town and County Planning, Haryana. Commercial area in the plotted area shall be governed by the existing provisions in this regard.
   f) One of the 18 meters wide internal road would be connected to the 30 meters wide proposed road along the foot-hills in Sector 42 and 26 A.
   g) Policy decisions taken by the Govt. regarding provision of Fire Protection measures in the multi storeyed buildings shall be abided by.
   h) The alignment/reservation along the creeks/carrier channel shall be maintained as per requirements of Irrigation/Drainage Deptt. Haryana and as approved by Director, Town and Country Planning, Haryana.
   i) Adequate access to all unlicenced pockets situated within the licenced colony shall be provided in the detailed layout plan of the group housing area.
   j) The layout plan will be got approved of the entire area as one scheme within a period of six months from the date of last approval i.e. 29.12.95.
   k) Community buildings in this area will be constructed within three years from the date of grant of licence.
4. That the portion of Sector/master plan road which shall form part of the licenced area, shall be transferred free of cost to the Government in accordance with Section 3(3) (a) (iii) of the Haryana Development and Regulation of Urban Areas Act, 1975.
5. This licence for the Group Housing Area is valid upto 15-4-2001.

Dated Chandigarh
the 16.4.96.

(R.S. GUJRAL)
DIRECTOR, Town & Country Planning,
Haryana, Chandigarh.

Endst. No.5DP-96/ 5671
Dated : 17-4-96

A copy alongwith a copy of schedule of land is forwarded to the following for information and necessary action :-

1. M/s. Sunrise Land & Housing Co. Ltd., DLF Centre Sansad Marg, New Delhi, alongwith a copy of agreement.
2. Chief Administrator, HUDA, Panchkula;
3. Addl. Director, Urban Estates, Haryana, Panchkula;
4. Chief Engineer, HUDA, Manimajra;
5. Superintending Engineer, HUDA, Gurgaon alongwith copy of agreement.
6. Land Acquisition Officer, Gurgaon;
7. Senior Town Planner, Gurgaon;
8. Senior Town Planner (Enforcement), Panchkula;
9. District Town Planner, Gurgaon; and
10. Accounts Officer, O/O D.T.C.P. Haryana, Chandigarh alongwith copy of agreement.

District Town Planner (Hq) M,
for DIRECTOR, Town & Country Planning,
Haryana, Chandigarh.

Converted with licence no 52/96

DETAILS OF LAND OF M?S SUNRISE LAND & HOUSING CO LTD

Land at village	Kh ra Nos.	Bigha-Biswa-Biswansi		
Wazirabad	2038/1	0	6	10
	2041/1	1	7	0
	2039/3 Min	0	3	0
	2040	1	2	0
	Total	2	18	10
	2/3 Share	1	19	0
	2042/2	2	8	3
	2043/1	0	6	18
	2043/3	0	4	18
	2044/1	0	0	19
	2045/1	0	6	0
	Total	3	6	18
	1/3 Share	1	2	6
	2036/2	0	6	2
	2037/3	0	18	18
	2038/5	1	08	15
	2035/1	0	18	10
	2042/4	0	2	16
	2043/5	0	4	19
	Total	4	0	0
	1/3rd Share	1	6	13
	2037/1	0	2	12
	2038/3	0	3	2
	2042/3	0	1	16
	2043/4	0	1	6
	2044/3	0	1	10
	Total	0	10	6
	1/3 Share	0	3	9
	2046/1/2	1	2	14
	2045/2	1	4	0
	2043/2	0	17	13
	Total	3	4	07
	1/3 Share	1	1	9
	Total	5	12	17
	Or Say :	3.526 Acres		

Total Area Purchased Balance Share Owned by Other Associate Companies Sd.

DIRECTOR

FORM LC-V.

(See Rule 12)

HARYANA GOVERNMENT

TOWN AND COUNTRY PLANNING DEPARTMENT

Licence No. 55 of 1996.

1. This licence has been granted under the Haryana Development & Regulation of Urban Areas Act, 1975 & the Rules made thereunder to M/s. D.L.F. Universal Ltd., DLF Centre Sansad Marg, New Delhi for setting up of a group housing colony at village Wazirabad, District Gurgaon.

2. The particulars of land wherein the aforesaid colony is to be set up are given in the Schedule annexed hereto and duly signed by the Director, Town and Country Planning, Haryana.

3. The licencee is granted subject to the conditions :-

   a) That the group housing/plotted colony is laid out to conform to the approved layout plan and development works are executed according to the designs and specifications shown in the approved plan.

   b) That the conditions of the agreements already executed are duly fulfilled and the provisions of Haryana Development and Regulation of Urban Areas Act, 1975 and Rules made thereunder are duly complied with.

   c) That the demarcation plan of the colony area is submitted before starting the development works in the colony and for approval of the zoning plan.

   d) The density of population shall not exceed 250 PPA and ground coverage shall be limited to 25% in the Group Housing area. Special care to maintain the green character of the area and accordingly sufficient provisions for greenary, trees and open green spaces shall be made.

   e) The Commercial area shall not exceed 6.5% of the net planned area of the group housing area. Besides this, an additional area of 1% of the net planned Group Housing area shall be allowed for cultural, recreational and amusement activities, which do not have a predominently commercial content like cultural centre, art musuem, ice skating rink and other such items to be decided by the Director, Town and County Planning, Haryana. Commercial area in the plotted area shall be governed by the existing provisions in this regard.

   f) One of the 18 meters wide internal road would be connected to the 30 meters wide proposed road along the foot-hills in Sector 42 and 26 A.

   g) Policy decisions taken by the Govt. regarding provision of Fire Protection measures in the multi storeyed buildings shall be abided by.

   h) The alignment/reservation along the creeks/carrier channel shall be maintained as per requirements of Irrigation/Drainage Deptt. Haryana and as approved by Director, Town and Country Planning, Haryana.

   i) Adequate access to all unlicenced pockets situated within the licenced colony shall be provided in the detailed layout plan of the group housing area.

   j) The layout plan will be got approved of the entire area as one scheme within a period of six months from the date of last approval i.e. 29.12.95.

   k) Community buildings in the area will be constructed within three years from the date of grant of licence.

4. That the portion of Sector/master plan road which shall form part of the licenced area, shall be transferred free of cost to the Government in accordance with Section 3(3) (a) (iii) of the Haryana Development and Regulation of Urban Areas Act, 1975.

5. This licence for the Group Housing Area is valid upto 15-4-2001.

Dated Chandigarh
the 18-4-96.

(R.S. GUJRAL)
DIRECTOR, Town & Country Planning,
Haryana, Chandigarh.

Endst. No.SDP-96/ 5531

Dated : 17.4.96

A copy alongwith a copy of schedule of land is forwarded to the following for information and necessary action :-

1. M/s. D.L.F. Universal Ltd., DLF Centre Sansad Marg, New Delhi, alongwith a copy of agreement.
2. Chief Administrator, HUDA, Panchkula;
3. Addl. Director, Urban Estates, Haryana, Panchkula;
4. Chief Engineer, HUDA, Manimajra;
5. Superintending Engineer, HUDA, Gurgaon alongwith copy of agreement.
6. Land Acquisition Officer, Gurgaon;
7. Senior Town Planner, Gurgaon;
8. Senior Town Planner (Enforcement), Panchkula;
9. District Town Planner, Gurgaon; and
10. Accounts Officer, O/O D.T.C.P. Haryana, Chandigarh alongwith copy of agreement.

District Town Planner (Hq) M,
for DIRECTOR, Town & Country Planning,
Haryana, Chandigarh.

DETAILS OF LAND OF M/S DLF UNIVERSAL LTD

Land at village	Khasra Nos.	Bigha	Biswa	Biswansi
Wazirabad	2042/2	2	8	3
	2043/1	0	6	18
	2043/3	0	4	18
	2044/1	0	0	19
	2045/1	0	6	0
	Total	3	6	18
	1/2 Share	1	13	9
	2046/1/2	1	2	14
	2045/2	1	4	0
	2043/2	0	17	13
	Total	3	4	7
	1/3 Share	1	1	9
	2037/1	0	2	12
	2038/3	0	3	2
	2042/2	0	1	16
	2043/4	0	1	6
	2044/3	0	1	10
	Total	0	10	6
	1/6 Share	0	1	14
		2	16	12

Or Say : 1.768 Acres

DIRECTOR

Haryana, Chandigarh.

FORM LC-V
(See Rule 12)
HARYANA GOVERNMENT
TOWN AND COUNTRY PLANNING DEPARTMENT

Licence No. 53 of 1996.

1. This licence has been granted under the Haryana Development & Regulation of Urban Areas Act, 1975 & the Rules made thereunder to M/ Moonlight Builders & Promotors Ltd., DLF Centre Sansad Marg, New Delhi for setting up of a group housing colony at village Wazirabad, District Gurgaon.

2. The particulars of land wherein the aforesaid colony is to be set up are given in the Schedule annexed hereto and duly signed by the Director, Town and Country Planning, Haryana.

3. The licence is granted subject to the conditions :-

   a) That the group housing/plotted colony is laid out to conform to the approved layout plan and development works are executed according to the designs and specifications shown in the approved plan.

   b) That the conditions of the agreements already executed are duly fulfilled and the provisions of Haryana Development *and Regulation of Urban Areas Act, 1975 and Rules made thereunder are duly complied with.*

   c) That the demarcation plan of the colony area is submitted before starting the development works in the colony and for approval of the zoning plan.

   d) The density of population shall not exceed 250 PPA and ground coverage shall be limited to 25% in the Group Housing area. Special care to maintain the green character of the area and accordingly sufficient provisions for greenary, trees and open green spaces shall be made.

   e) The Commercial area shall not exceed 6.5% of the net planned area of the group housing area. Besides this, an additional area of 1% of the net planned Group Housing area shall be allowed for cultural, recreational and amusement activities, which do not have a predominently commercial content like cultural centre, art musuem, ice skating rink and other such items to be decided by the Director, Town and County Planning, Haryana. Commercial area in the plotted area shall be governed by the existing provisions in this regard.

   f) One of the 18 meters wide internal road would be connected to the 30 meters wide proposed road along the foot-hills in Sector 42 and 26 A.

   g) Policy decisions taken by the Govt. regarding provision of Fire Protection measures in the multi storeyed buildings shall be abided by.

   h) The alignment/reservation along the creek/carrier channel shall be maintained as per requirements of Irrigation/Drainage Deptt. Haryana and as approved by Director, Town and Country Planning, Haryana.

   i) Adequate access to all unlicenced pockets situated within the licenced colony shall be provided in the detailed layout plan of the group housing area.

   j) The layout plan will be got approved of the entire area as one scheme within a period of six months from the date of last approval i.e. 29.12.95.

   k) Community buildings in this area will be constructed within three years from the date of grant of licence.

4. That the portion of Sector/master plan road which shall form part of the licenced area, shall be transferred free of cost to the Government in accordance with Section 3(3) (a) (iii) of the Haryana Development and Regulation of Urban Areas Act, 1975.

5. This licence for the Group Housing Area is valid upto 15-4-2001.

Dated Chandigarh
the 16-4-96

(R.S. GUJRAL)
DIRECTOR, Town & Country Planning,
Haryana, Chandigarh.

Endst. No.SDP-96/ 5651

Dated: 17-4-96

A copy alongwith a copy of schedule of land is forwarded to the following for information and necessary action :-

1. M/s. Moonlight Builders & Promotors Ltd., DLF Centre Sansad Marg, New Delhi, alongwith a copy of agreement.
2. Chief Administrator, HUDA, Panchkula;
3. Addl. Director, Urban Estates, Haryana, Panchkula;
4. Chief Engineer, HUDA, Manimajra;
5. Superintending Engineer, HUDA, Gurgaon alongwith copy of agreement.
6. Land Acquisition Officer, Gurgaon;
7. Senior Town Planner, Gurgaon;
8. Senior Town Planner (Enforcement), Panchkula;
9. District Town Planner, Gurgaon; and
10. Accounts Officer (O/O D.T.C.P. Haryana, Chandigarh alongwith copy of agreement.

District Town Planner (Hq) M,
for DIRECTOR, Town & Country Planning,
Haryana, Chandigarh.

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To be read with licence No. 53 of 96-

DETAILS OF LAND OF M/S MOONLIGHT BUILDERS & ~~DEVELOPERS~~ Promotors LTD

LAND AT VILLAGE	KHASRA NOS.	BIGH-BISWAS-BISWANSI		
Wazirabad	2038/2	0	8	8
	2041/2	1	13	0
	2042/1	1	6	5
		3	7	13
	1/3 Share	1	2	11
	2046/1/2	1	2	14
	2045/2	1	4	0
	2043/2	0	17	13
		3	4	7
	1/3 Share	1	1	9
	Total	2	4	0
	Or Say :	1.375 Acres		

Total Area Purchased Balance Owned By Other Associate Companies

andigarh

V

FORM LC-V
(See Rule 12)
HARYANA GOVERNMENT
TOWN AND COUNTRY PLANNING DEPARTMENT

Licence No 2 of 2002

1. This licence has been granted under the Haryana Development & Regulation of Urban Areas Act, 1975 & the Rules made thereunder to M/s Aravali Cultivation Limited, DLF Centre, Sansad Marg, New Delhi, for setting up of a Group Housing/Plotted colony at village Wazirabad, District Gurgaon.

2. The particulars of land wherein the aforesaid colony is to be set up are given in the Schedule annexed hereto and duly signed by the Director, Town & Country Planning, Haryana.

3. The licence is granted subject to the conditions :-

   a) That the group housing/plotted colony is laid out to conform to the approved layout plan and development works are executed according to the designs and specifications shown in the approved plan.

   b) That the conditions of the agreement already executed are duly fulfilled and the provisions of Haryana Development & Regulation of Urban Areas Act, 1975 & the Rules made thereunder are duly complied with.

   c) That the demarcation plan of the colony area is submitted before starting the development works in the colony and for approval of the zoning plan.

   d) The density of population shall not exceed 250 PPA and ground coverage shall be limited to 25% in the Group Housing area. Special care to maintain the green character of the area and accordingly sufficient provisions for greenery, tress and open green spaces shall be made.

   e) The Commercial area shall not exceed 6.5% of the net planned area of the group housing area. Besides this, an additional area of 1% of the net planned Group Housing area shall be allowed for cultural, recreational and amusement activities, which do not have a predominantly commercial content like cultural centre, art museum, ice skating rink and other such items to be decided by the Director, Town & Country Planning, Haryana. Commercial area in the plotted area shall be governed by the existing provisions in this regard.

   f) The 18 meters wide road coming from the Group Housing pocket shall be extended upto the boundary of *additional licenced area as shown in the layout plan to improve the circulation.*

   g) Policy decisions taken by the Govt. regarding provision of Fire Protection measures in the multi-storeyed buildings shall be abided by.

   h) The alignment/reservation along the creeks/carrier channel shall be maintained as per requirements of Irrigation/Drainage Deptt. Haryana and as approved by Director, Town & Country Planning, Haryana.

   i) Adequate access to all unlicenced pockets situated within the licenced colony shall be provided in the detailed layout plan of the group housing area.

   j) The layout plan will be got approved of the Group Housing scheme alongwith the Service Plans/Estimates within a period of sixty days from the date of grant of licence.

   k) Community buildings in this area will be constructed within three years from the date of grant of licence.

4. That the portion of Sector/Master Plan road which shall form part of the licenced area, shall be transferred free of cost to the Government in accordance with Section 3(3)(a)(iii) of the Haryana Development & Regulation of Urban Areas Act, 1975.

5. This licence is valid upto 24-1-2004

Dated Chandigarh
the 25-1-2002

(N C WADHWA)
DIRECTOR, Town & Country Planning
Haryana, Chandigarh

Endst.No.5DP(III)-2002/ 1885 Dated : 30-1-02

A copy alongwith a copy of schedule of land is forwarded to the following for information and necessary action :-

1. M/s Aravali Cultivation Limited, DLF Centre, Sansad Marg, New Delhi-110001.
2. Chief Administrator, HUDA, Panchkula;
3. Addl. Director, Urban Estate, Haryana, Panchkula;
4. Chief Engineer, HUDA, Panchkula;
5. Superintending Engineer, HUDA, Gurgaon alongwith copy of agreement.
6. Land Acquisition Officer, Gurgaon.
7. Senior Town Planner, Gurgaon.
8. Senior Town Planner (Enforcement), Panchkula;
9. District Town Planner, Gurgaon; and
10. Accounts Officer, O/O DTCP, Haryana, Chandigarh alongwith copy of agreement.

District Town Planner(HQ)MS
For Director, Town & Country Planning
Haryana, Chandigarh

DA/As above

To be read with Licence No. 2 of 2001

DETAILS OF LAND OF M/S ARAVALI CULTIVATIONS LIMITED AT VILLAGE WAZIRABAD, DISTT GURGAON

Land at village	Khasra Nos.	Area B-B-B	Share	Area Taken B-B-B
Wazirabad	2455/1	2-12-12		
	2456	0-14-0		
		3-6-12	21/36 share	1-18-17
	343/1	1-8-0	2/3 share	0-18-13
	2315/3	0-0-08		
	2316/3	0-0-16	—	0-1-04
		0-1-4		
	2315/4	0-1-08		
	2316/4	0-2-16		
		0-4-04	1/3 share	0-1-08
	2007/2	3-0-15		
	2050/1	1-7-10		
		4-8-05	1/3 share	1-9-09
	1993	2-4-0		
	2008	2-1-0		
	2006/2	0-1-0		
		4-6-0	1/5 share	0-17-4
			Total :	5-6-15
			Or say :	3.336 acres

Total Area [illegible] Balance
Share [illegible] the
Associate Companies

Director
Town and Country Planning.
Haryana, Chandigarh.

FORM LC-V
(See Rule 12)
HARYANA GOVERNMENT
TOWN AND COUNTRY PLANNING DEPARTMENT

Licence No. 6 of 2002

This licence has been granted under the Haryana Development & Regulation of Urban Areas Act, 1975 & the Rules made thereunder to M/s Madhur Cultivations Limited, DLF Centre, Sansad Marg, New Delhi, for setting up of a Group Housing/Plotted colony at village Wazirabad, District Gurgaon.

2 The particulars of land wherein the aforesaid colony is to be set up are given in the Schedule annexed hereto and duly signed by the Director, Town & Country Planning, Haryana.

3 The licence is granted subject to the conditions :-

a) That the group housing/plotted colony is laid out to conform to the approved layout plan and development works are executed according to the designs and specifications shown in the approved plan.

b) That the conditions of the agreement already executed are duly fulfilled and the provisions of Haryana Development & Regulation of Urban Areas Act, 1975 & the Rules made thereunder are duly complied with.

c) That the demarcation plan of the colony area is submitted before starting the development works in the colony and for approval of the zoning plan.

d) The density of population shall not exceed 250 PPA and ground coverage shall be limited to 25% in the Group Housing area. Special care to maintain the green character of the area and accordingly sufficient provisions for greenery, tress and open green spaces shall be made.

e) The Commercial area shall not exceed 6.5% of the net planned area of the group housing area. Besides this, an additional area of 1% of the net planned Group Housing area shall be allowed for cultural, recreational and amusement activities, which do not have a predominantly commercial content like cultural centre, art museum, ice skating rink and other such items to be decided by the Director, Town & Country Planning, Haryana. Commercial area in the plotted area shall be governed by the existing provisions in this regard.

f) The 18 meters wide road coming from the Group Housing pocket shall be extended upto the boundary of additional licenced area as shown in the layout plan to improve the circulation.

g) Policy decisions taken by the Govt. regarding provision of Fire Protection measures in the multi-storeyed buildings shall be abided by.

h) The alignment/reservation along the creeks/carrier channel shall be maintained as per requirements of Irrigation/Drainage Deptt. Haryana and as approved by Director, Town & Country Planning, Haryana.

i) Adequate access to all unlicenced pockets situated within the licenced colony shall be provided in the detailed layout plan of the group housing area.

j) The layout plan will be got approved of the Group Housing scheme alongwith the Service Plans/Estimates within a period of sixty days from the date of grant of licence.

k) Community buildings in this area will be constructed within three years from the date of grant of licence.

4 That the portion of Sector/Master Plan road which shall form part of the licenced area, shall be transferred free of cost to the Government in accordance with Section 3(3)(a)(iii) of the Haryana Development & Regulation of Urban Areas Act, 1975.

5 This licence is valid upto 24-1-2004

Dated Chandigarh
the 25-1-2002

(N C WADHWA)
DIRECTOR, Town & Country Planning
Haryana, Chandigarh.

Endst No 5DP(III)-2001/ 1926 Dated : 30-1-02

A copy alongwith a copy of schedule of land is forwarded to the following for information and necessary action :-

1 M/s Madhur Cultivations Limited, DLF Centre, Sansad Marg, New Delhi-110001.
2 Chief Administrator, HUDA, Panchkula.
3 Addl. Director, Urban Estate, Haryana, Panchkula;
4 Chief Engineer, HUDA, Panchkula;
5 Superintending Engineer, HUDA, Gurgaon alongwith copy of agreement.
6 Land Acquisition Officer, Gurgaon.
7 Senior Town Planner, Gurgaon.
8 Senior Town Planner (Enforcement), Panchkula.
9 District Town Planner, Gurgaon, and
10 Accounts Officer, O/O DTCP, Haryana, Chandigarh alongwith copy of agreement.

District Town Planner(Hq/M...
For Director, Town & Country Planning
Haryana, Chandigarh.

6)

To be read with Licence No. 6 of 2001

DETAILS OF LAND OF M/S MADHUR CULTIVATIONS LIMITED AT VILLAGE WAZIRABAD, DISTT GURGAON

Land at village	Khasra Nos.	Area B-B-B	Share	Area Taken B-B-B
Wazirabad	2455/1	2-12-12		
	2456	0-14-0		
		6-12	5/36 share	0-9-05
	2315/4	0-1-08		
	2316/4	0-2-16		
		0-4-04	1/3 share	0-1-08
	343/1	1-8-0	4/15 share	0-7-09
	2007/2	3-0-15		
	2050/1	1-7-10		
		4-8-05	1/3 share	1-9-08
	1993	2-4-0		
	2008	2-1-0		
	2006/2	0-1-0		
		4-6-0	1/5 share	0-17-4
			Total :	3-4-14
			Or say :	2.022 acres

Director,
Town and Country Planning,
Haryana, Chandigarh

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FORM LC-V
(See Rule 12)
HARYANA GOVERNMENT
TOWN AND COUNTRY PLANNING DEPARTMENT

Licence No 4 of 2001..

This licence has been granted under the Haryana Development & Regulation of Urban Areas Act, 1975 & the Rules made thereunder to M/s Pracheen Krishi Udyog Limited, DLF Centre, Sansad Marg, New Delhi, for setting up of a Group Housing/Plotted colony at village Wazirabad, District Gurgaon

2 The particulars of land wherein the aforesaid colony is to be set up are given in the Schedule annexed hereto and duly signed by the Director, Town & Country Planning, Haryana

3 The licence is granted subject to the conditions :

a) That the group housing/plotted colony is laid out to conform to the approved layout plan and development works are executed according to the designs and specifications shown in the approved plan

b) That the conditions of the agreement already executed are duly fulfilled and the provisions of Haryana Development & Regulation of Urban Areas Act, 1975 & the Rules made thereunder are duly complied with

c) That the demarcation plan of the colony area is submitted before starting the development works in the colony and for approval of the zoning plan

d) The density of population shall not exceed 250 PPA and ground coverage shall be limited to 25% in the Group Housing area. Special care to maintain the green character of the area and accordingly sufficient provisions for greenery, tress and open green spaces shall be made.

e) The Commercial area shall not exceed 6.5% of the net planned area of the group housing area. Besides this, an additional area of 1% of the net planned Group Housing area shall be allowed for cultural, recreational and amusement activities, which do not have a predominantly commercial content like cultural centre, art museum, ice skating rink and other such items to be decided by the Director, Town & Country Planning, Haryana. Commercial area in the plotted area shall be governed by the existing provisions in this regard

f) The 18 meters wide road coming from the Group Housing pocket shall be extended upto the boundary of additional licenced area as shown in the layout plan to improve the circulation.

g) Policy decisions taken by the Govt. regarding provision of Fire Protection measures in the multi-storeyed buildings shall be abided by.

h) The alignment/reservation along the creeks/carrier channel shall be maintained as per requirements of Irrigation/Drainage Deptt. Haryana and as approved by Director, Town & Country Planning, Haryana

i) Adequate access to all unlicenced pockets situated within the licenced colony shall be provided in the detailed layout plan of the group housing area

j) The layout plan will be got approved of the Group Housing scheme alongwith the Service Plans/Estimates within a period of sixty days from the date of grant of licence

k) Community buildings in this area will be constructed within three years from the date of grant of licence

4 That the portion of Sector/Master Plan road which shall form part of the licenced area, shall be transferred free of cost to the Government in accordance with Section 3(3)(a)(iii) of the Haryana Development & Regulation of Urban Areas Act, 1975

5 This licence is valid upto 24-1-2004

Dated Chandigarh
the 25-1-2002

(N C WADHWA)
DIRECTOR, Town & Country Planning
Haryana, Chandigarh

Endst No 5DP(III)-2001/ 1906 Dated 30-1-02

A copy alongwith a copy of schedule of land is forwarded to the following for information and necessary action :

1 M/s Pracheen Krishi Udyog Limited, DLF Centre, Sansad Marg, New Delhi-110001.
2 Chief Administrator, HUDA, Panchkula.
3 Addl. Director, Urban Estate, Haryana, Panchkula.
4 Chief Engineer, HUDA, Panchkula.
5 Superintending Engineer, HUDA, Gurgaon alongwith copy of agreement.
6 Land Acquisition Officer, Gurgaon.
7 Senior Town Planner, Gurgaon.
8 Senior Town Planner (Enforcement), Panchkula.
9 District Town Planner, Gurgaon, and
10 Accounts Officer, O/O DTP, Haryana, Chandigarh alongwith copy of agreement.

District Town Planner (Hq)Mo
For Director, Town & Country Planning
Haryana, Chandigarh

DA/As above

To be read with Licence No. 4 of 2001.

DETAILS OF LAND OF M/S PRACHEEN KRISHI UDYOG LIMITED
AT VILLAGE WAZIRABAD, DISTT GURGAON

Land at village	Khasra Nos.	Area B-B-B	Share	Area Taken B-B-B
Wazirabad	2455/1	2-12-12		
	2456	0-14-0		
		3-6-12	5/36 share	0-9-05
	2315/4	0-1-08		
	2316/4	0-2-16		
		0-4-04	1/3 share	0-1-08
	2007/2	3-0-15		
	2050/1	1-7-10		
		4-8-05	1/3 share	1-9-08
	1993	2-4-0		
	2008	2-1-0		
	2006/2	0-1-0		
		4-6-0	1/5 share	0-17-4
			Total :	2-17-5
			Or say :	1.789 acres

Chhote Ram

Directorate of Town & Country Planning, Haryana

Yojna Bhawan, Plot No. 3, Block-A, Sector 18 A, Madya Marg, Chandigarh,
web site: tcpharyana.gov.in
Phone: 0172-2549349; E-mail: tcpharyana7@gmail.com

Regd.

To

DLF Ltd., DLF Utilities Ltd.,
DLF Building & Service Pvt. Ltd.,

DLF Centre, Sansad Marg,
New Delhi.

Memo No. LC-LC-50/Asstt.(RK)/2020/ 6436 Dated: 11-03-2020

Subject: **Renewal of license no 110-133 of 1995 dated 29.12.1995, 134-146 of 1995 dated 30.12.1995, 8-18 of 2000 dated 08.03.200, 1-6 of 2002 dated 25.01.2002 , 40-41 of 2004 dated 31.03.2004 and 120 of 2011 dated 29.12.2011 having an area measuring 468.24 acres (384.65 + 14.40 + 44.55 + 10.31 + 0.93 + 13.40) out of total land measuring 542.6765 acres of Residential Plotted Colony/Group Housing Colony, Sector 42, 43, 53, 54, DLF City Phase-V, Gurugram Manesar Urban Complex.- DLF Ltd.**

Reference: Your application dated 13.12.2019 on the subject cited above.

1. License No. no 110-133 of 1995 dated 29.12.1995, 134-146 of 1995 dated 30.12.1995, 8-18 of 2000 dated 08.03.200, 1-6 of 2002 dated 25.01.2002 , 40-41 of 2004 dated 31.03.2004 and 120 of 2011 dated 29.12.2011 having an area measuring 468.24 acres (384.65 + 14.40 + 44.55 + 10.31 + 0.93 + 13.40) out of total land measuring 542.6765 acres of Residential Plotted Colony/Group Housing Colony, Sector 42, 43, 53, 54, DLF City Phase-V, Gurugram Manesar Urban Complex is hereby renewed for a period of five years upto the date of mentioned in the table given as under on the same terms and conditions mentioned therein:-

License No.	Date	Area	Renewed upto
110-133 of 1995	29-12-1995	384.65	28.12.2024
134-146 of 1995	30.12.1995	14.40	29.12.2024
8-18 of 2000	08.03.2000	44.55	07.03.2025
1-6 of 2002	25.01.2002	10.31	24.01.2025
40-41 of 2004	31.03.2004	0.93	30.03.2025
120 of 2011	29.12.2011	13.40	28.12.2024

2. It is further clarified that this renewal will not tantamount to certification of your satisfactory performance entitling you for renewal of license of further period.
3. The construction of community building will be completed as per provisions of section 3(3)(a)(iv) of Act of 8 of 1975.
4. The delay in allotment of EWS flats/plots, shall be got compounded in accordance with the provisions of Departmental policy dated 16.08.2013.
5. That you shall transfer the land falling in the sector road/24 m road free of cost to the Govt.

6. That you shall convey the 'Ultimate Power Load Requirement' of the project to the concerned power utility, with a copy to this office, within validity of license to enable provision of site in licensed land for Transformers/Switching Stations/Electric Sub Stations as per the norms prescribed by the power utility in the zoning plan of the project.
7. That the amendment in Rule 13 in respect of charging of renewal fees is under consideration, for which the draft notification was notified on 20.08.2019. Therefore, increased renewal fees shall be adjusted in accordance with the final notification or as decided by the Department from excess fee deposited by you.
8. That you shall abide by the decision taken in the complaints received from Sh. Haresh Thakur i.e. complainant by the Department.

The renewal of license will be void-ab-initio, if any of the conditions mentioned above are not complied with.

(K. Makrand Pandurang, IAS)
Director General,
Town & Country Planning
Haryana Chandigarh

Endst no: LC-50/Asstt.(RK)/2020/ Dated:

A copy is forwarded to following for information and further necessary action:-

1. Chief Administrator, HSVP, Panchkula.
2. Chief Engineer, HSVP, Panchkula.
3. Chief Account officer of this Directorate.
4. Senior Town Planner, Gurugram.
5. District Town Planner, Gurugram.
6. Project Manager (IT) of this Department for updation on website.

(Narender Kumar)
District Town Planner (HQ)
For: Director General, Town & Country Planning
Haryana, Chandigarh

Directorate of Town & Country Planning, Haryana

Nagar Yojana Bhawan, Plot No. 3, Block-A, Sector 18A, Madhya Marg Chandigarh;
Phone:0172-2549349; http://tcpharyana.gov.in

ADDENDUM TO THE RENEWAL ORDER

Your application dated 16.11.2020 regarding Renewal of license No. 38-53 of 1996 dated 16.04.1996, 54-59 of 1996 dated 30.04.1996, 3 of 2003 dated 30.04.2003, 6 of 2003 dated 02.05.2003 and 200 of 2007 dated 16.07.2007 for setting up of residential plotted/group housing colony on the land measuring 74.438 acres (25.977+44.215+1.146+1.767+ 1.333), Sector 42, 43, 53, 54, DLF City Phase -V, Gurugram was examined and licenses were renewed for a period of two years. However, as per notification dated 03.11.2020, the license was required to be renewed for five years that have become due during the period 31.01.2019 to 27.04.2020.

Accordingly, following amendments in the renewal order dated 02.08.2019 have been made:-

The year "2021" in the table shall be read as "2024" in the renewal order issued vide memo no. 18313 dated 02.08.2019. The validity of license is as under:-

License No.	Date	Area (in acres)	License valid upto	Renewed upto
38-53 of 1996	16.04.1996	25.977	15.04.2019	15.04.2024
54-59 of 1996	30.04.1996	44.215	29.04.2019	29.04.2024
03 of 2003	30.04.2003	1.146	29.04.2019	29.04.2024
06 of 2003	02.05.2003	1.767	01.05.2019	01.05.2024
200 of 2007	16.07.2007	1.333	15.07.2019	15.07.2024

All other condition of renewal will remain the same as mentioned in memo dated 02.08.2019.

(K. Makrand Pandurang, IAS)
Director,
Town & Country Planning
Haryana Chandigarh

Endst No:LC-50-JE(S)/2021/ 13496 Dated:- 11-06-2021

A copy is forwarded to following for information and further necessary action:-

1. DLF Ltd., DLF Utilities Ltd., DLF Building & Services Pvt. Ltd. Sh. Rajender Singh S/o Sh. Kade Ram,DLF Centre, Sansad Marg,New Delhi-110001.
2. Chief Administrator, HSVP, Panchkula.
3. Chief Engineer, HSVP, Panchkula.
4. Chief Accounts officer of this Directorate.
5. Senior Town Planner, Gurugram.
6. District Town planner, Gurugram.
7. Website Administrator with request to update the status on website.

(Lalit Kumar)
District Town Planner (HQ)
For :Director, Town & Country Planning,
Haryana, Chandigarh.

Directorate of Town & Country Planning, Haryana
Nagar Yojana Bhawan, Plot No. 3, Block-A, Sector 18A, Madhya Marg Chandigarh;
Phone:0172-2549349; http://tcpharyana.gov.in

ORDERS

Whereas, License No. 38-53 of 1996 dated 16.04.1996, 54-59 of 1996 dated 30.04.1996, 3 of 2003 dated 30.04.2003, 6 of 2003 dated 02.05.2003 and 200 of 2007 dated 16.07.2007 were granted to DLF Ltd., DLF Utilities Ltd., DLF Building & Services Pvt. Ltd., Sh. Rajender Singh S/o Sh. Kade Ram, DLF Centre, Sansad Marg, New Delhi-110001 under the provisions of Haryana Development and Regulation of Urban Areas Act, 1975. As per terms and conditions of the licenses and of the agreement executed on LC-IV, the colonizer is required to comply with the provisions of the Haryana Development and Regulation of Urban Areas Act, 1975 and its Rules, 1976.

And, whereas, for delay in compliance of the provisions of Rule 28 of the Haryana Development and Regulation of Urban Areas Rules, 1976 upto 31.03.2020. As per the rates finalized by the Govt. the composition fee has worked out as Rs. 6,000/-. The said amount has been adjusted from already excess amount of Rs. 1,58,57,421/- in license renewal fee.

Accordingly, in exercise of power conferred under Section-13(1) of the Haryana Development and Regulation of Urban Areas Act, 1975, I hereby order to compound the offence committed due to delay in compliance of above said Rules upto 31.03.2020.

(K. Makrand Pandurang, IAS)
Director,
Town & Country Planning,
Haryana, Chandigarh

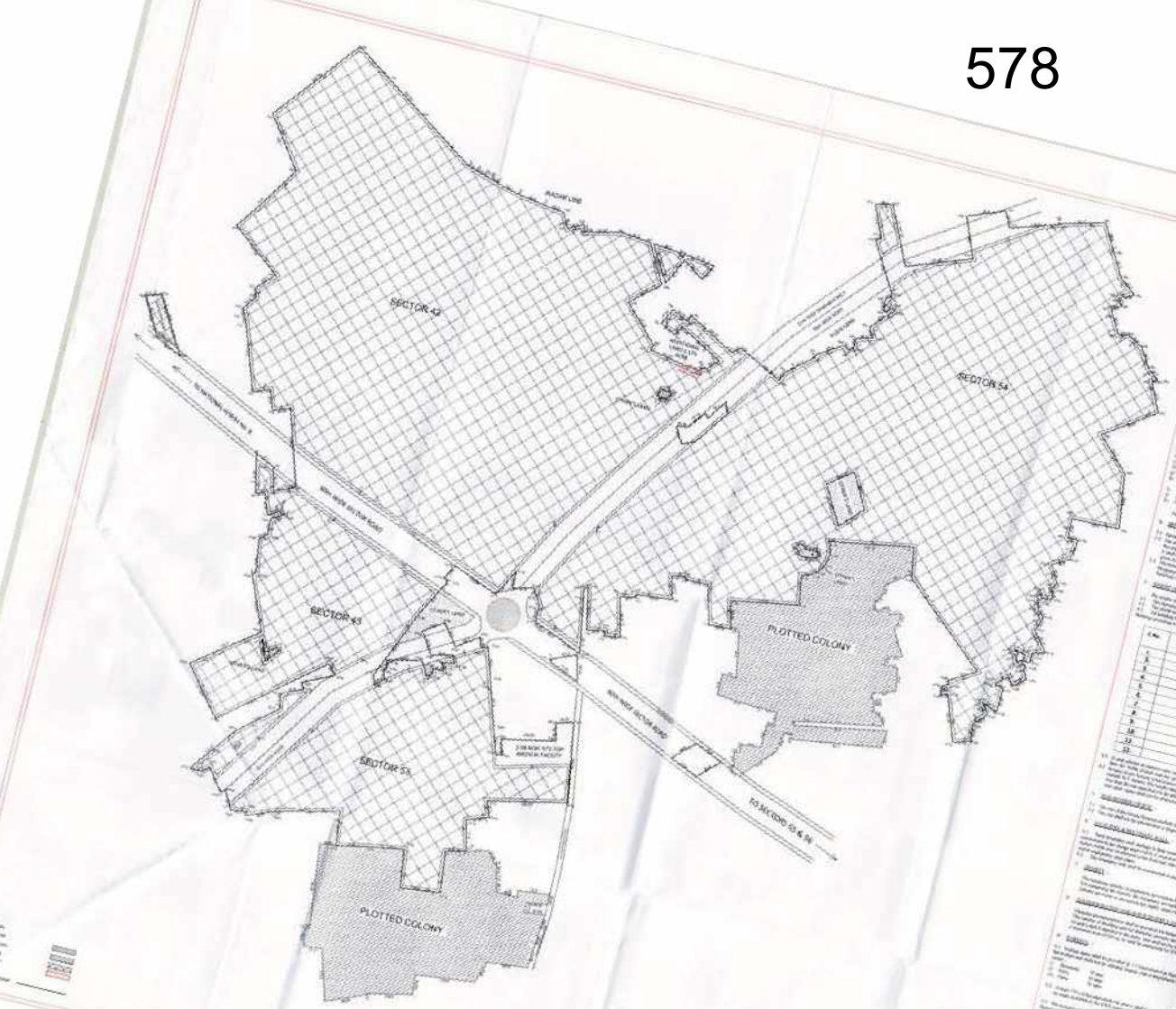
Endst. No. LC-50-JE(SJ)/2021/ 13504 Dated: 11-06-2021

A copy is forwarded to following for information and necessary action:-

1. Chief Accounts Officer, O/o Director Town and Country Planning Haryana Chandigarh with a request to adjust the excess amount.
2. DLF Ltd., DLF Utilities Ltd., DLF Building & Services Pvt. Ltd., Sh. Rajender Singh S/o Sh. Kade Ram, DLF Centre, Sansad Marg, New Delhi-110001.

(Lalit Kumar)
District Town Planner (HQ)
For: Director, Town and Country Planning,
Haryana, Chandigarh


PROPOSED GROUP HOUSING BUILDINGS IN PART OF DLF 5, SECTOR-54, GURUGRAM.
Associate Architects
RSMS ARCHITECTS
RSMS ARCHITECTS PVT. LTD.
OWNER:
DLF LIMITED
SITE PLAN
SUNKEN COURT



ZONING PLAN OF GROUP HOUSING COLONY FOR AN ADDITIONAL AREA MEASURING 0.175 ACRES (LICENSE NO.[illegible] 20[illegible]. DATED.[illegible]IN THE ALREADY LICENSED GROUP HOUSING COLONY MEASURING 476.4265 ACRES TOTALING 476.6015 ACRES IN DLF5 , FALLING IN SECTOR 42 , 43 , 53 & 54 GURUGRAM BEING DEVELOPED BY DLF LIMITED.

For purpose of Code 1.2 (xcvi) & 6.1 (1) of the Haryana Building Code, 2017, amended from time to time.

(AJIT SINGH)
JD (HQ)

(DINESH KUMAR)
SO(HQ)

ATP(HQ)

DTP(HQ)

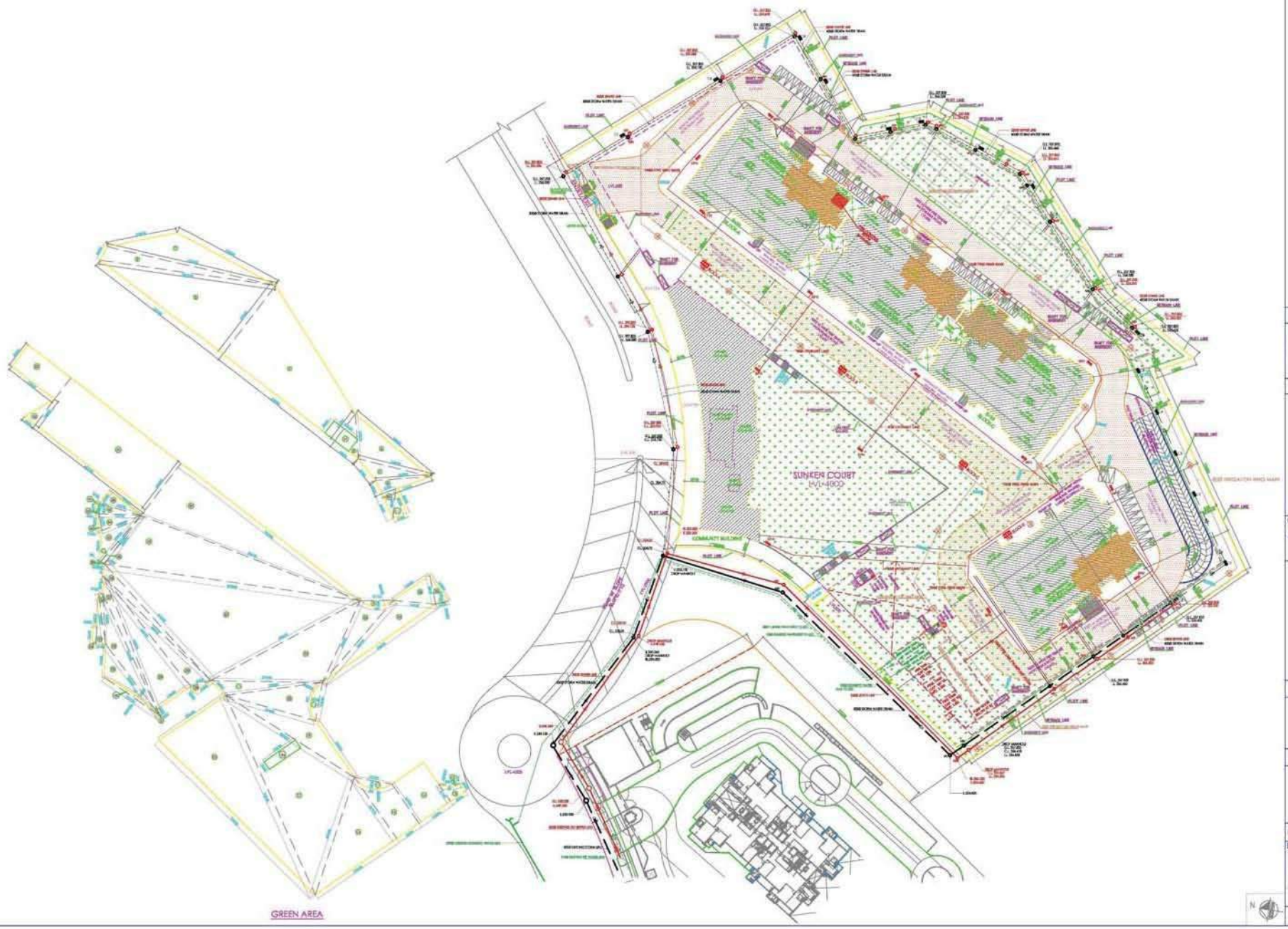
STP(HQ)

(JITENDER SIHAG)
CTP (HR)

(K. MAKRAND PANDURANG, IAS)
DTCP (HR)

Memo No. DTCP-[illegible]

Dated [illegible]



Note :-

1. BUILDING WILL BE DESIGN (STRUCTURES) AS PER RELEVENT IS CODES FOR EARTH QUAKE RESISTANCE.
2. BUILDING IS HAS AUTOMATIC SPRINKLER SYSTEM ON ALL FLOORS.

LEGEND:-

Project:

PROPOSED GROUP HOUSING BUILDINGS IN PART OF DLF 5, SECTOR-54, GURUGRAM.

Associate Architects

RSMS ARCHITECTS

RSMS ARCHITECTS PVT. LTD.
69,Nora Niwas Bhawani Kunj
(Behind D2), Vasant Kunj,
New Delhi-110070.
Tel.:011-26898616,26898617
www.rsms-arch.com

OWNER: DLF

DLF LIMITED
THE SHOPPING MALL,DLF
QUTAB ENCLAVE(PHASE-I)
GURGAON, HARYANA 122002

OWNER'S SEAL & SIGNATURE

ARCHITECT'S SEAL & SIGNATURE

FEB.-2022. | Scale : 1:400

Drawing Title:- LANDSCAPE PLAN

Drawing No:- ST-02

DLF5

1.1 Traffic Impact Analysis:

During Construction Phase

Table 1.1: no of vehicles during construction phase

S.No.	Mode of Transporation	No.of Vehicles Used/Day	PCU Factor	PCU/Day	PCU/hr
1	Tankers	5	5	25	2.5
2	Trucks	4	3.7	14.8	1.48
4	Car	10	1	10	1
5	Two-Wheelers	20	0.75	15	1.5
6	Three-wheelers	15	2	30	3
	Total	**50**		94.8	9.48

*** Construction activity time period has been taken as 10 hr. /day and on that basis above PCU/hr. calculated.**

Table 1.2: Modified Traffic Scenario and LOS during construction phase

Road	Increased PCU's- State/National highway	Increased Volume (V)	Capacity (C)	Modified V/C Ratio	LOS
NH-48	35% of 9 = 3.15	2054+3.15 = 2057.15	5400	0.381	**B**
NH-248 A	20% of 9 = 1.8	765+1.8 = 766.8	5400	0.142	**A**
NH-148A	20% of 9 = 1.8	855+1.8 = 856.8	3600	0.238	**B**
SH-15A	15% of 9 = 1.3	697+1.8 = 698.8	3600	0.194	**A**
MDR-137	10% of 9 = 0.9	603+0.9 = 603.9	3600	0.168	**A**

Table 1.3: During Operation Phase

S.No.	Mode of Transporation	No.of trips/Day	PCU Factor	PCU/Day	PCU/hr
1	Car	1615	1	1615	67.29
2	Two-Wheelers	450	0.75	337.5	14.06
3	Three-wheelers	30	2	60	2.50
	Total	**2095**		**2012.5**	**83.85**

*Probable maximum 10% traffic will be move at hourly basis on existing road (NH-8, NH-248A, NH-148A, SH-15A & MDR-137)

Table 1.4: Modified Traffic Scenario and LOS during Operation Phase

Road	Increased PCU's- State/National highway	Increased Volume (V)	Capacity (C)	Modified V/C Ratio	LOS
NH-48	35% of 84= 29.4	2054+29.4 = 2083.4	5400	0.386	**B**
NH-248 A	20% of 84 = 16.8	765+16.8 = 781.8	5400	0.145	**A**
NH-148A	20% of 84 = 16.8	855+16.8 = 871.8	3600	0.242	**B**
SH-15A	15% of 84 = 12.6	697+12.8 = 709.8	3600	0.197	**A**
MDR-137	10% of 84 = 8.4	603+8.4 = 611.4	3600	0.170	**A**

Conclusion

During Construction Phase

Not much impact on local transport during construction phase, as 50 vehicles will be required for transport of construction materials and other transportation activities. The LOS value from the project remain same i.e. LOS value for NH-248A, SH-15A and MDR-137 will remain same as Excellent, NH-48 & NH-148A will remain same as 'Very Good' So the additional load on the carrying capacity of the concern roads is not likely to have major affect.

During Operation Phase

The V/C ratio is found out to be 0.380 on NH-48, 0.142 on NH-248A, 0.237 on NH-148A, 0.194 on SH-15A and 0.167 on MDR-137 the project will result in a modified V/C ratio during construction phase to be 0.381 on NH-48, 0.142 on NH-248A, 0.238 on NH-148A, 0.194 on SH-15A and 0.168 on MDR-137, and during operation phase to 0.386 on NH-48, 0.145 on NH-248A, 0.242 on NH-148A, 0.197 on SH-15A and 0.170 on MDR-137. Thus the additional load on the carrying capacity of the concern roads is not likely to have any significant adverse effect


SPRINKLER SYSTEM
3.BUILDING IS MECHANICALLY VENTILATED & ARTIFICIALLY LIGHTED.
LEGEND:-
SUNKEN COURT
SURFACE PARKING AREA
Project:
PROPOSED GROUP HOUSING BUILDINGS IN PART OF DLF 5, SECTOR-54, GURUGRAM.
Associate Architects
RSMS ARCHITECTS
RSMS ARCHITECTS PVT. LTD.
69,Nana Niwas Bhawani Kunj (Behind D2), Vasant Kunj, New Delhi-110070.
Tel.:011-26898616,26898617
www.rsms-arch.com
OWNER:
DLF
DLF LIMITED
THE SHOPPING MALL,DLF QUTAB ENCLAVE(PHASE-I) GURGAON, HARYANA 122002
OWNER'S SEAL & SIGNATURE
ARCHITECT'S SEAL & SIGNATURE
FEB.-2022.
Scale : 1:400
Drawing Title:-
SITE PLAN

LEGEND	
1	160ø uPVC SOIL & WASTE PIPE
2	160ø uPVC KITCHEN WASTE PIPE
3	160ø uPVCANTI-SYPHONAGE PIPE
4	ø G.I COLD WATER SUPPLY DN. TAKE
5	ø G.I FLUSHING WATER SUPPLY DN. TAKE
6	65ø G.I COLD WATER SUPPLY RISER TO O.H.T.
7	40ø G.I FLUSHING WATER RISER TO O.H.T.
8	160ø uPVC RAIN WATER PIPE
8a	110ø uPVC RAIN WATER PIPE
9	110ø uPVC RAIN WATER PIPE FOR BALCONY
A	150ø MS FIRE RISER
B	80ø MS DRAIN PIPE WITH FHC
C	150ø MS SPRINKLER RISER
	C.I. SOIL AND WASTE PIPE
	C.I. RAIN WATER PIPE
COP	CLEAN-OUT PLUG
	COLD WATER SUPPLY LINE
	FLUSHING WATER SUPPLY LINE
	FIRE HYDRANT LINE

SCHEDULE OF PUMPS

SYM.	DESCRIPTION	CAP.	HEAD
F-1	ELEC.OPRATED FIRE PUMP	2850 lpm.	165 m.
F-2	ELEC.OPRATED FIRE PUMP	2850 lpm.	105 m.
F-3	DIESEL ENGINE	2850 lpm.	165 m.
F-4	DIESEL ENGINE	2850 lpm.	105 m.
F-5	JOCKEY PUMP	180 lpm.	165 m.
F-4	JOCKEY PUMP	180 lpm.	105 m.
PV	PRESSURE VESSEL		

DOOR SCHEDULE

BSD1	1250X2100	±00	+2100	PLUMBING SHAFT BASEMENT
FD	1250X2100	±00	+2100	STAIRCASE & BASEMENT SHUTTLE LIFT LOBBY DOOR (2HRS FIRE RATED)
FD1	800X1800	+300	+2100	SERVICE ROOM (2HRS FIRE RATED)
FD2	900X2300	±00	+2300	L.V. SHAFT, ELECTRICAL SHAFT DOOR (2HRS FIRE RATED)

NOTE:-

1. BUILDING WILL BE DESIGNED (STRUCTURES) AS PER RELEVENT IS CODES FOR EARTH QUAKE RESISTANCE.

2. BUILDING IS HAS AUTOMATIC SPRINKLER SYSTEM ON ALL FLOORS.

LEGEND:-

Project:

PROPOSED GROUP HOUSING BUILDINGS IN PART OF DLF 5, SECTOR-54, GURUGRAM .

Associate Architects

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ARCHITECT'S SEAL & SIGNATURE

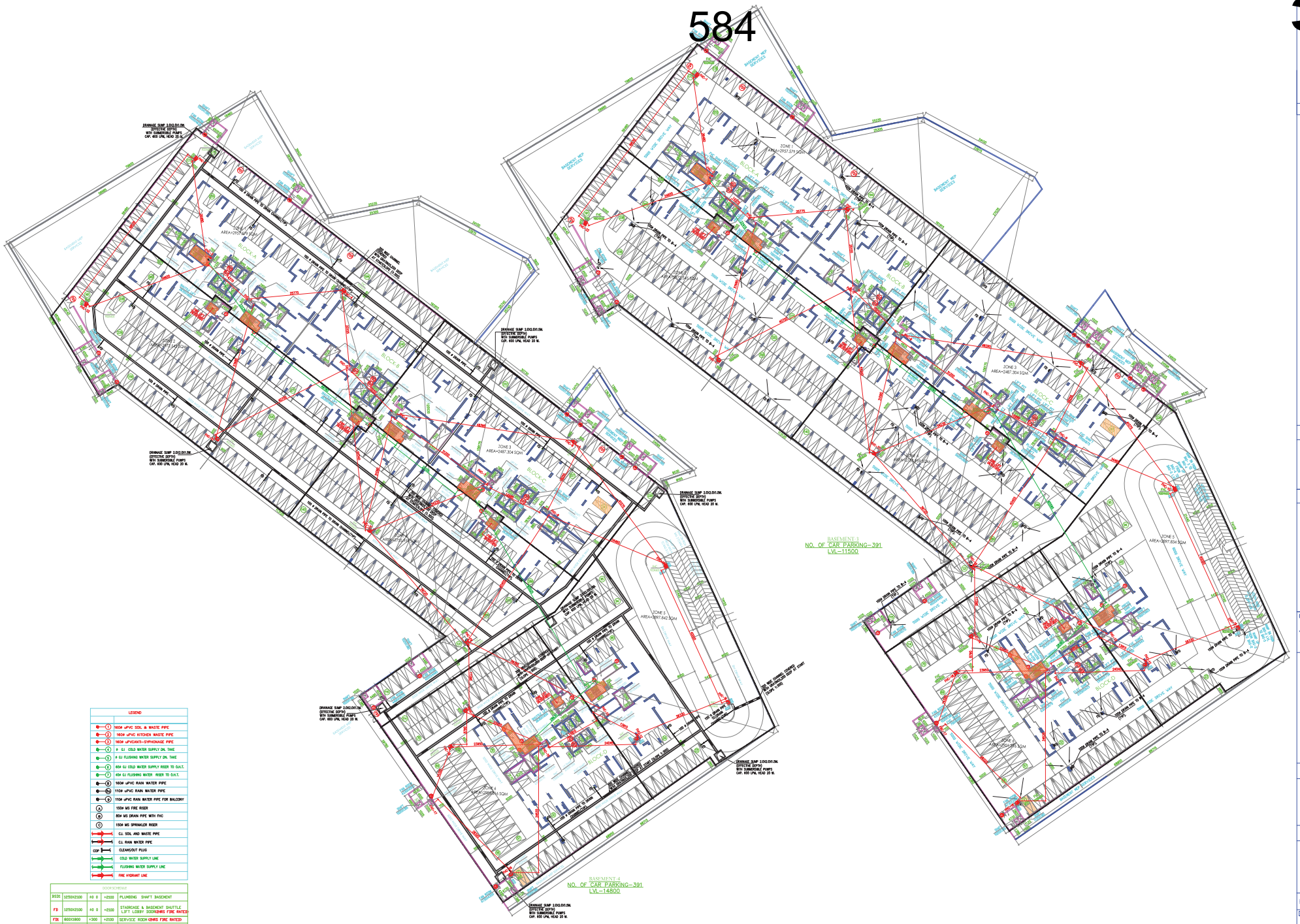
FEB.-2022. | Scale : 1:300

Drawing Title:- BASEMEN-01 & 02

Drawing No:- BS-01

584

399



Note :-

1. BUILDING IS DESIGNED AS PER RELEVENT CODES FOR EARTH QUAKE RESISTANCE.

2. BUILDING IS HAS AUTOMATIC SPRINKLER SYSTEM ON ALL FLOORS.

LEGEND:-

Project:

PROPOSED GROUP HOUSING BUILDINGS IN PART OF DLF 5, SECTOR-54, GURUGRAM.

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ARCHITECT'S SEAL & SIGNATURE

FEB.-2022. Scale : 1:100

Drawing Title:- BASEMEN-03 & 04

Drawing No:- BS-02

DLF5