ATTACHMENT-1

Ref: VCSPL/22/R-1886 **Date: 10.10.2022**

SIX MONTHLY COMPLIANCE REPORT (April-2022 to September-2022)

AMBIENT AIR QUALITY ANALYSIS REPORT

1. **Name of the project :** "Development of an Affordable Housing Project Over 20.21 Acres at Chandrasekharpur, Bhubaneswar
2. **Name of the Location : AAQ-1: Near Main Gate**

Parameters	PM_{10} $\mu g/m^3$	$PM_{2.5}$ $\mu g/m^3$	SO_2 $\mu g/m^3$	NOx $\mu g/m^3$	CO mg/m^3
April-2022	55.9	30.8	6.9	14.8	0.25
May-2022	54.1	29.4	7.3	14.5	0.29
June-2022	53.2	28.6	6.7	14.1	0.30
July-2022	52.6	29.1	6.6	14.1	0.29
August-2022	54.8	29.4	7.1	14.6	0.24
September-2022	53.1	27.1	6.8	13.9	0.26
Six Monthly Averages	54.0	29.1	6.9	14.3	0.3
Limit as per CPCB notification, New Delhi, 18th Nov, 2009. for Ambient air quality	100	60	80	80	4
Method of Measurement	Gravimetric IS 5182:P 23	Gravimetric EPA 1998	Improved West & Geake Method IS 5182 (P-2) RA 2017	Modified Jacob & Hochheiser Method IS 5182(P-6) RA 2017	Non Dispersive Infrared Method IS 5182 (P-10) 1999

Reviewed By:

Approved By:

Ref: VCSPL/22/R-1887 **Date: 10.10.2022**

SIX MONTHLY COMPLIANCE REPORT (April-2022 to September-2022)
AMBIENT AIR QUALITY ANALYSIS REPORT

1. **Name of the project :** "Development of an Affordable Housing Project Over 20.21 Acres at Chandrasekharpur, Bhubaneswar
2. **Name of the Location : AAQ-2: Near Office Site**

Parameters	PM_{10} $\mu g/m^3$	$PM_{2.5}$ $\mu g/m^3$	SO_2 $\mu g/m^3$	NOx $\mu g/m^3$	CO mg/m^3
April-2022	60.2	32.1	10.2	27.4	0.39
May-2022	61.7	33.9	10.5	23.9	0.34
June-2022	62.3	32.4	10.7	22.5	0.35
July-2022	58.5	30.6	11.1	22.1	0.31
August-2022	57.4	31.2	10.6	23.3	0.32
September-2022	59.1	32.6	11.3	24.2	0.29
Six Monthly Averages	59.9	32.1	10.7	23.9	0.30
Limit as per CPCB notification, New Delhi, 18th Nov, 2009. for Ambient air quality	100	60	80	80	4
Method of Measurement	Gravimetric IS 5182:P 23	Gravimetric EPA 1998	Improved West & Geake Method IS 5182 (P-2) RA 2017	Modified Jacob & Hochheiser Method IS 5182(P-6) RA 2017	Non Dispersive Infrared Method IS 5182 (P-10) 1999

Reviewed By:

Approved By:

Ref: VCSPL/22/R- 1888 **Date: 10.10.2022**

SIX MONTHLY COMPLIANCE REPORT (April-2022 to September-2022)
AMBIENT AIR QUALITY ANALYSIS REPORT

1. **Name of the project :** "Development of an Affordable Housing Project Over 20.21 Acres at Chandrasekharpur, Bhubaneswar
1. **Name of the Location : AAQ-3: Near Construction Site**

Parameters	PM_{10} $\mu g/m^3$	$PM_{2.5}$ $\mu g/m^3$	SO_2 $\mu g/m^3$	NOx $\mu g/m^3$	CO mg/m^3
April-2022	59.6	31.9	10.1	28.5	0.39
May-2022	61.2	32.5	10.9	25.1	0.36
June-2022	60.7	32.5	10.6	23.2	0.35
July-2022	58.6	31.2	11.1	23.1	0.31
August-2022	57.2	30.9	10.8	24.2	0.32
September-2022	58.3	32.1	11.3	22.8	0.29
Six Monthly Averages	59.3	31.9	10.8	24.5	0.30
Limit as per CPCB notification, New Delhi, 18th Nov, 2009. for Ambient air quality	100	60	80	80	4
Method of Measurement	Gravimetric IS 5182:P 23	Gravimetric EPA 1998	Improved West & Geake Method IS 5182 (P-2) RA 2017	Modified Jacob & Hochheiser Method IS 5182(P-6) RA 2017	Non Dispersive Infrared Method IS 5182 (P-10) 1999

Visiontek Consultancy Services Pvt. Ltd.

Reviewed By:

Visiontek Consultancy Services Pvt. Ltd. P. Pati BBSR

Approved By:

ATTACHMENT-II

Ref: VCSPL/22/R-1889 **Date: 10.10.2022**

SIX MONTHLY COMPLIANCE REPORT (April-2022 to September-2022)
GROUND WATER QUALITY ANALYSIS REPORT

1. **Name of the project :** "Development of an Affordable Housing Project Over 20.21 Acres at Chandrasekharpur, Bhubaneswar
2. **Sampling Location : GW1 : Bore Well Near to The Proposed project site**
3. **Sample Submitted By : VCSPL Representative**

Sl. No.	Parameter	Testing Method	Unit	Standard as per IS - 10500:2012 Amended on 2015 & 2018	Analysis Results						
					April-22	May-22	June-22	July-22	Aug-22	Sept-22	Average
Essential Characteristics											
1	Colour	Visual Comparison Method APHA 23RD Ed,2017 : 2120 B, C	Hazen	5	<5	<5	<5	<5	<5	<5	<5
2	Odour	Threshold Odour Test APHA 23RD Ed,2017 :2150 B	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	Taste	Flavor Threshold Test APHA 23RD Ed,2017 : 2160 C	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	Nephelometric Method APHA 23RD Ed,2017 :2130 B	NTU	1	<1	<1	<1	<1	<1	<1	<1
5	pH at 25°C	pH Meter APHA 23RD Ed,2017 : 4500H+ B	--	6.5-8.5	7.28	7.31	7.25	7.45	7.39	7.35	7.3
6	Total Hardness (as $CaCO_3$)	EDTA Titrimetric Method APHA 23RD Ed,2017 : 2340 C	mg/l	200	62	58	60	72	75	70	66.2
7	Iron (as Fe)	By AAS Method APHA 23RD Ed,2017 : 3111, B	mg/l	1.0	0.16	0.14	0.12	0.23	0.25	0.21	0.185
8	Chloride (as Cl)	Argentometric Method APHA 23RD Ed,2017 : 4500Cl- B	mg/l	250	28.6	26.4	30.1	34.2	32.1	34.6	31
9	Residual, free Chlorine	Iodometric Method APHA 23RD Ed,2017 : 4500Cl, B	mg/l	0.2	ND	ND	ND	ND	ND	ND	ND
Desirable Characteristics											
10	Dissolved Solids	Gravimetric Method APHA 23RD Ed,2017 : 2540 C	mg/l	500	124	116	131	146	122	138	129.5
11	Calcium (as Ca)	EDTA Titrimetric Method APHA 23RD Ed,2017 : 3500Ca B	mg/l	75	19.2	20.6	21.5	26.1	24.3	23.9	22.6
12	Magnesium (as Mg)	Calculation Method APHA 23RD Ed,2017 : 3500Mg B	mg/l	30	3.4	1.6	1.5	1.7	3.5	2.5	2.4
13	Copper (as Cu)	By AAS Method APHA 23RD Ed,2017: 3111 B	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL
14	Manganese (as Mn)	Persulfate Method APHA 23RD Ed,2017: 3500Mn B	mg/l	0.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL
15	Sulphate (as SO_4)	Turbidimetric Method APHA 23RD Ed,2017: 4500 SO_4^{2-} E	mg/l	200	2.6	3.5	3.3	4.2	3.9	4.0	3.58
16	Nitrate (as NO_3)	By UV-Screen Method APHA 23RD Ed,2017: 4500 NO_3^- E	mg/l	45	0.68	0.71	0.75	0.84	0.79	0.80	0.76

17	Fluoride (as F)	Distillation followed by Spectrophotometric Method APHA 23RD Ed,2017: 4500F⁻ C	mg/l	1.0	0.019	0.020	0.017	0.022	0.021	0.024	**0.020**
18	Phenolic Compounds (as C_6H_5OH)	Chloroform Extraction by Colorimetric Method APHA 23RD Ed,2017: 5530 B,D	mg/l	0.001	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
19	Mercury (as Hg)	AAS Method APHA 23RD Ed,2017: 3112 B	mg/l	0.001	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
20	Cadmium (as Cd)	AAS Method APHA 23RD Ed,2017: 3111 B	mg/l	0.003	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
21	Selenium (as Se)	By AAS Method APHA 23RD Ed,2017: 3500 Se C	mg/l	0.01	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
22	Arsenic (as As)	By AAS Method APHA 23RD Ed,2017: 3114 B	mg/l	0.01	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
23	Cyanide (as CN)	Distillation followed by Spectophotometric Method APHA 23RD Ed,2017: 4500 CN⁻ C,D	mg/l	0.05	ND	ND	ND	ND	ND	ND	**ND**
24	Lead (as Pb)	By AAS Method APHA 23RD Ed,2017 3111 B	mg/l	0.01	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
25	Zinc (as Zn)	By AAS Method APHA 23RD Ed,2017: 3111 B	mg/l	5	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
26	Anionic Detergents (as MBAS)	Anionic Surfactants as MBAS APHA 23RD Ed,2017: 5540 C	mg/l	0.2	ND	ND	ND	ND	ND	ND	**ND**
27	Chromium (as Cr^{+6})	Diphenyl Carbazide Method APHA 23RD Ed,2017: 3500Cr B	mg/l	--	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
28	Mineral Oil	Partition-Gravimetric Method APHA 23RD Ed,2017: 5520 B	mg/l	0.5	ND	ND	ND	ND	ND	ND	**ND**
29	Alkalinity	Titration Method APHA 23RD Ed,2017:2320 B	mg/l	200	46	50	51	58	53	54	**52**
30	Aluminium as(Al)	AAS Method APHA 23RD Ed,2017: 3111 D	mg/l	0.03	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
31	Boron (as B)	Curcumin Method APHA 23RD Ed,2017: 4500B, B	mg/l	0.5	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
32	E. coli	MPN Method APHA 23RD Ed,2017 : 9221 F	MPN / 100 ml	Shall not be dectable in any 100ml sample	Absent	Absent	Absent	Absent	Absent	Absent	**Absent**

Visiontek Consultancy Services Pvt. Ltd. BBSR

Reviewed By:

Visiontek Consultancy Services Pvt. Ltd. P. Pati BBSR

Approved By:

Ref: VCSPL/22/R- 1890 **Date: 10.10.2022**

SIX MONTHLY COMPLIANCE REPORT (April-2022 to September-2022)
GROUND WATER QUALITY ANALYSIS REPORT

1. **Name of the project :** "Development of an Affordable Housing Project Over 20.21 Acres at Chandrasekharpur, Bhubaneswar
2. **Sampling Location : GW2 : Bore Well Near to Utkal Hospital**
3. **Sample Submitted By : VCSPL Representative**

Sl. No.	Parameter	Testing Method	Unit	Standard as per IS - 10500:2012 Amended on 2015 & 2018	Analysis Results						
					April-22	May-22	June-22	July-22	Aug-22	Sept-22	Average
Essential Characteristics											
1	Colour	Visual Comparison Method APHA 23RD Ed,2017 : 2120 B, C	Hazen	5	<5	<5	<5	<5	<5	<5	**<5**
2	Odour	Threshold Odour Test APHA 23RD Ed,2017 :2150 B	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	**Agreeable**
3	Taste	Flavor Threshold Test APHA 23RD Ed,2017 : 2160 C	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	**Agreeable**
4	Turbidity	Nephelometric Method APHA 23RD Ed,2017 :2130 B	NTU	1	<1	<1	<1	<1	<1	<1	**<1**
5	pH at 25°C	pH Meter APHA 23RD Ed,2017 : 4500H+ B	--	6.5-8.5	7.56	7.78	7.41	7.52	7.61	7.59	**7.58**
6	Total Hardness (as $CaCO_3$)	EDTA Titrimetric Method APHA 23RD Ed,2017 : 2340 C	mg/l	200	80.1	78.9	82.6	88.2	89.7	85.4	**84.15**
7	Iron (as Fe)	By AAS Method APHA 23RD Ed,2017 : 3111, B	mg/l	1.0	0.29	0.33	0.36	0.44	0.39	0.4	**0.4**
8	Chloride (as Cl)	Argentometric Method APHA 23RD Ed,2017 : 4500Cl- B	mg/l	250	30.2	32.6	38.4	44.5	42.1	40.9	**38.1**
9	Residual, free Chlorine	Iodometric Method APHA 23RD Ed,2017 : 4500Cl, B	mg/l	0.2	ND	ND	ND	ND	ND	ND	**ND**
Desirable Characteristics											
10	Dissolved Solids	Gravimetric Method APHA 23RD Ed,2017 : 2540 C	mg/l	500	156	143	151	162	158	143	**152**
11	Calcium (as Ca)	EDTA Titrimetric Method APHA 23RD Ed,2017 : 3500Ca B	mg/l	75	31.5	30.9	29.8	33.2	33.6	32.4	**31.9**
12	Magnesium (as Mg)	Calculation Method APHA 23RD Ed,2017 : 3500Mg B	mg/l	30	0.4	0.4	2.0	1.3	1.4	1.1	**1.1**
13	Copper (as Cu)	By AAS Method APHA 23RD Ed,2017: 3111 B	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
14	Manganese (as Mn)	Persulfate Method APHA 23RD Ed,2017: 3500Mn B	mg/l	0.1	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
15	Sulphate (as SO_4)	Turbidimetric Method APHA 23RD Ed,2017: 4500 SO_4^{2-} E	mg/l	200	3.1	2.9	3.0	4.8	4.2	4.6	**3.77**
16	Nitrate (as NO_3)	By UV-Screen Method APHA 23RD Ed,2017: 4500 NO_3^- E	mg/l	45	0.36	0.32	0.41	0.58	0.66	0.49	**0.47**
17	Fluoride (as F)	Distillation followed by Spectrophotometric Method APHA 23RD Ed,2017: 4500F- C	mg/l	1.0	0.013	0.017	0.015	0.021	0.016	0.026	**0.018**
18	Phenolic Compounds (as C_6H_5OH)	Chloroform Extraction by Colorimetric Method APHA 23RD Ed,2017: 5530 B,D	mg/l	0.001	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
19	Mercury (as Hg)	AAS Method APHA 23RD Ed,2017: 3112 B	mg/l	0.001	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**

20	Cadmium (as Cd)	AAS Method APHA 23RD Ed,2017: 3111 B	mg/l	0.003	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
21	Selenium (as Se)	By AAS Method APHA 23RD Ed,2017: 3500 Se C	mg/l	0.01	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
22	Arsenic (as As)	By AAS Method APHA 23RD Ed,2017: 3114 B	mg/l	0.01	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
23	Cyanide (as CN)	Distillation followed by Spectophotometric Method APHA 23RD Ed,2017: 4500 CN^- C,D	mg/l	0.05	ND	ND	ND	ND	ND	ND	**ND**
24	Lead (as Pb)	By AAS Method APHA 23RD Ed,2017 3111 B	mg/l	0.01	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
25	Zinc (as Zn)	By AAS Method APHA 23RD Ed,2017: 3111 B	mg/l	5	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
26	Anionic Detergents (as MBAS)	Anionic Surfactants as MBAS APHA 23RD Ed,2017: 5540 C	mg/l	0.2	ND	ND	ND	ND	ND	ND	**ND**
27	Chromium (as Cr^{+6})	Diphenyl Carbazide Method APHA 23RD Ed,2017: 3500Cr B	mg/l	–	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
28	Mineral Oil	Partition-Gravimetric Method APHA 23RD Ed,2017: 5520 B	mg/l	0.5	ND	ND	ND	ND	ND	ND	**ND**
29	Alkalinity	Titration Method APHA 23RD Ed,2017:2320 B	mg/l	200	48	54	52	57	62	55	**55**
30	Aluminium as(Al)	AAS Method APHA 23RD Ed,2017: 3111 D	mg/l	0.03	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
31	Boron (as B)	Curcumin Method APHA 23RD Ed,2017: 4500B, B	mg/l	0.5	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
32	E. coli	MPN Method APHA 23RD Ed,2017 : 9221 F	MPN / 100 ml	Shall not be dectable in any 100ml sample	Absent	Absent	Absent	Absent	Absent	Absent	**Absent**

Visiontek Consultancy Services Pvt. Ltd. BBSR

Reviewed By:

Visiontek Consultancy Services Pvt. Ltd. BBSR

Approved By:

Ref: VCSPL/22/R-1891 **Date: 10.10.2022**

SIX MONTHLY COMPLIANCE REPORT (April-2022 to September-2022)
GROUND WATER QUALITY ANALYSIS REPORT

1. **Name of the project :** "Development of an Affordable Housing Project Over 20.21 Acres at Chandrasekharpur, Bhubaneswar
2. **Sampling Location : GW3 : Bore well from Laxmi Narayan Temple**
3. **Sample Submitted By : VCSPL Representative**

Sl. No.	Parameter	Testing Method	Unit	Standard as per IS - 10500:2012 Amended on 2015 & 2018	Analysis Results						
					April-22	May-22	June-22	July-22	Aug-22	Sept-22	Average
Essential Characteristics											
1	Colour	Visual Comparison Method APHA 23RD Ed,2017 : 2120 B, C	Hazen	5	<5	<5	<5	<5	<5	<5	**<5**
2	Odour	Threshold Odour Test APHA 23RD Ed,2017 :2150 B	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	**Agreeable**
3	Taste	Flavor Threshold Test APHA 23RD Ed,2017 : 2160 C	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	**Agreeable**
4	Turbidity	Nephelometric Method APHA 23RD Ed,2017 :2130 B	NTU	1	<1	<1	<1	<1	<1	<1	**<1**
5	pH at 25^{0}C	pH Meter APHA 23RD Ed,2017 : 4500H$^+$ B	--	6.5-8.5	7.46	7.51	7.39	7.58	7.61	7.53	**7.51**
6	Total Hardness (as $CaCO_3$)	EDTA Titrimetric Method APHA 23RD Ed,2017 : 2340 C	mg/l	200	78	72	68	84	89	85	**79.3**
7	Iron (as Fe)	By AAS Method APHA 23RD Ed,2017 : 3111, B	mg/l	1.0	0.36	0.4	0.39	0.58	0.49	0.53	**0.5**
8	Chloride (as Cl)	Argentometric Method APHA 23RD Ed,2017 : 4500Cl B	mg/l	250	45.5	43.2	44.7	50.6	54.9	48.8	**47.95**
9	Residual, free Chlorine	Iodometric Method APHA 23RD Ed,2017 : 4500Cl, B	mg/l	0.2	ND	ND	ND	ND	ND	ND	**ND**
Desirable Characteristics											
10	Dissolved Solids	Gravimetric Method APHA 23RD Ed,2017 : 2540 C	mg/l	500	143	136	140	148	151	150	**145**
11	Calcium (as Ca)	EDTA Titrimetric Method APHA 23RD Ed,2017 : 3500Ca B	mg/l	75	28.8	26.2	25.9	31.3	32.5	30.8	**29.3**
12	Magnesium (as Mg)	Calculation Method APHA 23RD Ed,2017 : 3500Mg B	mg/l	30	1.5	1.6	0.8	1.4	1.9	2.0	**1.5**
13	Copper (as Cu)	By AAS Method APHA 23RD Ed,2017: 3111 B	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
14	Manganese (as Mn)	Persulfate Method APHA 23RD Ed,2017: 3500Mn B	mg/l	0.1	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
15	Sulphate (as SO_4)	Turbidimetric Method APHA 23RD Ed,2017: 4500 SO_4^{2-} E	mg/l	200	4.21	5.1	4.9	6.3	6.8	6.1	**5.568**
16	Nitrate (as NO_3)	By UV-Screen Method APHA 23RD Ed,2017: 4500 NO_3^- E	mg/l	45	0.42	0.49	0.5	0.83	0.74	0.8	**0.63**
17	Fluoride (as F)	Distillation followed by Spectrophotometric Method APHA 23RD Ed,2017: 4500F$^-$ C	mg/l	1.0	0.018	0.02	0.021	0.026	0.024	0.028	**0.023**
18	Phenolic Compounds (as C_6H_5OH)	Chloroform Extraction by Colorimetric Method APHA 23RD Ed,2017: 5530 B,D	mg/l	0.001	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**

19	Mercury (as Hg)	AAS Method APHA 23RD Ed,2017: 3112 B	mg/l	0.001	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
20	Cadmium (as Cd)	AAS Method APHA 23RD Ed,2017: 3111 B	mg/l	0.003	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
21	Selenium (as Se)	By AAS Method APHA 23RD Ed,2017: 3500 Se C	mg/l	0.01	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
22	Arsenic (as As)	By AAS Method APHA 23RD Ed,2017: 3114 B	mg/l	0.01	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
23	Cyanide (as CN)	Distillation followed by Spectophotometric Method APHA 23RD Ed,2017: 4500 CN^- C,D	mg/l	0.05	ND	ND	ND	ND	ND	ND	**ND**
24	Lead (as Pb)	By AAS Method APHA 23RD Ed,2017 3111 B	mg/l	0.01	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
25	Zinc (as Zn)	By AAS Method APHA 23RD Ed,2017: 3111 B	mg/l	5	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
26	Anionic Detergents (as MBAS)	Anionic Surfactants as MBAS APHA 23RD Ed,2017: 5540 C	mg/l	0.2	ND	ND	ND	ND	ND	ND	**ND**
27	Chromium (as Cr^{+6})	Diphenyl Carbazide Method APHA 23RD Ed,2017: 3500Cr B	mg/l	--	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
28	Mineral Oil	Partition-Gravimetric Method APHA 23RD Ed,2017: 5520 B	mg/l	0.5	ND	ND	ND	ND	ND	ND	**ND**
29	Alkalinity	Titration Method APHA 23RD Ed,2017:2320 B	mg/l	200	42	57	52	59	70	68	**58**
30	Aluminium as(Al)	AAS Method APHA 23RD Ed,2017: 3111 D	mg/l	0.03	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
31	Boron (as B)	Curcumin Method APHA 23RD Ed,2017: 4500B, B	mg/l	0.5	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
32	E. coli	MPN Method APHA 23RD Ed,2017 : 9221 F	MPN/ 100ml	Shall not be dectable in any 100ml sample	Absent	Absent	Absent	Absent	Absent	Absent	**Absent**

Reviewed By:

Approved By:

ATTACHMENT-III

Ref: VCSPL/22/R-1892 **Date: 10.10.2022**

SIX MONTHLY COMPLIANCE REPORT (April-2022 to September-2022)
NOISE QUALITY MONITORING REPORT

1. **Name of the project :** "Development of an Affordable Housing Project Over 20.21 Acres at Chandrasekharpur, Bhubaneswar
2. **Sample Submitted By : VCSPL Representative**

Location ID	Ambient Noise Monitoring Station Location	Night time Equivalent Noise Level in dB(A) leq						Six Monthly Averages
		April-22	May-22	June-22	July-22	Aug-22	Sept-22	
N-1	Near Main Gate	58.2	56.4	57.1	55.2	53.9	57.4	56.4
N-2	Near Office Site	53.6	55.8	54.2	51.3	53.8	55.1	54.0
N-3	Near Construction Site	55.3	54.6	53.3	52.9	55.4	56.3	54.6
N-4	Near D.G. Area	54.6	53.6	57.4	56.9	58.2	54.1	55.8
N-5	Near Utkal Hospital Back Gate	50.9	51.4	50.6	53.4	55.8	52.8	52.5
Standard as per CPCB		75						

Reviewed By:

Approved By:

ATTACHMENT-IV

Ref: VCSPL/22/R-1893 **Date: 10.10.2022**

SIX MONTHLY COMPLIANCE REPORT (April-2022 to September-2022)
SOIL QUALITY MONITORING REPORT

1. **Name of the project :** "Development of an Affordable Housing Project Over 20.21 Acres at Chandrasekharpur, Bhubaneswar
2. **Sampling Location : S1- Soil Quality of Road Side**
3. **Sample Submitted By : VCSPL Representative**

S. No	Parameters	Unit	April-22	May-22	June-22	July-22	Aug-22	Sept-22	Six Month Average
1	pH at 25^0C	--	7.12	7.16	7.09	7.15	7.13	7.16	**7.14**
2	Colour	---	Brown	Brown	Brown	Brown	Brown	Brown	**Brown**
3	Soil Texture	---	Sandy	Sandy	Sandy	Sandy	Sandy	Sandy	**Sandy**
4	Bulk Density	gm/cc	1.22	1.24	1.2	1.29	1.31	1.27	**1.26**
5	Electrical Conductivity at 25^0C	µmho/cm	76	80	79	86	88	85	**82.3**
6	Available Potassium (K)	mg/kg	78.6	73.2	74.1	76.9	80.1	82.5	**77.6**
7	Available Phosphorus (P)	mg/kg	23.1	22.8	24.6	25.9	26.8	24.8	**24.7**
8	Available Nitrogen	mg/kg	138	141	136	137	142	141	**139.2**
9	Organic Matter	%	1.42	1.56	1.48	1.66	1.62	1.59	**1.56**
10	Permeability	cm/sec	$1.5X\ 10^{-7}$	$2.4X\ 10^{-7}$	$2.2X\ 10^{-7}$	$1.9X\ 10^{-7}$	$2.6X\ 10^{-7}$	$2.3X\ 10^{-7}$	**$2.2X\ 10^{-7}$**
11	Cation exchange capacity	Meq/100g	6.3	6.1	6.5	6.8	6.6	6.7	**6.5**
12	Chloride as Cl	mg/kg	118	121	115	123	128	121	**121**
13	Sulphate as SO_4	mg/kg	30.2	36.4	33.1	39.8	40.2	42.6	**37.1**
14	Organic Carbon	%	0.74	0.86	0.80	0.90	0.88	0.93	**0.85**
15	Iron (Fe)	mg/kg	2.12	2.31	2.25	2.36	2.31	2.41	**2.29**
16	Copper (Cu)	mg/kg	3.85	3.91	4.01	4.29	4.41	4.32	**4.13**
17	Zinc (Zn)	mg/kg	4.09	5.18	4.77	5.36	5.84	5.75	**5.17**
18	Available Calcium (Ca)	mg/kg	223	245	231	259	261	248	**245**
19	Available Magnesium (Mg)	mg/kg	33.6	30.9	31.2	32.5	33.8	32.1	**32.4**
20	Available Sodium (Na)	mg/kg	30.1	29.8	31.5	36.4	40.1	38.6	**34.4**

Visiontek Consultancy Services Pvt. Ltd.

Reviewed By:

Visiontek Consultancy Services Pvt. Ltd.

Approved By:

Ref: VCSPL/22/R- 1894 **Date: 10.10.2022**

SIX MONTHLY COMPLIANCE REPORT (April-2022 to September-2022)
SOIL QUALITY MONITORING REPORT

1. **Name of the project :** "Development of an Affordable Housing Project Over 20.21 Acres at Chandrasekharpur, Bhubaneswar
2. **Sampling Location : S2- Soil Quality Near Construction Site-I**
3. **Sample Submitted By : VCSPL Representative**

S. No	Parameters	Unit	April-22	May-22	June-22	July-22	Aug-22	Sept-22	Six Month Average
1	pH at 25^0C	--	7.19	7.21	7.2	7.31	7.29	7.33	**7.26**
2	Colour	---	Brown	Brown	Brown	Brown	Brown	Brown	**Brown**
3	Soil Texture	---	Sandy Clay	Sandy Clay	Sandy Clay	Sandy Clay	Sandy Clay	Sandy Clay	**Sandy Clay**
4	Bulk Density	gm/cc	1.16	1.20	1.24	1.26	1.30	1.28	**1.24**
5	Electrical Conductivity at 25^0C	µmho/cm	90.3	91.8	94.2	96.5	93.7	98.4	**94.2**
6	Available Potassium (K)	mg/kg	78.9	80.1	82.3	86.4	88.2	84.2	**83.4**
7	Available Phosphorus (P)	mg/kg	20.3	24.6	22.8	26.9	29.1	30.8	**25.8**
8	Available Nitrogen	mg/kg	117	121	119	130	129	133	**125**
9	Organic Matter	%	1.39	1.30	1.32	1.42	1.39	1.45	**1**
10	Permeability	cm/sec	$2.1X\ 10^{-7}$	$1.9\ X\ 10^{-7}$	$2.2\ X\ 10^{-7}$	$2.3\ X\ 10^{-7}$	$2.6\ X\ 10^{-7}$	$2.5\ X\ 10^{-7}$	**$2.3\ X\ 10^{-7}$**
11	Cation exchange capacity	Meq/100g	5.3	6.0	5.7	6.4	6.2	5.8	**5.9**
12	Chloride as Cl	mg/kg	124	129	131	142	138	132	**133**
13	Sulphate as SO_4	mg/kg	36.2	34.5	38.6	40.1	43.5	42.7	**39.3**
14	Organic Carbon	%	1.18	1.21	1.20	1.25	1.19	1.22	**1.2**
15	Iron (Fe)	mg/kg	3.1	2.9	3.4	3.9	4.5	4.2	**3.7**
16	Copper (Cu)	mg/kg	2.9	3.0	3.2	3.5	3.9	3.7	**3.4**
17	Zinc (Zn)	mg/kg	5.8	6.1	6.0	6.4	7.0	6.7	**6.3**
18	Available Calcium (Ca)	mg/kg	219	232	241	249	238	251	**238**
19	Available Magnesium (Mg)	mg/kg	32.6	34.9	32.5	34.6	36.2	35.7	**34.4**
20	Available Sodium (Na)	mg/kg	24.1	24.7	23.2	26.8	27.9	29.4	**26.0**

Reviewed By: Visiontek Consultancy Services Pvt. Ltd. BBSR

Approved By: Visiontek Consultancy Services Pvt. Ltd. BBSR

Ref: VCSPL/22/R-1895 **Date: 10.10.2022**

SIX MONTHLY COMPLIANCE REPORT (April-2022 to September-2022)
SOIL QUALITY MONITORING REPORT

1. **Name of the project :** "Development of an Affordable Housing Project Over 20.21 Acres at Chandrasekharpur, Bhubaneswar
2. **Sampling Location : S3- Soil Quality Near Water Tank**
3. **Sample Submitted By : VCSPL Representative**

S.No	Parameters	Unit	April-22	May-22	June-22	July-22	Aug-22	Sept-22	Six Month Average
1	pH at 25^0C	--	7.16	7.21	7.2	7.26	7.23	7.25	**7.22**
2	Colour	---	Brown	Brown	Brown	Brown	Brown	Brown	**Brown**
3	Soil Texture	---	Clay	Clay	Clay	Clay	Clay	Clay	**Brown**
4	Bulk Density	gm/cc	1.36	1.42	1.39	1.55	1.59	1.57	**1.48**
5	Electrical Conductivity at 25^0C	µmho/cm	86.4	90.3	90.2	94.2	92.8	92.7	**91.1**
6	Available Potassium (K)	mg/kg	66.9	70.1	67.5	78.2	80.1	83.4	**74.4**
7	Available Phosphorus (P)	mg/kg	20.3	21.6	21.9	22.1	23.6	24.7	**22.4**
8	Available Nitrogen	mg/kg	120	123	118	132	129	138	**127**
9	Organic Matter	%	1.27	1.24	1.21	1.37	1.42	1.39	**1.32**
10	Permeability	cm/sec	1.3×10^{-7}	1.2×10^{-7}	1.4×10^{-7}	1.4×10^{-7}	1.7×10^{-7}	1.4×10^{-7}	**1.4×10^{-7}**
11	Cation exchange capacity	Meq/100g	5.2	6.0	5.9	6.3	6.1	6.2	**5.95**
12	Chloride as Cl	mg/kg	128	131	127	131	134	129	**130**
13	Sulphate as SO_4	mg/kg	32.2	34.6	33.1	39.8	40.1	40.3	**36.7**
14	Organic Carbon	%	1.21	1.25	1.22	1.19	1.20	1.23	**1.22**
15	Iron (Fe)	mg/kg	2.4	2.1	2.5	2.9	2.7	2.8	**2.57**
16	Copper (Cu)	mg/kg	3.2	3.0	3.4	3.5	3.9	3.6	**3.43**
17	Zinc (Zn)	mg/kg	5.8	6.1	5.6	6.4	6.6	6.2	**6.12**
18	Available Calcium (Ca)	mg/kg	231	240	229	229	231	230	**232**
19	Available Magnesium (Mg)	mg/kg	22.5	24.6	25.9	31.2	30.4	32.8	**27.9**
20	Available Sodium (Na)	mg/kg	24.2	26.5	23.8	26.1	28.5	24.9	**25.7**

Reviewed By:

Approved By:

ANNEXURES

ANNEXURE-1

Tel : 2564033/2563924
EPABX : 2561909/2562847
E-mail: paribesh1@ospcboard.org
Web site : www.ospcboard.org

OFFICE OF THE
STATE POLLUTION CONTROL BOARD, ODISHA
Parivesh Bhawan, A/118, Nilakantha Nagar, Unit-VIII,
Bhubaneswar - 751 012

BY REGD POST

No. 5214 /IND-II-CTE-6302 Date 30.05.2019

OFFICE MEMORANDUM

In consideration of the online application no. **2462195** for obtaining Consent to Establish of **M/s Paramitra Smart Infra Pvt. Ltd.**, the State Pollution Control Board is pleased to convey its Consent to Establish under Section 25 of Water (Prevention & Control of Pollution) Act, 1974 and under Section 21 of Air (Prevention & Control of Pollution) Act, 1981 for **construction of 64 blocks (Type-I), One Block (II), 4 blocks of Amenities, One Block Neighbourhood Shopping Centre and 4 Blocks Kiosk Buildings under Affordable Urban Housing over an area of 12.527 acres with total built up area-88217.71 m² along with installation of DG set of capacity 1x250 KVA with project cost of ₹ 94.9451 Crore, At- Plot No. 321(P), Khata No. 619, Mouza- Chandrashekharpur, Bhubaneswar, Dist - Khordha** with the following conditions:

GENERAL CONDITIONS:

1. **This Consent to Establish is valid for the construction project as mentioned in the application form and for a period of five years from the date of issue of this letter. If the proponent fails to do substantial physical progress of the project within five years then a renewal of this Consent to Establish shall be sought by the proponent.**
2. The Project has to apply for grant of Consent to Operate under section 25 / 26 of Water (Prevention & Control of Pollution) Act, 1974 & under Section 21 of Air (Prevention & Control of Pollution) Act, 1981 at least 3 (three) months before the occupancy and obtain Consent to Operate from this Board.
3. **This Consent to Establish is subject to statutory and other clearances from Govt. of Odisha and / or Govt. of India, as and when applicable.**

SPECIAL CONDITIONS:

A. GENERAL CONDITIONS:

1. The proponent shall carry out construction activity as per Environmental Clearance granted by SEIAA vide letter No. 6155, dated 12.10.2018.
2. The proponent shall obtain permission from Department of Water Resources, Govt. of Odisha for drawl of ground/ surface water.
3. The proponent shall implement the pollution control measures and safeguards as proposed in the Environment Management Plan (EMP).

4. **Solar or other Renewable Energy shall be installed to meet electricity generation equivalent to 5% of the demand load.**
5. A green belt of adequate width and density preferably with local species along the periphery of the project area shall be raised so as to provide protection against particulates and noise. It must be ensured that at least 20% of the total land area shall be under permanent green cover. The proponent shall ensure the maintenance of green belt throughout the year and for all time to come. It is advised that they may engage professionals in this field for creation and maintenance of the green belt. An action plan for this purpose shall be prepared and shall be submitted accordingly.
6. Adequate drinking water and sanitary facilities should be provided for construction workers at the site. Provision should be made for mobile toilets. The safe disposal of wastewater and solid wastes generated during the construction phase should be ensured.
7. All vehicles carrying construction materials to the site shall be covered to avoid spreading of dust. Vehicles hired for bringing construction material at site should be in good condition and should have valid Pollution Under Check (PUC) certificate and to conform to applicable air and noise emission standards and should be operated only during non-peaking hours.
8. The project shall use fly ash bricks and other building materials made out of fly ash in construction.
9. The civil construction shall be carried out with the fly ash bricks. If the fly ash bricks are not available locally the civil construction may carried out with other bricks with prior intimation to the concerned Regional Office of SPC Board. A statement indicating use of fly ash bricks during construction period shall be submitted to the Board quarterly for record.
10. Use of glass shall be reduced by upto 40% to reduce the electricity consumption and load on air conditioning. If necessary, high quality double glass with special reflective coating in windows will be used.
11. Traffic congestion near the entry and exit points from the roads adjoining the proposed project site must be avoided. Parking should be inside the campus and no public space should be utilized.
12. Noise should be controlled to ensure that it does not exceed the prescribed standards. During night time the noise levels measured at the boundary of the building shall be restricted to the permissible levels to comply with the prevalent regulations.
13. The proponent shall comply to the provisions of E-waste (Management) Rules, 2016 and shall handover E-waste to authorized collection centers / register dismantlers / recyclers for proper disposal of E-waste.
14. **Separate collection bin shall be provided inside the building complex for collection of E- waste.**
15. **The construction and demolition wastes to be generated from the proposed project shall be disposed of in accordance with the provision under "Construction & Demolition Wastes Management Rules 2016".**

16. All the plastic waste generated from the premises during construction and commissioning shall be collected and sent for co-processing to the nearby cement kilns.

17. Municipal Solid Waste shall be disposed off as per the Solid Waste Management Rules, 2016 and amendment thereafter.

18. The Board may impose further condition or modify the conditions are stipulated in this order during installation and / or at the time of obtaining consent to operate and may revoke this order in case the stipulated conditions are not implemented and / or information is found to have been suppressed / wrongly furnished in the application form.

B. WATER POLLUTION:

19. Water Sprinkling shall be carried out in stock piles and haulage roads in the construction area to suppress fugitive emission.

20. Weep holes in the compound walls shall be provided to ensure natural drainage of rain water in the catchment area during the monsoon period.

21. Fixtures for showers, toilet flushing and drinking should be of low flow either by use of aerators or pressure reducing devices or sensor based control.

22. Rain water harvesting structure shall be developed inside premises and maximum efforts shall be made to reuse harvested rain water with a definite plan and programme to reduce drawl of fresh water from the local water bodies/ground water source as well as to recharge the ground water. Rain water harvesting structure shall be included from the construction stage itself. A scheme in this regard shall be submitted to the Board.

23. The domestic wastewater generated shall be treated in Sewage Treatment Plant of capacity 1400 KLD to meet the following standards as notified by the MoEF&CC, Govt. of India vide G.S.R. 1265 (E), dated 13.10.2017. The treated water shall be reused for flushing, gardening and plantation to the maximum possible extent.

Sl. No.	Parameters	Standards
1.	pH	6.5-9.0
2.	BOD (mg/l)	20
3.	TSS (mg/l)	<100
4.	Fecal Coliform (MPN/100ml)	< 1000

The surplus treated water from STP (Sewage Treated Plant) shall be discharged to the Municipal drain after meeting the above prescribed standard as proposed.

24. **The safe disposal of wastewater and solid wastes generated from washing of painting equipments during the construction phase should be ensured.**

C. AIR POLLUTION:

25. The diesel generator sets to be used during construction phase should be low Sulphur diesel type and should conform to Environment (Protection) Rules prescribed for air and noise emission standards.

26. All vehicles carrying building materials to the site shall be covered to avoid spreading of dust.

27. Diesel power generating sets proposed as source of backup power for elevators and common area illumination during operation phase should be of enclosed type and conform to rules made under the Environment (Protection) Act, 1986. The height of stack of DG sets should be equal to the height needed for the combined capacity of all proposed DG sets. Only low sulphur diesel will be used. The location of the DG sets may be decided in consultation with State Pollution Control Board.

28. The height of the stack attached to the D.G set shall confirm to the following:

    $H = h + 0.2\sqrt{KVA}$ (Where, h = Height of the building where it is installed in meter
    KVA = Capacity of D.G Set and H = Height of the stack in meter above ground level).

29. **The proponent shall take adequate measures to prevent noise during loading and unloading of the construction materials in night.**

30. **The proponent shall also take adequate measures during construction phase to prevent noise and dust pollution to surrounding area.**

D. <u>SOLID WASTE:</u>

31. **Intermediate storage area of adequate capacity for temporary storage of Municipal Solid Waste (MSW) shall be developed inside the premises before handing over the MSW to the approved agency for final disposal.**

32. **The proponent shall explore to establish Mechanized Waste Convertor having polycrack method and other similar method for processing of Municipal Solid Waste generated from the complex under covered shed to produce valuable products like oil, water, gas, carbon, metal, glass etc.**

33. The solid waste generated from the complex shall be segregated as biodegradable and non-biodegradable. This shall be collected in separate coloured beans. Proper waste management practices shall be adopted during the collection, storing and disposal of the generated solid waste.

34. Bio-degradable solid waste shall be sent to the organic waste converter for preparation of manure. Non-biodegradable wastes like polythene bags, metal, ceramic Waste, glass etc. shall be stored in separate garbage bin and will be sent to approved agency for final disposal.

35. All required sanitary and hygienic measures should be in place before starting construction activities and to be maintained throughout the construction phase.

36. All the top soil excavated during construction activities should be stored for use in horticulture / landscape development within the project site.

37. Disposal of muck during construction phase should not create any adverse effect on the neighbouring communities and be disposed taking the necessary precautions for general safety and health aspects of people, only in approved sites with the approval of competent authority.

38. Construction spoils, including bituminous material and other hazardous materials, must not be allowed to contaminate watercourses and the dump sites for such material must be secured so that they should not leach into the ground water.

39. The Project proponent shall dispose off hazardous waste materials such as tarry products, lead containing products, paints & pigments residues, broken fluorescent and mercury lamps during construction and operational phase as per Hazardous and Other Wastes (Management and Trans boundary Movement) Rules, 2016 and amended thereafter.

29/5/19

CHIEF ENV. ENGINEER

To

The Senior Executive- Projects,
M/s Paramitra Smart Infra Pvt. Ltd.
Plot No - 133, District Centre,
Chandrashekharpur,
Dist - Khordha, Odisha-751021.

Memo No. 5215 **/Date** 30.05.2019 /

Copy forwarded to:

1. The Collector & District Magistrate, **Khordha.**
2. The District Industries Centre, **Khordha.**
3. Consent to Operate Cell, SPC Board, Bhubaneswar.
4. Regional Officer, SPC Board, Bhubaneswar.
5. Copy to Guard file.

SR. ENV. ENGINEER-L-I

ANNEXURE-2

CIVIL ENGINEERING DEPARTMENT

College of Engineering & Technology, Bhubaneswar

Letter No. - 797/CED **Date – 08/04/2019**

From
HOD

To
Sri Sachikanta Swain,
Paramitra Smart Infra Private Ltd
133, Near Bilasiani Mandap, Dist Centre, Chandrasekharpur, Bhubaneswar-21
(GST No. : 21AAJCP1943M1ZB)

Sub: Vetting of Structural drawings for one EWS Block at Chandrasekharpur.

Ref: Your letter: PSPL/AHP/LT/18-19/01 date -11.02.2019

Sir,

With reference to the letter cited above, the **Vetting of Structural drawings for one EWS Block at Chandrasekharpur** for technical scrutiny were checked & found satisfactory. But this doesn't absolve the responsibility of the consultant of the project and executing agency for the safety & stability of the structure. Proper engineering construction practices are to be followed as per the guidelines of National Building Code for execution of the work.

Thanking you

Yours Faithfully,

08.04.19

Head of the Department
HEAD
Deptt. of Civil Engg
CET BPUT BBSR

ANNEXURE-3

STATE ENVIRONMENT IMPACT ASSESSMENT AUTHORITY (SEIAA), ODISHA.

5RF-2/1, Unit - IX, Bhubaneswar - 751022
E-mail : seiaaorissa@gmail.com

Ref. No. 6155/SEIAA Date 12.10.18

SEIAA File No: 75165/32-NCP/05-2018

To

Mr. Rahul Choudhary,
Sr. Executive (Project)
Paramitra Smart Infra SNA Private Ltd.
Plot No. 133, District Centre,
Near Bilasani Mandap, Chandrasekharpur
Bhubaneswar-751021, Khordha

Sub: Proposal for proposed (G+4) storied affordable housing project at mouza-Chandrasekharpur, Bhubaneswar, Dist- Khurda, Odisha of M/s Paramitra Smart Infra Pvt. Ltd with total built-up area 88,217.71 m^2-Environmental Clearance regarding.

Ref: Your online application for issue of EC vide File No: SIA/OR/NCP/75165/2018 dated 26.05.2018.

Sir,

This has reference to your application seeking environmental clearance of the project proposal mentioned above. The proposal has been appraised on the basis of the documents enclosed with the application such as Form-1, Form-IA, Conceptual Plan / EMP and clarifications furnished to SEAC in response to their observations.

Background:

1. This is a proposal for Environmental Clearance for proposed (G+4) storied affordable housing project at mouza-Chandrasekharpur, Bhubaneswar, Dist - Khurda, Odisha by M/s Paramitra Smart Infra Pvt. Ltd with total built-up area 88217.71 m^2.
2. Paramitra Smart Infra Private Limited is developing the site in partnership with Bhubaneswar Development Authority (PPP Mode). The project (PPP) guidelines stipulate 13.71 acres land area allocation for EWS Housing while remaining 6.5 acres land will be utilized for private development based on the market dynamics and development guidelines.

3. The proposed site is located at Chandrasekharpur, Bhubaneswar, Odisha. The Geographical co-ordinate of the project site is: Latitude - 20° 19' 15.23" N & Longitude - 85° 48' 12.66" E. The project site is well connected with Nandan Kanan road which take towards National Highway - 5 (Kolkata-Chennai Road). Nandan Kanan road is 1.5 Km from proposed AHP site. The nearest railway station is Bhubaneswar Railway station at a distance of approx 7.4 Km in South East direction. The nearest airport is Biju Patnaik Airport at a distance of approx. 8.3 Km in South direction from project site. The site is located adjacent to the local landmarks, Buddha Jayanti Park and Lumbini Convention. There is no structure or encroachments on the site. The site is easily accessible from Nandan Kanan Road.
4. The building details of the project is as follows:

Total Plot Area	= 50,694.96 sqm
Total Built up Area	= 88,217.71 sqm
Ground Coverage	= 18426.09 sqm
Total Greenbelt Area	= 10,654.89sqm (21 %)
Total Road Area	= 16,366.27 sqm
Total Parking (Open)	= 8,969.42 sqm

5. Requirement for the project are as follows:

(i) Power requirement:

The daily power requirement for the proposed Affordable Housing Project is preliminarily assessed as 3155 KW source from CESU. In order to meet emergency power requirements during the grid failure, there is provision of 1 no. of DG set having 250 KVA capacities for power back up in the EWS Project.
For energy conservation, there will be 75 nos. of Solar Lighting poles (@72 Watt) has been proposed for Street & common area solar lighting, so
Energy conservation by using Solar Street Lighting = 75 x 72 = 5400 watt = 5.4 KW
Energy conservation by using Solar lighting for common area = 200 KW
Total Energy Conservation = (200+ 5.4) KW = 205.4 KW
Total Energy saving = 205.4/3155 = 0.0651 x 100 = 6.5 %

(ii) Water requirement:

Fresh make up of 938 m^3/day will be required for the project which will be sourced from PHED/Municipal Supply. Waste water of 1198.8 KLD will be treated in a STP of 1400 KLD capacity, which includes primary, secondary and tertiary treatment. After treatment the treated water will be discharge to the Master Drain.
Rain Water will be harvested through 14 no. of recharging pits.

(iii) Green Belt Development:

Green belt will be developed over an area of 10,654.89 m^2 which is 21 % of the plot area; by using the local species.

(iv) Solid Waste Management:

From the residential complex solid waste in form of food waste from kitchen and miscellaneous waste will be generated @ 0.45 kg/capita/day, which will be about 10160 x 0.45 = 4572 kg/day. The generated solid waste from the residential complex will be segregated as biodegradable and non-biodegradable. This will be collected in separate coloured beans. Proper waste management practices will be adopted during the collection, storing and disposal of the generated solid waste.

Waste generated from Floating people will be @ 0.15 kg/capita/day, which will be about 1867 x 0.15 = 280.0 kg/day. Solid waste from sweeping and Dry Garbage containing non-biodegradable wastes like polythene bags, metal, ceramic Waste, glass etc. shall be stored in separate garbage bin and send to approved agency for final disposal. The biodegradable waste will be converted to manure by an organic waste convertor, which will be used for landscaping.

Sl. No.	Category	Counts (heads)	Waste generated
1.	Residents	10,160 @ 0.45 kg/day	4572.0 kg/day
2.	Floating Population	1,867 @ 0.15 kg/day	280.0 kg/day
3.	STP sludge		480.0 kg/day
Total Solid Waste Generated			5332.0 kg/day

(v) Estimated Project cost:

Total Capital Cost = Rs. 95 Crores
Environment Management Cost =Rs. 1.05 Crores

6. The proposed site was visited by the Sub-Committee of SEAC on 17.08.2018 to ascertain the actual position needs to be undertaken. The sub-committee recommended that the site is eligible for proposed project.
7. The proponent along with the consultant M/s Centre for Envotech & Management Consultancy Pvt. Ltd., Bhubaneswar made a detailed presentation before the SEAC.

Considering the information furnished by the proponent and presentation made by the consultant on behalf of proponent, the State Expert Appraisal Committee (SEAC) after due considerations of the relevant documents submitted by the project proponent and clarification/documents furnished to it have appraised the proposal and recommended for grant of Environmental Clearance for the project valid for a period of 7 years, stipulating various conditions.

The State Environment Impact Assessment Authority (SEIAA) after considering the proposal and recommendations of SEAC, Odisha hereby accords Environmental Clearance in favour of the project valid for a period of 7 (seven) years under the provisions

of EIA Notification 2006 and subsequent amendments thereto subject to strict compliance of all stipulated conditions, as follows.

Stipulated Conditions

Part A - Specific Conditions:

1. Consent to Establish/Operate for the project shall be obtained from the State Pollution Control Board as required under the Air (Prevention and Control of Pollution) Act, 1981 and the Water (Prevention and Control of Pollution) Act, 1974.
2. The approval of the Competent Authority shall be obtained for structural safety of buildings due to earthquakes, adequacy of fire fighting equipment etc. as per National Building Code including protection measures from lightening etc.
3. The project proponent shall obtain all necessary clearance/ permission from all relevant agencies including town planning authority before commencement of work. All the construction shall be done in accordance with the local building byelaws.

Topography and Natural Drainage:

4. The natural drain system should be maintained for ensuring unrestricted flow of water. No construction shall be allowed to obstruct the natural drainage through the site, on wetland and water bodies. Check dams, bio-swales, landscape and other Sustainable Urban Drainage Systems (SUDS) are allowed for maintaining the drainage pattern and to harvest rain water. Buildings shall be designed to follow the natural topography as much as possible. Minimum cutting and filling should be done.

Water Requirement, Conservation, Rain Water Harvesting, and Ground Water Recharge:

5. As proposed, fresh water requirement from PHED water supply shall not exceed 938 KLD. No ground water tapping will be done without due permission.
6. A certificate shall be obtained from the local body supplying water, specifying the total annual water availability with the local authority, the quantity of water already committed, the quantity of water allotted to the project under consideration and the balance water available. This should be specified separately for ground water and surface water sources, ensuring that there is no impact on other users.
7. The quantity of fresh water usage, water recycling and rainwater harvesting shall be measured and recorded to monitor the water balance as projected by the project proponent. The record shall be submitted to the Regional Office, MoEF & CC and SEIAA, Odisha along with six monthly Monitoring reports.
8. Installation of dual pipe plumbing for supplying fresh water for drinking, cooking and bathing etc. and other for supply of recycled water for flushing, landscape irrigation, car washing, thermal cooling, conditioning etc. shall be done.
9. Use of water saving devices/ fixtures (viz. low flow flushing systems; use of low flow faucets tap aerators etc.) for water conservation shall be incorporated in the building plan.
10. Separation of grey and black water should be done by the use of dual plumbing system. In case of single stack system separate recirculation lines for flushing by giving dual plumbing system be done.

11. Water demand during construction should be reduced by use of pre-mixed concrete, curing agents and other best practices referred.
12. The local bye-law provisions on rain water harvesting should be followed. If local bye-law provision is not available, adequate provision for storage and recharge should be followed as per the Ministry of Urban Development Model Building Byelaws, 2016. As proposed 07 (Seven) nos. of rain water harvesting recharge pits shall be provided.
13. Any ground water dewatering should be properly managed and shall conform to the approvals and the guidelines of the CGWA in the matter. Formal approval shall be taken from the CGWA for any ground water abstraction or dewatering. The proponent shall also obtain permission from Water Resources Department, Govt. of Odisha for drawal of water.
14. A complete plan for rainwater harvesting so as to harvest the quantum of rain water at the proposed site during the rainy days equal to the total quantity of water to be consumed for various usages by the building project in a full year shall be drawn up and implemented.

Solid Waste Management:

15. The provisions of the Solid Waste (Management) Rules, 2016, E-Waste (Management) Rules, 2016, and the Plastics Waste (Management) Rules, 2016 shall be followed.
16. Disposal of muck during construction phase shall not create any adverse effect on the neighbouring communities and be disposed taking the necessary precautions for general safety and health aspects of people, only in approved sites with the approval of competent authority.
17. Separate wet and dry bins must be provided in each unit and at the ground level for facilitating segregation of waste. Solid waste shall be segregated into wet garbage and inert materials. Wet garbage shall be composted in Organic Waste Converter. Adequate area shall be provided for solid waste management within the premises which will include area for segregation, composting. The inert waste from group housing project will be sent to dumping site.
18. Any hazardous waste generated during construction phase, shall be disposed off as per applicable rules and norms with necessary approvals of the State Pollution Control Board.
19. A certificate from the competent authority handling municipal solid wastes, indicating the existing civic capacities of handling and their adequacy to cater to the Municipal Solid Waste generated from project shall be obtained.

Sewage Treatment Plant:

20. Sewage shall be treated in the STP of capacity 1400 KLD with tertiary treatment. The treated effluent from STP shall be recycled/re-used for flushing, gardening and DG Cooling. As proposed, excess treated water shall be used for nearby construction site or will discharge to municipal sewer with prior permission of competent authority.
21. A certificate from the competent authority shall be obtained for discharging treated effluent/ untreated effluents into the Public sewer/ disposal/drainage systems along with the final disposal point.

22. No sewage or untreated effluent water would be discharged through storm water drains.
23. The installation of the Sewage Treatment Plant (STP) shall be certified by an independent expert and a report in this regard shall be submitted to the SEIAA, Odisha before the project is commissioned for operation. Periodical monitoring of water quality of treated sewage shall be conducted. Necessary measures should be made to mitigate the odour problem from STP.
24. Sludge from the onsite sewage treatment, including septic tanks, shall be collected, conveyed and disposed as per the Ministry of Urban Development, Central Public Health and Environmental Engineering Organization (CPHEEO) Manual on Sewerage and Sewage Treatment Systems, 2013.

Energy Conservation:

25. Compliance with the Energy Conservation Building Code (ECBC) of Bureau of Energy Efficiency shall be ensured. Buildings in the States which have notified their own ECBC, shall comply with the State ECBC. Outdoor and common area lighting shall be LED. Concept of passive solar design that minimize energy consumption in buildings by using design elements, such as building orientation, landscaping, efficient building envelope, appropriate fenestration, increased day lighting design and thermal mass etc. shall be incorporated in the building design. Wall, window, and roof u-values shall be as per ECBC specifications.
26. Energy conservation measures like installation of CFLs/ LED for the lighting the area outside the building should be integral part of the project design and should be in place before project commissioning. Used CFLs, TFL and LED shall be properly collected and disposed off/sent for recycling as per the prevailing guidelines/rules of the regulatory authority to avoid mercury contamination.
27. Solar, wind or other Renewable Energy shall be installed to meet electricity generation equivalent to 1% of the demand load or as per the state level/ local building bye-laws requirement, whichever is higher. Follow super ECBC requirement of ECBC 2017 and provide compliance report.
28. Solar power shall be used for lighting in the apartment to reduce the power load on grid. Separate electric meter shall be installed for solar power. Solar water heating shall be provided to meet 20% of the hot water demand of the commercial and institutional building or as per the requirement of the local building bye-laws, whichever is higher. Residential buildings are also recommended to meet its hot water demand from solar water heaters, as far as possible.
29. Use of environment friendly materials in bricks, blocks and other construction materials, shall be required for at least 20% of the construction material quantity. These include Fly Ash bricks, hollow bricks, AACs, Fly Ash Lime Gypsum blocks, Compressed earth blocks, and other environment friendly materials. Fly ash should be used as building material in the construction as per the provision of Fly Ash Notification of September, 1999 and amended as on 27th August, 2003 and 25th January, 2016. Ready mixed concrete must be used in building construction.
30. A certificate of adequacy of available power from the agency supplying power to the project along with the load allowed for the project shall be submitted.

Air Quality and Noise:

31. Construction site shall be adequately barricaded before the construction begins. Dust, smoke & other air pollution prevention measures shall be provided for the building as well as the site. These measures shall include screens for the building under construction, continuous dust/ wind breaking walls all around the site (at least 3 meter height). Plastic/tarpaulin sheet covers shall be provided for vehicles bringing in sand, cement, murram and other construction materials prone to causing dust pollution at the site as well as taking out debris from the site. Sand, murram, loose soil, cement, stored on site shall be covered adequately so as to prevent dust pollution. Wet jet shall be provided for grinding and stone cutting. Unpaved surfaces and loose soil shall be adequately sprinkled with water to suppress dust.
32. All construction and demolition debris shall be stored at the site (and not dumped on the roads or open spaces outside) before they are properly disposed. All demolition and construction waste shall be managed as per the provisions of the Construction and Demolition Waste Rules, 2016. All workers working at the construction site and involved in loading, unloading, carriage of construction material and construction debris or working in any area with dust pollution shall be provided with dust mask.
33. **Notification GSR 94(E) dated 25.01.2018 of MoEF & CC regarding Mandatory Implementation of Dust Mitigation Measures for Construction and Demolition Activities for projects requiring Environmental Clearance shall be complied with.**
34. The gaseous emissions from DG set shall be dispersed through adequate stack height as per CPCB standards. Acoustic enclosure shall be provided to the DG sets to mitigate the noise pollution. Low sulphur diesel shall be used. The location of the DG set and exhaust pipe height shall be as per the provisions of the Central Pollution Control Board (CPCB) norms.
35. For indoor air quality the ventilation provisions as per National Building Code of India shall be provided.
36. Ambient noise levels shall conform to residential standard both during day and night as per Noise Pollution (Control and Regulation) Rules, 2000. Incremental pollution loads on the ambient air and noise quality shall be closely monitored during construction phase. Adequate measures shall be made to reduce ambient air and noise level during construction phase, so as to conform to the stipulated standards by CPCB / SPCB.

Green Cover:

37. No tree cutting/transplantation of existing trees has been proposed in the instant project. A minimum of 1 tree for every 80 m^2 of land should be planted and maintained. The existing trees will be counted for this purpose. The landscape planning should include plantation of native species. The species with heavy foliage, broad leaves and wide canopy cover are desirable. Water intensive and/or invasive species should not be used for landscaping. As proposed 10,654.89 m^2 area (21% of plot area) shall be provided for green area development.

Top Soil Preservation and Reuse:

38. Topsoil should be stripped to a depth of 20 cm from the areas proposed for buildings, roads, paved areas, and external services. It should be stockpiled appropriately in designated areas and reapplied during plantation of the proposed vegetation on site.

Transportation:

39. A comprehensive mobility plan, as per Ministry of Urban Development best practices guidelines (URDPFI), shall be prepared to include motorized, non-motorized, public, and private networks. Road should be designed with due consideration for environment, and safety of users. The road system can be designed with these basic criteria.
    - Hierarchy of roads with proper segregation of vehicular and pedestrian traffic.
    - Traffic calming measures
    - Proper design of entry and exit points.
    - Parking norms as per local regulation
40. A detailed traffic management and traffic decongestion plan shall be drawn up to ensure that the current level of service of the roads within a 05 kms radius of the project is maintained and improved upon after the implementation of the project.
41. This plan should be based on cumulative impact of all development and increased habitation being carried out or proposed to be carried out by the project or other agencies in this 5 Kms radius of the site in different scenarios of space and time and the traffic management plan shall be duly validated and certified by the State Urban Development department and the P.W.D./ competent authority for road augmentation and shall also have their consent to the implementation of components of the plan which involve the participation of these departments.
42. Vehicles hired for bringing construction material to the site should be in good condition and should have a pollution check certificate and should conform to applicable air and noise emission standards be operated only during non-peak hours.

Environment Management Plan:

43. An Environmental Management Plan (EMP) shall be prepared and implemented to ensure compliance with the environmental conditions specified above. A dedicated Environment Monitoring Cell with defined functions and responsibility shall be put in place to implement the EMP. The environmental cell shall ensure that the environment infrastructure like Sewage Treatment Plant, Landscaping, Rain Water Harvesting, Energy efficiency and conservation, water efficiency and conservation, solid waste management, renewable energy etc. are kept operational and meet the required standards. The environmental cell shall also keep the record of environment monitoring and those related to the environment infrastructure.

Others:

44. Provisions shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, creche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.

45. A First Aid Room shall be provided in the project both during construction and operations of the project.
46. The company shall draw up and implement corporate social Responsibility plan as per the Company's Act of 2013.
47. As per the MoEF & CC, Govt. of India Office Memorandum F.No.22-65/2017-IA.III dated 1st May 2018, the project proponent is required to prepare and implement Corporate Environment Responsibility (CER) Plan. As per para 6(II) of the said O.M. appropriate funds shall be earmarked for the activities such as infrastructure creation for drinking water supply, sanitation, health, education, skill development, roads, cross drains, electrification including solar power, solid waste management facilities, scientific support and awareness to local farmers to increase yield of crop and fodder, rain water harvesting, soil moisture conservation works, avenue plantation, plantation in community areas etc. The activities proposed under CER shall be restricted to the affected area around the project. The entire activities proposed under the CER shall be treated as project and shall be monitored. The monitoring report shall be submitted to the regional office as a part of half yearly compliance report, and to the District Collector. It should be posted on the website of the project proponent.

Part B – General Conditions:

1. A copy of the Environmental Clearance letter shall also be displayed on the website of the concerned State Pollution Control Board. The EC letter shall also be displayed at the Regional Office, District Industries centre and Collector's Office/ Tehsildar's office for 30 days.
2. The funds earmarked for environmental protection measures shall be kept in separate account and shall not be diverted for other purpose. Year-wise expenditure shall be reported to the SEIAA, Odisha and MoEF & CC, Govt. of India and its concerned Regional Office.
3. Officials from the Regional Office of MoEF & CC, Bhubaneswar who would be monitoring the implementation of environmental safeguards should be given full cooperation, facilities and documents/data by the project proponents during their inspection.
4. In the case of any change(s) in the scope of the project, the project would require a fresh appraisal by the SEIAA, Odisha.
5. The SEIAA, Odisha reserves the right to add additional safeguard measures subsequently, if found necessary, and to take action including revoking of the environment clearance under the provisions of the Environmental (Protection) Act, 1986, to ensure effective implementation of the suggested safeguard measures in a time bound and satisfactory manner.
6. All other statutory clearances such as the approvals for storage of diesel from Chief Controller of Explosives, Fire Department, Civil Aviation Department, the Forest Conservation Act, 1980 and the Wildlife (Protection) Act, 1972 etc. shall be obtained, as applicable by project proponents from the respective competent authorities.
7. These stipulations would be enforced among others under the provisions of the Water (Prevention and Control of Pollution) Act, 1974, the Air (Prevention and Control of Pollution) Act 1981, the Environment (Protection) Act, 1986, the Public Liability (Insurance) Act, 1991 and the EIA Notification, 2006.

8. The project proponent shall advertise in at least two local Newspapers widely circulated in the region, one of which shall be in the vernacular language informing that the project has been accorded Environmental Clearance and copies of clearance letters are available with the State Pollution Control Board and may also be seen on the website of the SEIAA, Odisha. The advertisement shall be made within Seven days from the date of receipt of the Clearance letter and a copy of the same shall be forwarded to the Regional Office of MoEF & CC, Bhubaneswar.
9. Any appeal against this clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.
10. A copy of the clearance letter shall be sent by the proponent to concerned Panchayat, ZillaParisad/Municipal Corporation, Urban Local Body and the Local NGO, if any, from whom suggestions/ representations, if any, were received while processing the proposal. The clearance letter shall also be put on the website of the company by the proponent.
11. The proponent shall submit/upload six monthly reports on the status of compliance of the stipulated EC conditions, including results of monitored data on their website and shall also update the same on the website of MoEF & CC periodically. It shall simultaneously be sent to the Regional Office of MoEF & CC, the respective Zonal Office of CPCB and the SPCB. The criteria pollutant levels namely; SPM, RSPM, SO_2, NO_x (ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the project shall be monitored and displayed at a convenient location near the main gate of the company in the public domain.
12. The environmental statement for each financial year ending 31st March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of EC conditions and shall also be sent to the respective Regional Offices of MoEF & CC by E-mail.

Yours faithfully,

Member Secretary

Memo No 6456/SEIAA / Dt. 12.10.18

Copy to

1. Joint Secretary (Environment), Ministry of Environment, Forests and Climate Change Govt. of India, Indira Paryavaran Bhavan, Jor Bagh Road, Aliganj, New Delhi-110003 for information.
2. Additional Chief Secretary, Forests & Environment Dept., Government of Odisha for information.
3. Member Secretary, State Pollution Control Board, Odisha, Paribesh Bhawan, A/118, Nilakantha Nagar, Unit-8, Bhubaneswar for information.
4. Additional Principal Conservator of Forests, Regional Office (EZ), Ministry of Environment & Forests, A-31, Chandrasekharpur, Bhubaneswar for information.
5. Chairman, Central Pollution Control Board, CBD-cum-office Complex, East Arjun Nagar, New Delhi-110032 for information.

6. Member Secretary, CGWA, 18/11, Jamnagar House, ManSingh Road, New Delhi-110011 for information.
7. Collector, District Magistrate, Khordha, for kind information and necessary action.
8. Chairman/Member/Member Secretary, SEIAA for kind information.
9. Chairman, SEAC/Secretary, SEAC, Paribesh Bhawan, A/118, Nilakantha Nagar, Unit-VIII, Bhubaneswar for kind information.
10. Guard file for record.

Member Secretary

ANNEXURE-4

OFFICE OF THE EXECUTIVE ENGINEER
P.H. DIVISION-II, BHUBANESWAR.

No. 10267 / Date: 6.9.18

To,

M/S Paramitra Smartinfra Pvt. Ltd.
Sr. Executive Rahul Choudhary
Plot No.-133, Near Bilasini Mandap,
Chandrasekharpur, Bhubaneswar

Sub: Issue of NOC for Water Supply & Sewerage connection to proposed 2540 Dwelling units of G+4 storied Residential Apartment Building for Economic Weaker Section of the Society over plot No. – 321(P), Mouza – Chandrasekharpur, Bhubaneswar.

Ref: - Your application on dt. 04.07.2018.

Sir,

With reference to above, I would like to intimate you that the required quantity of water for your proposed Residential Apartment Building of BDA for Economic Weaker Section of the Society over Plot no. mentioned above can be supplied from the existing public water supply system of PHED on metering basis only & you are requested to construct the storage sump accordingly to meet your daily demand.

Regarding Sewerage disposal system you are requested to construct required capacity of STP in your premise & the effluent is to be discharge to the nearby main Hole. As such after obtaining approval from Bhubaneswar Development Authority, As per the availability you shall have to apply for availing both water supply and sewerage connection in proper form to the Assistant Executive Engineer P.H. Rent Sub-division Satyanagar Bhubaneswar as per water works (ULB) rules 1980 as amended from time to time. As such this office has no objection if BDA approves the said building plan.

Non compliance to the above as well as deviation to the Water Work Rule shall make you liable for action by the competent authority as per existing laws/rules of Govt. statutory authority.

1. You should take permission from Central Ground Water Authority/ Central Ground Water Board / Water Resource Deptt for abstraction of ground water for drinking/domestic purposes.
2. After getting approval from BDA and having own W/S arrangement, you should get the W/S samples tested in any Govt. approved laboratory for potability of water and submit the authenticated test report on every quarter to the concerned Assistant Engineer of PHED of the locality.
3. The treated effluent quality of sewage shall confirm to the effluent standard stipulated by the State / Central Pollution Control Board & relevant B.I.S. specification.
4. Under no circumstances effluent of septic tank/STP is to be discharged into the existing natural Nullah / water body. You should construct a captive Sewage Treatment Plant of required daily liquid treatment capacity. The sewerage system should confirm the requirements stipulated in CPHEEO manual.
5. You should also ensure that under no circumstances the environment is polluted due to non functioning /under performance of your sewerage system.
6. Non–compliance to the above conditions as well as deviation to the undertaking furnished in the form of affidavit shall make you liable for action by the competent authority as per existing laws / rules of Govt. statutory authority.

Yours faithfully,

6/9/18

Executive Engineer (P.H.)

6/9/18

Memo No. _____/ date_____

Copy submitted to the Superintending Engineer P.H. Circle, Bhubaneswar for favour of kind information.

Executive Engineer (P.H.)

Memo No. 10269 / date 6-9-18

Copy submitted to **Planning Member, Bhubaneswar Development Authority, Bhubaneswar for information.**

6/9/18

Executive Engineer (P.H.)

6/9/18

Memo No. _____/ date_____

Copy forwarded to the Executive Engineer, Bhubaneswar Municipal Corporation, Division No. I, Bhubaneswar for information.

Executive Engineer (P.H.)

Memo No. _____/ date_____

Copy forwarded to the Executive Engineer, P.H. Division – III, Bhubaneswar for information with reference to his Letter No- 3886 / Dt.28.06.2018.

Executive Engineer (P.H.)

Memo No. _____/ date_____

Copy to the Assistant Executive Engineer, P.H. Rent Sub-Division, Bhubaneswar for information.

Executive Engineer (P.H.)

Memo No. _____/dt._____

Copy forwarded to the Sr. Environment Engineer, State Pollution Control Board, A/118, Parivesh Bhawan, Nilakantha Nagar, Bhubaneswar for information.

Executive Engineer (P.H.)

Memo No. _____/dt._____

Copy forwarded to the Nodal Officer of CGWA in Central Ground Water Board, Bhujal Bhaban, Bhubaneswar-751001 for kind information & necessary action.

Executive Engineer (P.H.)

* * *

ANNEXURE-5

Phone : 0674- 2431253
Fax : 0674 – 2432895
E_mail :bmcbbsr@sancharnet.in

Bhubaneswar Municipal Corporation

No 11612 / Date 08.04.19

[File No. XI-PW(Div-I)-20/2019]

To

Mr. Rahul Choudhury,
Sr. Executive (Project)
Paramitra Smart Infra Private Ltd.,
Plot No. 133, District Centre,
Near Bilasini Mandap, Chandrasekharpur,
Bhubaneswar-751021, Khordha.

Sub: Issue of Administrative NOC for the Affordable Housing Project over Plot No. 321, Khata No. 619, Mouza-Chandrasekharpur over 20.21 Acres on PPP Mode under Model-III of the "Housing for All Policy" of Government of Odisha.

Ref: (i) Your Letter No. PSPL/BMC/CSP/2018-19/07 Dt. 06.03.2019
(ii) BDA Letter No. 23083-AL-IV(PPP)-07/15 (Pt.-II) Dt. 10.10.2017 & 23230-AL-IV(PPP)-07/15 (Pt.-II) Dt. 10.10.2018

Sir,

With reference to the subject cited above, it is to inform you that Administrative NOC is hereby given for the Affordable Housing Project over Plot No. 321, Khata No. 619, Mouza-Chandrasekharpur over 20.21 Acres on PPP Mode under Model-III of the "Housing for All Policy" of Government of Odisha with the following terms and conditions. The said conditions should be adhered and followed strictly;

1. Under no circumstances, untreated sewerage system should be connected to the drainage system either by gravity flow or through pumping arrangement.
2. For solid waste management and mosquito menace prevention & control activities, the agency and/or its Successor for the project or the Residents' Society to be constituted as per rules/guidelines, as applicable, should abide by the instructions of City Health Officer, BMC or any other official/agency declared/designated by BMC to perform such functions/activities.
3. These terms and conditions are not exhaustive. The agency and/or its Successor for the project or the Residents' Society to be constituted as per guidelines/rules should also abide by the other rules/regulations/enforcement activities of the corresponding authorised Govt. Organisations and act/respond accordingly.
4. NOC for Storm Water Disposal is to be obtained from BMC which is under observation.

Yours faithfully,

City Engineer
Bhubaneswar Municipal Corporation

bmc/1552/10

Phone : 0674- 2431253
Fax : 0674 – 2432895
E_mail :bmcbbsr@sancharnet.in

Bhubaneswar Municipal Corporation

Memo No. 11613 /Date 08.04.19

Copy forwarded to the Planning Member, Bhubaneswar Development Authority for information and necessary action.

8/4/19

City Engineer
Bhubaneswar Municipal Corporation

Memo No. 11614 /Date 08.04.19

Copy forwarded to Steno to Commissioner for kind information of Commissioner.

8/4/19

City Engineer
Bhubaneswar Municipal Corporation

ANNEXURE-6

DIRECTORATE GENERAL
FIRE SERVICE, HOME GUARDS AND CIVIL DEFENCE, ODISHA
NUAPATNA, CUTTACK-753001

***

FORM-II

[See rule-12 (5)]

Fire Safety Recommendation

File No. C-897-2018

1.	**Address of the proposed building/premises**	:-	Proposed G+4 storeyed affordable housing project in Mouza-Chandrasekharpur, Bhubaneswar, Dist-Khurda.
2.	**Name and Address of the Applicant**	:-	Sri Rahul Choudhary, Sr. Executive-Projects, Paramitra Smart Infra Private Limited, Plot No.133, District Centre, Chandrasekharpur, Bhubaneswar-751021
3.	**Date of Receipt of Application**	:-	10th May 2018.
4.	**Proposed occupancy (Type of building)**	:-	Block-Type-1 (62 Nos.), Type-2 (01 No.) and multi-purpose amenities centre (incidental occupancy-04 Nos.) are coming under Residential category of occupancy as per NBCI-2016 and Bhubaneswar Development Authority (Planning and Building Standards) Regulations, 2018. 01 Block of neighborhood shopping complex is coming under Commercial category of occupancy as per Bhubaneswar Development Authority (Planning and Building Standards) Regulations, 2018 and Mercantile-Group-F as per NBCI-2016.
5.	**Area with plot Number and. khata Number**	:-	Plot area-50694 m^2, Plot Number-321 (P), Khata Number-619, Mouza-Chandrasekharpur, Bhubaneswar
6.	**Date of Inspection**	:-	27th June - 2018

A. Recommendation:

As per the plan the site is approachable by fire service vehicle with 18 mtr abutting road.

As per the plan, floor-wise details of the buildings are as follows: -

- **Block Type-1 (62 Blocks) & Block Type-2- (01 Block) :- G+4th floors each block**

1. ***Typical Floor Ground to 4th floor***—Apartment houses.

- **Multi Purpose Amenities Center(04 Blocks)-G+2nd floors (Minor Occupancy to Main Occupancy) i.e. Residential**

1. ***Ground floor***—Indoor Play area, Anganbadi & Learning Center
2. ***1st Floor***-Library, Lecture Hall

3. ***2nd floor***-Multi Purpose Hall

➢ **Neighborhood Shopping Complex(01 Block) -G+2nd floors (Mercantile)**

1. ***Typical Floor Ground to 2nd floor***—Shop

The fire Safety Recommendations for said buildings are as under which are required to be complied: -

A. **ACCESS WAYS, OPEN SPACE, EXITS AND MEANS OF ESCAPE**:-

The width of the main entrance to the plot shall not be less than 06 mtrs. If compound wall is constructed then the entrance gate shall fold back against the compound wall of the premises. If the main entrance at the boundary wall is built over, the minimum clearance shall be 05 mtrs.

The height of the proposed Residential Buildings (Block-Type-1 & Type-2) will be 14.70 mtrs, proposed Multi Purpose Amenities Center building will be 9.45 mtr and Neighborhood Shopping Complex will be 9.6 mtr above the ground level.

As observed from the plan 63 numbers of affordable housing projects, 04 numbers multi-purpose amenities centre and 01 number of neighborhood shopping complex are proposed to be constructed in 03 patches. Provision of Open Spaces for individual blocks as shown in the plan varies between 02 to 04 mtrs. Besides, there is provision of 06 mtrs wide Open Space all around individual patches has been shown in the plan.

But, as per Bhubaneswar Development Authority (Planning and Building Standards) Regulations, 2018, open space required around the individual blocks are as follows: -

Front-04 mtrs., **Rear**-03 mtrs., **Left**-2.5 mtrs., **Right**-2.5 mtrs

However, BDA, Bhubaneswar may take appropriate decision as regards to open space applicable for said blocks as per provisions of Chapter-VIII (Overlay Regulations) of Bhubaneswar Development Authority (Planning and Building Standards) Regulations, 2018 for affordable housing projects.

The above required compulsory open space (as per BDA Regulations) around the blocks shall be free from obstruction at all time and shall be made hard surface. The internal access way of width not less than 06 mtrs within the plot having accessibility to individual blocks shall be provided and same shall be flushed with road level and have load bearing capacity 45 ton minimum.

Adequate exits and protected escape routes shall be provided in the buildings on all floors to enable its occupants to reach place of safety in case of emergency. The width of the exit doorways shall not be less than 01 mtr each. The travel distance to an exit on any floor shall not exceed 30 mtrs. in the case of neighborhood shopping complex block and 20 mtrs in case of other blocks. At least half of the required exit stairs from the upper floor shall discharge directly to the exterior or through the exit passageways. Corridors & Passageways in the buildings shall be of width not less than the calculated aggregate width of exit doorways leading from them in the direction of travel to the exit. However, the minimum width of corridor shall not be less than 01 mtr for single loaded and 1.8 mtrs for double loaded residential blocks and the same shall not be less than 1.5 mtrs for neighborhood shopping complex block. If there is a central corridor, the doors of rooms shall open inwards to permit smooth flow of traffic in the corridor. All the exits and exit passageways shall have a clear height of at least 2.4 mtrs. The minimum required number of exits on every floor of the building and their dimensions shall be determined as per clause-4.2.1 to 4.4.2.4.2 of Part-IV, NBCI-2016 & BDA Regulations.

The escape routes should be well ventilated and provided with safety lighting and free from obstructions. Exits shall be clearly visible and the routes to reach the exit shall be clearly marked and sign posted to guide the population of the floor concerned. Signs shall be illuminated and wired to an independent electrical circuit on an alternative source of supply. The colour of exit signs shall be green. Exit signs shall be provided such that no point in an exit access is more than 30 mtrs. from a visible exit directional sign. Provision

of escape lighting and exit signage shall be made in accordance to Clause-3.4.7.1 to 3.4.7.4 of Part-4, NBCI-2016 & relevant BIS.

B. CONSTRUCTION: - Non-combustible materials of appropriate fire resistance rating shall be used for construction of the building. Load bearing steel beams & columns of building having total covered area of 500m^2 & above shall be protected against failure/collapse of structure in case of fire. A door way or opening in a fire resistance wall on any floor shall be limited to 5.6 m^2 in area with a maximum height/width of 2.75 mtrs. Every wall opening shall be protected with fire resisting doors, having the fire rating of not less than 120 min. The openings in the floors shall be protected by vertical enclosures extending above and below such openings, such enclosures having a fire resistance of not less than 120 min. The vertical enclosures shall have a clear height of 2100 mm in the exit access.

The use of mirror shall not be permitted for enclosures for exits & exit passage way. The glazing & glass façade shall be done in accordance with Clause-3.4.10 of Part-IV, NBCI-2016 & Bhubaneswar Development Authority (Planning and Building Standards) Regulations-2018.

Refuse chutes, if any provided in the buildings, shall have an enclosure wall of non-combustible material with fire resistance of not less than 120 min. Sprinkler protection system shall be provided for the refuse chutes.

C. STAIRCASE: - As shown in the plan there is provision of one and two Staircases in each block of the Residential Block Type-1 and Type-2 respectively. Similarly, two staircases in Shopping Complex and 01 staircase in Multi Purpose Amenities Center building have been proposed. However, as per Regulation-57 (3) (Chapter-V, requirement of Special Occupancy) of Bhubaneswar Development Authority (Planning and Building Standards) Regulations-2018, there is requirement of at least two staircases for every six dwelling units or fraction thereof in a floor of apartment houses. As per plan, provision of eight dwelling units in each floor of Block-Type-1 have been proposed for which, at least two staircases are required. Hence, the building plans may be modified accordingly or BDA, Bhubaneswar may take appropriate decision as per the relevant rules / regulations applicable for Affordable Housing Projects.

The minimum width of treads without nosing shall be 30 cm for neighborhood shopping complex and 25 cm for residential occupancy in an internal staircase. The treads shall be constructed and maintained in a manner to prevent slipping. The maximum height of riser shall be 15 cm for neighborhood shopping complex and 19 cm for residential buildings. Construction of staircases & their dimension shall be as per Clause-4.4.2.4.3.1 to 4.4.2.4.3.4 of Part-IV, NBCI-2016 & Bhubaneswar Development Authority (Planning and Building Standards) Regulations, 2018. The internal staircases not constructed with external wall shall be pressurized and with external wall shall be naturally ventilated or pressurized. The entrance to staircase lobby at each floor of neighborhood shopping complex building shall be through a fire check door. Pressurization of the staircases shall be done as per the provisions given in Clause-4.4.2.5 of Part-4, NBCI-2016.

D. ELECTRICAL INSTALLATION: - It is desirable that the wiring and cabling are with flame retardant property. Medium and low voltage wiring running in shafts, and within false ceiling shall run in metal conduit. Any 230 V wiring for lighting or other services, above false ceiling, shall have 660V grade insulation.

The electric distribution cables/wiring shall be laid in a separate shaft. The shaft shall be sealed at every floor with fire stop materials having the same fire resistance as that of the floor. High, medium and low voltage wiring running in shaft and in false ceiling shall run in separate shaft/conduits. Any other service line shall not be laid in the duct used for electrical cables. An independent, ventilated or air conditioned MV panel room shall be provided on the ground level. This room shall be provided with access from outside. The MV panel room shall be provided with fire resistant walls and doors of fire resistance of not less than 120 min. Electrical MV main distribution panel and lift panels shall be provided with CO_2/inert gas flooding system for all panel compartments with a cylinder located beside the panel. A substation or a switch station with oil filled equipment shall not be allowed to be functional inside the building. All transformers of capacity more than 10

MVA shall be protected by high velocity water spray systems or nitrogen injection system. Transformers if located inside a building shall be of dry type & all sub-station / switch room walls, ceiling, floor, opening, including doors shall have a fire resistance rating of 120 min. Access to the sub-station shall be provided from the nearest fire exit/exit staircase for the purpose of electrical isolation. Diesel generator set (s) shall not be installed at any floor other than ground floor. If same are installed indoors, proper ventilation and exhaust shall be planned. The D.G. Set room shall be separated by 120 min fire resistance rated walls & doors. Provision for lightning protection shall be made in the building. Routing of down conductors of lightning protection shall not be made through electrical or other service shafts.

The specific requirements for electrical installations from fire safety point of view shall be in accordance to Part-8 of NBCI-2016, National Electrical Code-2011 and relevant BIS specifications.

E. SERVICE DUCTS & SHAFTS: - Openings in walls or floors which are necessary to be provided to allow passages of all building services like cables, electrical wirings, telephone cables, plumbing pipes, etc. shall be protected by enclosure in the form of ducts / shafts having a fire resistance not less than 120 min. The inspection door for electrical shafts / ducts shall be not less than 120 min rating and that in case of plumbing shafts that shall be not less than 30 min. rating. Further, medium & low voltage wiring running in shafts / ducts shall either be armoured type or run through metal conduits. The space between the electrical cables / conduits and the walls / slabs shall be filled in by a fire stop material having fire resistance rating of not less than 120 min. Provision of Service ducts & shafts in the buildings shall be made in accordance withClause-3.4.5.4 of Part-4, NBCI-2016.

F.STANDBY SOURCE OF POWER SUPPLY: - There shall be provision for dedicated emergency power supply to fire pumps, pressurization system, emergency lighting, escape route lighting, exit signage, public address system, lighting in fire command center, magnetic door hold open devices, etc. The power supply to the panel /distribution board of these fire and life safety systems shall be through fire proof enclosures or circuit integrity cables or through alternate route in the adjoining fire compartment to ensure supply of power is reliable to these systems and equipment. Cables for fire alarm and PA system shall be laid in metal conduits or armoured to provide physical segregation from the power cables.

G. LIGHTNING PROTECTION: - Provision for lightning protection shall be made in the proposed building incorporating to NBCI-2016 and relevant BIS specifications. Routing of down conductors of lightning protection shall not be made through electrical or other service shafts.

H. FIXED FIRE FIGHTING INSTALLATIONS FOR RESIDENTIAL BUILDINGS (BLOCK-TYPE-1 AND TYPE-2) AND MULTI-PURPOSE AMENITIES CENTRE: -

The following fixed fire fighting installations are required to be provided in the building as per NBCI-2016 and relevant BIS specifications.

i. **FIRE EXTINGUISHER**:-The exact requirement/types of fire extinguishers will be suggested after completion of construction of each block of the proposed building before occupation.

ii. **FIRST-AID HOSE REEL**: - The distribution of first-aid hose reel installation in each block of the building shall be so situated as not to be farther than 30 mtrs from any point in the area covered and First-aid hose reels shall not be more than 50 mtrs apart in horizontal.

iii. **TERRACE PUMPS**:- One Terrace pump of capacity 450 LPM shall be provided at top of each block of the proposed building for firefighting purpose. The pump is to be operated automatically or manually either from the usual supply of Electricity or from the stand by power supply (Generator) in case of failure of usual electrical supply.

iv. **TERRACE TANK**: - Terrace tank of 5,000 ltrs. capacity shall be provided at the top of the each block for firefighting purpose. It should be ensured that water in the tank is not utilized for any other purpose other than firefighting. The terrace tank should be connected to rising mains.

I. FIXED FIRE FIGHTING INSTALLATIONS FOR NEIGHBORHOOD SHOPING COMPLEX: -

The following fixed fire fighting installations are required to be provided in the building as per NBCI-2016 and relevant BIS specifications.

i. **FIRE EXTINGUISHER**:-The exact requirement/types of fire extinguishers will be suggested after completion of construction of each block of the proposed building before occupation.

ii. **FIRST-AID HOSE REEL**: - The distribution of first-aid hose reel installation in each block of the building shall be so situated as not to be farther than 30 mtrs from any point in the area covered and First-aid hose reels shall not be more than 50 mtrs apart in horizontal.

iii. **DOWN COMER**: - This is an arrangement within the building by means of down-comer pipe (s) on each floor connected to terrace tank through terrace pump, gate valve and non-return valve and having mains not less than 100 mm internal diameter with landing valves on each floor / landing. It is also fitted with inlet connections at ground level for charging with water by pumping from fire services appliances and air release valve at roof level to release trapped air inside. Down comer shall be in accordance to relevant BIS specifications. At each landing there should be provision of hose box to accommodate 02 nos. RRL Delivery hoses of 15mtrs length each of 63 mm Dia and 01 Branch pipe.

d. **MANUALLY OPERATED ELECTRONIC FIRE ALARM SYSTEM**:-Manually operated electronic fire alarm system at conspicuous places in each floor of all the three blocks including integrated basement shall be provided.

iii. **TERRACE PUMPS**:- One Terrace pump of capacity 900 LPM shall be provided at top of the building for firefighting purpose. The pump is to be operated automatically or manually either from the usual supply of Electricity or from the stand by power supply (Generator) in case of failure of usual electrical supply.

iv. **TERRACE TANK**: - Terrace tank of 25,000 ltrs. capacity shall be provided at the top of the building for firefighting purpose. It should be ensured that water in the tank is not utilized for any other purpose other than firefighting. The terrace tank should be connected to rising mains.

J. **FIRE COMMAND CENTER (FCC)**: -There shall be a Fire Command Center on entrance floor of the building having direct access. The control room shall have the main fire alarm panel with communication system (suitable public address system). The entire building shall be provided with public address system with main control operator at Fire Command Center. Fire Command Center shall have provisions as given in Clause-3.4.12 of Part-IV, NBCI-2016.

The applicant shall provide any additional fire safety requirements in future if the recommendation is issued by this office.

After completion of the construction work including installation of fixed firefighting measures as suggested, the applicant shall be required to apply for Fire Safety Certificate as per Rule 13 (1) of Odisha Fire Prevention and Fire Safety Rules, 2017, along with following documents:-

i. The applicant shall produce a certificate to be issued by the person concerned to the effect that all the provisions of Bye-Laws / Regulations of Bhubaneswar Development Authority have been incorporated in the building.

ii. The applicant shall produce a certificate of the Competent Authority concerned to the effect that electrical installations have been done as recommended and as per provisions given in Part-8 "Building Services, Section-2 Electrical and allied installations" of NBCI-2016 and Section-7 of National Electrical Code, 2011.

iii. The applicant shall produce a certificate of the agency concerned to the effect that installation of firefighting measures have been done as recommended and as per provisions given in Part-4 of National Building Code of India – 2016 and relevant BIS specifications.

By order of the Director of Fire Service

(B. B. Das)
Chief Fire Officer,
Fire Prevention Wing

Memo No. 11076 /FPW Date. 10 -07-2018

Copy to Sri Rahul Choudhary, Sr. Executive-Projects, Paramitra Smart Infra Private Limited, Plot No.133, District Centre, Chandrasekharpur, Bhubaneswar-751021 for information and necessary action.

Chief Fire Officer,
Fire Prevention Wing

Memo No. 11077 /FPW Date. 10 -07-2018

Copy to Fire Officer, Central Range, Cuttack for information.

Chief Fire Officer,
Fire Prevention Wing

Memo No. 11078 /FPW Date. 10 -07-2018

Copy to Deputy Fire Officer, Bhubaneswar Circle, Bhubaneswar for information with reference to his letter no.1418/BBS. CIR dt.09.06.2018.

Chief Fire Officer,
Fire Prevention Wing

Memo No. 11079 /FPW Date. 10 -07-2018

Copy to Secretary-cum-Member Estate, Bhubaneswar Development Authority, Bhubaneswar for information with reference to his letter no.16467 dt.07.06.2018 (AL-IV [PPP] – 07/15 {Pt. – II}).

Chief Fire Officer,
Fire Prevention Wing

302/17

ANNEXURE-7

भारतीय विमानपत्तन प्राधिकरण
AIRPORTS AUTHORITY OF INDIA

Ms Paramitra Smart Infra Pvt.ltd
plot no 133 district center
Chandrasekhar Pur Bhubaneswar

Date: 11-07-2017
Valid Upto: 10-07-2022

No Objection Certificate for Height Clearance

1. This NOC is issued by Airports Authority of India (AAI) in pursuance of responsibility conferred by and as per the provisions of Govt. of India (Ministry of Civil Aviation) order GSR751 (E) dated 30th Sep. 2015 for Safe and Regular Aircraft Operations.

2. This office has no objection to the construction of the proposed structure as per the following details:

NOC ID :	**BHUB/EAST/B/062917/228928**
Applicant Name*	**Rahul Choudhary**
Site Address*	**plot no 321 p ChandarsekharPur Bhubaneswar,ChandrasekharPur,Bhubaneshwar,Orissa**
Site Coordinates*	**85 48 12.103-20 19 18.958, 85 48 14.612-20 19 15.751, 85 48 25.453-20 19 12.681, 85 48 26.87-20 19 22.46,**
Site Elevation in mtrs AMSL as submitted by Applicant*	**82.561 M**
Permissible Top Elevation in mtrs Above Mean Sea Level(AMSL)	**182 M (Restricted)**

*As provided by applicant

3. This NOC is subject to the terms and conditions as given below:

a. Permissible Top elevation has been issued on the basis of Site coordinates and Site Elevation submitted by Applicant. AAI neither owns the responsibility nor authenticates the correctness of the site coordinates & site elevation provided by the applicant. If at any stage it is established that the actual data is different, this NOC will stand null and void and action will be taken as per law. The office in-charge of the concerned aerodrome may initiate action under the Aircraft (Demolition of Obstruction caused by Buildings and Trees etc.) Rules, 1994"

b. The Structure height (including any superstructure) shall be calculated by subtracting the Site elevation in AMSL from the Permissible Top Elevation in AMSL i.e. Maximum Structure Height = Permissible Top Elevation minus (-) Site Elevation.

c. The issue of the 'NOC' is further subject to the provisions of Section 9-A of the Indian Aircraft Act, 1934 and any notifications issued there under from time to time including the Aircraft (Demolition of Obstruction caused by Buildings and Trees etc.) Rules,1994.

d. No radio/TV Antenna, lighting arresters, staircase, Mumtee, Overhead water tank and attachments of fixtures of any kind shall project above the Permissible Top Elevation of 182 M (Restricted) , as indicated in para 2.

राजीव गांधी भवन
Rajiv Gandhi Bhawan
सफदरजंग हवाई अड्डा नई दिल्ली–110003
Safdarjung Airport, New Delhi-110003
दूरभाष : 24632950
Phone: 24632950

302/17

भारतीय विमानपत्तन प्राधिकरण
AIRPORTS AUTHORITY OF INDIA

e. Only use of oil fired or electric fired furnace is permissible, within 8 KM of the Aerodrome Reference Point.

f. The certificate is valid for a period of 5 years from the date of its issue. If the construction of structure/Chimney is not commenced within the period, a fresh 'NOC' from the Designated Officer of Airports Authority of India shall be obtained. However, if construction work has commenced, onetime revalidation request, for a period not exceeding 8 years from the date of issue of NOC in respect of building/structure and for a period not exceeding 12 years from the date of issue of NOC in respect of chimney, may be considered by AAI. The date of completion of the Structure should be intimated to this office.

g. No light or a combination of lights which by reason of its intensity, configuration or colour may cause confusion with the aeronautical ground lights of the Airport shall be installed at the site at any time, during or after the construction of the building. No activity shall be allowed which may affect the safe operations of flights

h. The applicant will not complain/claim compensation against aircraft noise, vibrations, damages etc. caused by aircraft operations at or in the vicinity of the airport.

i. Day markings & night lighting with secondary power supply shall be provided as per the guidelines specified in chapter 6 and appendix 6 of Civil Aviation Requirement Series 'B' Part I Section 4, available on DGCA India website: www.dgca.nic.in

j. The applicant is responsible to obtain all other statutory clearances from the concerned authorities including the approval of building plans. This NOC for height clearances is to ensure the safe and regular aircraft operations and shall not be used as document for any other purpose/claim whatsoever, including ownership of land etc.

k. This NOC has been issued w.r.t. the Civil Airports. Applicant needs to seek separate NOC from Defence, if the site lies within their jurisdiction.

l. In case of any discrepancy/interpretation of NOC letter, English version shall be valid.

m. In case of any dispute w.r.t site elevation and/or AGL height, top elevation in AMSL shall prevail.

12.07.17

महाप्रबंधक (एटीएम) पू.क्षे./Gen. Mgr (ATM)ER
भा.वि.प्रा., ने.सु.च.चो.अ. हवाई अड्डा
A.A.I., N.S.C.B.I. Airport
कोलकाता/Kolkata-700052

Chairman NOC Committee

Region Name: EAST

Address: General Manager Airports Authority of India, Regional Headquarter, Eastern Region, N.S.C.B.I Airport, Kolkata-700052

Email ID: gmatmer@aai.aero

Contact No: 033-25111293

राजीव गांधी भवन
Rajiv Gandhi Bhawan
सफदरजंग हवाई अड्डा नई दिल्ली–110003
Safdarjung Airport, New Delhi-110003
दूरभाष : 24632950
Phone: 24632950

12/7/17

Population Breakup

Annexure-8

S. No.	Description	Area / Rooms/Units	Occupancy
1	EWS UNITS	2600	10400
2	Multipurpose Hall	875	1313
3	Shops at Ground Level	290.45	1687
a	visitors		170
b	Staff		10
3	Shops at Above ground	1205	3615
a	visitors		362
b	Staff		10
4	KIOSK	240	240
	Total		17807

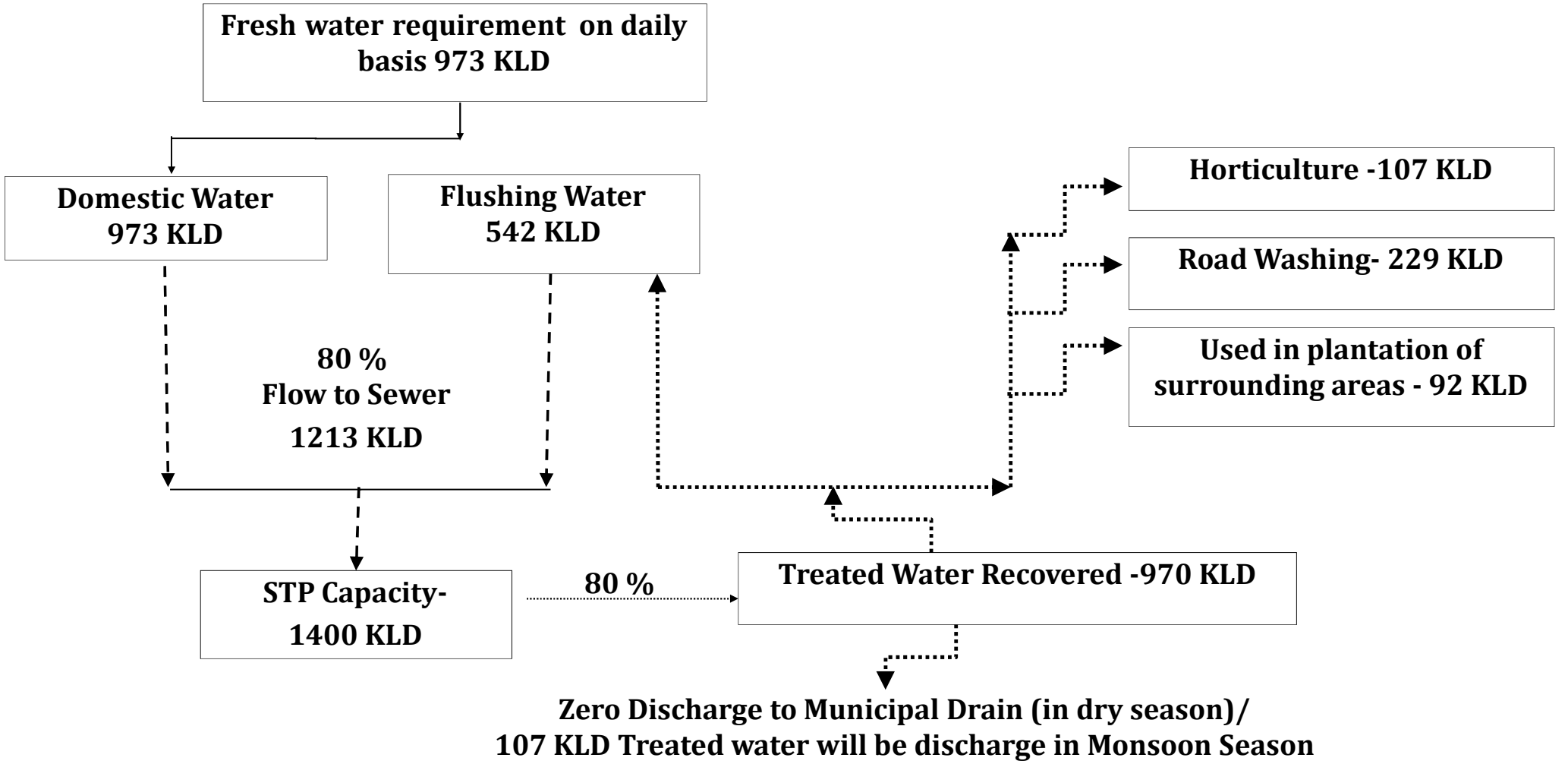
Water Requirement for the Proposed Project

Annexure-8

S. No.	Description	Area / Rooms/ Units	Occupancy	Total water requirement				Waste Water Generate		
				Domestic Water		Flushing Water		Domestic	Flushing	Total
				LPCD	LPD	LPCD	LPD	LPD	LPD	LPD
1	EWS UNITS	2600	10400	90	936000	45	468000	748800	374400	1123200
2	Multipurpose Hall	875	1313	5	6565	10	13130	5252	10504	15756
3	Shops at Ground Level	290.45	1687	5	8435	10	16870	6748	13496	20244
a	visitors		170	5	850	10	1700	680	1360	2040
b	Staff		10	25	250	20	200	200	160	360
3	Shops at Above ground	1205	3615	5	18075	10	36150	14460	28920	43380
a	visitors		362	5	1810	10	3620	1448	2896	4344
b	Staff		10	25	250	20	200	200	160	360
4	KIOSK	240	240	5	1200	10	2400	960	1920	2880
	Total		17807		973435		542270	778748	433816	1212564
	Say (KLD)				973 KLD		542 KLD			1213 KLD

Water Balance Chart

Annexure-8



Water storage details and quality report

WATER STORAGE DETAILS

•FOR RESIDENTIAL BUILDING & MAC

TERRACE PUMPS:- One Terrace pump of capacity 450 LPM shall be provided at top of each block of the proposed building for firefighting purpose. The pump is to be operated automatically or manually either from the usual supply of Electricity or from the stand by power supply (Generator) in case of failure of usual electrical supply.

TERRACE TANK: - Terrace tank of 5,000 ltrs. capacity shall be provided at the top of the each block for firefighting purpose. It should be ensured that water in the tank is not utilized for any other purpose other than firefighting. The terrace tank should be connected to rising mains.

•NEIGHBORHOOD SHOPING COMPLEX

TERRACE PUMPS:- One Terrace pump of capacity 900 LPM shall be provided at top of the building for firefighting purpose. The pump is to be operated automatically or manually either from the usual supply of Electricity or from the stand by power supply (Generator) in case of failure of usual electrical supply.

TERRACE TANK: - Terrace tank of 25,000 ltrs. Capacity shall be provided at the top of the building for firefighting purpose. It should be ensured that water in the tank is not utilized for any other purpose other than firefighting. The terrace tank should be connected to rising mains.

WATER QUALITY REPORT

Sl. No.	Parameter	Test Method	Result	Units
1	Colour	IS: 3025 (P-4)	< 5.0	Hazen
2	Odour	IS: 3025 (P-5)	Unobjectionable	-
3	Taste	IS: 3025 (P-7)	Agreeable	-
4	Turbidity	IS: 3025 (P-10)	< 2.0	NTU
5	pH	IS: 3025 (P-11)	7.1	-
6	Total Hardness (as CaCO3)	IS: 3025 (P-21)	236	mg/l
7	Calcium (as Ca)	IS: 3025 (P-40)	65.8	mg/l
8	Iron (as Fe)	IS: 3025 (P-53)	< 0.1	mg/l
9	Chloride (as Cl)	IS: 3025 (P-32)	37.1	mg/l
10	Residual Free Chlorine	IS: 3025 (P-26)	< 0.2	mg/l
11	Fluoride (as F)	IS: 3025 (P-60)	< 1.0	mg/l
12	Total Dissolved Solids	IS: 3025 (P-16)	342	mg/l
13	Magnesium (as Mg)	IS: 3025 (P-46)	26.9	mg/l
14	Copper (as Cu)	IS: 3025 (P-42)	< 0.05	mg/l
15	Manganese (as Mn)	IS: 3025 (P-59)	< 0.1	mg/l
16	Sulphate (as SO4)	IS: 3025 (P-24)	63.4	mg/l
17	Nitrate (as NO3)	IS: 3025 (P-34)	4.2	mg/l
18	Phenolic Compounds (as C6H5OH)	IS: 3025 (P-43)	< 0.001	mg/l
19	Mercury (as Hg)	IS: 3025 (P-48)	< 0.001	mg/l
20	Selenium (as Se)	IS: 3025 (P-56)	< 0.01	mg/l
21	Arsenic (as As)	IS: 3025 (P-37)	< 0.01	mg/l
22	Cyanide (as CN)	APHA 4500 CN-C	< 0.05	mg/l
23	Lead (as Pb)	IS: 3025 (P-47)	< 0.05	mg/l
24	Zinc (as Zn)	IS: 3025 (P-49)	< 0.5	mg/l
25	Chromium (as Cr+6)	IS: 3025 (P-52)	< 0.05	mg/l
26	Alkalinity (as CaCO3)	IS: 3025 (P-23)	317	mg/l
27	Aluminium (as Al)	IS: 3025 (P-55)	< 0.03	mg/l
28	Boron (as B)	IS: 3025 (P-57)	< 0.25	mg/l
29	Cadmium (as Cd)	IS: 3025 (P-41)	< 0.01	mg/l
30	Anionic Detergents (as MBAS)	APHA 5540-C	< 0.05	mg/l
31	Total Coliform	IS: 1622	< 2	MPN/100 mL
32	E.Coli	IS: 1622	Absent	MPN/100 mL

Sewerage Treatment Plan

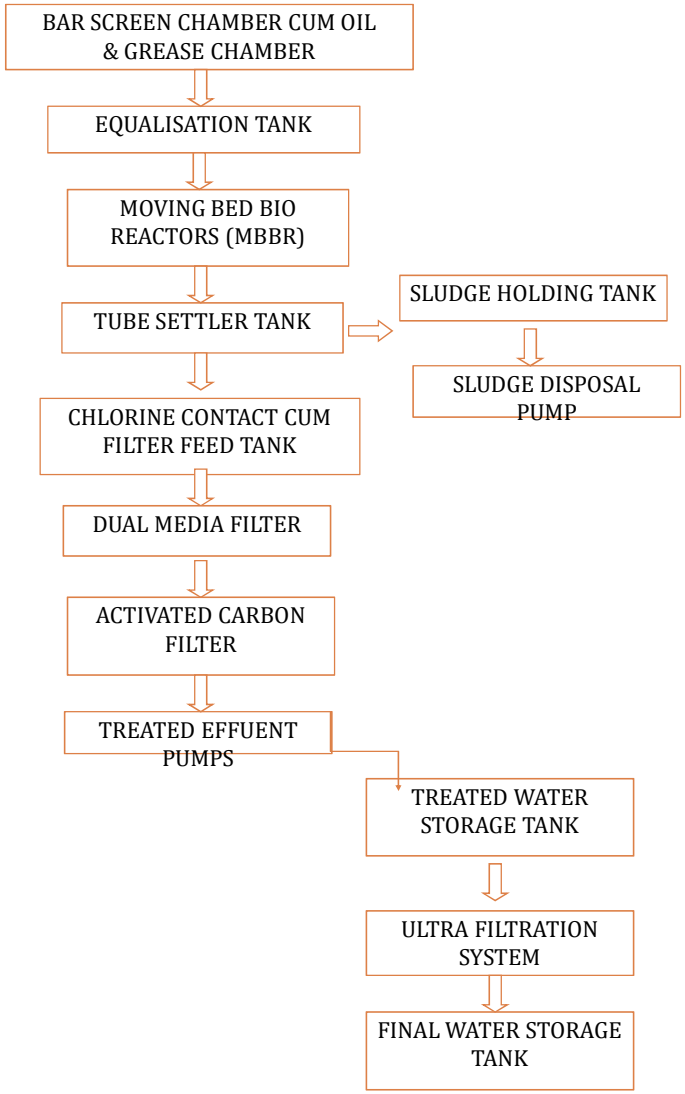
SEWAGE TREATMENT PLANT

Type of STP considered - MBBR Type
Capacity of STP - 1400 KLD
Recovery from STP -970 KLD

Physico chemical characteristics of Inlet And Outlet

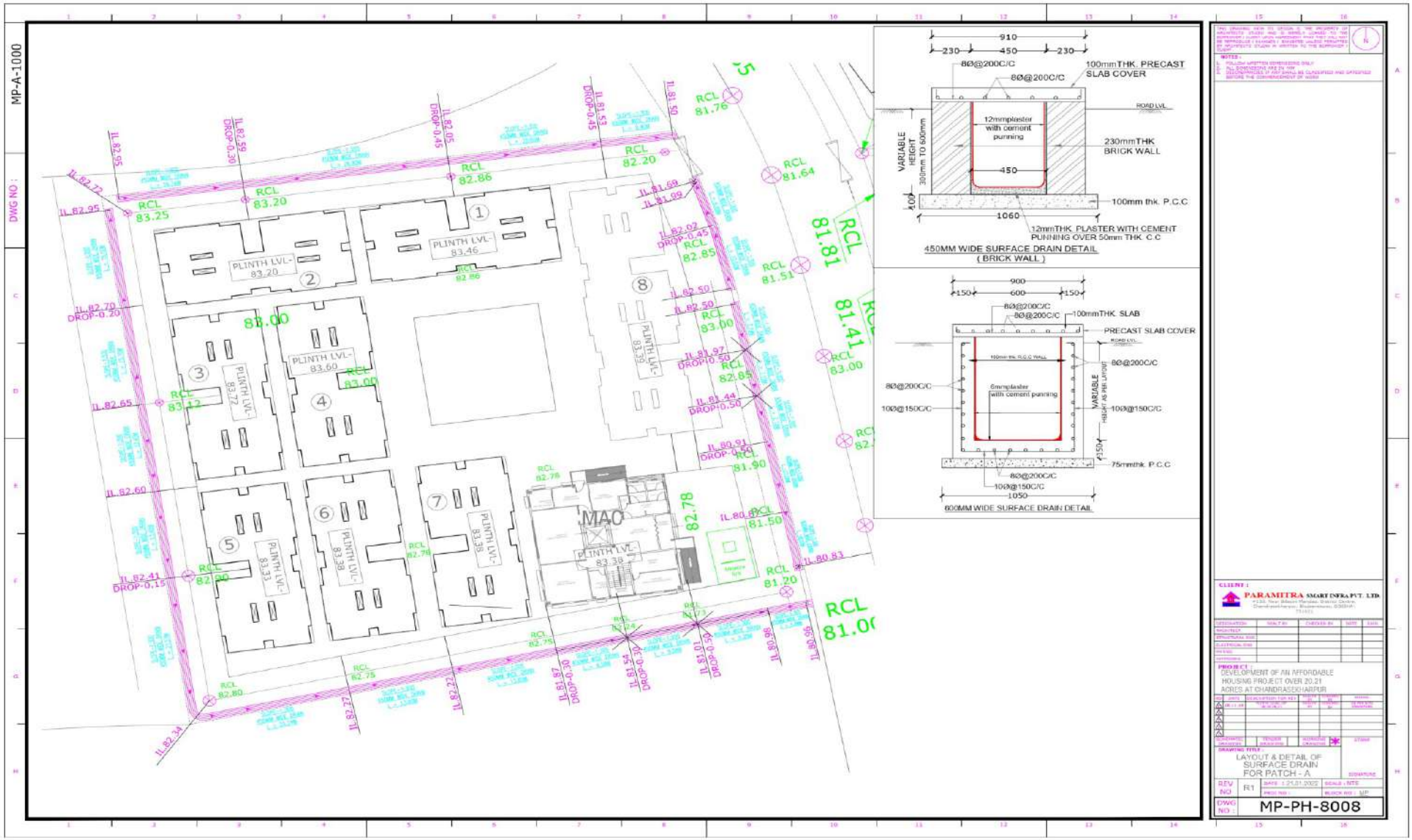
Sl. No.	Parameter	Unit	Inlet Value	Outlet Value
1.	pH	-	7.0 to 8.0	6.5 to 8.5
2.	BOD5	mg/L	300	< 10
3.	COD	mg/L	800	< 50
4.	TSS	mg/L	350	< 50
5.	O & G	mg/L	50	< 5
6.	E COLI	MPN	106 – 107 / 1000 ml	103 /1000 ml
7.	Colour		Unobjectionable	Un objectionable

SCHEMATIC PROCESS BLOCK DIAGRAM



Surface Drainage Plan

Annexure-8



Rain water Harvesting Plan

Maximum hourly rainfall = 120 mm/hr

Calculations for storm water load for recharging in Max. Rainfall

Total Run-off: Roof Top

Intensity of rainfall = 120 mm/hr
Drainage area in sqm = 19126.76 m2
Coefficient of run-off = 0.90
Therefore, runoff = 0.90 x 0.12 x 19126.76 = 2066 m3/hr

Total Run-off: Paved Surface

Intensity of rainfall = 120 mm/hr
Drainage area in sqm = 19077.62 m2
Coefficient of run-off = 0.70
Therefore, runoff = 0.70 x 0.12 x 19077.62 = 1607 m3/hr

Total Run-off: Unpaved Surface (Green belt area)

Intensity of rainfall = 120 mm/hr
Drainage area in sqm = 10155.6 m2
Coefficient of run-off = 0.15
Therefore, runoff = 0.15 x 0.12 x 10155.6 = 183 **m3/hr**
Total Runoff Load = (2066 + 1607 + 183 **) m3/hr**
= 3855 **m3/hr**

Typical Rain Water Recharge Pit Details:

- Considering coefficient for Evaporation/ Spillage and first flush etc. = 0.700
- Total Storm Water Flow = 3855 X 0.700 m3 /Hour = 2699 m3 /Hour

VOLUME OF STORM WATER

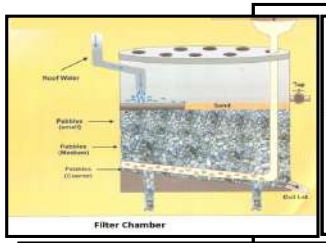
Total Storm Water Flow = 2699 m3/hr
Considering 15 minutes (0.25 Hr) Retention Period.
Volume Required = 2699 x 0.25
= 675 m3
Volume = 700 m3

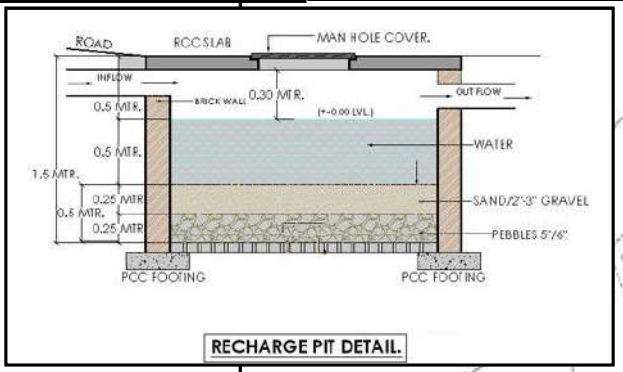
Considering 1 No. Rain Water Harvesting Pit of size 4.0 m dia and 2.5 m effective depth.

Volume of One No. Rain Water Harvesting Pit
Diameter of Pit (d) = 4.0 m
Radius (r) = 2.0 m
Water Depth (h) = 2.5 m
Volume of 1 No. Rain Water Harvesting Pit
= 2.0 x $\pi r2h$
= 2.0 x 3.14 x (2.0)2 x 2.5
= 63 m3
No. of Rain Water Harvesting Pit
Total No. of rain water harvesting pit required
= Total Volume/Volume of One Rain Water Harvesting Pit
= 700/63 m3
= 11 Nos. but provided 13 no. of recharge pit

Actual Rain Water Available on Normal Rainfall: Rainfall during monsoon = 1442 mm/yr (in 54 days)
Average daily rainfall during monsoon = 26.7 mm/day say 27 mm/day
Actual Rain Water Available on Normal Rainfall = 355145 m3
Fresh Water Requirement = 973 m3/day
Fresh Water Requirement per year = 973 x 365 = **355145 m3**/Annum
Rain Water Available during Monsoon Season = 104088 m3/year
Actual Rain Water Harvesting = 104088 / 355145 = 30 %
Expected Recharge annually to Phreatic aquifer = Around 104088 m3

Layout plan showing external rain water harvesting





Structure of Recharge pit

ANNEXURE-10

Traffic Study Report

for

"Development of an Affordable Housing Project Over 20.21 Acres at Chandrasekharpur, Bhubaneswarin Partnership with Bhubaneswar Development Authority"

[Private Public Partnership Project]

At mouza- Chandrasekharpur, Plot No: 321 (p) Khata No. 619, Bhubaneswar, District -Khordha, Odisha

By:

BHUBANESWAR DEVELOPMENT AUTHORITY

With their PPP Partner

M/s Paramitra Smart Infra Pvt. Ltd.

PSPL

At: Chandrasekharpur, Bhubaneswar, Odisha.

10.8.2022

Prof. Pravat Kumar Parhi
Professor, Civil Engg. Department
Odisha University of Technology & Research
(Formerly CET Bhubaneswar)

ANNEXURE-10

CONTENT

1. INTRODUCTION

1.1 Background

M/s. Paramitra Smart Infra Pvt. Ltd. has proposed for Environmental Clearance regarding Expansion with Modification of "Development of Affordable Housing Project" in partnership with Bhubaneswar Development Authority via PPP mode over 11.95 Acres of Plot No. 321(p), Khata No. 619, Mz- Chandrasekharpur, Bhubaneswar, District- Khordha, Odisha.

1.2 Scope

- To conduct a traffic survey of the area within 5 km of project site to capture base traffic.
- To review the traffic circulation plan considering various types of vehicles users.
- Analyze the forecast traffic in conjunction with base traffic.
- Conduct an impact analysis of project traffic as well as study impact and mitigation measures.
- Review traffic circulation to ensure proper and efficient traffic movement.
- Conduct swept path analysis at critical locations of project entry/exit to ensure safe and efficient turning maneuvers.
- Address the provision of the road signs and marking.
- To provide traffic management plan to improve the current situation of existing roads and for future aspects.

1.3 Purpose of Study

- Due to the proposed project, roads may get affected due to heavy traffic volume.
- To know the existing & future scenario of traffic volume or demand.
- To provide mitigation measures to remove any bottlenecks based on the traffic demand.

1.4 Design Parameters

The basic design parameters considered for the study has been illustrated below:

- The visitors will expect a safe and efficient circulation with good levels of service, i.e. minimum waiting time at security check, proper traffic control at entry / exits, minimum congestion delays and pleasing aesthetics.
- A design vehicle is a vehicle whose dimensions and operational characteristics are used to establish layout geometry.2-wheeler, 3-wheeler and 4-wheeler were chosen as the design vehicles.
- The speed of the vehicle is restricted within the premises as below:
    - On the straight sections – 15 kmph
    - On turns and bends – 10 kmph
    - On ramps – 10 kmph
- The maximum number of traffic in a road can carry is referred to as its capacity or design Service Volume.

Level of Service (LOS) can be defined as a letter designation that describes a range of operating characteristics on a given facility. Six Levels of Service are defined for capacity analysis. They are given letter designations from A to F, with LOS 'A' representing best level of operational standards and LOS 'F' the worst.

2. SITE APPRECIATION & EXISTING TRANSPORT NETWORK & BASE TRAFFIC

2.1 Project Site Locations

The project site is located over Plot No.- 321(p) and Khata No.- 619 of Mz-Chandrasekharpur, Bhubaneswar. The project site is bounded by co-ordinate as follows: Latitude- 20°19'15.23"N & Longitude- 85°48'12.66"E. The project is well connected with Nandankanan Road, which is about 1.5 km from project site. The nearest railway station is Bhubaneswar Railway Station, which is 7.4 km in SE-direction. Biju Patnaik International Airport, Bhubaneswar is the nearest airport, about 8.3 km in S-direction.

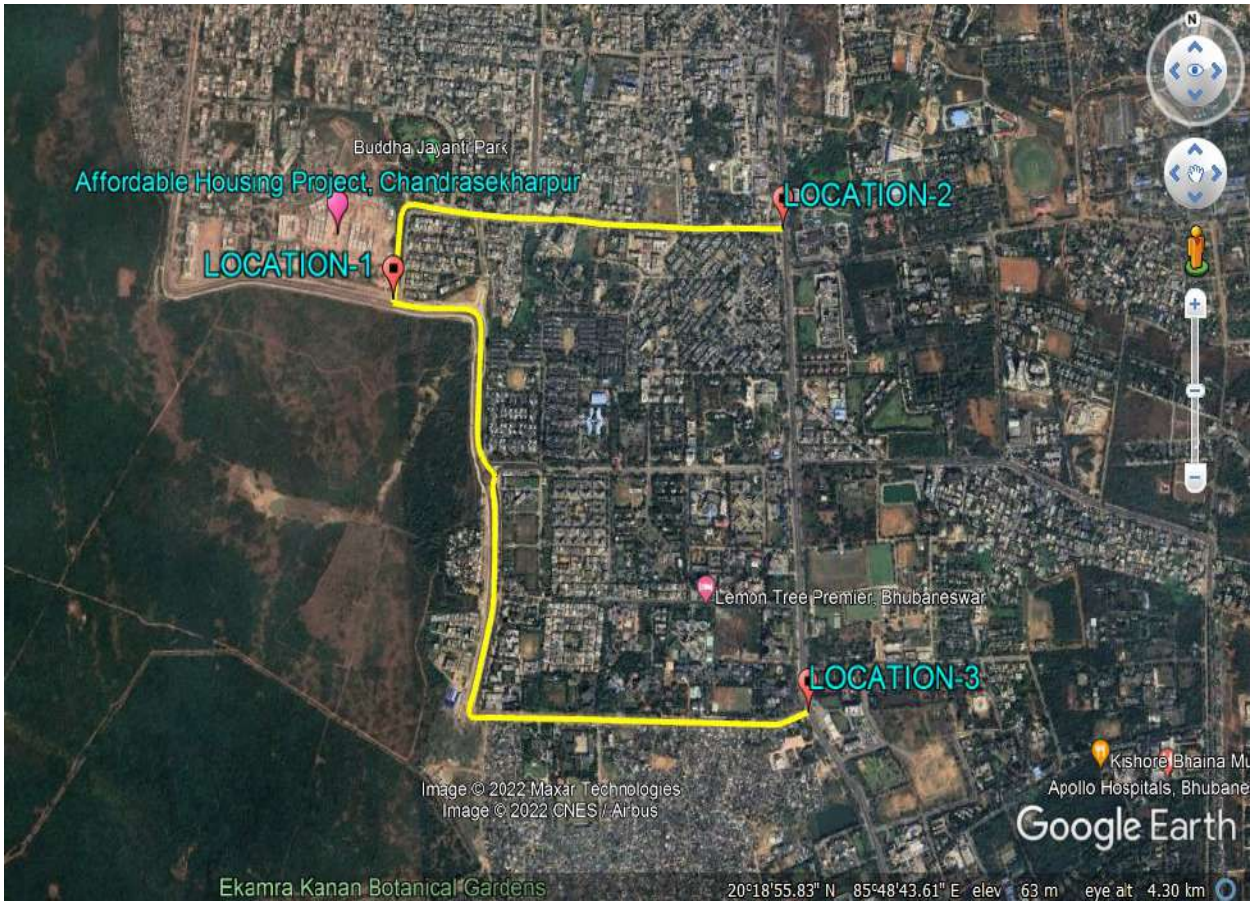


Figure 1: Project Site & Traffic Study Locations

2.2 Traffic Survey

Traffic surveys are necessary to gather base data information about existing traffic and travel pattern on surrounding roads. Road network within 5 km radius from the project location is considered for traffic study is shown in above figure. Traffic surveys were carried out on 12-05-2022 and 14-05-2022. The traffic surveys included classified traffic volume counts. Traffic survey was conducted near Project Site at Utkal Hospital Rd, at Care Hospital Square and at Xavier Square.

2.3 Condition of Existing Road Network

During the field visit, the Survey team has done a reconnaissance survey on the existing road network in the study area and observed the traffic movement considering the operational issues in each of the components of the various road corridors which included facilities available for public vehicles, private vehicles and vulnerable road users. The following observations were derived from the broad assessment made during the reconnaissance survey are as follows:

- On-street parking of cars along the traffic study route especially in evening.
- Utkal Hospital road near Project site is 4-lane two-way road.
- Heavy Traffic volumes at Care Hospital Rd caused traffic jams during peak hours.
- Traffic signals are to be maintained properly along the traffic study route.
- Proper channelized traffic flow at Xavier Square.

3. METHODOLOGY

3.1 Reconnaissance Survey

The reconnaissance survey was done to understand the study requirements of the selection intersections and road corridors, site constraints, available carriageway and Right of Way (ROW) Width, and physical inspection of encroachment, if any.

The study team also held discussions with the project team at the site to understand the following issues:

- Secondary data requirements including building location.
- Right of Way (ROW) details at various intersections and approaching arms for acquisition improvements.
- Mixed traffic conditions
- Encroachment resulting in a reduction of the capacity of roads
- Lack of enforcement measures
- Lack of engineering measures
- Inefficient and inadequate mass transport system

The traffic study was conducted manually at all three locations. The capacities of the existing road network have been presented and the Level of Service for the same has been discussed for the base year and horizon year.

3.1.1 Traffic Survey

Traffic surveys were conducted at the identified location assessing the number of vehicles in 24 hrs time. The capacity and Level of Service was thus analyzed as per IS Code. Traffic surveys at intersections were carried out on normal working days for 24 hours period 06:00 Hrs to the next day 06:00 Hrs at

- Near Project Site at Utkal Hospital Road

- At Care Hospital Square
- At Xavier Sqaure

Table 1: Type of Vehicles on Study Roads

S.No.	Vehicle Type	PCU Factors
1.	Two wheelers motor cycle or scooter	0.5
2.	Cars, Pickup van, Jeep, auto Rickshaw	1.0
3.	Light Commercial Vehicles	1.5
4.	Truck Or Bus	3.0
5.	Truck trailer, agricultural tractors	4.5
	Slow Moving Vehicles	
6.	Cycle	0.5
7.	Cycle Rickshaw	2.0
8.	Hand Cart	3.0
9.	Horse-drawn vehicle	4.0
10.	Bullock Cart	8.0

Ref: IRC: 64-1990

*For smaller bullock cart a value of 6 will be appropriate

3.1.2 Traffic Study

Traffic studies are carried out to analyze the traffic characteristics. These studies help in deciding the geometric design features traffic control for safe and efficient traffic movement.

The various traffic survey studies generally carried out are:

- Traffic volume study
- Origin and destination study
- Traffic flow characteristics
- Traffic capacity study
- Parking Study

3.1.3 Traffic Volume Study

It is the number of vehicles crossing a section of road per unit time at any selected period. It is used as a quantitative measure of flow: the common units are vehicles/day or vehicles/hour.

- It is generally accepted as a correct procedure of the relative importance for roads and in deciding the priority for improvement and expansion.
- This is used in planning, traffic operation, and control of existing facilities and also for planning the new facilities.
- It is used in the analysis of traffic flow patterns and growth trends of vehicles.
- Useful in structural design of pavements and roads.

3.1.4 Methods of Counting

- Manual Counting Method
- Automatic Counting Method

For our study purpose, we have opted manual method.

Manual Method

The most common method of collecting traffic volume data is the manual method of traffic volume count, which involves a group of people recording a number of vehicles passing, on a pre-determined location, using tally marks in inventories. Raw data from those inventories are then organized for compilation and analysis. This method of data collection can be expensive in terms of manpower, but it is nonetheless necessary in most cases where vehicles are to be classified with a number of movements recorded separately, such as at intersections also in the case where automatic methods cannot be used due to lack of infrastructure, necessary authorization etc.

Advantages:

- Detailed distress information can be collected.
- Simple to conduct
- No capital expenditure required

Disadvantages:

- Resource intensive
- High Safety Risk

3.2 Traffic Data Analysis

Based on the manual method of traffic volume count, a survey on the identified corridors has been quantified for the base year (2022). Based on the above traffic surveys, the existing traffic volumes and traffic speeds on the identified corridors were quantified. Traffic growth was estimated by considering past trends of motor vehicles registered in Odisha. The base year data analysis and projected year traffic are presented in Chapter 5.

4. TRAFFIC DATA COLLECTION AND ANALYSIS OF EXISTING ROAD NETWORKS BASED ON DATA COLLECTED

4.1 Analysis of Monitored Traffic Density

Data were collected at three locations i.e. near Project Site at Utkal Hospital Road, at Care Hospital Square and at Xavier Square. Traffic Volume data collection was carried out manually in all the three locations. The data were collected for 24 hours starting from 06:00 Hrs. Based on the data collected, the number of vehicles/day was converted to equivalent PSUs, the factor for which has been discussed in chapter 3.

The following table provides a summary of Passenger Car Units (PCUs) monitored at the identified monitoring locations:

Table 2: Monitored Cumulative Data of Traffic per day, dated 12.05.2022

S.No.	Locations	PCU Count						
		2-wheeler	3-wheeler	LMV	2-Axle Truck	3-Axle Truck	Multi-Axle Truck	PCUs/day
1.	Near Project Site at Utkal Hospital Road	3978	3324	5549	2987	2103	491	18432
2.	At Care Hospital Square	11213	5375	12487	7341	4870	810	42096
3.	At Xavier Square	18974	7867	15798	6895	3875	1287	54696

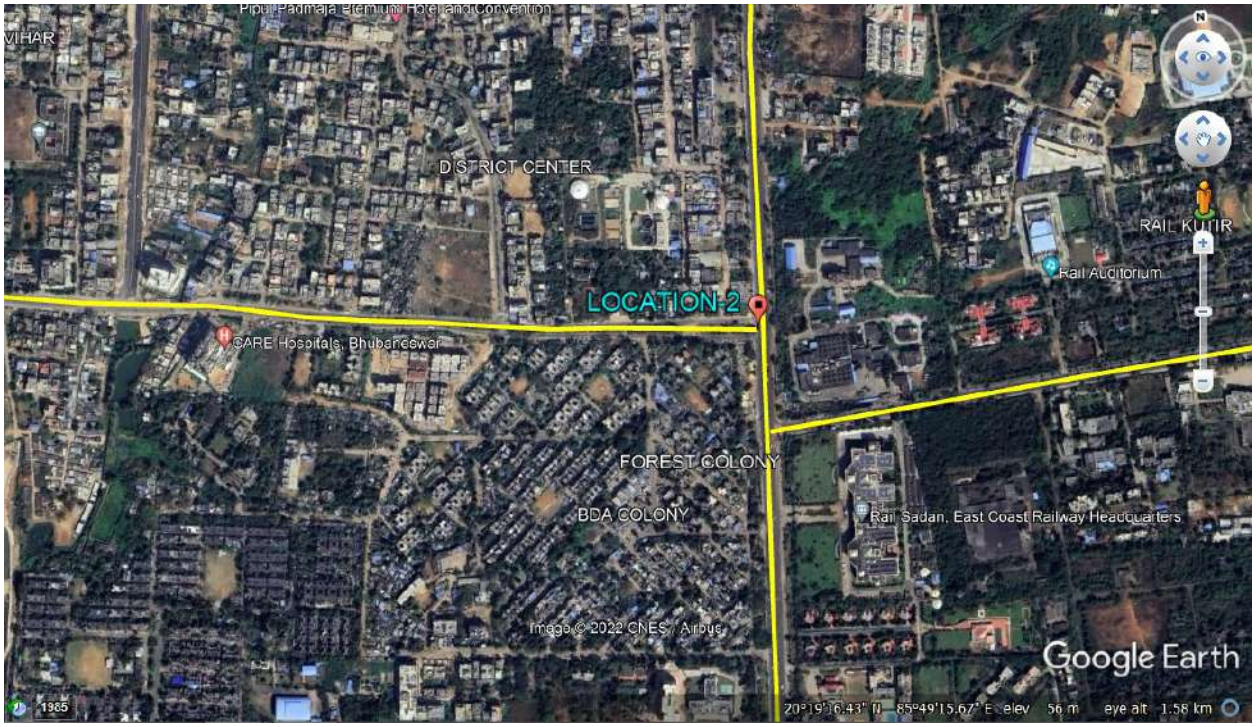
Table 3: Monitored Cumulative Data of Traffic per day, 14.05.2022

S.No.	Locations	PCU Count						
		2-wheeler	3-wheeler	LMV	2-Axle Truck	3-Axle Truck	Multi-Axle Truck	PCUs/day
1.	Near Project Site at Utkal Hospital Road	3841	3271	5512	2990	2087	395	18096
2.	At Care Hospital Square	10769	5871	12957	7891	4978	854	43320
3.	At Xavier Square	17253	6987	14874	6208	3751	1087	50160

The monitored PCUs per day at the three locations i.e. near Project Site at Utkal Hospital Road, at Care Hospital Square and at Xavier Square were 18,432 PCU/day, 42096 PCU/day, and 54696 PCU/day respectively on 12.05.2022 & 18,096 PCU/day, 43320 PCU/day, and 50160 PCU/day on survey conducted on 14.05.2022 respectively.

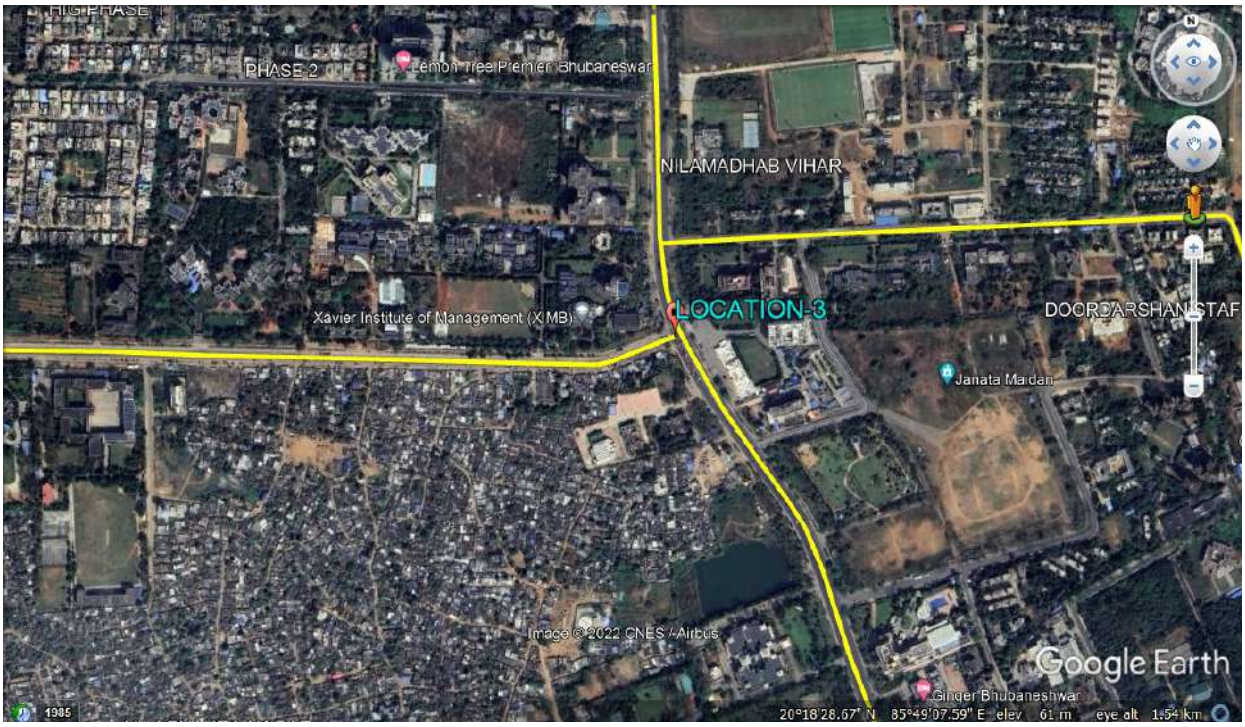
Source: Google Earth

Figure 2: Near Project Site at Utkal Hospital Road (20°19'12.43"N; 85°48'25.70"E)



Source: Google Earth

Figure 3: At Care Hospital Square (20°19'16.63"N; 85°49'13.32"E)



Source: Google Earth

Figure 4: At Xavier Square (20°18'28.33"N, 85°49'12.64"E)

Table 4: Peak Hourly Traffic and Peak Time

Survey Details									
Date	**Near Project Site at Utkal Hospital Road**	**Peak Hourly Traffic**	**Peak Traffic Hours**	**At Care Hospital Square**	**Peak Hourly Traffic**	**Peak Traffic Hours**	**At Xavier Square**	**Peak Hourly Traffic**	**Peak Traffic Hours**
12.05.2022	18432	791	5-6 PM	42096	1960	9-10 AM	54696	2391	6-7 PM
14.05.2022	18096	776	5-6 PM	43320	2004	10-11 AM	50160	2327	6-7 PM

Source: Field Study

4.2 Level of Service (LOS)

The adequacy of roads is analyzed in comparison to the Indian Road Congress (IRC) guidelines. The existing traffic scenario and the Level of Service (LOS) have been assessed in the table below.

Table 5: Recommended design service volumes (PCU/hr)

S.No.	Type of Carriageway	Total Design Service Volume		
		Arterial Road	Sub-Arterial Road	Collector Road
1.	2-Lane (One-Way)	2400	1900	1400
2.	2-Lane (Two-Way)	1500	1200	900
3.	3-Lane (One-Way)	3600	2900	2200
4.	4-Lane Undivided (Two-Way)	3000	2400	1800
5.	4-Lane Divided (Two-Way)	3600	2900	-
6.	6-Lane Undivided (Two-Way)	4800	3800	-
7.	6-Lane Divided (Two-Way)	5400	4300	-
8.	8-Lane Divided (Two-Way)	7200	-	-

Ref: IRC: 106-1990

Table 6: Existing Traffic Scenario and Level of Service as per the survey conducted on 12.05.2022

S.No.	Study Location	Details	Volume (PCU/hr)	*Capacity (PCU/hr)	Existing V/C ratio	**Level of Service (LOS)
1.	Near Project Site at Utkal Hospital Road	Average Hour Load	768	4300	0.17	A
		Peak Hourly Load	791		0.18	A
2.	At Care Hospital	Average	1754	5400	0.32	B

	Square	Hour Load				
		Peak Hourly Load	1960		0.36	B
3.	At Xavier Square	Average Hour Load	2279	5400	0.42	C
		Peak Hourly Load	2391		0.44	C

**Source: IRC: 106-1990*
**Level of Service (LOS) as per IRC*

Table 7: Existing Traffic Scenario and Level of Service as per the survey conducted on 14.05.2022

S.No.	Study Location	Details	Volume (PCU/hr)	*Capacity (PCU/hr)	Existing V/C ratio	**Level of Service (LOS)
1.	Near Project Site at Utkal Hospital Road	Average Hour Load	754	4300	0.17	A
		Peak Hourly Load	776		0.18	A
2.	At Care Hospital Square	Average Hour Load	1805	5400	0.33	B
		Peak Hourly Load	2004		0.37	B
3.	At Xavier Square	Average Hour Load	2090	5400	0.38	B
		Peak Hourly Load	2327		0.43	C

**Source: IRC: 106-1990*
**Level of Service (LOS) as per IRC*

Table 8: LOS of Monitored Location at Present Scenario

Date	TS1	LOS at Average Hour Load	LOS at Peak Hourly Load	TS2	LOS at Average Hour Load	LOS at Peak Hourly Load	TS3	LOS at Average Hour Load	LOS at Peak Hourly Load
12.05.2022	Near Project Site at Utkal Hospital Road	A	A	At Care Hospital Square	B	B	At Xavier Square	C	C
14.05.2022		A	A		B	B		B	C

- The LOS of Utkal Hospital road near Project Site is “A” i.e. excellent as the road condition is very good and the present traffic volume is well within the limit.
- The LOS of road at Care Hospital Square is “B” i.e. very good most of the time.
- The LOS of road at Xavier Square is “C” i.e. good during peak hours.

Table 9: LOS Factors

S.No.	V/C	LOS	Performance
1.	0.0 – 0.2	A	Excellent
2.	0.2 – 0.4	B	Very Good
3.	0.4 – 0.6	C	Good
4.	0.6 – 0.8	D	Fair/Average
5.	0.8 – 1.0	E	Poor
6.	1.0 & Above	F	Very Poor

4.3 Level of Service after expansion of Project

After the initiation of the project, it is envisaged that traffic volume from the project area will increase. Due to the proposed residential cum commercial project in the final scenario, the vehicles will increase the impact load on the road network. The current traffic volumes on the road network are discussed in Table above 2, 3 and 4. The increase in vehicles from the project area will be mainly 2-wheeler, 3-wheeler and LMV.

Considering the worst condition, in which after the implementation of the Project, can add upto 125 PCU/hr at peak hours.

Near Project Site at Utkal Hospital Road :

C = Two way six-lane divided road carrying capacity – 4300 PCU/hr
V = 791 + 125 = 916
V/C = 916/4300 = 0.21 (LOS-B)

At Care Hospital Square:

C = Two way six-lane divided road carrying capacity – 5400 PCU/hr
V = 2004 + 125 = 2129
V/C = 2129/5400 = 0.39 (LOS-B)

At Xavier Square:

C = Two way six-lane divided road carrying capacity – 5400 PCU/hr
V = 2391 + 125 = 2516
V/C = 2516/5400 = 0.46 (LOS-C)

Taking worst-case scenario after implementation of the Project, it can be seen that during peak hours the LOS of Utkal Hospital Road near Project Site & at Care Hospital Square is "B" i.e. very good. But, LOS of road at Xavier Suqare changes remains same as "C" i.e. good.

5. TRAFFIC DATA PROJECTIONS

5.1 Projected Horizon Year Traffic

The predicted total traffic volume at the three study locations has been estimated for the horizon years 2027 and 2032. Projected total traffic and peak hourly traffic are given in and presented in table below.

The horizon year peak hour flow is useful for:

- Intersection improvement
- Corridor improvement

Table 10: Present Traffic and Predicted Traffic (PCU)

Name of Intersection	Base Year		2027		2032	
	Total Traffic Max. (PCU)	Peak Hour Traffic (PCU)	Total Traffic Max. (PCU)	Peak Hour Traffic (PCU)	Total Traffic Max. (PCU)	Peak Hour Traffic (PCU)
Near Project Site at Utkal Hospital Road	18432	791	19353	830	20320	871
At Care Hospital Square	43320	2004	45486	2104	47760	2209
At Xavier Square	54696	2391	57430	2510	60301	2635

Based on the number of the registered vehicle each year in Odisha, it is predicted that the PCUs increase in all three locations for 2027 and 2032 will be around 5% of the existing traffic. The level of service for the base year and horizon year has been shown in table below i.e. for peak hour traffic.

Table 11: Peak Hour Traffic for Horizon Year

S.No.	Name of the Intersection	Base Year			For Year 2027			For Year 2032		
		Peak Hour Traffic (PCU)	Capacity	LOS (PCU/Capacity)	Peak Hour Traffic (PCU)	Capacity	LOS (PCU/Capacity)	Peak Hour Traffic (PCU)	Capacity	LOS (PCU/Capacity)
1.	Near Project Site at Utkal Hospital Road	791	4300	0.18	830	4300	0.19	871	4300	0.20
2.	At Care Hospital Square	2004	5400	0.37	2104	5400	0.38	2209	5400	0.40
3.	At Xavier Square	2391	5400	0.44	2510	5400	0.46	2635	5400	0.48

It is observed that LOS during peak hour of Location-1 is “A” for base year as well as for horizon year. LOS of Location-2 i.e. at Care Hospital Square during peak hours for base year and horizon year is also same i.e. “B”. Similarly, LOS of Location-3 i.e. at Xavier Square during peak hours for base year and horizon year is also same i.e. “C”.

6. TRAFFIC MANAGEMENT PLAN

6.1 Introduction

Volume by capacity ratio has been considered for evaluating the performance of road network. The ratio of volume to capacity was established using the field data for the base year and horizon year by considering the projected data. These are discussed in the following sections.

6.2 V/C ratio for base year 2022

Volume – Capacity ratio has been determined for various road links falling in the influence region of the study area. The Volume - Capacity (V/C) ratio is one of the simplest methods for arriving at the Level of Service (LOS) offered by the road. The capacities have been obtained according to the type of road. In this study capacity values for assessing the V/C has been considered from IRC: 106-1990.

Table 12: Level of Service description

S.No.	Level of Service	Description
1.	A	Free-flow operation
2.	B	Reasonably free-flow, ability of manoeuvre is only slightly, effects of minor incidents still easily absorbed.
3.	C	Speeds at or near free-flow, freedom to manoeuvre is noticeably restricted, Queues may form.
4.	D	Speeds decline slightly with increasing flows, Density increases more quickly, Freedom to manoeuvre is more noticeably limited, Minor incidents create queuing.
5.	E	Operation near or at capacity, No usable gaps in the traffic stream, Operations extremely volatile, Any disruption causes queuing.
6.	F	Breakdown in flow, Queues form behind breakdown points, Demand is greater than capacity.

- To maintain a smooth movement of vehicle on the corridors it is recommended that a proper signalized intersection is required.
- Proper road marking is recommended for proper safety measures. Traffic markings provide a psychological barrier and imply the delineation of traffic path and its lateral clearance from traffic hazards for the safe movement of vehicles.
- Traffic signals are recommended to provide near intersection point.
- Street lights are recommended to be provided along the road.
- Inclined parking facilities are recommended to provide near existing school.
- Warning road signs are recommended to provide near existing school.
- Smooth movement of vehicles will be possible by well maintenance of the roads in proper condition.

6.3 Traffic Management Plan

Based on the traffic study conducted at the three locations, it was found that the LOS is 'A' during peak hours near Project Site at Utkal Hospital Road; LOS is "B" during peak hours at Care Hospital Square and LOS is "C" during peak hours at Xavier Square. This indicates free-flow operation of traffic at near Project Site at Utkal Hospital Road. And reasonably free-flow of traffic i.e. ability of maneuver is only slightly restricted at Care Hospital Square. But, at Xavier Square the freedom to maneuver is noticeably restricted.

However, the following issues persist in and around the study area:

- Roads are encroached by vehicles along the side of the road.
- No signals and marking at intersections
- Improper functioning of street lights along the road
- Encroachments by small shops / stalls along the road

6.3.1 Traffic Management Policy and Measures

The existing LOS caused during peak hours is excellent (A) near Project Site at Utkal Hospital Road. While LOS caused during peak hours is very good (B) at Care Hospital Square and (C) at Xavier Square. It implies the main road network in and around the

Project Site is capable enough to handle the traffic load. Only during certain peak instances, the traffic load is on the higher side. And in considering the future growth it has been envisaged that the LOS will still remain the same. However, an appropriate systematic traffic management plan will be essential for safety and smooth traffic flows on roads, making a maximum usage of road facilities to enlarge the current road capacities.

Following are the measures that can be taken to improve the traffic conditions:

- Improvement of traffic signals
- Improvement of parking system
- Traffic safety campaign and education
- Improvement of traffic operation
- Strengthening traffic enforcement
- Well maintenance of roads

Table 13: Traffic Management Plan Suggested

S.No.	Existing Conditions	Issues	Counter Measures
1.	Traffic congestion at non-signalized intersection or roundabout	• Traffic signals • Improvement of intersections	• Installations of traffic signal control system a) Installation of traffic signal • Improvement of intersection a) Geometric and channelization b)Reconstructions of roundabouts c) Proper lighting of all junctions
2.	Traffic congestion by on-street parking	• Less parking space • Parking Policy	• Provision of more designated parking space • No parking zone • Enforcement of parking restrictions along the roadside • Establishment of Parking Policy and Regulation
3.	Traffic Accidents	• Ignorance of traffic rules • Disfunctioning of traffic signals	• Improvement of Traffic Safety Education • Traffic safety education to

		• Illegal Parking • Encroachment of road	driver • Traffic safety education to peoples • Improvement of Traffic Safety Facilities • Traffic safety facilities • Conduct of Traffic Campaign
4.	Adequacy of roads	• The estimated peak traffic in terms of PCUs is compared with the stipulated standards by IRC for traffic capacity of the existing road network. The existing road network is found adequate as the present traffic scenario on an average day hour.	• Monitoring of traffic system. • Maintenance of existing approach roads period wise. • Phase-wise replacement of old trucks to new ones.

6.3.2 Installation of Road Signs and Marking

Road sign and road marking is vital for proper channelization at the intersection. The road marking provides guidance and information for drivers to drive safely and smoothly.

- **Regulatroy Signs**

A regulatory sign is used to indicate or reinforce traffic laws, regulations or requirements which apply either at all times or at specified times or places upon a street or highway, the disregard of which may constitute a violation, or a sign in general that regulates public behavior in places open to the public which is shown in figure below.

Figure 5: Regulatory Signs

- **Warning Signs**

A warning sign is a type of sign which indicates a potential hazard, obstacle, or condition requiring special attention. Some are traffic signs that indicate hazards on roads that may not be readily apparent to a driver i.e. shown in the figure below.

Figure 6: Warning Signs

- **Informatory Signs**

To provide information about direction, destination, distance, etc to the driver, It is usually help the driver in saving time and reaching to their destination easily which is shown in figure below.

Figure 7: Informatory Signs

7. SIGNIFICANT FINDINGS AND RECOMMENDATIONS

7.1 Significant Findings

A total of 3 locations were taken up for study and traffic surveys such were conducted to understand the prevailing traffic problems and assess the capacity of roads with respect to the vehicular traffic plying through the intersections in the study road network.

Traffic growth was estimated by considering past trends of motor vehicle registration in Odisha State, for horizon years. Intersection improvements plans were proposed taking into account the traffic survey results, prevailing site conditions. The main influencing parameters such as traffic volume and composition, turning movement's volume, design speeds, Right of Way (ROW) were considered while developing the conceptual Intersection improvement drawings.

7.2 Observations from Traffic Volume Studies

Patia Station Square is the most critical junction among the three studied locations. Traffic volume and flow along the monitored locations are quiet systematic and within the limits of handling capacity of the road.

7.3 Recommendations

The following recommendations are proposed based on the results of the various field inventories and traffic studies and results obtained from these studies.

- Up-gradation of internal connectivity roads from existing carriageway to three lane roads with paved shouder.
- It is recommended that provision of adequate parking facilities for visitors of residential as well as commercial sections.
- Development of road conditions, installation of more efficient street lights, maintenance of signals & markings are highly recommended.

- Road signs and road markings are main guiding factors for the road users which is essentially required to be adequate and placed at appropriate places on the road. Hence it is immediate requirement to install the signboards and markings at all intersections.
- Maintenance of existing approach road to keep the traffic flow smooth in consideration of the traffic load after implementation of the project.

Traffic study for the expansion of project is reviewed and found to be okas for Govt. guidelines. Due respect is done for the project.

10.8.2022