The Singareni Collieries Company Limited
(A Government Company)
Bhupalpalli Area

Ref.No. BHP/ENV/Env stmt/2024/ 87 **Date: 28.08.2024**

To
The Member Secretary,
T. G. Pollution Control Board,
Paryavaran Bhavan,
A-3, Industrial Estate, Sanathnagar,
Hyderabad-500018

Dear Sir,

Sub: Environmental statement pertaining to KTK 6 Incline of SCCL, for the year 2023-24–Reg.

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With reference to the above cited subject, please find enclosed here with the Environmental statement pertaining to KTK 6 Incline of Bhupalpalli area, SCCL for the year 2023-24.

Thanking you,

Yours faithfully,

General Manager
Bhupalpalli Area.

Encl: As above

Cc to:
The Environmental Engineer,
T.G. Pollution Control Board,
R/O.Hanamkonda
Warangal (dist.)

ENVIRONMENTAL STATEMENT OF KTK 6 INCLINE, SCCL FOR THE YEAR 2023-24

Brief Note about KTK 6 incline:

KTK 6 incline mine is one of the working underground mines of Bhupalpalli area falling under Bhupalpalli Mandal of Jayashankar Bhupalapalli (Dist.) in Telangana State. The area is located between North Latitudes18^{o}24' 57" to 18^{o}26'55" and East Longitudes 79^{o}52'23" to 79^{o}54'56" covered in the survey of India Topo sheet no. 56N/15. The project site is located on the Parkal - Mahadevpur Road

SITE LOCATION:

The Project is located in Bhupalpalli Mandal of Jayashankar Bhupalapalli district of Telangana the project is a distance of 1.3 km from the district head quarters that is Bhupalapalli town and is well connected with the Warangal - Mahadevpur state highway the topographical elevation of Bhupalpalli area is 190m-220m. The ground level varies from 189.24 in the north western part to 209.7m above MSL in the south eastern part .In general, the area is of a plane terrain with a gentle slope towards north west that is Maner River.

Climate:

The area experiences typical tropical climate with hot summer from March to June with occasional dust storms, a good monsoon from June to September and cool winter from October to February. The maximum relative humidity in the area is 100% in the rainy season and varies between 13% to 96%. Daily rain fall collected from Bhupalpalli. The annual rain fall varies from 619.9mm to 1767.4mm with a mean annual rain fall of 1065.9mm the maximum monthly rain fall is 875.5mm (July 1976).

Season	Months	Characteristics
Summer	March-May	Hottest part of the year , occurrence of dust storms
South west monsoon	June to September	Characterized by predominantly SW Winds generally strong and persistence winds prevails
North-East monsoon	Oct-Nov	Characterized by predominantly NE Winds. Fair weather with the variable winds.
Winter	Dec-Feb	Cool season of the year

Topography

The general topographical elevation of Bhupalpalli area is 190m to 220m. Both the proximal basement as well as the lower gondwana sediments occupy the ground level and from a gentile undulating terrain. But the kamthi formations, mainly the upper number forms prominent topographic features in the form of hills, situated to further east of the block. Sarlappa gutta forms a familiar land mark situated about 3.5km.to east of the block and rise to an elevation of 166m height from the general ground level.

Process involved in coal production:

It is proposed to develop coal users in phase-1 and phase-2 properties by conventional Bord and Pillar method .Though the development will be Bord and Pillar method, it is proposed initially to develop panels by skeleton development to facilitate introduction of cost effective mechanization if any, in future. The systems mainly consist of building the handheld drills and blasting with approved explosives. The blasted coal will be loaded in to the tubs and hauled by a rope hauler to the surface and unloaded into the surface bunkers.

Industrial activities within 10km radius:

- SCCL: Underground and Opencast mines, 10MW Solar Power Plant of SCCL.
- Other than SCCL: 1x500MW & 1x600MW Power Plant of KTPP, TGGENCO, Nos. of Brick Kilns, Pottery Kilns, Tiles Kilns, Stone crushers.

Land use pattern in the surrounding areas:

Industrial, agricultural lands both wet and dry waste land and fallow lands, settlements, residential colonies, tanks and Nallahs, roadways.

The major sources of water for irrigation in this area are tanks, Nallahs, mine discharge water and domestic effluents let out from townships.

FORM-V
(RULE NO.14 OF EPR 1986)

Environmental statement of KTK 6 of Bhupalpalli Area for the year 2023-24

PART-A

General

Sl.no	Item	Details
1	Name & address of the Owner Occupier of the industry/operation or process	Agent KTK 6 incline Bhupalpalli Area The S.C.Co.Ltd Bhupalpalli -506 169.
2	Industry category	Primary, Coal Mines (Red-Non Hazardous)
3	Production capacity	0.312 MTPA
4	Year of establishment	1996
5	Date of last Environmental statement submitted	27.09.2023

Sl. No	Item	2022-23	2023-24
1	Total coal production (in Lakh tons)	1.47 (In lakh tonnes)	1.20 In lakh tonnes)
2	Output per man shift	0.81	0.73
3	Total men on roll	787	719

PART-B

Water and Raw Material consumption

A. Water Consumption:

Sl. No	Description	Unit	2023-24
1	Name of the Product		Coal
2	Water consumed for 1000 tons of coal.	KL	40.00

B. Raw Material Consumption per 1000 tonnes of coal produced:

Sl.No	Description	Unit	2022-23	2023-24
1	i)Explosives	Kgs	66,200	57,150
	ii)Detonators	Nos.	1,37,589	1,13,308
2	i)Kerosene oil	Lt.	Nil	Nil
	ii)Lubricant oil	Lt.	8,619	777
	iii)Tub lubricating oil	Lt.	6,967	6,327
	iv)Hydraulic oil	Lt.	210	77,059
	v) Transformer oil	Lt.	Nil	Nil
3	Grease of different grades	Kg	519	413
4	Paints of different types			
	i)Tub paint	Lt.	Nil	90
	ii)Enamel paint	Lt.	172	103
	iii)Red oxide paint/powder	Kgs	100	Nil
5	Timber of all types	Nos	32,543	20,107
		M3	2.32	4.06
6	Cement	bags	677	769
7	Drill bits	Nos.	5,474	4,626
8	Drill rods	Nos.	394	271
9	Rails	MT	Nil	9.030
10	Girders	MT	Nil	Nil
11	Roof bolts & nuts	Nos.	37,263	34,964
12	Inorganic grouting capsules	Nos.	1,73,350	1,28,500
13	Channels	MT	Nil	Nil
14	Dog nails	Kg	5,200	3650
15	Flat Iron	MT	0.82	Nil
16	CI Pipes	m.	Nil	Nil
17	GI Pipes	m.	2,586	536.279
18	Tub Pedestals	Nos.	139	246
19	Haulage rope	m.	7,500	7,500
20	Coal baskets	Nos.	26	13
21	Cap lamp batteries	Nos.	220	100
22	Conveyor belt	m.	Nil	200
23	Sand used for stowing in mines	Cu.m	1,41,700.00	1,15,634.63
24	Electrical power	kWh	49,32,973	46,85,813

Note: There is no direct process involved in the extraction of coal. Coal reserves hidden under the Earth crust are extracted by making an entry from surface through over lying strata. Raw material consumption varies from mine to mine depending upon the geological conditions, depth, extent of mine workings, method of working etc. Explosives are used for blasting the coal. Different types of machinery are used for drilling, coal transportation, ventilation and water pumping. Timber is used for supporting the roof strata. Girders, roof bolts, Channels are used for supporting the roof and sides. Rails, and dog nails are used for track laying. Tubs are used for a carrying the coal, cement, sand. Masonry stone and bricks are used for construction of ventilation and fire stopping. Diesel oil is used for coal transportation and other conveyance vehicles on surface, petrol, is used for conveyance vehicles on surface. Lubricating oils, gear oil, grease, engine oil and transforms oil is used for the maintenance of machinery in underground and surface. Sand is used for masonry works and filling of the voids in underground where coal is extracted.

(6) Energy and Resource conservation measures:-

1. Switching off lights and fans in the Offices and outside when not required.
2. Integration of ventilation system.
3. Reorganization of pumping system.
4. UG sub-stations were shifted to nearer to the districts to reduce cable lengths.
5. Replace old pumps by energy efficient pumps.
6. Using rated voltage, voltage drops to be avoided.
7. Using suitable rated capacitors for power factor correction.

(7) Steps taken to conservation of oil and grease:-

1. Reusing the oils for lubricating the coal tubs.
2. Using funnels for oil filling to prevent ingress of foreign matter.
3. Markings were given for minimum and maximum oil level to maintain Temperatures and bearings.
4. Color code being followed for different lubricants.

(8) Waste materials generated and waste management practices

1. 2 Nos. of vermi compost and 6 Nos. of compost pits provided.
2. Ropes using for Rope barricades
3. Belt using for belt canister for detonators, belt rings for pipe joints and flaps for ventilation coursing.
4. Scrap iron is being disposed by awarding tenders.

(9) WELFARE MEASURES TAKEN:

(a) Total No. of employees on roll as on 31.03.2024	:	719
(b) No. of employees provided quarters facilities	:	538
(c) No. of employees using LPG gas	:	720
(d) No. of employees provided with Bank payments	:	730
(e) No. of employees undergone family planning operation	:	02
(f) No. of employees undergone PME during last 6 months	:	133
(g) No. of employees took part in games & Sports during last 6 months:		Nil
(h) No. of employees using any other facilities (Pl. Specify)	:	Nil

PART-C

POLLUTION GENERATED

a) Air pollution source & control measures.

i) Air pollution source:

The activities contributing to the air pollution are mine exhaust air, transportation of coal, men & material, coal handling operations like screening, crushing, etc., The major pollutants are suspended particulate matter, dust and oxides of Nitrogen.

ii) Air pollution control measures:

1. Arrangements for dust suppression. Provided water spraying arrangements at all U/G workings before and after blasting and up to coal loading point with specially made water spraying pipe. On surface, water sprinkler arrangements with 40HP pump from filter bed are provided along main road up to coal bunker and around all coal yards, also provided water spraying at bank head, distribution point and lorry loading point near bunker.
2. Regarding approach roads are maintaining clean and to control the spillage of coal, every lorry is being given only 8 tubs of coal and leveled before leaving the mine premises to avoid dust formation.
3. Chimneys are provided at blacksmith sheds.
4. Restricting the coal heaps up to 1.5m height and water spraying arrangements are in progress.

b) Water Pollution source& control measures.

i) **Water Pollution source:**

The source of water pollution is mine discharge water, contaminated water from workshops and domestic waste water.

ii) **Water Pollution control measures:**

The mine water is pumped out from the mine into filter bed, where water will be filtered. The same filtered water is being supplied for colliery consumption; mine works in underground and nearby villages (drinking). Drainage of waste water from canteen and other washing places is provided. In the filtering process every Sunday, the old sand will be removed and new sand will be placed in the filter bed. For colliery consumption and mine consumption (drinking), the filter water was analyzed and found fit for human consumption. Excess water discharged for cultivation purpose and for plantations in acquired land. Drainage plan is being maintained up to 5 kms. Radius of the mine.

c) Noise pollution source & control measures.

i) Noise pollution source:

The source of noise pollution is due to coal dispatch arrangements like (bunkers, tipplers etc.) and surface main mechanical ventilator fan.

ii) Noise pollution control measures:

The noise levels at sound generating points are within the permissible limits and records are also being maintained. The thick green belt of 50m is being maintained around the surface fan house, two rows of plants on both sides of the approach road, bank head, Distribution point, rest shelters, substations and blacksmith and tub repairing shed. There is a practice of leaving some coal in the bunkers under tipplers to control the noise and to prevent the damages to the bunker.

d) Environment awareness campaign measures.

Environmental Awareness brought among the employees by wide publicity through public address system, Posters, Banners, Paintings and Pamphlets, Writing on all walls and important locations and through pamphlets, etc., and conducted Quiz programs. We have pledged about the Environment Awareness among the all workmen at the shift beginning. All the workmen adopted each one plant and they are pledged for serving them.

We have formed Pit Head Environment Management Committee (EMC) with Manager, Safety officer, Engineer, Surveyor and Welfare officer to perform the Environment activities and to bring awareness among the workmen.

Land management and land use details:

Sl.No.		Area in Ha.
1.	TOTAL PROJECT AREA	100
2.	Total Acquired land	78.3
	➢ Private land	42.0
	➢ Govt. land	36.3
	➢ Forest land	-
3.	Land use details of acquired land	
(a)	Mine pit head structure / Establishment area	5.85
(b)	Fan house Area	0.07
(c)	Magazine area if any outside establishment area	0.018
(d)	Air shaft area	0.005
(e)	Sand stowing bunker	0.50
(f)	Sand stock yards	5.00
(g)	Surface buildings	5.00
(h)	Coal dump area if any, outside establishment area	2.15
(i)	Other surface building area b) Jawahar colony ii) Land under dispute	-
(j)	Road & Transmission line	0.07
(k)	Nallah & Tank etc	21.70
(l)	Plantation area	58.00
(m)	Vacant area	7.487

	Total	100
4.	LAND AVAILABLE [2-3(1)]	Nil
	SUBSIDENCE AREA DETAILS	
5.	Total subsidence area	Nil
	(a) Active subsidence area	Nil
	(b) Stabilized subsidence area	Nil
	❑ Area where O.B is filled and planted	Nil
	❑ Area where O.B. is filled and not yet planted and ready for plantation	Nil
	❑ Area where O.B. filling is not required any ready for plantation	Nil
6.	Vacant coal bearing area where subsidence is not expected/anticipated within next 8 years (at the proposed rate of extraction)	Nil
7.	Vacant non coal bearing area	Nil

1. SUBSIDENCE MANAGEMENT DETAILS: **NIL**

(a) Total seam wise area developed (including Depillaring area) so far:

Sl.No	Seam	Area in Ha.	Depth(m) Min. Max.	Total Thickness (m)	Working Height(m)
1	1 Seam	55.32	100 232	3.34	2.50
2	2 Bottom Seam	7.70	137 186	2.88	2.50
3	2 Top Seam				
4	3 Seam	82.17	40 300	3.60	2.70

(b) Total seam wise area depillared so far since inception:

Sl.No	Seam	Area in Ha.	Depth(m) Min. Max.	Total Thickness (m)	Working Height(m)
1	1 Seam	34.75	106 183	3.34	2.90
2	2 Seam				
3	3 Seam	46.91	182 325	3.60	2.90
4	4 Seam				

(c) Subsidence Management:

a. total area affected due to subsidence so far	Nil
b. Max crack width observed so far	Nil
c. Max subsidence occurred so far	Nil
d. Whether the vegetation effected if any	Nil
e. If affected, give details	-
f. Total man shifts worked in subsidence area for crack filling and dozing	-
g. Total dozer shifts worked for subsidence reclamation	-
h. Area filled up with OB/ subsoil material in ha	-
i. Quantity of OB/ Subsoil dumped: in L.cu.m.	-
j. Maximum height of dump:	-
k. Total Subsidence area planted so far in ha.	-
l. Total expenditure incurred so far on subsidence area treatment so far	

PART-*D*

HAZARDOUS WASTES

Not applicable

PART-E
SOLID WASTES

The solid wastes generated in this area are mainly rejects separated from coal at the coal face. Scrap iron of various types generated at mines and used materials such as old bits, drill rods, cap lamp batteries etc are sent to Central Work shop through area stores periodically for recycling and to other firms like M/s Green world recyclers, Thiruvalluvar, E-Friendly copper recycler, Bengaluru, M/s Southern Alloys, Thiruvalluvar & M/s Modern Tires(Grinding wheels) Hyderabad.

REJECTS (STONE, SHALE & CLAY):

Rejects separated from coal consists of stone pieces, carbonaceous shale and clay material. These rejects are picked out from the coal manually when coal is passing on slow moving conveyor belts, in Coal Screening Plant. The rejects picked out are put into separate bunkers through a separate belt. From the bunkers the rejects are loaded into trucks and dumped over low-lying areas and in ditches in the townships.

OLD IRON SCRAP AND OTHER WASTE:

The scrap iron material generated at Workshops and mines consists of steel scrap of various types like old coal tub tops and bottom, worn out tub wheels, old pedestals, worn out friction rollers, old haulage wire ropes, worn out belt rollers and idler sections, old iron props and chalk frames, old CI pipes, worn out parts of various machinery and vehicles used in mines etc,..

Many of these old materials are used at unit level for some other appropriate use. For example, old haulage wire ropes are used for roof stitching in underground mines and for fencing on surface, worn-out old conveyor belts are reused for coursing of air in underground workings, for making washers and wipers and cushioning over the chute plates at conveyor transfer points. Flat iron scrap is used for making washers, liners etc,. Some of the scrap iron materials such as endless hauler segments, Bewel pulleys 1', 3' and 5' pulleys couplings are melted in the cuppola furnace and recasted into different items.

SOLID WASTES GENERATED, RECYCLED, SOLID / DISPOSED OFF DURING THE YEAR 2023-24: - NIL -

PART - F

CHARACTERISATION OF SOLID WASTE AND DISPOSAL PRACTICE

Solid wastes generated are stones, carbonaceous shale and clay etc. These waste materials are picked out from coal when passing on slow moving belts by manual in coal screening plants. These rejects are put into separate bunkers and loaded into trucks and dumped in low-lying areas and ditches in the townships.

The Iron scrap of various types generated at mine is sent to area stores. Some of the scrap is utilized in the company and remaining is disposed through action from different firms like M/s Green world recyclers, Thiruvalluvar, E Friendly copper recycler, Bengaluru, M/s Southern Alloys, Thiruvalluvar

Used drill rods drill bits are sent to area stores from where they are disposed through action from different firms like M/s. Gaurav Steel, Kolkata.

Other waste materials like old shoes and old canister bags also collected and sent to area stores from where they are disposed off by auction through.

PART-G

IMPACT OF POLLUTION CONTROL MEASURES TAKEN ON CONSERVATION OF NATURAL RESOURCES AND ON THE COST OF PRODUCTION

1. About 60% of total mine discharge water is used/ recycled for drinking, washing, dust suppression, plantation and sand stowing after treatment at mine filter beds. The excess water let out on surface is used for irrigation by the villagers nearby directly or indirectly through irrigation tanks. Thus the entire quantity of water pumped out from the mine is utilized either directly or indirectly. An amount of **Rs.10.02 Lakhs** has been spent for mine water treatment during the year 2023-24

2. As a result of water spraying being done at the working places coal transportation points, mine premises, coal screening plant premises, coal loading and unloading points, along the conveyor belts, screening points the dust is getting suppressed near the source and thereby preventing it becoming air borne and spreading into the surrounding areas. An amount of about Rs.19.35 Lakhs has been spent in the form of wages and other costs for water spraying purposes during the year 2023-24.

3. *Voids created as a result of extraction of coal in underground are filled up with sand/POB to control subsidence and thereby to control land degradation on surface. 1.156 Lakh Cu.m. of sand is filled into the voids during 2023-24 for which an amount of **Rs. 12.08 crores** has been spent in all.

4. Total 47 Ha of subsidence area and Project area is converted into green belt so far at KTK 6 Incline Rs. 4.64 Lakhs is spent on maintenance of the plantations during the year 2023-24.

5. Land degraded due to subsidence is restored to its original landscape by filling the subsidence cracks and troughs developed with loose earth and leveling the same by dozing. - Nil.

P A R T – H

ADDITIONAL MEASURES / INVESTMENT PROPOSALS FOR ENVIRONMENTAL PROTECTION AND OF POLLUTION

1. Reimbursement of cost of one LPG gas cylinder (at IOC rates) per month to the employees using LPG gas to discourage use of coal for domestic use. All the employees are using LPG gas at present.
2. Development of green belt over vacant places in phases.

PART – H

ADDITIONAL MEASURES / INVESTMENT PROPOSALS FOR ENVIRONMENTAL PROTECTION AND OF POLLUTION

1. Reimbursement of cost of one LPG gas cylinder (at IOC rates) per month to the employees using LPG gas to discourage use of coal for domestic use. All the employees are using LPG gas at present.
2. Development of green belt over vacant places in phases.

PART-I

ANY OTHER PARTICULARS FOR IMPROVING THE QUALITY OF ENVIRONMENT

1. Health & family planning camps were organized during the year.
2. The World Environment day was observed on 5th June, 2023. Planting of saplings, environment awareness rallies and exhibition on "Health & Environment" are some of special programs organized on 5th June and 30th June, 2023 to bring awareness among employees, children & public in general.

Agent /KTK 1 Gr
Bhupalpalli Area.
The S.C.Co.Ltd.

AGENT
KTK-1 Group.BHP

Ambient Air Quality Results at KTK-6 Incline (CA4)

April,2023 - March, 2024

Sl. No.	Date of Sampling	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)
Coal mine standards, GSR 742(E), Dated 25.09.2000		**250**	**-**	**120**	**120**
1.	01.04.2023	164	57.2	12.5	15.8
2.	17.04.2023	167	57.3	10.0	15.2
3.	05.05.2023	173	61.5	10.9	14.1
4.	20.05.2023	149	56.8	10.0	14.1
5.	06.06.2023	142	52.4	10.1	13.9
6.	16.06.2023	127	49.4	11.2	17.7
7.	01.07.2023	79	39.7	8.0	14.2
8.	17.07.2023	86	40.4	9.6	13.9
9.	01.08.2023	96	40.9	10.4	13.6
10.	16.08.2023	104	41.8	10.6	13.2
11.	01.09.2023	108	59.8	9.7	12.6
12.	16.09.2023	108	48.9	10.2	14.9
13	02.10.2023	133	62.4	9.5	13.0
14	18.10.2023	75	70	48.3	34.8
15	01.11.2023	108	50.4	13.5	17.1
16	18.11.2023	149	49.3	9.7	14.4
17	01.12.2023	133	53.4	11.1	16.1
18	19.12.2023	215	56.8	10.9	14.1
19	02.01.2024	144	49.5	11.2	14.7
20	18.01.2024	136	52.9	9.8	15.3
21	05.02.2024	75	70	52.4	50.2
22	19.02.2024	138	48.3	10.1	15.0
23	02.03.2024	154	67.6	12.7	17.3
24	18.03.2024	162	49.4	12.8	18.2
min		**75**	**39.7**	**8**	**12.6**
max		**215**	**70**	**52.4**	**50.2**
avg		**127.00**	**53.25**	**14.21**	**17.38**
98 Per		**197.36**	**70.00**	**50.68**	**43.73**

Ambient Air Quality Results at Bhoopalpalli Village (BA5)
April,2023 - March, 2024

Sl. No.	Date of Sampling	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)
NAAQ Standards, CPCB Dated: 18.11.2009		**100**	**60**	**80**	**80**
1.	03.04.2023	92	47.6	9.5	12.6
2.	18.04.2023	89	46.9	8.6	13.7
3.	06.05.2023	91	48.3	7.8	11.6
4.	22.05.2023	76	38.2	9.6	14.0
5.	07.06.2023	85	46.3	9.0	13.3
6.	17.06.2023	78	39.2	9.0	14.5
7.	03.07.2023	58	29.3	8.0	13.4
8.	18.07.2023	46	28.4	9.3	14.9
9.	02.08.2023	62	34.5	7.8	12.6
10.	17.08.2023	72	38.2	8.5	12.2
11.	02.09.2023	72	36.8	9.8	13.2
12.	18.09.2023	75	39.7	8.8	12.5
13	03.10.2023	82	43.5	8.7	12.3
14	17.10.2023	82	42.8	9.2	13.7
15	02.11.2023	77	39.8	8.1	13.7
16	17.11.2023	66	38.5	9.0	13.0
17	02.12.2023	76	36.8	7.2	11.5
18	18.12.2023	77	41.0	10.2	14.1
19	03.01.2024	88	46.6	9.7	13.6
20	17.01.2024	69	39.5	8.7	13.7
21	02.02.2024	82	43.1	11.2	16.6
22	17.02.2024	74	33.6	9.4	12.9
23	05.03.2024	92	46.9	13.2	19.5
24	20.03.2024	88	43.0	15.0	20.2
min		**46**	**28.4**	**7.2**	**11.5**
max		**92**	**48.3**	**15**	**20.2**
avg		**75.82**	**39.73**	**9.42**	**13.95**
98 Per		**91.58**	**47.71**	**14.24**	**19.91**

Ambient Air Quality Results at Mallampally Village (BA6)

April,2023 - March, 2024

Sl. No.	Date of Sampling	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)
NAAQ Standards, CPCB Dated: 18.11.2009		**100**	**60**	**80**	**80**
1.	01.04.2023	66	35.6	8.7	11.7
2.	17.04.2023	65	36.3	9.2	12.8
3.	05.05.2023	59	30.3	8.8	13.3
4.	20.05.2023	59	31.5	10.2	13.3
5.	09.06.2023	76	42.3	9.3	13.2
6.	16.06.2023	69	35.4	10.1	14.3
7.	01.07.2023	54	28.2	10.9	14.1
8.	17.07.2023	55	30.5	8.7	14.0
9.	01.08.2023	48	30.1	9.8	12.2
10.	16.08.2023	55	27.4	8.6	13.0
11.	01.09.2023	43	24.5	8.8	13.9
12.	16.09.2023	53	28.7	8.5	11.2
13	02.10.2023	59	29.7	8.0	11.2
14	16.10.2023	79	41.2	9.5	13.6
15	01.11.2023	63	35.2	9.3	14.1
16	16.11.2023	68	34.4	9.0	13.9
17	01.12.2023	67	37.2	9.2	13.2
18	16.12.2023	73	36.5	11.6	14.0
19	02.01.2024	76	38.5	9.3	13.3
20	16.01.2024	70	32.2	8.0	13.5
21	01.02.2024	73	35.1	10.6	13.1
22	16.02.2024	69	33.8	8.3	14.6
23	04.03.2024	56	23.7	8.0	12.8
24	19.03.2024	60	27.1	9.7	13.5
min		**43**	**23.7**	**8**	**11.2**
max		**79**	**42.3**	**11.6**	**14.6**
avg		**62.91**	**32.43**	**9.28**	**13.33**
98 Per		**77.74**	**41.84**	**11.31**	**14.47**

Ambient Air Quality Results at Krishna Colony (BA8)
April,2023 - March, 2024

Sl. No.	Date of Sampling	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)
NAAQ Standards, CPCB Dated: 18.11.2009		**100**	**60**	**80**	**80**
1.	01.04.2023	84	43.7	9.1	11.9
2.	17.04.2023	79	39.8	9.2	11.4
3.	05.05.2023	86	43.7	8.8	12.9
4.	20.05.2023	82	40.9	7.8	12.5
5.	08.06.2023	82	45.3	10.7	13.2
6.	16.06.2023	72	37.6	9.3	13.6
7.	01.07.2023	46	30.6	9.6	12.7
8.	17.07.2023	41	23.4	8.3	13.0
9.	01.08.2023	50	26.9	8.8	12.0
10.	16.08.2023	66	36.2	9.0	12.7
11.	01.09.2023	55	29.8	7.7	12.8
12.	16.09.2023	70	36.9	8.2	13.0
13	02.10.2023	73	37.6	9.0	14.1
14	16.10.2023	80	41.2	8.1	13.2
15	01.11.2023	69	36.7	8.7	14.0
16	16.11.2023	65	37.3	8.8	12.1
17	01.12.2023	69	35.7	8.1	12.5
18	16.12.2023	76	41.6	9.7	13.4
19	02.01.2024	80	43.3	9.7	12.9
20	16.01.2024	69	39.8	8.9	13.5
21	01.02.2024	75	34.3	10.2	15.8
22	16.02.2024	61	25.0	8.9	14.7
23	05.03.2024	82	42	12.6	18
24	20.03.2024	91	46.6	10.0	15.7
min		**41**	**23.4**	**7.7**	**12**
max		**91**	**46.6**	**12.6**	**18**
avg		**70.00**	**36.93**	**9.13**	**13.56**
98 Per		**88.90**	**46.05**	**11.80**	**17.08**

Ambient Air Quality Results at Pulluriramaiahpalli / Kompally village (BA10)
April,2023 - March, 2024

Sl. No.	Date of Sampling	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)
NAAQ Standards, CPCB Dated: 18.11.2009		**100**	**60**	**80**	**80**
1.	04.04.2023	73	38.1	9.0	12.6
2.	19.04.2023	68	35.5	8.3	14.5
3.	08.05.2023	67	36.6	9.3	14.1
4.	23.05.2023	61	33.7	8.0	11.5
5.	06.06.2023	56	29.4	9.6	12.5
6.	19.06.2023	65	35.8	10.0	13.5
7.	04.07.2023	47	23.8	10.0	13.7
8.	19.07.2023	62	34.5	8.7	14.3
9.	03.08.2023	59	31.3	9.5	12.3
10.	18.08.2023	69	40.6	8.2	11.4
11.	04.09.2023	62	33.4	8.0	11.7
12.	19.09.2023	63	38.9	8.6	11.0
13	04.10.2023	68	40.5	8.8	13.6
14	18.10.2023	66	37.5	8.5	12.6
15	03.11.2023	72	38.5	8.7	12.6
16	18.11.2023	72	39.1	9.7	12.5
17	04.12.2023	78	40.5	9.3	13.0
18	19.12.2023	59	32.3	10.3	13.9
19	04.01.2024	82	43.4	9.6	12.1
20	18.01.2024	71	38.9	9.3	13.4
21	03.02.2024	66	29.6	8.5	12.2
22	19.02.2024	58	30.1	9.2	13.1
23	05.03.2024	64	28.2	10.1	15.5
24	20.03.2024	86	33.7	11.6	16.8
min		**47**	**23.8**	**8**	**11**
max		**86**	**43.4**	**11.6**	**16.8**
avg		**66.05**	**35.01**	**9.25**	**13.06**
98 Per		**84.32**	**42.22**	**11.05**	**16.25**

Noise Quality Data

Monitoring Period: April,2023 - March, 2024

Name of the Location	Date of Sampling	Noise levels in dB (A)	
		Leq Day	Leq Night
KTK 6 incline(CN5)	04.04.2023	40.8	34.7
	19.04.2023	50.5	42.6
	08.05.2023	41.2	31.0
	23.05.2023	40.3	35.7
	08.06.2023	43.1	36.0
	19.06.2023	50.8	40.7
	04.07.2023	43.4	34.0
	19.07.2023	52.6	46.5
	03.08.2023	47.3	36.0
	18.08.2023	44.8	35.1
	04.09.2023	41.9	30.9
	19.09.2023	48.6	39.7
	04.10.2023	43.2	34.8
	18.10.2023	48.3	34.8
	03.11.2023	45.5	35.9
	18.11.2023	41.4	38.6
	04.12.2023	60.8	41.6
	19.12.2023	62.3	50.8
	04.01.2024	48.1	40.4
KTK 6 incline(CN5)	18.01.2024	52.4	50.2
	05.02.2024	52.4	50.2
	21.02.2024	55.8	47.6
	04.03.2024	57.0	48.4
	19.03.2024	55.6	47.2
	Min	**40.3**	**30.9**
	Max	**62.3**	**50.8**
	Average	**48.95**	**40.28**
	98 per	**61.67**	**50.55**
GSR 742 (E) Standards		**75**	**70**

Noise Quality Data- Pulluriramaiahpalli / Kompally village
Monitoring Period: From April,2023 - March,2024

Name of the Location	Date of Sampling	Noise levels in dB (A)	
		Leq Day	Leq Night
Pulluriramaiahpalli / Kompally village	**05.04.2023**	40.6	34.1
	20.04.2023	38.8	29.1
	09.05.2023	37.1	29.0
	24.05.2023	41.9	29.8
	09.06.2023	46.7	35.2
	20.06.2023	44.4	33.6
	05.07.2023	39.4	29.4
	20.07.2023	56.2	34.9
	04.08.2023	36.8	28.0
	19.08.2023	27.0	35.6
	05.09.2023	49.8	33.7
	20.09.2023	48.3	32.8
	05.10.2023	36.5	36.2
	19.10.2023	47.1	32.4
	04.11.2023	39.4	28.7
	20.11.2023	33.6	22.2
	05.12.2023	49.0	33.8
	20.12.2023	49.3	34.6
	05.01.2024	46.0	31.4
	19.01.2024	43.3	35.7
	05.02.2024	43.3	35.7
	21.02.2024	44.4	35.1
	06.03.2024	47.1	37.5
	21.03.2024	48.0	38.3
	Min	**27**	**22.2**
	Max	**56.2**	**38.3**
	Average	**43.39**	**32.89**
	98 per	**53.51**	**37.96**
GSR 742 (E) Standards		**55**	**45**

Noise Quality Data- Pulluriramaiahpalli / Kompally village
Monitoring Period: From April,2023 - March, 2024

Name of the Location	Date of Sampling	Noise levels in dB (A)	
		Leq Day	Leq Night
Mallampally Village	03.04.2023	39.6	33.2
	18.04.2023	39.3	30.4
	06.05.2023	47.2	31.0
	22.05.2023	42.6	32.0
	07.06.2023	44.1	35.9
	17.06.2023	46.6	35.9
	03.07.2023	42.9	36.5
	18.07.2023	52.3	32.4
	02.08.2023	44.7	32.4
	17.08.2023	40.6	31.0
	02.09.2023	39.6	27.2
	18.09.2023	36.8	26.5
	03.10.2023	34.4	22.0
	17.10.2023	41.9	28.7
	02.11.2023	40.6	35.5
	17.11.2023	40.6	26.2
	02.12.2023	43.0	37.4
	17.12.2023	42.8	34.5
	03.01.2024	44.6	33.3
	17.01.2024	47.8	38.9
	02.02.2024	47.8	38.9
	22.02.2024	46.2	34.8
	05.03.2024	44.6	32.3
	20.03.2024	46.6	36.7
	Min	**34.4**	**22**
	Max	**52.3**	**38.9**
	Average	**43.56**	**32.73**
	98 per	**50.41**	**38.90**
GSR 742 (E) Standards		**55**	**45**

WATER QUALITY

4.1 Selection of Sampling Locations

A total of 3 water samples i.e., 1 sample from surface and 2 samples from groundwater were collected and analyzed for various physico-chemical and bacteriological parameters.

Table 4.1 Surface Water Sampling Locations

Sl. No.	Sampling code	Date of sampling				Sampling Location	Latitude	Longitude
		1st Quarter	2nd Quarter	3rd Quarter	4th Quarter			
1.	SW-7	08.11.2022	03.02.2023	23.04.2023	16.08.2023	Tank near Mallampalli	N 18°27'43.07"	E 79°53'46.62"

Table 4.2 Groundwater Sampling Locations

Sl. No.	Sampling code	Date of sampling				Sampling Location	Latitude	Longitude
		1st Quarter	2nd Quarter	3rd Quarter	4th Quarter			
1.	GW-9	08.11.2022	03.02.2023	23.04.2023	16.08.2023	Kamalapuram Village	N 18°28' 23.23"	E 79° 55' 20.37"
2.	GW-10	08.11.2022	03.02.2023	23.04.2023	16.08.2023	Pulluriramiahpalli / Kompally Village	N 18°27' 49.89"	E 79° 53' 45.09"

Table 4.3 Physical-Chemical and Bacteriological Characteristics of Surface Water

Table 4.3.1 Physical-Chemical and Bacteriological Characteristics of Surface Water as per CPCB Water Quality Criteria

Sl. No	Parameters	Unit	Test Method	CPCB Water Quality Criteria					RESULT			
				Class A	Class B	Class C	Class D	Class E	SW-7 Tank near Mallampalli			
									1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
1	pH	-	4500-H^+B	6.5-8.5	6.5-8.5	6.0 – 9.0	6.5-8.5	6.0-8.5	7.9	7.2	7.5	7.3
2	Electrical Conductivity	µmhos/cm	2510-B	-	-	-	-	2250 µmhos/ cm	423	379	420	384
3	Dissolved Oxygen (DO)	mg/L	4500-O.C	6 mg/l or more	5 mg/l or more	4 mg/l or more	4 mg/l or more	-	5.9	6.1	6.0	6.1
4	Bio chemical Oxygen Demand (3 days 27^o C)	mg/L	IS: 3025	2 mg/l or less	3 mg/l or less	3 mg/l or less	-	-	2.8	2.3	2.2	2.2
5	Total Coliforms	MPN/100mL	9221 B	50 or less	500 or less	5000 or less	-	-	220	140	140	94
6	Free Ammonia (as N)	mg/L	4500-NH_3 –F	-	-	-	1.2 mg/L or less	-	BDL	BDL	BDL	BDL
7	Boron as B	mg/L	3120-B	-	-	-	-	Less than 2 mg/L	0.18	0.07	0.09	0.09
8	SAR	-	-	-	-	-	-	Less than 26	0.99	0.79	0.80	1.21

Table 4.3.2 Physico-Chemical Characteristics of Surface Water at Selected Locations in the Study Area

Sl.No	Parameters	Unit	Test Method	RESULT			
				SW-7 Tank near Mallampalli			
				1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
1	Colour	Hazen	2120. B	5	5	5	5
2	Odour	TON	2150. B	No odour observed	No odour observed	No odour observed	No odour observed
3	Temperature	ºC	2550. B	25.0	25.1	25.0	25.0
4	Turbidity	NTU	2130. B	2.9	1.5	3.6	3.8
5	Total Dissolved Solids at 180^{o} C	mg/L	2540.C	248	220	245	225
6	Total Suspended Solids at 105^{o} C	mg/L	2540. D	18	21	11	39
7	Chemical Oxygen Demand	mg/L	5220. D	30	12	8	8
8	Chlorides as Cl^-	mg/L	4500-Cl^-.B	33	36	31	35
9	Sulphates as SO_4^{2-}	mg/L	4500-SO_4^{2-}.E	38	36	22	26
10	Fluoride as F^-	mg/L	4500-F^-.C	0.35	0.31	0.23	0.3
11	Calcium as Ca	mg/L	3500-Ca.B	24	26	21	22
12	Magnesium as Mg	mg/L	3500-Mg.B	17	20	19	15
13	Sodium as Na	mg/L	3500-Na.B	26	22	21	30
14	Potassium as K	mg/L	3500-K.B	4.2	4.8	2.8	1.2
15	Nitrites as NO_2	mg/L	4500-NO_2^-.B	21.3	0.36	3.1	BDL
16	Nitrates as NO_3	mg/L	4500-NO_3^-.B	20.1	4.1	3.8	2.3
17	Total Phosphates	mg/L	4500-P-D	BDL	BDL	BDL	BDL
18	Ammonical Nitrogen as NH_3-N	mg/L	4500-NH_3-C	BDL	BDL	BDL	BDL
19	Phenolic compounds as C_6H_5OH	mg/L	5530-D	BDL	BDL	BDL	BDL
20	Oil & Grease	mg/L	5520. B	<1	<1	<1	<1
21	Carbonates as CO_3	mg/L	2320. B	Nil	Nil	Nil	Nil
22	Bi-carbonates as HCO_3	mg/L	2320. B	124	108	190	135
23	Fecal Coliforms	MPN/100mL	9221 E	21	17	6.8	6.8

Sl.No	Parameters	Unit	Test Method	RESULT			
				SW-7 Tank near Mallampalli			
				1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
24	Zinc as Zn	mg/L	3120. B	0.09	0.08	0.19	0.07
25	Iron as Fe	mg/L	3120. B	0.44	0.39	0.38	0.36
26	Arsenic as As	mg/L	3120. B	BDL	BDL	BDL	BDL
27	Lead as Pb	mg/L	3120. B	BDL	BDL	BDL	BDL
28	Cadmium as Cd	mg/L	3120. B	BDL	BDL	BDL	BDL
29	Total Chromium as Cr	mg/L	3120. B	BDL	BDL	BDL	BDL
30	Nickel as Ni	mg/L	3120. B	BDL	BDL	BDL	BDL
31	Copper as Cu	mg/L	3120-B	BDL	BDL	BDL	BDL
32	Selenium as Se	mg/L	3120-B	BDL	BDL	BDL	BDL

Table 4.4 Physico-Chemical, Bacteriological Characteristics of Groundwater Collected within the Study Area

Table 4.4.1 Organoleptic and Physical Parameters

Sl. No.	Parameters	Unit	Test Method	IS: 10500 Requirement (Acceptable Limit)	IS: 10500 Permissible Limit in the absence of alternate source	RESULT							
						GW-9 Kamalapuram Village				GW-10 Pulluriramiahpalli / Kompally Village			
						1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
1.	Colour	Hazen	2120. B	5	15	<5	<5	<5	<5	<5	<5	<5	<5
2.	Odour	TON	2150. B	Agreeable	Agreeable	Agree.	Agree.	Agree.	Agree.	Agree.	Agree.	Agree.	Agree.
3.	pH	-	4500-H^+B	6.5 to 8.5	No relaxation	6.7	7.0	7.5	7.1	7.0	7.0	6.9	7.1
4.	Taste	FTN	2160. B	Agreeable	Agreeable	Agree.	Agree.	Agree.	Agree.	Agree.	Agree.	Agree.	Agree.
5.	Turbidity	NTU	2130. B	1	5	0.46	0.43	0.31	0.58	0.39	0.71	0.27	0.42
6.	Total Dissolved Solids at 180^{o}C	mg/L	2540.C	500	2000	398	743	215	575	774	830	645	776

Table 4.4.2 General Parameters Concerning Substances Undesirable in Excessive Amounts

Sl. No.	Parameters	Unit	Test Method	IS: 10500 Requirement (Acceptable Limit)	IS: 10500 Permissible Limit in absence of alternate source	RESULT							
						GW-9 Kamalapuram Village				GW-10 Pulluriramiahpalli / Kompally Village			
						1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
1.	Calcium as Ca	mg/L	3500-Ca.B	75	200	44	82	27	66	102	106	56	92
2.	Magnesium as Mg	mg/L	3500-Mg.B	30	100	33	59	19	56	62	79	38	75
3.	Chlorides as Cl-	mg/L	4500-Cl-.B	250	1000	78	77	31	112	156	171	154	170
4.	Sulphates as SO42-	mg/L	4500-SO42- .E	200	400	29	64	28	59	58	78	72	69
5.	Fluoride as F-	mg/L	4500-F-.C	1.0	1.5	0.43	0.6	0.05	0.67	0.55	0.9	0.23	0.58
6.	Nitrates as NO3	mg/L	4500-NO3-.B	45	No relaxation	19	55	35	43	78	51	47	50
7.	Total Alkalinity as CaCO3	mg/L	2320. B	200	600	210	565	140	265	386	459	285	340
8.	Total Hardness as CaCO3	mg/L	2340. C	200	600	246	446	146	395	510	590	296	539
9.	Sulphide as H_2S	mg/L	4500-S2-F&D	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10.	Total Ammonia-N	mg/L	IS 3025 (Part 34)	0.5	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11.	Phenolic compounds as C6H5OH	mg/L	5530-D	0.001	0.002	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
12.	Residual free chlorine	mg/L	4500-Cl-.B	0.2	1.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
13.	Mineral oil	mg/L	IS:3025 (part 39)	0.5	No relaxation	absent	absent	absent	absent	absent	absent	absent	absent
14.	Anionic Detergents (as MBAS)	mg/L	IS:13428:2005K	0.2	1.0	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
15.	Aluminium as Al	mg/L	3120-B	0.03	0.2	BDL	BDL	0.06	BDL	BDL	0.08	BDL	0.10
16.	Barium as Ba	mg/L	3120. B	0.7	No relaxation	0.32	0.46	0.35	0.11	0.18	0.23	0.14	0.25
17.	Boron as B	mg/L	3120-B	0.5	2.4	0.18	0.21	0.26	0.14	0.25	0.09	0.19	0.09

Sl. No.	Parameters	Unit	Test Method	IS: 10500 Requirement (Acceptable Limit)	IS: 10500 Permissible Limit in absence of alternate source	RESULT							
						GW-9 Kamalapuram Village				GW-10 Pulluriramiahpalli / Kompally Village			
						1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
18.	Iron as Fe	mg/L	3120-B	1.0	No relaxation	0.67	1.04	0.73	0.26	0.45	0.86	0.61	0.45
19.	Zinc as Zn	mg/L	3120-B	5	15	0.18	0.11	0.25	0.18	0.21	0.09	0.19	0.24
20.	Copper as Cu	mg/L	3120-B	0.05	1.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
21.	Manganese as Mn	mg/L	3120-B	0.1	0.3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22.	Selenium as Se	mg/L	3120-B	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
23.	Silver as Ag	mg/L	3120. B	0.1	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Table 4.4.3 Parameters Concerning Toxic Substances

Sl. No.	Parameters	Unit	Test Method	IS: 10500 Requirement (Acceptable Limit)	IS: 10500 Permissible Limit in absence of alternate source	RESULT							
						GW-9 Kamalapuram Village				GW-10 Pulluriramiahpalli / Kompally Village			
						1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
1.	Cadmium as Cd	mg/L	3120-B	0.003	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
2.	Cyanide as CN-	mg/L	4500-CN^-.F	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
3.	Lead as Pb	mg/L	3120-B	0.01	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
4.	Molybdenum as Mo	mg/L	3120. B	0.07	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
5.	Nickel as Ni	mg/L	3120-B	0.02	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
6.	Total Arsenic as As	mg/L	3120-B	0.01	0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
7.	Total Chromium as Cr	mg/L	3120-B	0.05	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8.	Mercury as Hg	µg/L	3500-Hg.B	0.001	No relaxation	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
9.	**Pesticides:** α–BHC, β-BHC, γ-BHC, δ-BHC, o, p-DDT, p, p' –DDT, Endosulfan, β- Endosulfan, Aldrin, Dieldrin	µg/L	6630. D	Absent	0.001	ND	ND	ND	ND	ND	ND	ND	ND

Sl. No.	Parameters	Unit	Test Method	IS: 10500 Requirement (Acceptable Limit)	IS: 10500 Permissible Limit in absence of alternate source	RESULT							
						GW-9 Kamalapuram Village				GW-10 Pulluriramiahpalli / Kompally Village			
						1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
	2,4-D, Carboryl (Carbonate) Malathion Methyl Parathion Anilophos, Chloropyriphos	Qualitative Analysis	6630. D	Absent	0.001	ND	ND	ND	ND	ND	ND	ND	ND
10.	**Polyaromatic Hydrocarbons (PAH's):** Acenaphthene, Acenaphthylene, Anthracene, B(a)A, B(a)P, B(b)F, B(k)F, Pyrene, Dibenz (a,h) anthracene, Fluoranthene, Fluorene, Indeno (1,2,3-(d) Pyrene, Naphthalene, Phenanthrene, Pyrene, Methyl Naphthalene	µg/L	6440.C	--	--	ND	ND	ND	ND	ND	ND	ND	ND

Table 4.4.4 Bacteriological Quality of Drinking Water

Sl. No.	Parameters	Unit	Test Method	IS: 10500 Requirement (Acceptable Limit)	IS: 10500 Permissible Limit in absence of alternate source	RESULT							
						GW-9 Kamalapuram Village				GW-10 Pulluriramiahpalli / Kompally Village			
						1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
1	Total Coliforms	MPN/100 mL	9221 B	-	-	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
2	Fecal Coliforms	MPN/100 mL	9221 E	-	-	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8

Table 4.1 Surface Water Sampling Locations

Sl. No.	Sampling code	Date of Sampling	Sampling Location	Latitude	Longitude
1	SW-7	08.01.2024	Tank near Mallampalli	N 18°27'43.07"	E 79°53'46.62"

Table 4.2 Groundwater Sampling Locations

Sl. No.	Sampling code	Date of Sampling	Sampling Location	Latitude	Longitude
1	GW-9	09.01.2024	Kamalapuram Village	N 18°28' 23.23"	E 79° 55' 20.37"
2	GW-10	08.01.2024	Pulluriramiahpalli / Kompally Village	N 18°27' 49.89"	E 79° 53' 45.09"

Table 4.3 Physical-Chemical and Bacteriological Characteristics of Surface Water

Table 4.3.1 Physical-Chemical and Bacteriological Characteristics of Surface Water as per CPCB Water Quality Criteria

Sl.No	Parameters	Unit	Test Method	CPCB Water Quality Criteria					RESULT
				Class A	Class B	Class C	Class D	Class E	SW-7 Tank near Mallampalli
1	pH	-	4500-H^+B	6.5-8.5	6.5-8.5	6.0 – 9.0	6.5-8.5	6.0-8.5	8.6
2	Electrical Conductivity	µmhos/cm	2510-B	-	-	-	-	2250 µmhos/cm	448
3	Dissolved Oxygen (DO)	mg/L	4500-O.C	6 mg/l or more	5 mg/l or more	4 mg/l or more	4 mg/l or more	-	5
4	Bio chemical Oxygen Demand (3 days 27° C)	mg/L	IS: 3025	2 mg/l or less	3 mg/l or less	3 mg/l or less	-	-	1.8
5	Total Coliforms	MPN/100mL	9221 B	50 or less	500 or less	5000 or less	-	-	220
6	Free Ammonia (as N)	mg/L	4500-NH_3–F	-	-	-	1.2 mg/L or less	-	BDL
7	Boron as B	mg/L	3120-B	-	-	-	-	Less than 2 mg/L	0.22
8	SAR	-	-	-	-	-	-	Less than 26	0.47

Table 4.3.2 Physico-Chemical Characteristics of Surface Water at Selected Locations in the Study Area

Sl.No	Parameters	Unit	Test Method	RESULT
				SW-7 Tank near Mallampalli
1	Colour	Hazen	2120. B	10
2	Odour	TON	2150. B	No odour observed
3	Temperature	ºC	2550. B	25.6
4	Turbidity	NTU	2130. B	12.4
5	Total Dissolved Solids at 180º C	mg/L	2540.C	262
6	Total Suspended Solids at 105º C	mg/L	2540. D	16
7	Chemical Oxygen Demand	mg/L	5220. D	12
8	Calcium as Ca	mg/L	3500-Ca.B	44
9	Magnesium as Mg	mg/L	3500-Mg.B	26
10	Sodium as Na	mg/L	3500-Na.B	16
11	Potassium as K	mg/L	3500-K.B	2.6
12	Chlorides as Cl^-	mg/L	4500-Cl^-.B	24
13	Sulphates as SO_4^{2-}	mg/L	4500-SO_4^{2-}.E	22
14	Fluoride as F^-	mg/L	4500-F^-.C	0.4
15	Nitrates as NO_3	mg/L	4500-NO_3^-.B	0.26
16	Nitrites as NO_2	mg/L	4500-NO_2^-.B	BDL
17	Total Phosphates	mg/L	4500-P-D	0.92
18	Ammonical Nitrogen as NH_3-N	mg/L	4500-NH_3-C	BDL
19	Phenolic compounds as C_6H_5OH	mg/L	5530-D	BDL
20	Oil & Grease	mg/L	5520. B	<1
21	Carbonates as CO_3	mg/L	2320. B	Nil
22	Bi-carbonates as HCO_3	mg/L	2320. B	195
23	Fecal Coliforms	MPN/100mL	9221 E	23

Sl.No	Parameters	Unit	Test Method	RESULT
				SW-7 Tank near Mallampalli
24	Zinc as Zn	mg/L	3120. B	0.19
25	Iron as Fe	mg/L	3120. B	0.39
26	Arsenic as As	mg/L	3120. B	BDL
27	Lead as Pb	mg/L	3120. B	BDL
28	Cadmium as Cd	mg/L	3120. B	BDL
29	Total Chromium as Cr	mg/L	3120. B	BDL
30	Nickel as Ni	mg/L	3120. B	BDL
31	Copper as Cu	mg/L	3120-B	BDL
32	Selenium as Se	mg/L	3120-B	BDL

Table 4.4 Physico-Chemical, Bacteriological Characteristics of Groundwater Collected within the Study Area

Table 4.4.1 Organoleptic and Physical Parameters

S.No.	Parameters	Unit	Test Method	IS: 10500 Requirement (Acceptable Limit)	IS: 10500 Permissible Limit in the absence of alternate source	RESULT	
						GW-9 Kamalapuram Village	GW-10 Pulluriramiahpalli / Kompally Village
1	Colour	Hazen	2120. B	5	15	<5	5
2	Odour	TON	2150. B	Agreeable	Agreeable	Agree.	Agree.
3	pH	--	4500-H^+B	6.5 to 8.5	No relaxation	7.9	7.8
4	Taste	FTN	2160. B	Agreeable	Agreeable	Agree.	Agree.
5	Turbidity	NTU	2130. B	1	5	0.92	0.36
6	Total Dissolved Solids at 180^{o}C	mg/L	2540.C	500	2000	535	704

Table 4.4.2 General Parameters Concerning Substances Undesirable in Excessive Amounts

S.No.	Parameters	Unit	Test Method	IS: 10500 Requirement (Acceptable Limit)	IS: 10500 Permissible Limit in the absence of alternate source	RESULT	
						GW-9 Kamalapuram Village	**GW-10** Pulluriramiahpalli / Kompally Village
1.	Calcium as Ca	mg/L	3500-Ca.B	75	200	64	86
2.	Magnesium as Mg	mg/L	3500-Mg.B	30	100	57	74
3.	Chlorides as Cl-	mg/L	4500-Cl-.B	250	1000	105	167
4.	Sulphates as SO42-	mg/L	4500-SO42- .E	200	400	58	62
5.	Fluoride as F-	mg/L	4500-F-.C	1.0	1.5	0.4	0.7
6.	Nitrates as NO3	mg/L	4500-NO3-.B	45	No relaxation	39	60
7.	Total Alkalinity as CaCO3	mg/L	2320. B	200	600	275	330
8.	Total Hardness as CaCO3	mg/L	2340. C	200	600	395	519
9.	Sulphide as H_2S	mg/L	4500-S2-F&D	0.05	No relaxation	BDL	BDL
10.	Total Ammonia-N	mg/L	IS 3025 (Part 34)	0.5	No relaxation	BDL	BDL
11.	Phenolic compounds as C6H5OH	mg/L	5530-D	0.001	0.002	BDL	BDL
12.	Residual free chlorine	mg/L	4500-Cl-.B	0.2	1.0	BDL	BDL
13.	Mineral oil	mg/L	IS:3025 (part 39)	0.5	No relaxation	absent	absent
14.	Anionic Detergents (as MBAS)	mg/L	IS:13428:2005K	0.2	1.0	<0.2	<0.2
15.	Aluminium as Al	mg/L	3120-B	0.03	0.2	BDL	BDL
16.	Barium as Ba	mg/L	3120. B	0.7	No relaxation	0.32	0.24
17.	Boron as B	mg/L	3120-B	0.5	2.4	0.21	0.09
18.	Iron as Fe	mg/L	3120-B	1.0	No relaxation	0.72	0.58
19.	Zinc as Zn	mg/L	3120-B	5	15	0.1	0.16
20.	Copper as Cu	mg/L	3120-B	0.05	1.5	BDL	BDL
21.	Manganese as Mn	mg/L	3120-B	0.1	0.3	BDL	BDL
22.	Selenium as Se	mg/L	3120-B	0.01	No relaxation	BDL	BDL
23.	Silver as Ag	mg/L	3120. B	0.1	No relaxation	BDL	BDL

Table 4.4.3 Parameters Concerning Toxic Substances

S. No.	Parameters	Unit	Test Method	IS: 10500 Requirement (Acceptable Limit)	IS: 10500 Permissible Limit in the absence of alternate source	RESULT	
						GW-9 Kamalapuram Village	GW-10 Pulluriramiahpalli / Kompally Village
1	Cadmium as Cd	mg/L	3120-B	0.003	No relaxation	BDL	BDL
2	Cyanide as CN-	mg/L	4500-CN^-.F	0.05	No relaxation	BDL	BDL
3	Lead as Pb	mg/L	3120-B	0.01	No relaxation	BDL	BDL
4	Molybdenum as Mo	mg/L	3120. B	0.07	No relaxation	BDL	BDL
5	Nickel as Ni	mg/L	3120-B	0.02	No relaxation	BDL	BDL
6	Total Arsenic as As	mg/L	3120-B	0.01	0.05	BDL	BDL
7	Total Chromium as Cr	mg/L	3120-B	0.05	No relaxation	BDL	BDL
8	Mercury as Hg	µg/L	3500-Hg.B	0.001	No relaxation	BDL	BDL
9	**Pesticides:** α–BHC, β-BHC, γ-BHC, δ-BHC, o,p-DDT, p,p' –DDT, Endosulfan, β- Endosulfan, Aldrin, Dieldrin	µg/L	6630. D	Absent	0.001	ND	ND
	2,4-D, Carboryl (Carbonate) Malathion Methyl Parathion Anilophos, Chloropyriphos	Qualitative analysis	6630. D	Absent	0.001	ND	ND
10	**Polyaromatic Hydrocarbons (PAH's):** Acenaphthene, Acenaphthylene, Anthracene, B(a)A, B(a)P, B(b)F, B(k)F, Pyrene, Dibenz (a,h) anthracene, Fluoranthene, Fluorene, Indeno (1,2,3-(d) Pyrene, Naphthalene, Phenanthrene, Pyrene, Methyl Naphthalene	µg/L	6440.C	-	-	ND	ND

Table 4.4.4 Bacteriological Quality of Drinking Water

S.No.	Parameters	Unit	Test Method	IS: 10500 Requirement (Acceptable Limit)	IS: 10500 Permissible Limit in the absence of alternate source	RESULT	
						GW-9 Kamalapuram Village	**GW-10** Pulluriramiahpalli / Kompally Village
1	Total Coliforms	MPN/100 mL	9221 B	-	-	<1.8	<1.8
2	Fecal Coliforms	MPN/100 mL	9221 E	-	-	<1.8	<1.8

NTU – Nephelometric Turbidity Unit; BDL – Below Detection Limit
Detection Limits of Aluminium (AI), Antimony (Sb), Arsenic (As), Barium (Ba), Boron (B), Cadmium (Cd), Chromium (Cr)/Total Chromium, Cobalt (Co), Copper (Cu), Iron (Fe), Lead (Pb), Magnesium (Mg), Manganese (Mn), Molybdenum (Mo), Nickel (Ni), Nickel (Ni), Selenium (Se), Silver (Ag), Vanadium (V), Zinc (Zn), Phenols is 0.01mg/L. Detection Limit of Mercury (Hg), Phosphates/Total Phosphates, Nitrites NO2, Free Ammonia, Total Ammonia is 0.02mg/L. Detection Limits of Potassium (K), Sodium (Na) is 0.03mg/L. Detection Limits of Cyanide (CN), Sulfide (S2), Hexavalent Chromium Cr+6 is 0.05mg/L. Detection Limits of Nitrates as NO3, Fluoride is 0.1mg/L. Detection Limits of Residual Free chlorine, Free Available chlorine, O&G is 1mg/L. Detection Limits of Sulfate SO_4^{-2}, Ammonical Nitrogen, Total Kjeldhl Nitrogen (TKN), COD, Total Nitrogen (TN) is 5mg/L. BOD-3mg/L. ND-Not Detected; Detection Limit: Pesticides– 0.1 ppm; PAHs – 1 ppm.