

# **Executive Summary**

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## ***Proposed Municipal Solid waste Management (Landfill) Of Paradeep Municipality***

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### ***Draft Environment Impact Assessment Report of Proposed Municipal Solid Waste Management Facility***

*at*

***Khata No. 01, Plot No. 69,71,82, 95 Ward No. 4,  
Village-Bhitargarh, Tehsil-Kujanga, and  
District-Jagatsinghpur, State- Odisha.***

***Submitted By :***

***Paradeep Municipality  
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## EXECUTIVE SUMMARY

### 1. Project Description

The proposed project is to set up a Municipal Solid Waste Management Facility(Landfill) to cater to the needs of waste disposal in Paradeep Municipality area. As per EIA Notification'2006 and its amendments, the proposed project comes under schedule 7(i) of EIA which includes Common Municipal Solid Waste Management Facility (CMSWMF). The proposed project falls under Category “B” and requires Environmental Clearance from SEIAA-Odisha.

### LOCATION OF THE PROJECT

Paradeep Municipality proposed to setup a Municipal Solid Waste Management(Landfill) System for processing facilities and sanitary landfill at Khata No. 01, Plot No. 71, 82, 95, 69 , village-Bhitargarh, Tehsil Kujanga, Distt. Jagatsinghpur, Odisha. Total Area of the project site is 52.6 Acres and area utilized for development will be 20 Acres.

**Table-1: Details of Sensitive Receptor**

<b>Sensitive Receptor</b>			
<b>S.No.</b>	<b>Particulars</b>	<b>Description</b>	<b>Distance and Direction</b>
1.	Nearest School & College	Delhi Public School DAV Public School	350 m, North 2 km, North
2.	Nearest Hospital	Vivekanand Hospital	800 m, North
3.	Places of worship	Shiv Temple	400 m, North
4.	Water Bodies	Mahanadi River Balijhara Lake Creek	5 km, East 1 km, East 150 m, East
5.	Forest/Nearest Wetlands and	Petachhola PF	13 km, North

**Draft EIA/EMP Report for Proposed Municipal Solid Waste Management (Landfill) at Bhitargarh in Khata No. 1, Plot No. 69,71, 82, 95, ward No.04, Tehsil Kujanga, Distt. Jagatsinghpur, Odisha by Paradeep Municipality.**

	Sanctuaries	Sanatubi PF	10.5 km, North
		Saralikud PF	11.5 km, North-East
		Jogidhankud PF	8 km, East
		Protected Forest	10 km, South-West

*Source: - (Primary Survey and Google Earth)*

The proposed municipal solid waste management facility is planned to be developed over 20 acres area. Details of the land breakup for present and for catering the future needs are given in below **Table-2**.

**Table-2: Land area break-up at the project site**

S.No.	Item	Dimension
1	Main Gate	7 M
2	Security room + Scale room for weighbridge	11.25 sq m
3	Office + Laboratory + Meter room	96 sq m
4	Parking	200 sq m
5	DG Platform	25 sq m
6	Tyre Washing Facility	40 sq m
7	Tipping Shed	300 sq m
8	Daily Cover Area	200 sq m
9	Water Sump	12.5 sq m
10	Leachate Tank	55 sq m
11	Landfill	25760 sq m
12	Boundary Wall Length	829 m
13	5.5 M Wide Road	960 m
14	Green Belt Area	5755 sq m

15	Storm Water Drain Length	836 m
16	Leachate Collection Length	677 m
17	Monitoring Wells	4 No.
18	Surface Clearing	37947 sq m
19	Future Expansion	41539 sq m

*Source: - Detailed project Report (DPR) prepared by IPE Global, New Delhi*

### **Design Parameters**

The proposed waste management plan and infrastructure/equipment for primary & secondary waste collection and transportation system have been framed based on the following design parameters given in below **Table-3**:

**Table-3: Design Parameters**

Base Year	2018
Design Year	2026
Base Population (2018)	114042
Design Population (2026)	129691
Base Waste Quantity (2018)	55.08 TPD
Projected Waste Quantity (2026)	62.64TPD
Gross Per-capita Waste Generation	483 grams/day/person (Period of survey)

### **Waste Streams**

As per the SWM Rules, 2016, the collection of waste shall be done in at least three different streams namely wet, dry and domestic hazardous waste.

**Wet Waste Stream:** Any waste which has high moisture content and ability to degrade into simpler compounds by micro-organisms. The waste to be segregated and stored in green colored bin. For ex: food waste, flower waste, leaf waste, vegetable waste etc.

**Dry Waste Stream:** Waste other than biodegradable waste and street sweeping including recyclable and combustible but excluding hazardous waste. The waste to be segregated and stored in white colored bin. For ex: paper, plastic, tetra pack, textile, rubber, leather, coconut shells, thermo-col, wood, metals, Street sweeping waste, glass, ash and silt

**Domestic Hazardous Waste:** means discarded paint drums, pesticide cans, CFL bulbs, tube lights, expired Medicines, broken mercury thermometers, used batteries, used needles and syringes and contaminated gauge etc., generated at the household level. The waste to be segregated and stored in a jute bag.

**Landfill Area Requirement:** The volume of inert waste and landfill capacity required to accommodate the inert waste for 20 years has been provided in the **Table-4** & the details of other dimensions are given in the **Table-4**.

**Table-4: Calculation for Landfill Capacity**

Description	2018-2022	2023-2027	2028-2032	2033-2037	Total	Unit
Total waste Generation in each 5 years (T)	26029	28160	30223	38913	<b>123324</b>	MT
Density	0.85	0.85	0.85	0.85		Kg/cum
Volume of Waste Generation ( $V_w$ )	30622	33129	35556	45780		Cum
Total Volume of Waste ( $V_w$ )	<b>30622</b>	<b>33129</b>	<b>35556</b>	<b>45780</b>	<b>145088</b>	Cum
Total Volume of daily cover ( $V_{dc}$ )= $0.1 \times V_w$	3062	3313	3556	4578		Cum
Total Volume required for components of Liner and cover system ( $V_c$ ) = $0.25 \times V_w$	7656	8282	8889	11445		Cum
Volume likely to become due to Settlement ( $V_s$ ) = $0.05 \times V_w$	1531	1656	1778	2289		Cum
Estimate of Landfill Capacity	<b>39809</b>	<b>43068</b>	<b>46223</b>	<b>59513</b>	<b>188614</b>	<b>Cu</b>

**Draft EIA/EMP Report for Proposed Municipal Solid Waste Management (Landfill) at Bhitargarh in Khata No. 1, Plot No. 69,71, 82, 95, ward No.04, Tehsil Kujanga, Distt. Jagatsinghpur, Odisha by Paradeep Municipality.**

<b>Description</b>	<b>2018-2022</b>	<b>2023-2027</b>	<b>2028-2032</b>	<b>2033-2037</b>	<b>Total</b>	<b>Unit</b>
$C_i = V_w + V_{dc} + V_c - V_s$						<b>m</b>
Hi	12.0	12.0	12.0	12.0		m
Area of Landfill without Embankment	3317	3589	3852	4959		Sq. m
Total Area Requirement for the Landfill					<b>3.9</b>	<b>Acres</b>
Plan Dimensions of Landfill					<b>15718</b>	Sq. m
Length of Landfill					190	m
Width of Landfill					83	m
Height of Embankment	3	3	3	3		m
Top of Embankment	5					m
Slope of Embankment (1:2)						
Length of Landfill including Embankment	34	34	34	34	224	m
Width of Landfill including Embankment	34	34	34	34	117	m
<b>Area of Landfill including Embankment</b>	<b>1156</b>	<b>1156</b>	<b>1156</b>	<b>1156</b>	<b>26146</b>	<b>Sq. m</b>

## 2. Detail of the Project

This project is an interlinked project for the setting up of Solid Waste Management facility(Landfill) for Paradeep Municipality. All the inert/rejects generated from processing facilities will be disposed off at Regional Sanitary Landfill Facility proposed at Paradeep. The cost incurred in the landfill and common ISWM facility will be shared in the same proportion as that of waste is being generated in the Paradeep. The salient features of the project are provided in **Table-5:**

**Table-5: Salient features of the project**

S. No.	Information	Details	
1	Project name	Proposed Solid Waste Management Facility(Landfill) at village Bhitargarh, tehsil Kujanga, Distt-Jagatsinghpur, Odisha.	
2	Area	Total Area- 20 Acres	
3	Name of the Project Proponent	Paradeep Municipality	
4	<b>Location of Site</b>		
	Co-ordinates of the Project	<b>Corners</b>	
		<b>Pillar Coordinates</b>	
		Corner 1	20°17'39.586"N 86°37'5.627"E
		Corner 2	20°17'35.261"N 86°37'11.221"E
		Corner 3	20°17'37.943"N 86°37'3.782"E
		Corner 4	20°17'34.731"N 86°37'2.112"E
		Corner 5	20°17'33.957"N 86°37'3.324"E
	Corner 6	20°17'25.943"N 86°36'56.557"E	
Corner 7	20°17'23.1"N 86°36'59.698"E		
Villages	Bhitargada		
District	Jagatsinghpur		
State	Odisha		
5	Water Requirement and its source	During the construction phase, 50 KLD of water will be required that will be met through Rengali canal. During the operational phase, 30 KLD of water will be required that will be abstracted through bore wells.	
6	Power Requirement and its source	10 KVA <b>Source:</b> Central Electricity Supply Utility of Orissa (CESU).	
7	Capacity of Compost Plant	2 TPD capacity each of Organic waste convertor plant (OWC - 500)	
8	Project Cost	23.4 Crores	
8	Nearest Railway station	<ul style="list-style-type: none"> <li>Paradeep Railway Station is approx. 1.5 km in South</li> </ul>	
10	Nearest SH/NH	<ul style="list-style-type: none"> <li>NH-5A is 3 km towards South</li> </ul>	
11	Nearest Air port	<ul style="list-style-type: none"> <li>Biju Patnaik International Airport, Bhubaneswar approx. 85 Km in West</li> </ul>	
12	Nearest Water Bodies	<ul style="list-style-type: none"> <li>Mahanadi River 5Km, East</li> <li>Balijhara Lake 1 Km, East</li> <li>Creek 150 m, East</li> </ul>	
13	Nearest Forest	<ul style="list-style-type: none"> <li>Petachhola PF is 13 km towards North</li> <li>Sanatubi PF is 10.5 km, North</li> </ul>	

S. No.	Information	Details
		<ul style="list-style-type: none"><li>• Saralikud PF 11.5 km, North-East</li><li>• Jogidhankud PF 8 Km, East</li></ul>

### **3. Technology and Process Description**

#### **Existing SWM system in city**

Major waste generation sources in Paradeep Municipality city are residential establishments, commercial establishments' viz. hotels/restaurants/guest house, street sweeping, drain silt and construction & demolition sites. As per the waste projections carried out, 55.08 TPD MSW will be generated in Paradeep city in year 2018, out of which 53% is biodegradable, 15% is recyclable, 22% is inerts and 10% is street sweeping waste. The calculations also suggest that per capita per day waste generation is around 483 gms/ capita/ day in year 2014.

#### **Segregation at Source and Primary Collection:**

There is no practice followed for segregation of MSW at source into biodegradable (wet) and non-biodegradable (dry) waste in the town. There is uniform system of door to door collection in the town.. Private operators carry out sanitation activities in 14 wards whereas Municipality do obligatory function in 5 wards. At present, there is no processing system of waste established in the town.

#### **Secondary Storage and Transportation:**

There are open waste storage sites, wheeled bins and cement concrete bins spread in the town where waste is disposed by traditional carts after collecting the waste from source or directly by the residents. The waste is collected from the bins and open dumps by the tractor & auto tipper for final disposal at the dumping site

#### **Disposal of Waste:**

At present, there is no processing system of waste established in the town. The existing dumpsite which is located at Bangalipad, Ward no. 13 which is a Port land with three side Boundary Wall. This site is approximately 5 km away from the centre of town and having 11 acres area.

The following gaps were found in the existing MSW management with respect to SWM Rules 2016 in Paradeep Municipality:

- The existing status of the open dumps in the city, road side dumps, clogged nallahs reflect the inefficiency of the present system. The safai karamcharis also dump the drain silt and waste at open dumps.



- There is a lack of awareness about efficient SWM System among city residents and civic authorities.
- During door to door collection, waste is transported in open vehicles which are overloaded, resulting in road littering during transportation. Municipal workers involved in primary collection of MSW do not use any Personal Protection Equipment (PPEs).
- Secondary storage of solid waste is unorganized and inefficient. The dustbins were broken or rusted. Main collection points are all open dumps scattered all over the city. Animals strayed on open dumps, collection bins overflowed and waste collection appeared to be poor. There was no marking for segregation of waste into separate bins.
- Collection and disposal of construction waste is not appropriate and is mainly use for the filling of low lying areas
- Biomedical waste is collected in mixed form with MSW waste and is dumped in open in an adjoining land.

There is no pre-processing system of waste and hence, more infrastructures are required to get it fully processed. There is no engineered sanitary landfill site for safe disposal of solid waste.

### **3.1 Proposed MSW Management System**

In the DPR, storage of waste at the source, primary & secondary collection and transportation system are proposed in accordance with the guidelines issued by CPHEEO, CPCB/ MoEF, actual site conditions as depicted from the extensive surveys conducted and in line with SWM Rules, 2016. While planning the proposed management system, the collection, storage & transportation of waste has been planned to achieve high segregation of MSW, where in the Bio-degradable waste and Non- Biodegradable waste would be collected and transported on daily basis.

#### **Segregation at Source:**

For storage of waste in segregated manner two closed containers consist of 10L capacity for biodegradable (green colored container) & 10 L capacity for non-biodegradable (white colored container) at household level has been estimated.

#### **Primary Collection:**

Door to door collection has been proposed through wheelbarrows and auto tipper for the collection of waste from the households based on the population density. Auto Tipper (1 cu m capacity) will have separate storage compartments for wet and dry waste. The workers involved in SWM also need to be equipped with adequate personal protective equipment's (PPEs) like gloves, boots, broom, shovels and uniform.

#### **Street Sweeping:**

For Street Sweeping of 151 km of road length has been considered for street sweeping. Length of roads having divider is 8 Km. 50% of road length to be by street sweeping machine & 50 % of road length to be cleaned manually with utilization capacity of 80%. No of wheelbarrows (with 5% backup) is 83 having capacity of 250 Kg.

### **Secondary Storage and Transportation:**

The primary collection will be done through Auto-Tippers and therefore, secondary collection points will only be required for storage of street sweeping waste. For secondary storage, 58 SCPs will be placed at a distance of 750 m. Additionally, 10 storage points will be kept at market areas to cater for contingency requirements .

It is proposed to use 2 Refuse Collector vehicle of 8 cu m capacity for transportation of Street Sweeping Waste. Deposition Center has also been proposed in system for Domestic Hazardous Waste as per SWM Rules, 2016.

### **3.2 Processing of Waste**

Paradeep Municipality has identified a piece of land for the setting up of ISWM Facility. After the perusal of proposed dumping site, land of 20 acres approximately at Bhitargarh has been finalized for setting up of ISWM Facility. The Facilities to be provided at the ISWM facility for the Processing and Disposal of segregated MSW are as follows:-

- ❖ For the Processing of Bio-degradable waste: ***Organic Waste Converter***
- ❖ For the processing of dry waste: ***Recycling Centre***
- ❖ For the Final Disposal of the Inert Waste and the Rejects from the above mentioned Processing Facilities: ***Sanitary landfill***
- ❖

#### **Sanitary landfill**

The regional sanitary landfill facility has been proposed at Paradeep having 20 acres of land for the setting up of proposed facility. Only inert waste of Paradeep will dispose at Regional Sanitary Landfill at Bhitargarh in Khata No. 1, ward No. 04. Design period is considered for 20 years by taking base year as 2018 and design year has been considered as 2038.

### **4. Description of Environment (Baseline Data Details)**

Baseline study of the study area (*i.e.* 10 km radius from the project boundary) was conducted during Winter Season (Oct, 2017 to Dec, 2017). The components of Environmental indicators for which Baseline study was carried out are: Ambient Air Quality, Ambient Noise Level, Water Quality, Soil Quality, Land Use Pattern, Demography, Flora & Fauna. All these details are studied separately for the core & buffer zone:

#### **a. Land use and land cover**

The study area is predominantly surrounded by 34.273732 Sq km (11.19 %) of green belt of the study area. The agricultural land is about 117.086465 Sq km (38.21 %) in the study area. The study area has 130.74 Sq km (42.67 %) of water bodies, which includes reservoir, canal, lake and River etc. The study area comprises of built up land of about 20.904768 Sq km (6.82 %). The 10 Km radius False Color Composite satellite map surrounding the project site.

#### **b. Water Environment**

##### ***Surface Water Quality***

The physico-chemical analysis of water samples was compared with surface water quality standards as per IS: 2296. The data analyzed revealed that general qualities of water in all the

locations are good. All the measured parameters were observed well within the prescribed limit of water quality standards.

***Ground Water Quality***

The physico-chemical analysis of water samples was compared with water quality standards as per BIS (IS: 10500:2001). The result shows that the total dissolved solid varies from 346 mg/l to 1024 mg/l, well within the permissible limits as per drinking water standard (IS-10500), pH varies from 7.31 to 7.88. Total hardness varies from 36-620 mg/l and which is within the permissible limit. The other parameters are within the drinking water limits.

***c. Air environment***

The baseline data collection for ambient air has been carried out during Oct 2017 to Dec 2017. The ambient air quality was monitored at 5 locations in the month of October, November and December, and the month wise summary of results obtained is given in **Table-6.**

**Table-6: Summary of Ambient Air Quality Results**

Parameter	Summary of baseline air data monitored over 3 months at 5 locations including project site		
	Min	Max	NAAQS Limits as per CPCB
PM <sub>2.5</sub> (µg/m <sup>3</sup> )	57.10	87.4	60
PM <sub>10</sub> (µg/m <sup>3</sup> )	110.26	273.53	100
SO <sub>2</sub> (µg/m <sup>3</sup> )	3.7	24.47	80
NO <sub>x</sub> (µg/m <sup>3</sup> )	5.91	18.36	80
CO (mg/m <sup>3</sup> )	0.06	1.03	2

***d. Soil Quality***

The result shows that the moisture retention capacity of the soil samples at all five locations is approx. 30%, which is good from the point of agricultural potential. Soils of the project area are neutral at three locations except at Village Rangiagarh. Most of the crop grows if the soil pH ranges between 4.9 to 7.87. Nitrogen, Phosphorous, Potassium values are good at all the locations, with better organic matter having low sand and balanced iron contents. The Texture of soil at all the locations is “Sandy loamy” texture proving the soil to be good for fertility and better for agriculture point of view.

***e. Ambient Noise Quality***

The day time noise level monitored along all the major settlement exceeded the maximum permissible noise level at project site and Village Rangiagarh and the night noise level for residential and commercial area within the permissible level. The daytime equivalent noise level varied between 54.8Leq dB(A) to 51.7 Leq dB(A) and nighttime equivalent noise level varied between 42.4-45.3 dB(A).The congested urban built-up area experience high noise level due to commercial activities of the area and traffic congestion.

**f. Socio-Economic Environment**

The total population within the project influence area is about 68,585 residing in 17,485 households. The male and female population 54.38% constitutes and 45.62 % respectively. Infant population comprises about 42.33% of the total population. The overall sex ratio is about 968 females per 1000 males, while that of infants is 922 females per 1000 males. The average family size is 4 persons per household.

**5 Anticipated Environmental impacts and mitigation measures**

**A. Impacts on Air Environment during construction and operational phase**

- i. Particulate Matter (PM<sub>10</sub>, PM<sub>2.5</sub>)
- ii. Gaseous Pollutants (SO<sub>2</sub>, NO<sub>x</sub>, CO, CH<sub>4</sub>, NH<sub>3</sub>)

Mitigation measures : Compaction of haulage road by using water, covering garbage transportation trucks with tarpaulin cover, Use of Bharat stage-IV vehicles, Wheel washing of vehicles entering the site, training operators of vehicles, development of green belt at the site.

**B. Impacts on Odour**

Construction phase: No impact of odour in construction phase.

Operational phase: Decomposition of organic matter brought to the site for disposal.

Mitigation measures:

- i. Processing all waste received at the site in same day.
- ii. The biodegradable component of the municipal solid wastes shall be separated and taken for composting on daily basis.
- iii. Both the biodegradable and non-biodegradable components of the municipal solid wastes shall be covered with a cover of soil.

**C. Noise**

Impact in construction phase: Construction activities at the site

Impact in operation phase: Movement of vehicles

Mitigation Measures: Periodic maintenance of vehicles trucks carrying solid waste & development of green belt. There are no villages within 500 meters of the project site. Also the Green Belt around the Project Boundary will act as a barrier for noise.

**D. Ground Water & Surface water**

Impact in construction phase: During construction phase no ground water contamination is anticipated.

Impact in operational phase: Exposure of ground water & surface to leachate contamination due to fractured and fissured rocks and proximal distance of Water bodies to the proposed site. Contamination of ground water due to sewer generated from the site.

Mitigation measures:

- i. Installation of temporary site drains, and all associated measures as required controlling the run off of surface water from areas disturbed by construction.
- ii. The use of settlement ponds to reduce sediment loads prior to discharge to water bodies, including the sea, if applicable.

- iii. The domestic waste water will be sent to septic tank followed by soak pit.
- iv. Awareness on optimal water consumption shall be provided to the laborers.
- v. The leachate will be treated in a Leachate Treatment Plant (LTP) and recycled for utilization in Vehicle washing, greenbelt development and floor washing.
- vi. Excavation will be avoided during monsoon season.
- vii. No discharge of wastewater to soil and ground water body will be done.
- viii. All containers and storage tanks are clearly marked and have hazard information displayed on them when appropriate.
- ix. Leachate generated within the OWC will be very minimal in quantity and it will be re-utilized.

#### E. Land Environment

The proposed project will be developed on the barren land waste disposal site; hence, no change in the land-use of the site due to the proposed project is anticipated. As a site development activity for the proposed plant, a green belt corridor around the periphery of project site would be developed. Some other aesthetic changes would be made at the plant site, thereby creating an overall positive visual impact on the site.

During operation phase of the project, the final rejects/treated waste from waste segregation system will be disposed at the landfill site. Vegetation cover shall be provided over the compost site.. Shelter belt with avenue plantation on both sides of road and Landscaping lawns area including plantation of herbs & shrubs will be done. Plantations would be of large leaf trees that provide adequate shade and are semi-evergreen to evergreen. The selection of plants will be done after consultation with local forest & Horticulture department. Plantation will be help to minimize soil erosion. Landscape design along the periphery of the project will be facilitate to achieve attenuation factor conforming to Noise & Air standards.

#### F. Biological Environment

Impact Construction phase & Operation phase: Indirect impact on breeding, feeding and movement of animals due to construction activities and operational activities.

Mitigation measures:

- ❖ Construction activities will be restricted to day hours only.
- ❖ Poaching of animals by laborers will be strictly prohibited.
- ❖ Ward and watch for the animal movement in and around the project area during construction phase will be provided.
- ❖ Environment and Wildlife Conservation awareness program will be organized for both work force and surrounding villages.
- ❖ All the vehicles delivering materials to the site shall be covered to avoid spillage of material.
- ❖ Approach road used by vehicles shall be kept clean and clear of dust.
- ❖ All earth work shall be protected to minimize dust generation.

#### G. Socio-Economic Environment

Anticipated impact in construction and operational phase

- ✓ Litter

Mitigation measures:

- ✓ Covering trucks/tractors carrying waste with tarpaulin covers.
- ✓ Encouraging rag pickers to collect litter on voluntary basis.

**Population composition:** The impact will be insignificant as very less number of people from outside get employment in the project and settle in the study area.

**Impact on employment generation:** Direct employment opportunities will be given to 126 persons. The skilled/semi-skilled workers will be 10 in total while the unskilled workers for the site services will be 116. The skilled and unskilled workers will be recruited locally preferably. The local people may get employed in the project as semi-skilled workers after necessary training.

**Impact on the Local Area Development:** The infrastructural development in the area will bring other supportive facilities such as drinking water, road construction, electricity supply, basic phones or mobile phone connections.

**Impact on Urban Development:** The urban development will get much required impetus due to proposed Municipal Solid Waste management Project.

**Impact on the nearby inhabitants:** It will help in increasing the localized employment structure as well as increasing further development opportunity. However the Land prices in immediate surroundings may decrease as a negative impact.

**Impact on GDP:** A very minor contribution will be made on the Gross Domestic Product (GDP).

**Impact on Quality of Life:** The proposed Municipal Solid Waste Management Project will help in reducing burden of municipal solid waste in the city.

## **6. Environmental Monitoring Program:**

<b>S. No.</b>	<b>Type</b>	<b>Locations</b>	<b>Parameters</b>	<b>Period &amp; Frequency</b>	<b>Methodology</b>
1.	Ambient Air Quality Monitoring	Project Site, Nearby habitations, upwind, downwind, crosswind	PM <sub>10</sub> , PM <sub>2.5</sub> , NO <sub>x</sub> , CO, and Odour	Monthly once	As per CPCB Standards (NAAQS-2009)

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S. No.	Type	Locations	Parameters	Period & Frequency	Methodology
2.	Ambient Noise Monitoring	Within Project site (DG Set, Compost yard area, SLF area) and nearest habitation.	Noise level $L_{eq}$ both during daytime and night time	Monthly once	As per CPCB Standards for Industrial area
3.	Water Quality Testing (Surface and Underground)	Project Site, Piezometers around the landfill, ground water & surface water from nearby villages	Drinking water parameters as per IS 10500:2012.	Monthly once	As per CPCB Standards
4.	Soil Quality	Project Site and Nearby habitations,	pH, Humidity, Texture, Organic matter, NPK, Sulphate, Calcium, Magnesium, C: N ratio.	Monthly once	IS 2720 and USDA Guidelines
5.	Leachate	Windrow, compost plant, Secured landfill	Parameters as per MSW Rules	Monthly once	As per MSW Rules
6.	Compost	Final Product	Parameters as per MSW Rules	Monthly	As per As per MSW Rules
7.	Plantation	Green	Half yearly	Survival of plants and replacement of immature plants.	----
8.	Stack Emissions Monitoring	DG stack	PM, $SO_2$ , $NO_x$ , CO, HC	Monthly once	As per CPCB Standards

## 7. Additional Studies

### Setting up Waste acceptance criteria

- All waste will be routinely accepted if the truck/tipper authorized documents indicating the source of waste. Such waste shall be routinely inspected visually at the landfill site. A waste screening platform is provided for this purpose.
- No hazardous waste shall be accepted
- Dewatered sludges certified as non-hazardous shall be accepted at landfill sites provided they are less than 10% of MSW received daily.

- d. Large quantities of non-hazardous industrial solid waste (more than 10% of MSW generated daily) shall not be accepted at the landfill site.
- e. Construction and demolition debris be accepted for daily cover requirements.

**Risk assessment:**

Major hazards anticipated in the proposed project are

- a) Hazardous pertaining to fires in project / plant area
- b) Fire in diesel storage areas, garbage storage area and disposal areas
- c) Natural disaster (Earthquakes, flooding etc)
- d) Electrical accidents
- e) Flooding from man-made causes
- f) Rainfall induced landslides
- g) Environmental & Health Aspects

Relevant plan for management of these hazards is prepared.



## **8. Project Benefits**

- The risk of environmental sanitation related diseases would be reduced with properly maintained and functioning waste management together with increased public awareness on the effects of indiscriminate disposal of wastes into waterways and dumping of rubbish in open areas.
- With coming up of the proposed project the employment opportunities (direct as well as indirect) will increase and local people will be employed on the priority basis as per their skills.
- The transportation of the material will involve a network of persons engaged in collection and transportation of material, thus developing the indirect employment opportunity.
- The proposed project will help in creating pollution free clean environment and will generate source of income from otherwise considered waste. This will help in improving the living conditions of the people.
- The project will involve the treatment of waste in scientific way without causing environmental problems such as odour, health hazard etc.
- Local people will be employed in the project. Due to coming of the proposed project the surrounding environment will not face any problem related to pollution because appropriate pollution control equipment will be followed.
- Economic revenue through sales of compost; sale of recyclables; users charges from household and commercial establishments in Paradeep Municipality.

## **9. Environment Management Plan**

### **Control of Fugitive Dust**

1. The haulage trucks and tractors involved for garbage transportation shall be covered fully with tarpaulins and shall be prevented from spillage of dirt during transit.
2. Periodic maintenance of the machineries and equipment as well as the haul trucks/tractors involved shall be done as per the manual requirement.
3. The fully developed green belt shall present an appealing landscape and would be scientific also in purpose.
4. Water sprinkling

### **Control of Methane Gas (Land Fill Gas) generation**

Owing to small area of site and composting of biodegradable waste in OWC, the emissions of methane and ammonia are expected to be zero. Hence a gas collection system and flaring has not been planned to be installed.

### **Control of Noise Pollution**

- Acoustic enclosures and noise barriers will be provided in areas of high noise generating sources.
- Regular maintenance of its vehicles and repair of its equipment/ machinery.
- Construction workers working near high noise generation shall be provided with ear plugs/ ear muffs to limit exposure to occupational hazards

- Existing green area around facility will act as noise barrier between project site & surrounding area.

#### **Control of Odour**

- Both the biodegradable and non-biodegradable components of the municipal solid wastes shall be covered with a cover of soil to prevent coming in contact with air and also water through rains. The burial of biodegradable matter beneath fresh layer of soil shall prevent spread of foul smell/odour into the environment. At present the biodegradable wastes namely food and vegetable wastes are dumped in open. The dumping of these wastes in open generates aerobic decomposition due to interaction of microbes and bacteria which release foul gases and odour into open air. This aerobic decomposition of biodegradables shall be covered with fresh layer of soil spread up on each day's MSW load. It shall eventually stop generation of bad odour and smell.
- A dense growth trees with perfume releasing flowers may be grown which shall curb this menace to greater and effective way naturally.

#### **Emissions due to MSW Components**

- Non-Biodegradable component of MSW – shall be sorted out and segregated. The segregated material will be sold to the scrap dealer.
- Inert waste-The proposed project site will be used only for the processing of compostable waste and the rejects/inert waste will be disposed off at Paradeep proposed landfill facility.

#### **Water Environment**

- Excavation to be avoided during monsoon season.
- Construction of Pit latrines and community toilets with temporary soak pits and septic tanks.
- The floors of oil/grease handling area will be kept effectively impervious
- All stacking and loading areas should be made impervious.
- Water management is required to ensure that rainwater run-off does not drain into the waste stacked below; from surrounding areas and that there is no waterlogging/ ponding on site.

#### **Leachate Management**

- Leachate generated within the OWC will be very minimal in quantity and it will be re-utilized.

#### **Land Environment**

There is no change in the land-use of the proposed site. With the site development for the proposed plant, green belt around the periphery of project site would be developed and other aesthetic changes would be made at the plant site, thereby creating overall positive impact on the aesthetics of the site.

### **Biological Environment**

- At present the project site is a vacant land (being used as dumpsite) with sparse growth of herbs and shrub;
- Construction activities will be restricted to day hours only.
- Ward and watch for the animal movement in and around the project area during construction phase will be provided.
- Environment and Wildlife Conservation awareness program will be organized for both work force and surrounding villages

### **Green Belt Development**

Vegetation cover shall be provided over the compost site. Green Area will be developed. Shelter belt with avenue plantation on both sides of road and landscaping lawns area including plantation of herbs & shrubs will be done. Plantations would be of large leaf trees that provide adequate shade and are semi-evergreen to evergreen. The selection of plants will be done after consultation with local forest & Horticulture department. Plantation will help to minimize soil erosion.

**Table-7: Environmental Management Cost**

<b>S. No.</b>	<b>Description</b>	<b>Cost (in Lakhs)</b>
<b>One Time Cost</b>		
1.	Evaporation Tank	Rs. 35.00
2.	Leachate Collection Tank	Rs. 20.00
3.	Septic Tank and Soak Pit	Rs. 15.00
4.	Green Belt Development	Rs. 40.00
5.	Occupational Health & Safety	Rs. 4.00
<b>Recurring Cost</b>		
6.	Green Belt	Rs. 10.50
7.	Environmental Monitoring Cost	Rs. 1.50

The plant proposes to create Environmental Management Cell in its organization to monitor and implement programs to improve its environmental status from time to time and will adopt all such technological advances to reduce the impact due to its operation on the environment.

- Mitigation measures will be undertaken to prevent adverse impacts on the surrounding environment like air, water, land and biological.
- There shall be economic growth and development at the local and regional level.

### **10. Conclusion**

The conclusions drawn from the above study relates to the fact that the proposed project of the “**Municipal Solid Waste Management Facility(Landfill) at Paradeep** has certain level or marginal impacts on the local environmental setting, which will not affect the natural environmental setting of the study zone either drastically or otherwise. However, certain beneficial impacts are anticipated in terms of the employment opportunities created

during the operation of the proposed project. Also there will be economic growth at the regional level.

AEEPL