

EXECUTIVE SUMMARY

1.0 BACKGROUND

The inappropriate and often careless handling of hazardous industrial wastes, bio-medical wastes and municipal solids wastes has all too often created problems worldwide for human health and the environment. Effective control of these wastes is of paramount importance for proper health, environmental protection and natural resources management. Developing countries, as they experience rapid industrial growth as in India have a particularly urgent need to initiate programs for effective management of hazardous wastes. Consequently governmental initiative in management of all kinds of hazardous wastes has become necessary.

There is no satisfactory inventory of hazardous waste quantities or relative toxicity at the national level, nor is there any central coordinating organization responsible for the implementation of sound management strategies. Current legislation involves several Government departments in statutory or advisory roles connected with hazardous waste management, but administration of disposal practices devolves to regional and local authorities. The occasional uncontrolled discharge of chemical wastes, unsatisfactory past practices regarding landfill siting and leachate management, and the development of major industries, together requires better coordinated and enforced policies concerning hazardous waste disposal.

Dindigul is one of the important Centers for leather and leather products. There are 61 tanneries in Dindigul, are situated within a 5 km distance from the centre of the town. Several of them have been in existence for thirty to forty years. Out of 61 tanneries connected to CETP, only 46 tanneries are under operation at present and the remaining 15 tanneries are not under operation for various reasons.

The quantities of hazardous wastes generated in DINTEC CETP are relatively small, both in total volume and on a per capita basis: The major sludge from CETP contains chemically coagulated, flocculated and precipitated matter with low concentration of residual total chromium. Present sludge generation from CETP is about 450-500 tonnes/year.

The most widely advocated method of hazardous waste disposal for DINTEC CETP is disposal in appropriately sited and controlled engineered landfills, with particular emphasis on protection of freshwater resources, both surface and subsurface. The secured landfill solution adopted for the

sludge which is generated from CETP. Greater use of replacement, recycling or reprocessing must be encouraged in order to minimize the quantities, thus increasing the effective life of the landfill and toxicity of hazardous wastes requiring disposal in DINTEC CETP.

2.0 PROJECT DESCRIPTION

The proposed Secured Landfill facility is located on Dindigul to Batlagundu Road NH 45 Extension and survey no 628/2, 642/1B, 642/1D, 642/1B, 642/1A, 642/1C, 642/2A, 628/1C, 628/1A, 628/1B in Pallapatti village.– Dindigul District and covers an area about 7 acres. The proposed site has 10°43'16"N latitude and 77°53'33"E longitude. It is adjacent to the cluster of Tanneries in the industrial area and is located on the south side of Dindigul CETP.

The site is 550 m away from NH-45 extension road and 750 m away from NH-7 Road. There are no flowing rivers or water bodies near the proposed site and is more than 500 m away from the main road. No major wetland or agricultural activities in this area due to poor rainfall, infertile soil and non-availability of quality ground surface water supply. The drainage network connecting to CETP also exists in this area, which can be used for conveying the leachate to CETP.

Secured landfill Facility

The landfill will be designed and constructed as a secured facility to contain the waste material and any leachate, which is formed by the entrapped moisture or by infiltration of rainfall. To meet these requirements the base of the landfill has been designed as an engineered liner constructed prior to the placement of waste. The estimated cost of the project is **402 lakhs**.

The conventional central landfill facilities are generally provided in huge land area with earthen bund above ground level. It was observed that, the soil required for earthen bund for small capacities (i.e. less than 1, 00,000 m³) would be 100 to 200% more than the actual holding capacity of the landfill for disposal. In addition, making available of huge quantity soil and clay is a major constraint in many places particularly in Tamil Nadu. Dindigul SLF proposal have been prepared with the guidelines prescribed by CPCB clearance for Ranipet SLF vide letter No. B29016/1/05/PCI-I/1297 dated 14.12.2005 and accorded for many including TNPCB clearance for Pernambut SLF vide letter no. Tannery/TNPCBd/F.1465/94 dated. 21-06-2006. as per the guidelines of CPCB, for single liner system, the thickness of clay layer of 1.5 m is not feasible due to non-availability of quality clay and other technical constraints/ factors for small capacity

secured landfill systems. To overcome the above difficulties, CLRI has developed an appropriate design with watertight RCC base / sidewall, which shall hold more quantity of sludge within the available land and the following conditions, will be adopted for RCC design of proposed Secured Landfill Facility provided by CLRI as per the conditions imposed by CPCB.

- Main components in CLRI design are Reinforced Cement Concrete (RCC) sidewall and base with 1500 micron HDPE sheet at bottom instead of huge earthen bund which occupies large land area, volume of earth & clay, 1.5 m thick clay base etc.
- A HDPE sheet with a thickness of 1.5 mm and a liner below the RCC/ PCC including sand/ fly ash cover for HDPE sheet as a safety measure have been proposed in the SLF design.
- As an additional safety protection, a secondary leachate collection system and a secondary HDPE liner with leak detection layer with geo-net will be provided to suit the Dindigul CETP field conditions in accordance with CPCB suggestions for a similar secured landfill system. Landfill layout is optimized to accommodate maximum quantity of solid waste for disposal with available land area.
- The imperviousness of the raft as well as the joints in the rafts shall be checked and certified by SERC at the design stage and construction stage.
- The secured landfill shall be designed in a way that it should be above the existing ground level.
- The cover system shall comply with guidelines for HW landfills to ensure longevity during post-closure and post-abandonment stage.
- Implementation and utilization of modular concept
- It is recommended to dispose sludge generated from CETP and pretreatment units of Dindigul cluster taking into account the latest developments and the rejects from the reverse osmosis (RO) plants and from any evaporation system shall not be disposed off into Secured Landfill Facility.
- Providing pizeometers which constitutes the leachate monitoring system

The built up area of secured landfill is about 5000 m². The depth of sludge would be about 3.0 m at the periphery and 6 m at the center. In order to improve the landscape of the area, green belt of about 5 to 10 m width around the boundary of the landfill site will be provided. Provision has been made for water harvesting by digging open ponds in the odd shape areas. The adopted baseline data for the designing of Secured Landfill Facility is given in **Table-1**.

Table 1 Basic design criteria

Sl. No	Details	Value
1.	Annual rainfall	100 cm
2.	Rainy days	October and November
3.	Depth of groundwater table	2 – 3 m
4.	Top soil	Clay and sandy clay
5.	Land planned for secured landfill development	4 acres during phase-I with additional land for future expansion
6.	Base layer of landfill for control of leachate	Watertight structure with RCC over PCC and HDPE liner. Additional liner with leak detection layer is provided.
7.	Sludge Generation from Dindigul tannery sector	About 450-500 tonnes/year
8.	Sidewall of landfill	RCC side wall with HDPE inner liner
9.	Total waste layer depth in the landfill	3.0 m at the periphery and upto 6 m at the center of the landfill
10.	Total volume of landfill	About 18,000 m ³
11.	Landfill Plan Area	5000 m ²
12.	Design Life of Landfill	10 years
13.	Scope for expansion for landfill	Land provision is available for future expansion.

R & D project of UASB system and Energy Recovery at CETP

The assessment of the extent of pollution and identification of sources through process audit has been carried out in different tanning centers in India in order to evolve effective and appropriate strategies for mitigating the pollution related problems faced by the leather industry. Even in tannery clusters such as Dindigul, Vaniyambadi etc., the CETPs were having conventional treatment units such as open anaerobic lagoons followed by aerated lagoons. They face problems in accumulation of sludge in lagoons, emission of tannery green house gas etc., and have to be addressed and to comply with C.R.E.P. (Charter on Corporate Responsibility on Environmental

Protection – Govt. of India, MoEF) recommendation to bypass the anaerobic lagoon by UASBR. Appropriate techniques have been developed by CLRI at pilot scale (50 – 100 m³/day) provided with closed anaerobic system with scope for bio-energy, Sulphur recovery etc. and need to be demonstrated at commercial Scale.

This applied R & D project is being implemented in Dindigul CETP with a total financial outlay of Rs. 490 lakhs contributed by the Ministry of Environment & Forests (MoEF), Ministry of Non-conventional Energy Sources (MNES), Council of Scientific and Industrial Research (CSIR) and tanneries in Dindigul. The components of R & D project are Filter Press House, Sludge Holding Tank, UASB Reactor, Platform Connecting to UASB, Equalization Tank, Absorption Column, Distribution Box, UASB Sludge Holding Tank, Stripper & Pre-Aeration Tank, Sulphur Settling Tank, Electrical – SLD – Filter Press Control Panel. The Laying of foundation stone was held on November 17, 2004 for implementation of R & D projects has completed. The entire applied R & D system has been commissioned.

Sources of Sludge Generation

In tanneries, the streams from soaking, pickling and tanning operations are collected separately for disposal in solar pans. The spent chrome liquor is collected and processed in chrome recovery plant for reuse. Other streams are collected as a combined stream and treated in pretreatment plant. The major objectives of on-site segregation and treatment facility at the tanneries are to remove coarse materials and grit in order to reduce clogging and settling problems in the wastewater collection network.

The estimated accumulated sludge from the CETP is around 1800 tonnes and it is anticipated to propose Secured Landfill Facility (SLF).

Sludge from Pretreatment units and Individual Tanneries & CETP

The expected average quantity of sludge generated from pretreatment plants and Primary Settling Tank are given in **Table-2** in order to dispose the sludge into SLF. The sludge is proposed to dispose to the proposed landfill.

Table -2 Expected sludge generation from pretreatment units and CETP

Sl.No	Source	Quantity of Sludge (MT/month)
1	Sludge from Pre-treatment units	25
2	sludge from Primary settling tank	110
	Total	135

Expected quantity of sludge generation per month = 25+110
=135 tonnes

Expected total quantity of sludge generation per year = 1620 tonnes
or say, 1,700 tonnes

Expected total quantity of sludge generation for 10 years (1700 x 10) = 17,000 tonnes

Hence it is recommended to install the secured landfill for 18,000 tonnes or say 18,000 m³.

However, according to seasonal variation and market demand the productivity may increase or decrease. The design of SLF includes the market fluctuation and seasonal variation. At present the amount of sludge generation from CETP is estimated around 450 – 500 tonnes/year. If the same scenario exists the life of landfill shall be increased to 20 to 25 years.

Sludge Characteristics

The characteristics of sludge which are being generated from Pretreatment unit and CETP are given in **Table-3**. The Toxicity Characteristics of Leaching Procedure (TCLP) test was conducted for Dindigul CETP Sludge and the analysis result conclude that the concentration of chromium is 1.34 mg/l and it is below the permissible limit of 5.0 mg/l as per CPCB conditions and also it proves that it suits for RCC design of SLF as Chromium concentration is below 2.0 mg/l.

Table -3 Sludge Characteristics

Sl.No	Parameter	Concentration
1	pH	7.0-8.6
2	Hexavalent Chromium (mg/kg)	BDL
3	Total Chromium (% wt)	<0.5%
4	Moisture	65-75%
5	Sludge	16-25%

Storage Facility

The dewatered sludge from the CETP is stored in temporary storage yard and the temporary waste storage facility shall keep each shipment of wastes separately. Each shipment of wastes shall be properly logged and numbered.

Precaution measures to be taken in handling the wastes and emergency procedures to be adopted. This message shall be carried forward until final treatment/ disposal of the waste is completed and the waste is disposed or is rendered non-hazardous. If the waste has to be stored the same shall be carried forward until its final pathway is determined and executed. An emergency preparedness plan is being prepared and shall be submitted to TNPCB prior to commencement of operations.

Leachate Collection/ Treatment and Disposal

The leachate collected will be pumped to the receiving sump/equalization tank of CETP for treatment. The critical priority constituent in the leachate is the chromium. It is experienced in India that the chromium in the tannery sludge is mostly in trivalent [Cr (III)] state. The water-soluble portion of chromium is insignificant as the trivalent chromium is insoluble in water. Thus, the actual chromium concentration in the leachate is likely to be in traces. Although there are no specific regulations in India for leachate, the treatment and disposal for leachate will be carried out to comply with the Water Pollution (Prevention and Control) Act 1974. The leachate-conveying pipe is made of HDPE, with a diameter suitable to carry the flow of 6 to 8 m³/ hour with a total head of about 6 m.

Drainage of surface run-off, its collection, treatment and disposal

Network of open channels have been designed and shall be constructed around the landfill to intercept surface runoff generated due to rainwater and divert it around the facility or collect it for the use at the facility or for disposal. A storm water drain with adequate slope is proposed around the landfill. It is proposed to connect the collected rainwater to the rain water harvesting system. In particular the storm water system will be designed and implemented to prevent surface runoff entering the landfill and thus minimizing the leachate generation.

Infrastructure Facilities

The proposed infrastructure facilities of Secured Landfill Facility are surface water drainage, leachate management, fencing and green belt along the peripheral boundary and approach road.

For easy access of the truck and for inspection, a road of 5 m width is proposed. Green belt is suggested along the boundary on all side walls to improve the aesthetic value. The existing laboratory facility in the Dindigul CETP can be used for analysis of leachate and sludge.

3.0 BASELINE ENVIRONMENT DATA

Land use

The land use of the study area is studied by analyzing the available secondary data such as the District Primary Census Handbooks of Dindigul district for the year 2001. As per the census records, the entire geographical area of all settlements covered in the study work out to about 31199.69 ha. There is no notified forest land in the study area. Altogether 17058.2 ha area comprising of irrigated and un-irrigated lands, is used for cultivation in the study area. More than one fourth of the study area falls in this category of land and admeasures about 9242.74 ha which works out to about 29.62% of the study area. Altogether 4898.78 ha land in study area is not available for cultivation. The share of this category of land in the study area works out to about 15.70%.

Seismicity

The area under study falls in Zone-II, according to the Indian Standard Seismic Zoning Map. Suitable seismic coefficients in horizontal and vertical directions respectively, have to be adopted while designing the structures.

Soil Environment

The present soil investigation comprising three exploratory boreholes in the sludge disposal area at Dindigul revealed uniform soil stratification. However, the top sand clay found in the south side is not found in the north side. The top sandy clay up to about 1.60m is low plasticity type. This soil has some permeability under natural condition. This soil will have much lower permeability after re-working. Very dense dirty sand layers derived from complete weathering of rock is present below 1.60m to 2.0m below the existing ground levels. The elevation of this very dense sand is dipping towards north. Highly weathered rock is present at about 4.50m. Groundwater table was at about 1.50m below existing ground level (w.r.t. elevated area) as observed from open well.

It has been observed that the texture of soil is mostly sand in the study area. It has been observed that the pH of the soil quality ranged from 7.07-7.87 indicating that the soil is usually neutral to

moderately alkaline in nature. The maximum pH indicates that the soil is moderately alkaline and the minimum value indicates that the soil is neutral in nature. The bulk density of soil ranges between 1.06- 1.35 g/cc.

The Electrical Conductivity was observed to be in the range of 26-1689 $\mu\text{S}/\text{cm}$, with the maximum observed at project site (S1) and minimum observed at Silapadi Village (S1).

The Nitrogen values ranged between 6723-7177 kg/ha. The Phosphorus values range between 1839-10058 kg/ha. The Potassium values range between 25823-33804 kg/ha. The observed N, P & K observed values are indicating that the study area has more than sufficient quantity of Nutrients.

The detailed assessment of the obtained results shows that the soil is good for vegetation and greenbelt development.

Meteorological Environment

The meteorological data recorded at the Project Site during post monsoon season of October month. The temperature was observed at the existing site during the study period ranged from 24.5°C to 28.8°C. The observed maximum temperature was 28.8°C. During the period of observation the relative humidity ranged from 73.0% to 93.0%. The rainfall is nil during the study period. A review of the wind rose diagram shows that predominant winds are mostly from NE and NW direction. Calm condition is nil.

Air Environment

Ambient air quality monitoring has been carried out for 24 hours during post monsoon season of 2007 at four locations. The concentrations of important air pollutants like SPM, RPM, SO₂, NO_x, CO and Pb at the study area are well within the permissible limits prescribed by Central Pollution Control Board (CPCB).

Water Environment

The analytical results of the six water samples collected during the post monsoon season of October 2007 for each location and the results were compared with Indian Standards 10500 –1993 drinking water specifications.

The pH values for all the locations are well within the desirable range of 7.19 – 7.54. The result shows that the quality of water is basic in nature.

Total Dissolved Solids (TDS) are various from 594 to 5480 mg/l. In all the sampling location having higher value of TDS than the desirable and permissible limit of 500 & 2000 mg/l. It shows the hardness of water little bit high in the project proposed area

The chloride value is ranging from 133 to 1614 mg/l and it is exceeding the permissible limit of 1000 mg/l except at silapadi village.

The desirable limit and permissible limit as per IS10500 for hardness is 300 mg/l & 600 mg/l, in the water samples collected, the hardness value is varying from 434 to 1900 mg/l which shows that these waters are not suitable for drinking purposes without treatment.

Heavy metals like Cr, Cd, Pb, etc are very less than STD limits, some of them are the detection limits of (BDL).

Hence keeping the above observations in view, it can be concluded that the water quality of some of the sources in the study area is fairly good and can be used for drinking and other domestic needs some are having high hardness and chlorides etc and also these analytical results are comply with the analytical results of various location nearby project site that has analyzed by TNPCB Dindigul.

Noise Environment

The daytime (L_{day}) noise levels at all the residential locations are observed to be in the range of 45.6 dB (A) to 67.6 dB (A). The maximum noise level of 67.6 dB (A) was observed at Silapadi Village (N2) and the minimum noise level of 45.6 dB (A) was observed at Sindhalagundu Village (N3). It is also observed that the day time noise levels at all the residential locations are exceeding the prescribed limit of 55 dB(A) may be due to highway and railway activities nearby location Silapadi and Alamarathupatti Villages except at Sindhalagundu Village (N3).

The daytime (L_{day}) noise level at Project Site, Near National Highway (NH-45) is observed 61.6 dB (A). It is also observed that the day time noise levels within the prescribed limit of 75 dB (A).

The nighttime (L_{night}) noise levels at all the residential locations are observed to be in the range of 38.9 dB (A) to 57.7 dB (A). The maximum noise level of 57.7 dB (A) was observed at Silapadi Village (N2) and the minimum noise level of 38.9 dB (A) was observed at Sindhalagundu Village (N3). It is also observed that the night time noise levels at all the residential locations are exceeding

the prescribed limit of 45 dB (A) may be due to highway and railway activities nearby location Silapadi and Alamarathupatti Villages except at Sindhalagundu Village (N3).

The night time (L_{night}) noise levels at Project Site, Near National Highway (NH-45) is observed 61.6 dB (A). It is also observed that the night time noise levels within the prescribed limit of 70 dB (A).

Ecological Environment

The existing Flora and Fauna in the study area is mentioned below. As per Botanical Survey of India records and available published literature pertaining to the study area and current detailed study of project site, no threatened, endangered and rare plant species were observed from the study area. No reserve forest, protected forest, turtle breeding ground, elephant and /or tiger reserve is within 10-km radius of the project site.

Traffic Scenario

Traffic survey has been carried towards Batlagundu road (NH-45) and towards Dindigul road (NH-45) near proposed project site. The total daily traffic has been divided into various categories like two wheeler, three wheeler, four wheeler and heavy vehicles. It could be seen from the traffic density analysis below those two wheelers and heavy vehicles are most prevalent in the National Highway. From the traffic density study it is clear that the peak hour for traffic density in the NH_45 towards Batlagundu Road is 2 pm – 4 pm and the peak hour for traffic density in the NH_45 towards Dindigul Road is 8 pm – 10 pm and movement of heavy vehicle and four wheelers are more in the National highway-45.

Socio Economic Environment

Review of secondary data (District Census Statistical Handbooks-2001) with respect to population, occupation-l structure and infrastructure facilities available for 10-km radius study area.

As per 2001 census the study area had a total population of 432557. The males and females constitute to about 48.71% and 49.82% of the study area population respectively. The study area had a family size of 4.0 as per 2001. As per 2001 census about 14.40% of the population are belongs to Scheduled Castes (SC) and 0.08% to Scheduled Tribes (ST). The study area experiences a considerably good literacy rate of 70.21% (2001). The marginal workers and non-workers constitute to 4.41% and 58.20% of the total population respectively.

Infrastructure Facilities

The infrastructure and amenities available in the study area denotes the economic well being of the region. Reasonably good levels of infrastructure facilities are available in the study area, which consists of education, health care, communications, transportation, etc.

As per 2001 census, the study area had a good level of educational facilities. In all, there were 117 primary schools, 35 middle schools and 19 high schools in the study area. The middle schools and high school are situated in larger villages. Some smaller villages were devoid of any educational institutions.

Different types of health facilities such as Nursing homes and Family Welfare Centers are available in the study area. The study area has good communication network.

4.0 ENVIRONMENTAL IMPACT STATEMENT

Air Environment

The loading / unloading, treatment and disposal of hazardous waste at the proposed site may cause a slight deterioration in ambient air quality in the surrounding area in terms of SPM and volatile organic emissions. These impacts can be minimised by adopting appropriate measures as recommended in the EMP.

Noise Environment

The major noise generating sources in handling and disposal of hazardous wastes would be transportation vehicles, dumpers, loaders, etc. The impact due to the noise levels would be insignificant on the surrounding population and marginal on the workers. Moreover, the creation of a green belt as suggested would act as a noise barrier and help in minimizing the adverse impacts, if any.

Water Environment

No surface water body nearby and around the study area, thus hardly any significant impacts are envisaged on the surface water. Groundwater is the most critical and most sensitive receptor to many hazardous waste management facilities across the world. Major sources of groundwater pollution within the facility during operational phase include leachate percolation into the groundwater. As the dewatered dry sludge will be dispensed in the landfill, the chances of

leachate generation will be maximal during the rainy season. The site has no previous history of flood events. It is pertinent to note the soil type of the site is clayey and clay mixed with loam. The average transmissivity of compacted clay is extremely low. Moreover, the depth of aquifer is well below the saturation level. These above reasons make the site most suitable for establishment of SLF.

From the geological conditions of the site, the impacts on groundwater quality are minimal and negligible. The leachate collection and treatment in CETP will prevent the groundwater contamination as groundwater quality will be monitored periodically by installing piezometers. However, as the potential for this is high and impacts could be severe, adequate measures for protection of groundwater are suggested both in the design and from the EMP as presented in the subsequent chapters. To ensure that the water quality is protected, it is proposed that the entire leachate generated within the landfill be collected and getting in to manhole and will be taken to CETP for treatment.

Traffic Impact

The proposed project will have only one truck per day for the transportation of waste to the SLF. So there will not be any further increase in traffic in the National Highway due to the proposed SLF activity.

Socio-Economic Environment

The socio-economic environment shall not be disturbed in the proposed project area. During the construction phase, operational phase and restoration phase of the project direct and indirect employment opportunities associated with developments would be provided to the residents of the surrounding areas. It is estimated that about 100.

Workforce would be required for collection, transportation, treatment and disposal of the sludge and typically more than 50% of these opportunities are picked up from the local market as this would be appropriate. This would improve the socio-economic environment of the project area.

Biological Environment

There are no rare or sensitive flora and fauna species in site or in the region, it is predicted that the impacts on existing flora and fauna will be negligible. Further, development of green belt of about 0.2 ha of land around the facility would enhance the situation by encouraging for species not present in the present environment.

5.0 ENVIRONMENTAL MANAGEMENT PLAN

The purpose of the Environmental Management Plan (EMP) is to minimize the potential environmental impacts due to proposed project and reflects the promoter's commitment to protect the environment as well as the surrounding population. Environmental Management Plan (EMP) has been prepared to prevent and mitigate the possible adverse environmental impacts due to the construction / operation of the proposed landfill facility as given in **Table-4**.

Table -4 Environmental Management Plan

S.No	Activity	Environmental Hazardous	Management Action to be Taken
(A) Managing Landfill Facility			
1	Loading of the solid waste in the dumber trucks etc	Fugitive emission of the Waste	Spray Water to suppress the dust
		Spillage of the Waste	Avoid spillage by careful handling of the solid waste
		Leakage of the Waste	Checks for leakage have to be made while loading
		Adverse Health Impact on the Laboures	Laboures should be given primary training for handling solid waste and personnel protective equipment.
(B) Transportation			
1	Transportation of the waste	Littering of the waste on the road	As far as possible solid waste should be transported in closed containers.
		Spillage of the waste on the way	Loaded waste should be fully covered with HDPE sheet

*Rapid Environmental Impact Assessment for the proposed
Secured Landfill Facility (SLF) at Pallapatti Village, Dindigul District, Tamilnadu*

S.No	Activity	Environmental Hazardous	Management Action to be Taken
(C) Final Disposal			
1	Final Disposal of the waste into landfill facility	Excessive leachate generation in monsoon season	Cover the sub-cells of the facility with HDPE sheets and ensure that no water comes in contact with the waste
			Cover the waste with fresh soil
		Blowing away of the waste dust with the wind	Spray water
		Disposal of waste at wrong place	Erect indicators and sign boards for systematic operation
		Leachate Generation	Provide leachate collection and conveyance system
2	Monitoring activity (Monitoring activity should continue even after closure of the facility)	Ground water pollution	Dig/drill bore wells around the site based upon ground water flow and take samples of ground water periodically for analysis. In case of pollution of ground water is noticed develop adequate redemption plan and execute it and keep monitoring
		Soil pollution due to leachate	In case of any pollution of ground water is noticed, then soil samples at various depths around the SLF should be analyzed and suitable remediation steps be undertaken