BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL

PRINCIPAL BENCH, NEW DELHI

ORIGINAL APPLICATION NO. 519/2019

WITH

ORIGINAL APPLICATION NO. 386/2019

IN THE MATTER OF:-

NEWS ITEM PUBLISHED IN "THE TIMES OF INDIA" AUTHORED BY JASJEEV GANDHIOK & PARAS SINGH TITLED "BELOW MOUNTAINS OF TRASH LIE POISON LAKES"

WITH

CENTRE FOR WILDLIFE AND ENVIRONMENT LITIGATION **APPLICANT(S)**

VS.

UNION OF INDIA & ORS. **RESPONDENT(S)**

INDEX

(DIVYA SINHA)
SCIENTIST -E
CENTRAL POLLUTION CONTROL BOARD
PARIVESH BHAWAN, EAST ARJUN NAGAR,
DELHI-110032

PLACE: DELHI
DATED: 31.01.2020

A

CENTRAL POLLUTION CONTROL BOARD, DELHI

January 31, 2020

STATUS REPORT ON BIO-REMEDIATION OF BHALSWA, GAZIPUR AND OKHLA DUMPSITES OF DELHI IN THE MATTER OF O.A NO. 519 OF 2019; TITLED NEWS ITEM PUBLISHED IN "THE TIMES OF INDIA" AUTHORED BY JASJEEV GANDHIOK & PARAS SINGH TITLED "BELOW MOUNTAINS OF TRASH LIE POISON LAKES" WITH O.A NO. 386/2019 CENTRE FOR WILDLIFE AND ENVIRONMENT LITIGATION VS UOI & ORS.

1.0 BACKGROUND

Vide Order dated 19.11.2019 in the matter of O.A. No. 519 of 2019; titled news item published in "the times of india" authored by jasjeev gandhiok & paras singh titled "below mountains of trash lie poison lakes" with o.a no. 386/2019 centre for wildlife and environment litigation vs UOI & ors. (*regarding bio mining of Bhalswa, Gazipur and Okhla dumpsites of Delhi*),Hon'ble National Green Tribunal directed as follows:

> *" Para 7: Since we are informed that at Bhalswa, capacity will be shortly increased to 3300 TPD. The capacity at Okhla and Ghazipur dumpsites also needs to be enhanced, the capacity for bio-mining may be further enhanced, at all the three sites. An action plan be prepared and implemented so as to clear the legacy waste in an expedited timeline but within one year as earlier directed. It needs to be ensured bio-remediation is carried out rather than mere mechanical separation. The CPCB may verify that waste clearance is as per norms and give a report. The implementation of action plan be monitored by the Chief Secretary, Delhi."*

Previously vide order dated July 17, 2019 on the matter, Hon'ble NGT had directed for bio-remediation of Bhalswa, Ghazipur and Okhla dumpsites of Delhi.

2.0 ACTION TAKEN BY CPCB

CPCB officials inspected dumpsites w.r.t. bio remediation in Delhi, Gujarat, Haryana, Karnataka and Tamil Nadu during September - October,2019. During inspection many shortcomings in the procedures adopted by different municipal corporations were observed.

CPCB convened a meeting with various Municipal Corporations including South Delhi Municipal Corporation (SDMC), North Delhi Municipal Corporation (NDMC) on 18th Nov,2019 to highlight the issues observed during the CPCB inspection. EDMC officials did not attend the meeting.

The concerned Municipal Corporations were informed to follow CPCB Guidelines on disposal of legacy waste specifically with reference to- stabilization of waste, proper screening of waste, action plan to include proposed destination for utilization of different fractions, leachate management system and testing of bio-earth etc.

Presentations made during meeting and Minutes of Meeting is enclosed at **Annexure-A.**

3.0 Observations :-

In compliance of aforesaid Hon'ble NGT's Order, CPCB officials inspected Bhalswa, Ghazipur and Okhla dumpsites during January 2019. An overview of the observations made during the inspection is given in Table 1. The detailed inspection reports of the legacy waste management through bioremediation at these sites are enclosed at **Annexure B to D.**

Table 1: Overview of the CPCB observations *made during inspection of three Dumpsites in Delhi*

S. No.	Name of the dumpsite	Status of legacy waste management	Quantity of legacy waste being processed (TPD)	Total quantity of legacy waste processed till 14-1-2020	No. of trommels operational	Compliance to CPCB guidelines	Annexures of inspection report
1	Ghazipur	Under progress	600	25000 MT	2	Not complying	Annexure-B
2	Okhla	Under progress	250	19000 MT	1	Not complying	Annexure-C
3	Bhalsawa	Under progress	2200	65000 MT	9	Not complying	Annexure -D
Total			**3050 T**	**1,09,000 MT**	**12**		

i. <u>Stabilization of Waste</u>: -

Waste stabilization through bio-remediation is being practiced only at Okhla dumpsite. Windrow method has been adopted and bio culture is being sprayed over windrows to stabilize the waste prior to screening at this site.

However, fumes were being generated from waste being transferred to trommel, indicating that stabilization of waste was not complete. In the remaining two sites at Bhalsawa and Ghazipur, no waste stabilization is being done and the legacy waste is just being excavated and spread for 2-3 days prior to screening. No bio culture used in this process at these two sites.

ii. **Screening of Waste**: -

The screening of waste is currently not as per the CPCB guidelines in all the three dumpsites. Only one screen size (30 mm), instead of at least 2 screen sizes (30 mm and 4-6 mm), is being used at these sites. It was observed that the under 30 mm fraction contained a lot of plastics and inerts (**Photo 4c of Annexure B**), which restricted its utilization for beneficial purpose, including its use as a soil enricher. A trommel of 6 mm screen size has been set up at Ghazipur site. As per the test report of the under 6 mm fraction (**Photo 4d of Annexure B**) , the fractions complies with the limits for most of the parameters including limits specified for heavy metal, C/N ratio , Nitrogen, P_2O5 and K_2O specified for Organic Compost as specified in Schedule II of SWM Rules 2016. Further tests may be carried out for TOC and pH to confirm its usage as compost. It may alternatively be used as soil enricher as per CPCB Guidelines. It was informed by SDMC officials that they are also planning to install two trommels of 6 mm size.

iii. **Disposal of Different Fractions**: -

RDF generated from Ghazipur dumpsite is being sent to Waste to Energy plant at Ghazipur. NDMC has webcasted a tender "*Empanelment of contractors for removal of RDF recovered from bio mining process at* ***Bhalswa*** *dump site in Delhi*" on 3rd January,2020.

However, there is currently no plan for disposal for the remaining screened fractions, at all the three dumpsites, which are currently being dumped on–site. It is a major issue being faced at all the three dumpsites, specifically at Ghazipur site, where the screened fraction is precariously stored on berm.

iv. Proper arrangement for preparation of RDF as per MoHUA guidelines has not been made and only a fan has been provided. No process control measure implemented for improving quality of RDF. Information related to quality of RDF (moisture content/calorific value etc) for grading of RDF is not available at these sites.

v. Testing for specified parameters (RDF for calorific value parameters, moisture content etc; under 6 mm fraction for parameters specified in Schedule II of SWM Rules,2016) to ensure its utilization for the intended use is not done.

vi. The records of generation & disposal of each fraction of materials recovered from the bio-mining process is not maintained.

vii. Leachate was being generated, however, leachate treatment is not being carried out at any of these dumpsites.

viii. Fresh waste is being dumped at all the 3 dumpsites.

ix. The bio-remediation is being carried out in the open. No shade has been provided in the bio-remediation area in absence of which work may be hampered during rain.

x. Work is being executed on piece meal basis and no comprehensive time bound action plan for bio-remediation, including timeframe for clearance of dumpsite, details of machinery to be set up, utilization of screened fractions has been prepared for bioremediation of the three dumpsites.

Annexure-A

Minutes of Meeting on "Bio mining process of legacy waste in states" with Municipalities held on 18th November, 2019

An interaction meeting was held at CPCB, Delhi on 18.11.2019 with State Urban Development Departments (SUDDs) &Urban Local Bodies (ULBs) on **"Bio mining process of legacy waste in states"** from Hosur, Krishnagiri, Rasipuram, Mettur, Mysure.

The main objective of the meeting was to convey the findings of the inspection conducted by CPCB of the bio mining site and further to brief the participants about the bio mining procedure as per the CPCB guideline on the matter. The list of participants in the meeting is enclosed as **Annexure-I.**

Mr. Pankaj Agrawal, Scientist E, UPC-II welcomed the dignitaries and highlighted the issues related to constraints in bio mining. Ms. Yogesh Chandra Scientist B, made a brief presentation on bio mining procedure as per CPCB guidelines, practices followed at various sites and CPCB's observations in the same.

It was informed by CPCB that bio mining at most of the site was not being done as per CPCB's guidelines and the following points were not being complied with.

- Baseline analysis of Ground Water /Soil
- Characteristics of the waste
- Stabilization of Waste
- Appropriate machinery
- Use of Bio culture for stabilization of Waste
- Screening of middle fraction of waste using one / two size of screens
- Analysis of Bio earth
- Leachate management
- Proper record of utilization of different category of products
- Fresh waste continued to be dumped at the dumpsites

Details of major findings of CPCB inspection are placed at **Annexure-II.**

The participants were requested to share their experience and give input on the various issues related to Bio mining, which included stabilization of legacy waste, recycling of plastic waste and other processed output.

The various suggestions given by the participants included:

1. Ms. R. Chandra, Commissioner Krishnagiri Muncipality, requested CPCB to issue guidelines to cement industries and recycling units to utilise the RDF from municipalities in their plant .
2. Dr. Jayant CHO, Mysuru informed about the stabilisation of waste done in dumpsite under Mysuru city corporation. He further informed that the output from processed

legacy waste could not be utilised as they do not have any co processing/Waste to Energy recycling unit in Karnataka.

3. SDMC delegates informed that the 1 trommel of 30mm screen size had been installed at the dumpsite and processed legacy waste output is being stored. They highlighted issue related to requirement for storing and handling of waste. He further informed that compost generated after processing of legacy waste is not being used as there is no buyer to take it out.
4. NDMC informed about installation of 11 trommels of 30 mm size screen and 3 working trommels at Bhalaswa dumpsite and they plan for installation of trommels below 10 mm. They further informed about tender being floated for disposal of processed output (RDF, etc.) and proposed for installation for bailing machine to compact RDF.
5. Main concern of the participants was regarding proper disposal of processed legacy waste, as recyclers were not accepting output from processed legacy waste, due to its poor quality.

Ms. Divya Sinha, DH UPC-II, concluded the meeting by summarizing the highlights and directed the participants to ensure compliance with CPCB guidelines specifically with reference to the following points:

- Stabilization of waste
- Proper screening of waste
- Utilization plan to include proposed destination for utilization of different fractions
- Leachate management system to be incorporated
- Bio-earth to confirm to Standards for Compost as per Schedule
- Records to be maintained for tracking of different fractions of waste subject to verification

The participants were further informed to submit bi-monthly compliance report to CPCB along with time-frame for completion which shall be subjected to verification by CPCB.

ATTENDANCE SHEET

Dated: 18/11/2019

Sub: - Meeting on disposal of legacy waste as per CPCB Guidelines

Sl. No.	Name & Designation	Organization	Phone no. & E-mail
1	V. Karthikeyan, Municipal Engineer	Hosur City Corporation	9443546539
2	R. Chandra, Commissioner	Krishnagiri Municipality	7397396252 Commr.krishnagiri@tn.gov.in
3	P. Natesanm, Municipal Engineer	Rasipuram Municipality	9487393318 Commr.rasipuram@tn.gov.in
4	S. Arun Kumar, Assistant Engineer	Mettur Municipality	9600939990 Commr.mettur@tn.gov.in
5	Dr. M.S. Jayanth, Corporation Health Officer (CHO)	Mysuru City Corporation	9448325885 Jaymys67@gmail.com; mcchealthofficer@gmail.com
6	Mahukar M, Environment Engineer	Mysuru City Corporation	9686768309 Madhu3210@gmail.com
7	Deepak Kumar	South Delhi Municipal Corporation	dirdemscc@gmail.com
8	Sanjay Hingorani	South Delhi Municipal Corporation	Shingorani11@yahoo.com 9717788196

The major findings of the inspection

Delhi

NDMC has issued work order as tender for hiring of segregation trammels for bio mining and bio-remediation of old dump waste at Bhalswa,Ghazipur and okhla dumpsites in Delhi and work initiated in the first week of October

Bhalsawa:

- 11 trommels of 30 mm size screen has installed and work started in 3 trommels working.
- Leachate generated discharged to nearby drains
- Incidents of fire has been reported from the site
- Grass plantation has been done on slopes of dump site
- Fresh waste (2000-2500 TPD) is being dumped at the site
- Stabilization of MSW is not being done.

Okhala:

- Excavator and bulldozers procured
- One trommel of 10 mm screen size is has been installed.
- Fresh (2000 TPD) waste is still being dumped at Site
- Discussions with DJB for treatment of leachate ay STP
- Part of the site has been capped
- Leachate observed near new dump fill site
- Stabilization of MSW is not being done at dumpsite

Ghazipur :

- Trommels with screen size 40 mm and 6 mm being installed
- RDF to be sent to Waste to Energy plant,Ghazipur
- Excavators , hopper, ballistic separator, conveyor belt installed
- Fresh waste still being dumped at site
- Stabilization of MSW is not being done at dumpsite

Gujrat (Ahemdabad)

Pirana-:

- Excavation and screening with single sieve size- Excavators, loaders , belt conveyor system & Tromells provided
- Stabilization of waste not being done

- Leachate COD 3441 mg/l, BOD 1463 mg/l, TDS 20826 mg/l &Colour: 10000 Hazen.
- No proper leachate management system
- Site allocated for bio-remediation of fresh waste
- Landfilling and RDF of segregated waste

Karnataka

Mysuru

- Single size screen trommels installed
- Fresh waste being dumped
- waste stabilization through bio-remediation was not practised
- quantification of the fine earth and recyclables materials is not practised
- contour level survey of the dumpsite done
- baseline analysis of surface, subsurface soils and water analysis
- Analysis of fine earthy not done and is given to farmers as a compost

Hosur:

- Third party audit is being done through Centre for Environmental Studies, Department of civil Engineering, Anna University, Chennai
- Thin layer stabilization done
- Compost is being sent for testing
- No bio cultures are added for stabilization
- no separate storage facilities provided to store the segregated waste.
- Proper leachate system to be provided

Tamil Nadu

Dharampuri:

- Countering & Baseline study done
- Characterization of waste and leachate not done
- Windrow stabilization of waste- Bioculture sprayed
- Dual size screens installed
- Waste segregated into compost, recyclables, non-recyclables & inert
- Fresh waste being dumped

Mettur,

- Ground water analysis done
- Bioculture sprayed- Windrow stabilization

- Tipper, JCB used

Rasipuram,

- Fresh waste being dumped
- No proper leachate management system

Krishnagiri,

- Thin layer method adopted for waste stabilization. No bioculture used
- Waste is spread over to form thin layer bed over concrete floor and dried for two days.
- Plastic waste is segregated separately & sent to plastic recycling unit
- Screens of 35mm, 12mm & 3mm used in Trommel
- 19% of land has been recovered so far
- Third party auditing done
- Biomining is carried out in phased manner. The officials from Anna University measure and demark the area w.r.t length, width & height for which biomining is to be carried out.
- No leachate management system provided

Tambaram,:

- Three level screens used (100mm , 40 mm and 20 mm)
- Output from each passed through air density separators to remove plastics
- Windrow and cone method adopted for stabilization
- No leachate management
- No bioculture used
- Bio-earth tested twice a month
- Processing system is being monitored through computerised system in which quantity of waste processed, power consumption (through EB & DG), processing percentage of each screens, belt conveyors, run hours, faults etc. are being recorded

Kanchipuram District,

- Bio mining work was started on 29.12.2017 and completed by February 2019
- Land reclaimed is 4.5 acres
- Waste cleared through bio mining is 38624 Cu.m
- Waste below the Ground level is not carried out

BIOMINING OF LEGACY WASTE

NOVEMBER 18, 2019

CENTRAL POLLUTION CONTROL BOARD

SOLID WASTE MANAGEMENT STATUS

(As per Annual Report 2018-19)

- MSW GENERATION : 152076 TPD
- MSW Collection : 149748 TPD
- MSW Treated : 55759.6 TPD
- MSW Landfilled: 50162 TPD

Dumpsites in India

- Indiscriminate unscientific disposal of Solid Waste over the years has lead to proliferation of Solid Waste Dumpsites across the Country
- 3159 Dumpsites Covering 35 States /Union Territory in India

Biomining

Refers to the excavation of old dumped waste , making windrow of legacy waste stabilization of the waste through bio-remediation i.e. exposure of all the waste to air along with use of composting bio-cultures and screening of the stabilized waste to recover all

Legacy waste guidelines

Guidelines on "Disposal of Legacy Waste (old MSW)" prepared by CPCB in February 2019 .

- Submitted to Hon'ble NGT ,
- Circulated to SPCBs/PCCs for implementation
- Uploaded on CPCB website.

LEGACY WASTE MANAGEMENT

1.0 Baseline data generation

- Ground Water & Soil Analysis
- Assessment of Volume & Characteristics of Waste / Leachate

2.0 Stabilization of Waste

3.0 Processing of Legacy waste

- Screening
- Handling

4.0 Utilization of Waste

Stabilization of Waste

Type of Biomining

Trench; Cone; Windrow, Thin Layer

Machinery

- Excavating Dumpsite: Tractor Tiller etc
- Preparing windrows: JCB etc

Essential Requirements:

- Use of Bioculture
- Stabilization of End Product
- Leachate management
- Removal of Large Objects & turning of windrows

Processing of Legacy waste

Segregation into Compost/ Recyclables/RDF/ C&D/Inerts etc

Machinery Used

Screening : Trommel (Screen Size: 150;. 80-100, 24-50, 12-16 & 4-6 mm;

Vibrating Screen;Electromagnet;Air classifier; Loader, conveyor & Fork lift

- ✓ Coarse fraction- Inerts + Fuel (Shredding required)
- ✓ Midfraction: Inerts (Road making) + Fuel (Shredding not required)
- ✓ Fine fraction : Bio earth
- Handling :

Essential Requirements

- Quantity being generated/Utilized in each category
- Analysis results of bio- earth

States where Bio-mining is being done

1. Andhra Pradesh
2. Delhi
3. Goa
4. Gujarat
5. Karnataka
6. Kerala
7. Madhya Pradesh
8. Maharashtra
9. Tamil Nadu

States where Bio-mining already done

1. Chhattisgarh
2. Goa
3. Madhya Pradesh
4. Maharashtra
5. West Bengal

DELHI

Bhalsawa:

- Work initiated
- Trommels being installed
- Leachate generated discharged to nearby drains
- Incidents of fire has been reported from the site
- Grass plantation has been done on slopes of dump site
- Fresh waste (2000-2500 TPD) is being dumped at the site

Okhla

- Excavator and bulldozers procured
- Fresh (2000 TPD) waste is still being dumped at Site
- Discussions with DJB for treatment of leachate ay STP
- Part of the site has been capped

Ghazipur

- Trommels with screen size 40 mm and 6 mm being installed
- RDF to be sent to Waste to Energy plant
- Excavators , hopper, ballistic separator, conveyot belt installed
- Fresh waste still being dumped at site

Pirana- Ahemdabad

- Excavation and screening with single sieve size- Excavators, loaders , belt conveyor system & Tromells provided
- Stabilization of waste not being done
- Leachate COD 3441 mg/l, BOD 1463 mg/l, TDS 20826 mg/l &Colour :10000 Hazen.
- No proper leachate management system
- Site allocated for bio-remediation of fresh waste
- Landfilling and RDF of segregated waste

Mysuru (Karnataka)

- Single size screen trommels installed
- Fresh waste being dumped
- waste stabilization through bio-remediation was not practised
- quantification of the fine earth and recyclables materials is not practised
- contour level survey of the dumpsite done
- baseline analysis of surface, subsurface soils and water analysis
- Analysis of fine earthy not done and is given to farmers as a compost

Hosur, Tamil Nadu

Third party audit is being done through Centre for Environmental Studies, Department of civil Engineering, Anna University, Chennai

- Thin layer stabilization done
- Compost is being sent for testing
- No bio cultures are added for stabilization
- no separate storage facilities provided to store the segregated waste.
- Proper leachate system to be provided

Dharampuri – Tamil Nadu

- Counturing & Baseline study done
- Characterization of waste and leachate not done
- Windrow stabilization of waste- Bioculture sprayed
- Dual size screens installed
- Waste segregated into compost, recyclables, non-recyclables & inert
- Fresh waste being dumped

Mettur, Tamil Nadu

Ground water analysis done

Bioculture sprayed- Windrow stabilization

Tipper, JCB used

Rasipuram, Tamilnadu

Fresh waste being dumped

No proper leachate management system

Krishnagiri, Tamilnadu

- Thin layer method adopted for waste stabilization. No bioculture used
- Waste is spread over to form thin layer bed over concrete floor and dried for two days.
- Plastic waste is segregated separately & sent to plastic recycling unit
- Screens of 35mm, 12mm & 3mm used in Trommel
- 19% of land has been recovered so far
- Third party auditing done
- Biomining is carried out in phased manner. The officials from Anna University measure and demark the area w.r.t length, width & height for which biomining is to be carried out.
- No leachate management system provided

Tambaram, Tamil Nadu

- Three level screens used (100mm , 40 mm and 20 mm)
- Output from each passed through air density separators to remove plastics
- Windrow and cone method adopted for stabilization
- No leachate management
- No bioculture used
- Bio-earth tested twice a month
- Processing system is being monitored through computerised system in which quantity of waste processed, power consumption (through EB & DG), processing percentage of each screens, belt conveyors, run hours, faults etc. are being recorded

Kanchipuram District, Tamilnadu

- Bio mining work was started on 29.12.2017 and completed by February 2019
- Land reclaimed is 4.5 acres
- Waste cleared through bio mining is 38624 Cu.m
- Waste below the Ground level is not carried out

Issues related to Biomining

Biomining not as per CPCB Guidelines. Following not complied with:

- Baseline analysis of Ground Water /Soil
- Characteristics of the waste
- Stabilization of Waste
- Appropriate machinery
- Use of Bioculture for stabilization of Waste
- Screening of middle fraction of waste using one / two size of screens
- Analysis of Bioearth
- Leachate management
- Proper record of utilization of different category of products
- Fresh waste continued to be dumped at the dumpsites

Concerned agencies required to :

- Comply with CPCB Guidelines specifically with reference to:
  - ✓Stabilization of waste
  - ✓Proper screening of waste
  - ✓Utilization plan to include proposed destination for utilization of different fractions
  - ✓Leachate management system to be incorporated
  - ✓Bio-earth to confirm to Standards for Compost as per Schedule
  - ✓Records to be maintained for tracking of different fractions of waste subject to verification
- Submit monthly compliance report to CPCB along with time-frame for completion which shall be subject to verification by CPCB

Annexure-B

Inspection report format for legacy Waste Dumpsites

Serial No.			Item	Remarks
1			**General Information**	
	A		City & Location of Dumpsite	**Ghazipur Dumpsite** under East Delhi Municipal Corporation, Delhi
	B		Name, Designation & Contact Details of Nodal Officers for Bio mining	Mr. Khandelwal, CE, EDMC, 9717788004 Mr Arun Kumar, SE, EDMC 9717788001 Mr. Chandan Singh, AE (SLF), EDMC, 9717788224
	C		Stage of Bio mining (Planned/Being Executed/Completed	Being Executed
2			**Volume of Waste**	
	A		Has Contour Survey of site been Done (Y/N)	Yes. A Contour Map was prepared in 2017.
	B		Length (Initial -M)	As informed, dumpsite is spread over in 70 acre area.
	C		Width (Initial -M)	
			Height (Initial -M)	65 meters
			Total Volume (Cub. Meter)	140 lac tons
3			**Characteristics of Waste**	Done by EDMC, test report attached as **Annexure – 1.**
4	A		**Leachate Characteristics**	Leachate test report attached as **Annexure – 2.**
5			**Baseline Survey**	
	A		Ground Water Analysis	Test report of ground water analysis is attached as **Annexure – 3**.
	B		Soil Analysis	Not done
	C		Quantity Of Waste Processed Per Day (TPD)	600 TPD
6			**Process Flowsheet of Bio-Mining**	Bio mining Process Flowsheet for 6mm trommel is attached as **Annexure – 4**
7			**Stabilization of waste**	
	A		Type of bio-mining method Adopted (Tractor tiller, Trench	Thin layer method

			method; Cone Method; Windrow, Thin Layer Method)	
	B		Machinery used for Excavating Dumpsite (Tractor Tiller Etc)	Excavators, loaders
	C		Machinery Used for preparing Windrows (JCB etc)	Excavator & JCB
	D		Are large objects removed prior to windrow preparation	Not applicable
	E		Are Windrows Turned Every 4-5 Days	Not applicable
	F		Duration of Stabilization	48-72 hours
	G		Bio culture Used	No
	H		Is End Product Stabilized (No Heat / Gas /leachate /Smell)	Yes
	I		Is leachate Being Generated From the waste	Yes
	J		If Yes, methodology for leachate Management Adopted	Leachate is not being treated, it is meeting nearby drain.
8			**Processing of Legacy Waste**	
			Machinery Used For processing of legacy waste	Hydraulic Excavator, Bulldozer
	a		**Screening**	
		i	Trommel (Number & Capacity (TPD)	• 2 Nos. of 300 TPD Trommel (30 mm sieve size) are operational (**Photo-I**) in a shift (8 hours) from Oct,2019. • 1 Number of 300 TPD pilot based trommel (6 mm sieve size) with Ballistic Separator (40 mm sieve size) (**Photo-II**) has also been installed • Further, 8 Nos. of 300 TPD trommels having 30 mm sieve size to be installed within two months (**Photo-III**)
		ii	Size of screens used (Mostly used 150 mm. 80 to 100 mm, 24 to 50mm, 1216 mm and 4-6)	6 mm and 30 mm Trommels. One trommel is with Ballistic Separator of 40 mm sieve size.
		iii	Vibrating Screen (No)	1 No.
		iv	Electromagnet (For separating ferrous metals)	No
		v	Air Classifier (for separating light material from heavy organic)	Blower

23

		vi	Disc/Star (No)	No
	b		**Handling**	
		i	Loader (No.)	4 Nos.
		ii	Conveyor (No.)	6 Nos.
		iii	Fork Lift (No.)	Nil.
		iv	Categories in which the waste is segregated (Compost/Recyclables/RDF/C&D/Inerts etc)	C&D waste (**Photo-IV(a)**), Refused Derived Fuel (RDF, **Photo-IV(b)**) and inert (-30mm; **Photo-IV(c)**) & -6 mm fraction; **Photo-IV(d)**)
		v	Quantity of items which is being generated in each category	As informed ~10-15% RDF, ~15-20% C&D waste & ~50-60% inerts are being generated after screening.
		vi	Quantity of items being utilized of different categories	As informed presently C&D waste is being used in filling the ramps/roads of SLF site, RDF is being sent to nearby Ghazipur WtE plant (IL&FS). **Approx.4200 MT RDF has been sent to WtE plant so far.**
		vii	Documents supporting usage of different fractions (Bio earth/Recyclable/RDF/Other wastes)	Document of generated RDF sent to WtE plant in last two months is provided for reference (**Annexure-5**).
		viii	Analysis results of fine earth	Analysis report of fine earth is enclosed as **Annexure-6**.
		ix	Frequency of testing of bio-earth	Done only once. No plan for further testing.
9			**Miscellaneous**	
		a	Have fires being reported at the site	No
		b	Methodology to tackle fires	As informed, fire is doused by C&D waste and being monitored through CCTV cameras.
		c	Is fresh waste being dumped at the site	Yes
		d	Percentage land recovered so far	Nil as waste is being excavated from top heap.
		e	Is third party audit of bio mining being done	No

24

10			**Other observations** 1. At the time of inspection, only 2 trommels (30mm size screen) were in operation, one trommel of 6 mm size screen was under maintenance 2. As informed, approx. 25000 MT legacy waste has been processed so far since Oct,2019 and out of it, approx.4200 MT RDF has been sent to WtE plant. 3. Characteristics of Waste has been determined and organic content is found approx. 20%.Bio earth (under 6 mm) testing has been done and it is observed that the fraction complies with the limits for most of the parameters including limits specified for heavy metal, C/N ratio , Nitrogen, P2O5 and K2O specified for Organic Compost in SWM Rules,2016. 4. It was noticed that the waste stabilization through bio-remediation is not being practiced. 5. The screening of waste is not as per the CPCB guidelines, only one size of screen (30 mm) is being used. 6mm screen size trommel was not in operation during inspection. 6. Heaps of 3 m height of under 30 mm fraction of waste found dumped precariously at berm of the SLF site. (**Photo-V**) No provision was found for its further utilization. 7. No leachate treatment is being carried out. Leachate is meeting nearby drain. 8. Approx.2000-2200 TPD of fresh waste is being dumped at dumpsite.	
			Name & Designation of Inspecting Officer	Pankaj Agarwal, Sct. E, CPCB & Atanu Dey, RA
			Date of Inspection	15/1/2019

Photographs

Photo I: Two working Trommels (Capacity: 300 TPD; Sieve Size: 30 mm)

Photo II: Pilot based Trommel (Sieve Size: 6 mm)

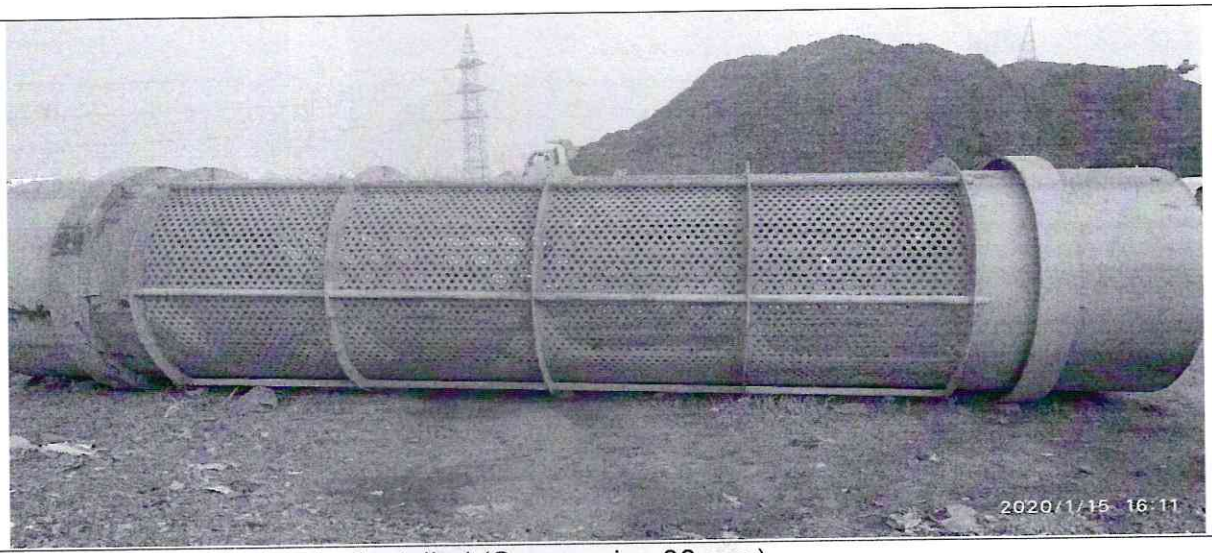

Photo-III: Trommel to be installed (Screen size:30 mm)

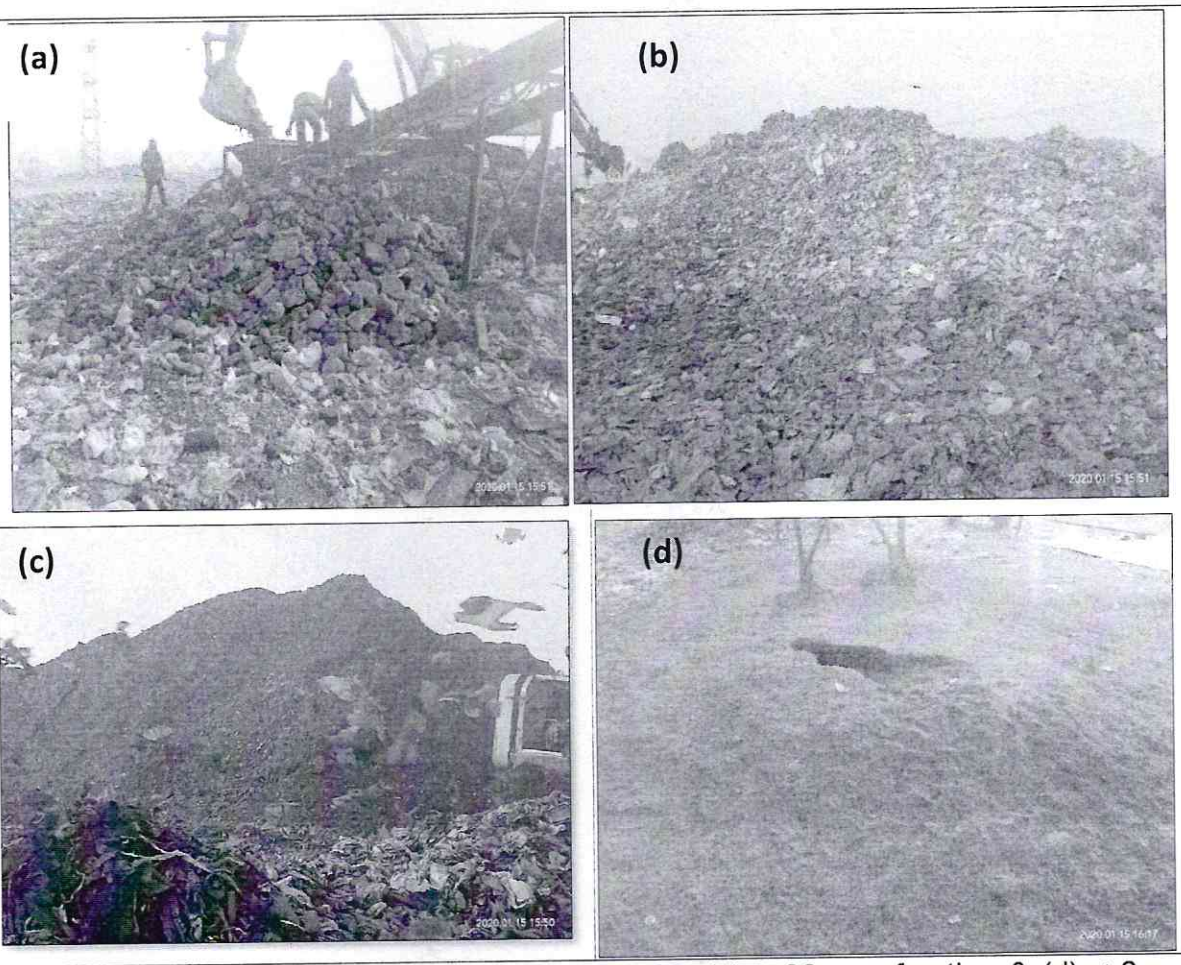

Photo-IV : Segregated wastes (a) C&D, (b) RDF, (c) <-30 mm fraction & (d) <-6 mm fraction

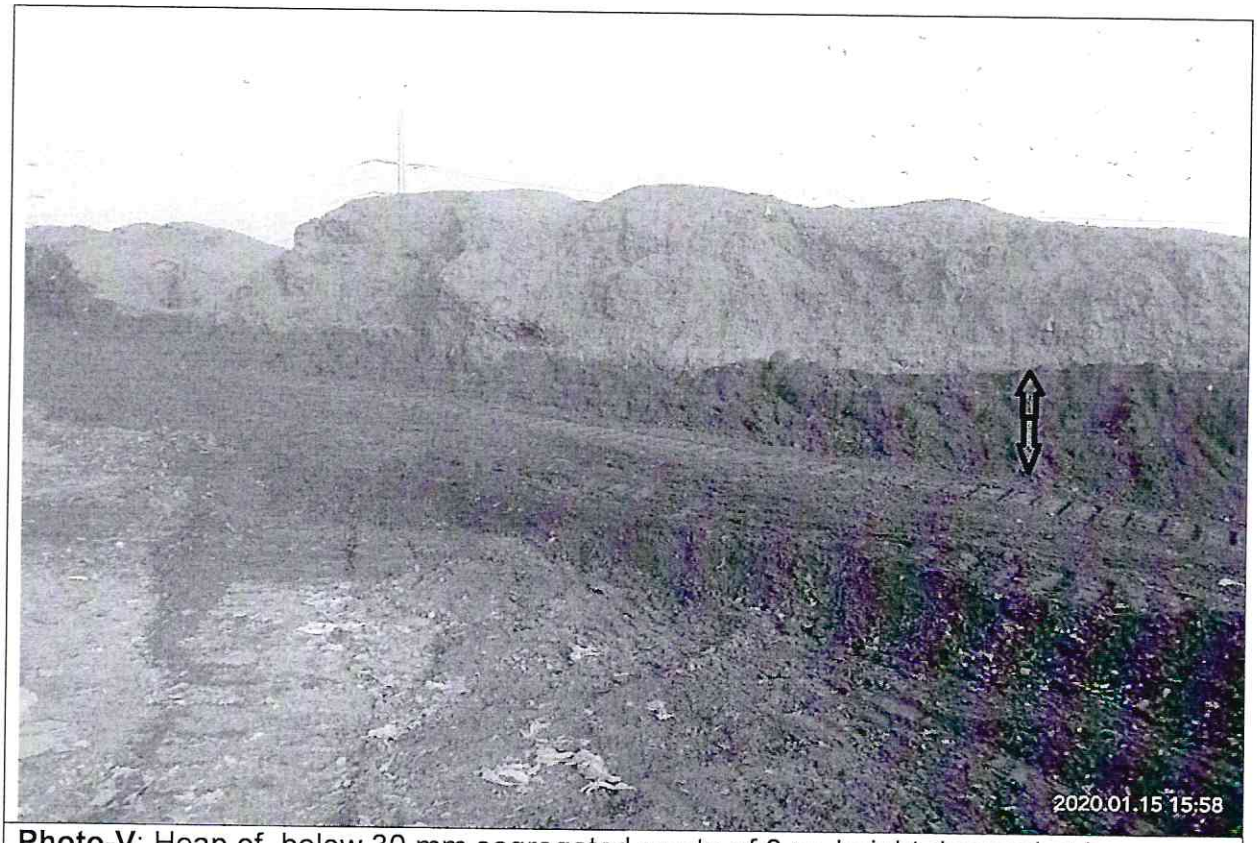

Photo-V: Heap of below 30 mm segregated waste of 3 m height dumped at berm

B

Annexure-1

PILOT PROJECT OF 2000 TPD CAPACITY FOR LANDFILL RECLAMATION AT GHAZIPUR

(TEST REPORT OF DIFFERENT COMPONENTS OF SOLID WASTE)

Submitted By:-

SPECTROANALYTICAL LABS LTD.

E-41, Okhla Industrial Area,

Phase – II, New Delhi 20.

Phone: (011) 41611000, 26383048/49

Fax (011) 40503150/51

www.spectro.in

Submitted To:-

M/S DELHI INTEGRATED MULTI - MODEL TRANSIT SYSTEM LIMITED

1st Floor, Maharana Pratap ISBT Building, Kashmere Gate, Delhi 110006

SPECTRO
ANALYTICAL LABS LIMITED

E -41 Okhla Indi. Area, Ph-II
New Delhi- 110020(INDIA)
Ph: - 91-11-40522000, 41611000
Fax : 91-11-40503150, 40503151
care@spectro.in www.spectro.in

ID - 100727311

Particle Size Distribution:

Height of Waste (m)	Sample Collection Height from Ground (m)	Sample Collection Depth from Top (m)	Sample Number	Results (%)					
				< 10 mm	10 mm - 20 mm	20 mm - 50 mm	50 mm - 100 mm	100 mm - 200 mm	> 200 mm
Borehole Number 1									
30	0	30	1A	51	11	19	12	7	0
	10	20	1B	55	9	13	19	4	0
	25	5	1C	53	8	13	18	8	0
	27.5	2.5	1D	38	19	18	16	9	0
Borehole Number 2									
25	0	25	2A	51	10	17	16	6	0
	7.5	17.5	2B	48	11	13	18	10	0
	15	10	2C	42	11	15	21	11	0
Borehole Number 3									
25	2.5	22.5	3B	54	10	17	15	4	0
	20	5	3C	46	15	13	17	9	0
	22.5	2.5	3D	41	12	20	19	8	0
Borehole Number 4									
25	5	20	4B	62	8	12	16	2	0
	12.5	12.5	4C	53	5	17	20	5	0
	17.5	7.5	4D	51	11	13	19	6	0
Borehole Number 5									
20	0	20	5A	63	9	13	10	5	0
	7.5	12.5	5B	43	15	15	16	11	0
	15	5	5C	51	4	20	11	14	0

Continue...

UMESH DUTT

Authorised Signatory

B

Annexure-I

SPECTRO ANALYTICAL LABS LIMITED

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care@spectro.in www.spectro.in

ID - 100727311

Particle Size Distribution:

Height of Waste (m)	Sample Collection Height from Ground (m)	Sample Collection Depth from Top (m)	Sample Number	Results (%)					
				< 10 mm	10 mm - 20 mm	20 mm - 50 mm	50 mm - 100 mm	100 mm - 200 mm	> 200 mm
Borehole Number 6									
20	2.5	17.5	6B	67	6	11	12	4	0
	10	10	6C	53	5	22	13	7	0
Borehole Number 7									
20	17.5	2.5	7C	43	8	18	13	18	0
	20	0	7D	36	12	26	23	3	0
Borehole Number 8									
15	12.5	2.5	8B	43	10	17	19	11	0
Borehole Number 9									
15	2.5	12.5	9B	71	8	9	10	2	0
	15	0	9C	70	7	8	9	6	0
Borehole Number 10									
15	5	10	10B	41	11	24	21	3	0
	12.5	2.5	10C	34	15	23	19	9	0
Borehole Number 11									
15	0	15	11A	63	9	11	12	5	0
	7.5	7.5	11B	61	12	10	8	9	0
Borehole Number 12									
15	10	5	12B	58	11	21	4	6	0
Borehole Number 13									
10	0	10	13A	56	11	17	11	5	0
	5	5	13B	42	17	20	14	7	0

Leachate Results

Authorised Signatory

Annexure - 2

SPECTRO ANALYTICAL LABS LIMITED

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New Delhi- 110020(INDIA)
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care@spectro.in www.spectro.in

B.Chemical Characterization:

Height of Waste (m)	Sample Collection Height from Ground (m)	Sample Numberin g	Results					
			Odour (Sensory)	Colour (Visual)	Tem (°C)	Density (Kg/m³)	Moisture Contents, %	Organic Contents %
Borehole Number 1								
30	0	1A	VERY BAD	Gray	35	1050	27.2	21.75
	10	1B	VERY BAD	Gray	33	1126	18.9	16.53
	25	1C	VERY BAD	Gray	34	945	29.8	17.98
	27.5	1D	VERY BAD	Gray	33	856	25.8	26.07
Borehole Number 2								
25	0	2A	VERY BAD	Gray	34	1167	29.0	14.76
	7.5	2B	VERY BAD	Gray	32	912	15.6	21.11
	15	2C	VERY BAD	Gray	32	834	19.0	23.42
Borehole Number 3								
25	2.5	3B	VERY BAD	Gray	34	1045	29.0	13.43
	20	3C	VERY BAD	Gray	35	943	15.6	18.80
	22.5	3D	VERY BAD	Gray	34	985	19.0	19.47
Borehole Number 4								
25	5	4B	VERY BAD	Gray	32	1283	22.2	9.42
	12.5	4C	VERY BAD	Gray	31	1149	11.5	10.96
	17.5	4D	VERY BAD	Gray	31	1034	14.8	12.40
Borehole Number 5								
20	0	5A	VERY BAD	Gray	32	1322	45.2	10.21
	7.5	5B	VERY BAD	Gray	31	935	40.7	23.18
	15	5C	VERY BAD	Gray	32	976	39.8	22.26
Borehole Number 6								
20	2.5	6B	VERY BAD	Gray	33	1293	18.0	15.30
	10	6C	VERY BAD	Gray	33	1098	26.5	21.84
Borehole Number 7								
20	17.5	7C	VERY BAD	Gray	31	968	29.4	28.22
	20	7D	VERY BAD	Gray	32	1120	22.0	14.22
Borehole Number 8								
15	12.5	8B	VERY BAD	Gray	30	987	17.6	17.62
Borehole Number 9								
15	2.5	9B	VERY BAD	Gray	30	1389	26.8	8.62
	15	9C	VERY BAD	Gray	30	1307	22.4	7.90
Borehole Number 10								
15	5	10B	VERY BAD	Gray	32	1278	24.2	15.24
	12.5	10C	VERY BAD	Gray	31	965	18.4	26.53
Borehole Number 11								
15	0	11A	VERY BAD	Gray	32	987	37.2	16.94
	7.5	11B	VERY BAD	Gray	32	912	32.8	14.65
Borehole Number 12								
15	10	12B	VERY BAD	Gray	31	943	37.5	11.48
Borehole Number 13								
10	0	13A	VERY BAD	Gray	32	1176	30.7	22.32
	5	13B	VERY BAD	Gray	30	854	13.1	15.99

B

SPECTRO
ANALYTICAL LABS LIMITED

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Fax : 91-11-40503150, 40503151
care@spectro.in www.spectro.in

ID - 100727311

A.Calorific value and CN Ratio Results

Sl. No.	Bore Hole No.	Height of Waste (m)	Results	
			Calorific Value (kcal/Kg)	CN Ratio
1	1	30-1C	1238	17.8
2	2	25-2C	1074	19.8
3	3	25-3D	1458	21.08
4	4	25-4C	878	14.76
5	5	20-5B	1654	23.46
6	6	20-6C	1648	22.98
7	7	20-7C	2058	26.70
8	8	15-8B	1410	20.88
9	9	15-9B	690	14.46
10	10	15-10C	1922	24.78
11	11	15-11A	1056	18.90
12	12	15-12B	918	15.65
13	13	10-13A	1686	22.78

Authorised signatory

Annexure - II

SPECTRO
ANALYTICAL LABS LIMITED

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New Delhi- 110020(INDIA)
Ph: - 91-11-40522000, 41611000
Fax : 91-11-40503150, 40503151
care@spectro.in www.spectro.in

ID - 100727310

Sample No. 1 - Bore Hole No.2

Sample No. 2 – Bore hole No. 7

Sl. No.	Parameters	Results	
		Leachate Sample No 1	Leachate Sample No 2
1	Suspended solids, mg/l	22800	24680
2	Dissolved solids (inorganic), mg/l	8890	9150
3	pH Value	6.1	6.3
4	Ammonical nitrogen (as N), mg/l	242.5	288.9
5	Total kjeldahl nitrogen (as N), mg/l.	658.1	702.4
6	Biochemical Oxygen Demand, mg/l	11400	12800
7	Chemical Oxygen Demand, mg/l	18380.8	20640.2
8	Arsenic (as As), mg/l	<0.01	<0.01
9	Mercury (as Hg), mg/l	0.00020	0.00024
10	Lead (as Pb), mg/l	0.55	0.61
11	Cadmium (as Cd), mg/l	0.056	0.060
12	Total Chromium (as Cr), mg/l	0.11	0.14
13	Copper (as Cu), mg/l	2.68	3.34
14	Zinc (as Zn), mg/l	10.67	12.54
15	Nickel (as Ni), mg/l	1.67	1.89
16	Cyanide (as CN), mg/l	<1.0	<1.0
17	Chloride (as Cl), mg/l	2240	2870
18	Fluoride (as F), mg/ l	5.68	6.14
19	Phenolic Compounds (as C_6H_5OH), mg/l	4.88	5.12

Protocol – IS3025/APHA/ICP-OES

Authorised Signatory

B

Annexum-II

E -41 Okhla Indi. Area, Ph-II
New Delhi- 110020(INDIA)
Ph: - 91-11-40522000, 41611000
Fax : 91-11-40503150, 40503151
care@spectro.in www.spectro.in

SPECTRO
ANALYTICAL LABS LIMITED

ID - 100727311

Sample No. 1 - Bore Hole No.2

Sample No. 2 – Bore hole No. 7

Sl. No.	Parameters	Results	
		Leachate Sample No 1	Leachate Sample No 2
1	Suspended solids, mg/l	22800	24680
2	Dissolved solids (inorganic), mg/l	8890	9150
3	pH Value	6.1	6.3
4	Ammonical nitrogen (as N), mg/l	242.5	288.9
5	Total kjeldahl nitrogen (as N), mg/l.	658.1	702.4
6	Biochemical Oxygen Demand, mg/l	11400	12800
7	Chemical Oxygen Demand, mg/l	18380.8	20640.2
8	Arsenic (as As), mg/l	<0.01	<0.01
9	Mercury (as Hg), mg/l	0.00020	0.00024
10	Lead (as Pb), mg/l	0.55	0.61
11	Cadmium (as Cd), mg/l	0.056	0.060
12	Total Chromium (as Cr), mg/l	0.11	0.14
13	Copper (as Cu), mg/l	2.68	3.34
14	Zinc (as Zn), mg/l	10.67	12.54
15	Nickel (as Ni), mg/l	1.67	1.89
16	Cyanide (as CN), mg/l	<1.0	<1.0
17	Chloride (as Cl), mg/l	2240	2870
18	Fluoride (as F), mg/ l	5.68	6.14
19	Phenolic Compounds (as C_6H_5OH), mg/l	4.88	5.12

Protocol – IS3025/APHA/ICP-OES

Authorised Signatory

East Delhi Municipal Corporation
Office of Ex. Engineer (Technical Lab)
Alipur Road, Delhi-54

No. EE(Lab)/EDMC/2019-20/D- 21 Dated. 24/6/19

May kindly Refer to letter no. EE(SLF)/EDMC/2019-20/D-233 dated 18.06.2019 regarding testing of the water sample manually as per direction of E-in-C/EDMC dated 18.06.2019. Accordingly three samples of the water received in technical laboratory EDMC vide this office testing register serial no. 181 dated 18.06.2019 and tested on 19.06.2019 and the results are as under:-

TEST REQUISTITION DETAILS

Test Request No. :- EE(SLF)/EDMC/2019-20/D-233 Dated 18/06/2019
Subject :-Regarding testing of water sample in the vicinity of SLF Ghazipur in the light of order dated 30.05.19 of Hon'ble NGT in Original Application no. 519 /2019. In the matter of News item published in "The Times of India" Authored by Jasjeev Gandhiok & Paras Singh Titled "Below mountains of trash lie poison lakes".

Location of Sample :- SLF Ghazipur
Material Name: - **(Water)**

TEST RESULTS

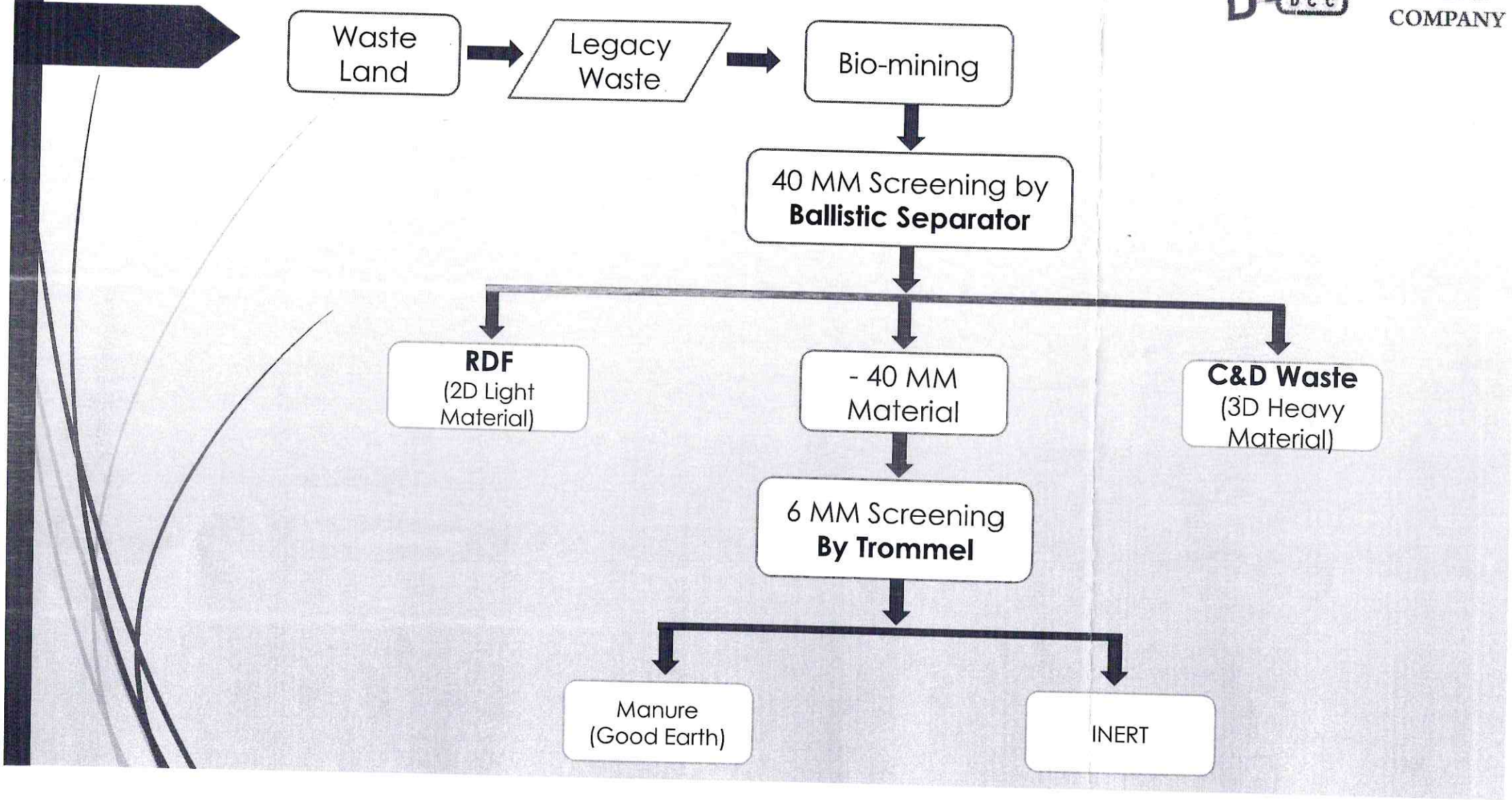
		Result		Limit
1.	Alkalinity	45.0ml	Alkalinity in 100 ml Water	25 ml (Maximum)
2.	Acidity	1.5ml	Acidity in 100 ml Water	5 ml (Maximum)
3.	Sulphates	296.28mg/l	Sulphates	400 mg /litre (Maximum)
4.	Chlorides	470mg/l	Chlorides	2000 mg/litre (Maximum)
5.	Inorganic Solid	7000mg/l	Inorganic Solid	3000 mg/litre (Maximum)
6.	Organic Solid	100mg/l	Organic Solids	200 mg/litre (Maximum)
7.	PH Value	8.0	PH Value	6.0 (Minimum)

AE(Lab)

E.E. (Lab), EDMC
E.E.(slf)/EDMC

www.zerowasterecycler.com
+91-7290049003

DAYA CHARAN & COMPANY



B

Annexure-V

SLF GHAZIPUR

S.NO.	DATE	(RDF)	S.NO.	DATE	(RDF)
1	30.09.19	2890	29	31.10.19	19940
2	01.10.19	6920	30	01.11.19	26375
3	02.10.19	0	31	02.11.19	0
4	03.10.19	12550	32	04.11.19	49580
5	04.10.19	5680	33	05.11.19	0
6	05.10.19	6970	34	06.11.19	0
7	06.10.19	0	35	08.11.19	26840
8	07.10.19	25140			553935
9	08.10.19	0			553.94 MT
10	09.10.19	45380			
11	10.10.19	11760			
12	11.10.19	7730			
13	12.10.19	0			
14	13.10.19	0			
15	14.10.19	25945			
16	15.10.19	26540			
17	16.01.19	25940			
18	17.10.19	26335			
19	18.10.19	16870			
20	19.10.19	0			
21	20.10.19	50030			
22	22.10.19	17920			
23	23.10.19	0			
24	24.10.19	0			
25	25.10.19	0			
26	26.10.19	31630			
27	29.10.19	40940			
28	30.10.19	44030			

15/1/20
Chandan Singh
AE (SLF)

D

SLF GHAZIPUR

S.NO	DATED	TOTAL RDF (MT)	S.NO	DATED	TOTAL RDF (MT)
1	23.11.19	5.64	32	25.12.19	102.88
2	24.11.19	69.30	33	26.12.19	68.10
3	25.11.19	69.30	34	27.12.19	115.21
4	26.11.19	53.75	35	28.12.19	100.68
5	27.11.19	34.23	36	29.12.19	0.00
6	28.11.19	80.89	37	30.12.19	60.58
7	29.11.19	58.87	38	31.12.19	83.67
8	30.11.19	76.63	39	01.01.20	0.00
9	01.12.19	0.00	40	02.01.20	103.03
10	02.12.19	52.31	41	03.01.20	78.41
11	03.12.19	53.91	42	04.01.20	144.36
12	04.12.19	55.45	43	05.01.20	132.57
13	05.12.19	50.46	44	06.01.20	141.18
14	06.12.19	80.06	45	07.01.20	107.19
15	07.12.19	79.66	46	08.01.20	24.28
16	08.12.19	0.00	47	09.01.20	0.00
17	09.12.19	65.87	48	10.01.20	83.51
18	10.12.19	59.38	49	11.01.20	110.16
19	11.12.19	51.50			3619.31
20	12.12.19	46.34			
21	13.12.19	93.42			
22	14.12.19	87.78			
23	15.12.19	0.00			
24	16.12.19	78.43			
25	17.12.19	45.35			
26	18.12.19	119.64			
27	19.12.19	126.81			
28	20.12.19	121.00			
29	21.12.19	143.01			
30	23.12.19	135.97			
31	24.12.19	168.54			

Send to WtE

15/1/20
Chandan Singh
AE-(SLF)

Annexure-VI

SHRIRAM INSTITUTE FOR INDUSTRIAL RESEARCH
(A unit of Shriram Scientific and Industrial Research Foundation)
19, University Road, Delhi – 110007 (India)
An ISO - 9001, 14001 & OHSAS 18001 Certified Institute
Website : www.shriraminstitute.org
E-mail id : customercare@shriraminstitute.org

TEST CERTIFICATE NO : C1/0000196065

Issued To :
Client Code : (NDLS01E0491)
EAST DELHI MUNICIPAL CORPORATION
OFFICE OF THE EXECUTIVE ENGINEER (SLF, ADJACENT TO MC PRIMARY SCHOOL, LALITA PARK, NEAR LAXMI NAGAR, METRO STATION, NEW DELHI
NEW DELHI
DELHI-110092
Kind Attn: MR. SANJAY KUMAR,EXECUITVE ENGINEER (SLF)

Date	: 31-10-2019
Job No	: 1910-1-421-2035
Booking No	: RG1920/1/8487
Booking Date	: 14-10-2019
Customer Ref No.	: NO.EE(SLF)/EDMC/2019-20/D-682
Customer Ref Dt.	: 11-10-2019

Sample Particulars:
One Sealed Sample of Soil NOW:- Proposal for Installation, Operation and O & M of Waste Processing Facility of Legacy Waste at Ghazipur Sanitary Land Fill. W.O.No.: EE/SLF/EDMC/2019-20/D-485 dated 21.08.2019 Seal not legible was received.

Note: The sampling was not carried out by Shriram Institute for Industrial Research. The sample details provided in the test certificate are based on the declaration by sponsor.

S. No.	Tests		Results	Protocol/Test Method
1.	Total Nitrogen (as N), % by mass (on dry basis)		0.8	ASTM D 5373 guidelines
2.	C: N Ratio, % by mass (on dry basis)		9.0	ASTM D 5373 guidelines By Calculation
3.	Potassium (as K_2O), % by mass (on dry basis)		1.1	Method No. 3050, 3052 of EPA SW-846
4.	Phosphate (as P_2O_5), % by mass (on dry basis)		2.0	Method No. 3050, 3052 of EPA SW-846
5.	Grain Size	Sand %	53	IS:2720 Part -4
		Silt %	37	
		Clay %	8	

AUTHORISED SIGNATORY
EMPLOYEE CODE:(6095)

Phone : 91-11-27667267, 27667983, 27667860 Fax : 91-11-27667676, 27667207

के लिए

D303549

SHRIRAM INSTITUTE FOR INDUSTRIAL RESEARCH

(A unit of Shriram Scientific and Industrial Research Foundation)

19, University Road, Delhi – 110007 (India) An ISO - 9001, 14001 & OHSAS 18001 Certified Institute

Website : www.shriraminstitute.org
E-mail id : customercare@shriraminstitute.org

TEST CERTIFICATE NO : C1/0000196065

TCLP Study:

S. No.	Parameter	Results (mg/l)	Detection Limit (mg/l)	Max Concentration (mg/l)	Protocol/ Method of test
1.	Arsenic (as As), mg/l	Below Detection Limit	0.005	5.0	CPCB Manual on Sampling, Analysis and Characterization of Hazardous Waste (TCLP Study)
2.	Selenium (as Se), mg/l	Not Detected	0.005	1.0	
3.	Mercury (as Hg), mg/l	Not Detected	0.002	0.2	
4.	Copper (as Cu), mg/l	0.19	0.01	25.0	
5.	Nickel (as Ni), mg/l	0.05	0.01	20.0	
6.	Cobalt (as Co), mg/l	0.03	0.01	80.0	
7.	Lead (as Pb), mg/l	Not Detected	0.01	5.0	
8.	Cadmium (as Cd), mg/l	Not Detected	0.01	1.0	
9.	Chromium (as Cr), mg/l	0.01	0.01	5.0	
10.	Iron (as Fe), mg/l	1.3	0.01	--	
11.	Zinc (as Zn), mg/l	1.3	0.01	250	

******

DOR: 14.10.2019
DOC: 31.10.2019

AUTHORISED SIGNATORY
EMPLOYEE CODE: (6095)

Phone : 91-11-27667267, 27667983, 27667860 Fax : 91-11-27667676, 27667207

See overleaf for terms & conditions

I-C1 (Rev. 02)

Annexure - C

INSPECTION REPORT FORMAT FOR LEGACY WASTE DUMPSITES				
S. No.			**Item**	**Remarks**
1			**General Information**	
	a		City & Location of Dumpsite	South Delhi Municipal Corporation (SDMC) SLF (dump site) at Industrial area Okhla Phase-I on Maa Anand Mai Marg , New Delhi
	b		Name, Designation & Contact Details of Nodal officer for Bio-mining	Sh. Deepak Kumar, Executive Engineer (SLF) SDMC. Sh. Mohd. Rehan, Nodal officer, Mob. No. 9838150323
	c		Stage of Bio-mining (Planned/Being Executed/Completed)	Being executed
2			**Volume of Waste**	
	a		Has Contour survey of Site been done (Y/N)	Yes, Contour survey of site has been done. However, the same was stabilized measuring approx. 1,59,445.33 sqm. area and 40 meters height.
	b		Length (Initial-m)	As above 'a'
	c		Width (Initial-m)	As above 'a'
	d		Height (Initial-m)	40 meters
	e		Total Volume (Cub. Meter)	60 lacs cum (Approx.)
3	a		**Characteristics of Waste**	Report of Shriram Institute Delhi and IIT Delhi are enclosed at **Annexure - I**
4	a		**Leachate characteristics**	As informed, leachate has not been collected & tested so far.
5			**Baseline survey**	
	a		Ground water analysis	As informed, test not done
	b		Soil Analysis	Not done
	c		**Quantity of waste processed per day (TPD)**	As informed, Quantity of waste processed average 200-250 TPD in one shift i.e. 9 am to 5 pm.
5			**Process flowsheet of Bio-mining**	Not enclosed
6			**Stabilization of Waste**	
	a		Types of Bio-mining method adopted (Tractor tiller, Trenchmethod; Cone method; Windrow, Thin Layer method)	Windrows method adopted (**Photo1**)
	b		Machinery used for Excavating Dumpsite (Tractor Tiller etc.)	Hydraulic Excavator, Bulldozer
	c		Machinery used for preparing windrows (JCB etc.)	Hydraulic Excavator, Bulldozer

	d		Are large objects removed prior to windrow preparation	Yes
	e		Are windrows turned every 4-5 days	Yes
	f		Duration of Stabilization	30-45 days
	g		Bio-culture used	Yes
	h		Is end product stabilized (No heat/gas/leachate/Smell)	Yes
	i		Is leachate being generated from the waste	Not observed in legacy waste dumpsite at the time of inspection
	j		If yes, methodology for leachate management adopted	NA
7			**Processing of Legacy waste**	
			Machinery used for Processing of Legacy waste	Hydraulic Excavator, Bulldozer
	a		**Screening**	
		i	Trommel (Number & Capacity (TPD)	1 no. Trommel having capacity of 300 TPD (with screening size 30mm) has already been installed and it is working since 7.10.2019 **(Photo 2)**. In addition to the above 5 additional Trommels (3 nos. with screening size 30mm & 2 nos. 6mm) will also be installed (**Photo 3**), for which work orders has been placed and copies of the same are enclosed. These 5 nos. Trommels would be functional in the month of Jan-Feb 2020 for which the work of construction of platform is being carried out at site.
		ii	Size of screens used (Mostly used 150 mn. 80 to 100 mm, 24 to 50mm, 1216 mm & 4-6)	1 no. with 30 mm.
		iii	Vibrating Screen (No)	No
		iv	Electromagnet (For separating ferrous metals)	No
		v	Air classifier (for separating light material from heavy organic.)	Yes (Air blower)
		vi	Disc/Star (No)	No
	b		**Handling**	
		i	Loader (No.)	1 no. Excavator
		ii	Conveyor (No.)	3 nos.
		iii	Fork Lift (No.)	No
		iv	Categories in which the waste is segregated (compost/Recyclables/RDF/C&D/Inerts etc.)	C&D, RDF and Inert materials are being segregated

		v	Quantity of items which is being generated in each category	C&D= 40 TPD, RDF= 20 TPD & Inert materials =160 TPD are being generated (approximately).
		vi	Quantity of items being utilized of different categories	As informed, presently segregated inert materials and C&D waste are being utilized for making platform for setting up of additional trommels. As informed RDF is proposed to sent to Waste to Energy Plant Okhla for processing. In future,inert materials will be dumped in low lying area which will be provided by DDA/GNCTD
		vii	Documents supporting usage of different fractions (Bio-earth/Recyclable/RDF/Other wastes)	Not provided
		viii	Analysis results of fine earth	Not yet done. As informed, analysis of fine earth is being done by Shriram Institute, Delhi.
		ix	Frequency of testing of bio-earth	Not yet decided.
8			**Miscellaneous**	
	a		Have fires being reported at the site	No fire has been reported.
	b		Methodology to tackle fires	Not applicable
	c		Is fresh waste being dumped at the site	No. (Fresh waste is being dumped at adjoining 6.2 acres approx. land) **(photo 4)**
	d		Percentage land recovered so far	1000 sqm. and height 15 meter from the top level of stabilized/legacy waste. **(Photo 5)**
	e		Is third party audit of bio-mining being done	At present no third party audit of bio-mining engaged.
9			**Other observations** • It was observed that some part of dumpsite has been capped. It was informed by SDMC officials that some part was capped in 2018 after stabilization of waste but it was observed that fumes were emitting from excavated stabilized waste. • Characteristics of waste has been determined by SDMC and organic content is found approx. 5-7%. • The screening of waste is not as per the CPCB guidelines, only one size (30 mm) of screen is being used. • Screened fractions of waste found dumped at SLF site. No provision was found for its further utilization. • Leachate Characteristics, Ground Water analysis, Soil analysis not yet done.	

			• The RDF quality being generated at these three dumpsite is not upto the mark.	
			Name & Designation of Inspecting Officer	Ratnesh Kumar, Sc. "B" & Mohan Reddy, JRF
			Date of Inspection	14.01.2020

PHOTOGRAPHS

Photo.1: Biomining (Windrows method) of legacy waste

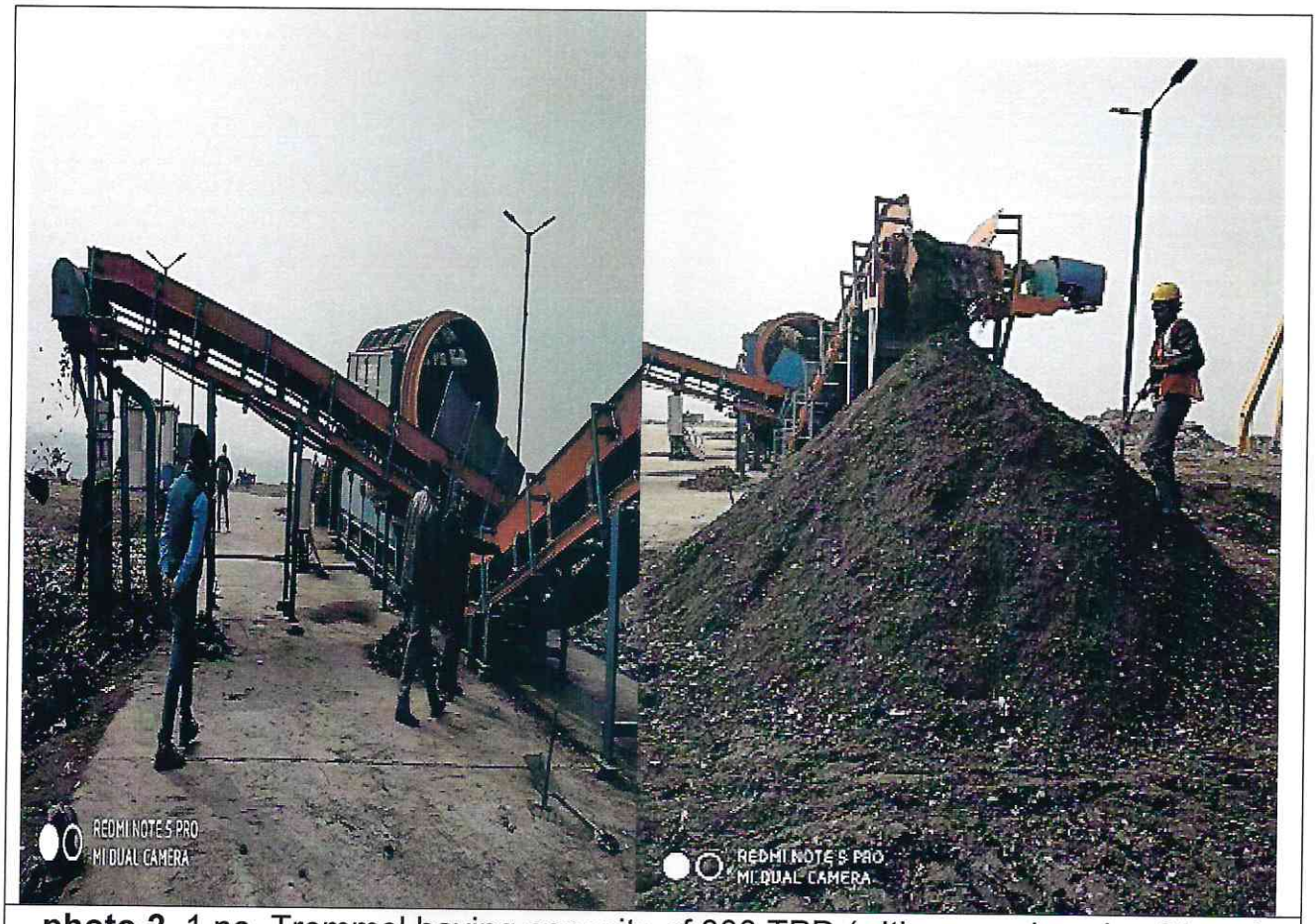


photo.2. 1 no. Trommel having capacity of 300 TPD (with screening size 30mm) has already been installed and it is working since 7.10.2019.

Photo3: One trommel (With capacity of 300 TPD and 30mm screen to be installed)

Photo4.: Dumping of fresh waste at adjoining 6.2 acres (approx.) land

Photo 5. land recovered and it will be used for base foundation work for trommel setting & biomining

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Annexure-1 of

Office of the Assistant Engineer (SLF) Okhla
Dy.No./F 300
Date 6/8/18
South Delhi Municipal Corporation

TEST CERTIFICATE NO: C1/0000136162

Office of the Ex-Engineer (SLF) Okhla
Dy.No. 540
Date 3/8/18
South Delhi Municipal Corporation
RE/SLF Fo3/8

Issued To :
Client Code : (NDLS01O0338)
OFFICE OF THE EXECUTIVE ENGINEER (SLF) SDMC
ROOM NO. 6, GATE NO. 4, DR. AMBEDKAR STADIUM, DELHI GATE
NEW DELHI
DELHI-110002
Kind Attn: MR. DEEPAK KUMAR,EE (SLF) SDMC

Date	: 30-07-2018
Job No	: 14011819/1/44
Booking No	: PJ1819/1/47
Booking Date	: 09-05-2018
Customer Ref No.	: EMAIL
Customer Ref Dt.	: 07-05-2018

Sample Particulars :
One sample of Municipal Solid Waste marked as "Existing waste - 2A" drawn by our representative on 02.07.2018 as per details given below was received.

1. Name & address of the Site : M/s. Landfill Site Okhla Phase-I, Okhla, Delhi
2. Site Representative : Mr. Deepak Kumar (E.E), SDMC

Results Table

1. Density of Existing waste:

S. No.	Test	Field Bulk Density	Dry Bulk Density	Protocol/Test Method
i.	Densit , gm./cc	1.73	1.54	Mechanical

2. Moisture Content:

S. No.	Test	Specimen (I)		Specimen (II)		Protocol/Test Method
ii.	Moisture Content, % by mass	i	12.89	i	11.86	ASTM D 2974
		ii	12.39	ii	12.64	
		Avg.	12.6	Avg.	12.3	

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EMPLOYEE CODE: 6095

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TEST CERTIFICATE NO : C1/0000136162

3. Grain Size Distribution:

S. No.	% Fraction (mm)	Specimen (I)	Specimen (II)	Protocol/Test Method
i.	0 – 0.075 mm, % by mass	3.04	4.21	IS: 2720 Pt- 4
ii.	0.075 - 4.75 mm, % by mass	46.84	46.53	
iii.	4.75 – 20 mm, % by mass	16.63	14.70	
iv.	20 - 80mm, % by mass	16.99	18.62	
v.	80 - 300mm, % by mass	13.53	11.48	
vi.	>300mm, % by mass	2.96	4.45	

4. Physical Composition):

S. No.	Tests	Results (% Dry Basis)	Protocol/Test Method
i.	Coconut Shell / Straw / Hay / Stalk	0.81	ASTM D 5261-92
ii.	Textiles	1.31	
iii.	Plastics	2.70	
iv.	Metals	0.20	
v.	Glass	0.35	
vi.	Sand / Soil / Earth	49.04	
vii.	Stones / Bricks / Concrete / Ceramic, etc.,	45.59	

5. Proximate Analysis:

a) Organic matter (loss on ignition at 550 °C)

S. No.	Test	Grain Size				Protocol/Test Method
		0 – 4.75 mm		4.75 - 80 mm		
i.	Organic matter (loss at 550 °C), % by mass	i	5.96	i	4.98	ASTM 2974
		ii	6.04	ii	4.84	
		Avg.	6.0	Avg.	4.9	

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b) Total Soluble Solids

S. No.	Test	Grain Size				Protocol/Test Method
		0 – 4.75 mm		4.75 - 80 mm		
ii.	Total Soluble Solids, % by mass	i	1.86	i	1.36	IS:2720, Pt. 21
		ii	1.92	ii	1.38	
		Avg.	**1.89**	**Avg.**	**1.37**	

5. Ultimate Analysis:

S. No.	Tests	Grain Size				Protocol/Test Method
		0 – 4.75 mm		4.75 - 80 mm		
i.	Nitrogen (as N), % by mass	i	0.14	i	0.17	ASTM D 5373 Guidelines
		ii	0.21	ii	0.16	
		Avg.	**<0.5**	**Avg.**	**<0.5**	
ii.	Carbon (as C), % by mass	i	3.30	i	2.65	
		ii	3.27	ii	2.31	
		Avg.	**3.3**	**Avg.**	**2.5**	
iii.	Sulphur (as S), % by mass	i	0.24	i	0.22	
		ii	0.35	ii	0.17	
		Avg.	**<0.5**	**Avg.**	**<0.5**	
iv.	Hydrogen (as H), % by mass	i	0.80	i	0.19	
		ii	0.37	ii	0.06	
		Avg.	**0.6**	**Avg.**	**<0.5**	
v.	Oxygen (as O), % by mass	i	95.5	i	96.8	
		ii	95.8	ii	97.3	
		Avg.	95.7	Avg.	97.0	

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D.O.R.: 02.07.2018
D.O.C.: 30.07.2018

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TEST CERTIFICATE

NO : C1/0000136178

Issued To :
Client Code : (NDLS01O0338)
OFFICE OF THE EXECUTIVE ENGINEER (SLF) SDMC
ROOM NO. 6, GATE NO. 4, DR. AMBEDKAR
STADIUM, DELHI GATE
NEW DELHI
DELHI-110002
Kind Attn: MR. DEEPAK KUMAR,EE (SLF) SDMC

Date	: 30-07-2018
Job No	: 14011819/1/44
Booking No	: PJ1819/1/47
Booking Date	: 09-05-2018
Customer Ref No.	: EMAIL
Customer Ref Dt.	: 07-05-2018

Sample Particulars :
One sample of Municipal Solid Waste marked as "Compacted Waste - 4B" drawn by our representative on 12.07.2018 as per details given below was received.

1. Name & address of the Site : M/s. Landfill Site Okhla Phase-I, Okhla, Delhi
2. Site Representative : Mr. Deepak Kumar (E.E), SDMC

Results Table

1. Density of Compacted Waste:

S. No.	Test	Field Bulk Density	Dry Bulk Density	Protocol/Test Method
i.	Density, gm./cc (Compacted Waste)	1.82	1.64	Mechanical

2. Moisture Content:

S. No.	Test	Specimen (I)		Specimen (II)		Protocol/Test Method
i.	Moisture Content, % by mass	i	9.33	i	10.58	ASTM D 2974
		ii	10.49	ii	11.97	
		Avg.	9.9	Avg.	11.3	

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TEST CERTIFICATE NO : C1/0000136178

3. Grain Size Distribution:

S. No.	% Fraction (mm)	Specimen (I)	Specimen (II)	Protocol/Test Method
i.	0 – 0.075 mm, % by mass	3.52	5.09	IS: 2720 Pt- 4
ii.	0.075 - 4.75 mm, % by mass	45.75	43.78	
iii.	4.75 – 20 mm, % by mass	13.46	15.66	
iv.	20 - 80mm, % by mass	5.31	18.58	
v.	80 - 300mm, % by mass	28.54	10.85	
vi.	>300mm, % by mass	3.42	6.05	

4. Physical Composition):

S. No.	Tests	Results (%Dry Basis)	Protocol/Test Method
i.	Coconut Shell / Straw / Hay / Stalk	0.71	ASTM D 5231-92
ii.	Textiles	1.42	
iii.	Plastics	3.69	
iv.	Sand / Soil / Earth	49.03	
v.	Stones / Bricks / Concrete / Ceramic, etc.,	45.15	

5. Proximate Analysis:

a) Organic matter (loss on ignition at 550 °C)

S. No.	Test	Grain Size				Protocol/Test Method
		0 – 4.75 mm		4.75 - 80 mm		
i.	Organic matter (loss at 550 °C), % by mass	i	7.05	i	7.13	ASTM D 2974
		ii	7.27	ii	6.83	
		Avg.	7.2	Avg.	7.0	

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TEST CERTIFICATE NO : C1/0000136178

b) Total Soluble Solids

S. No.	Test	Grain Size				Protocol/Test Method
		0 – 4.75 mm		4.75 - 80 mm		
i.	Total Soluble Solids, % by mass	i	2.56	i	1.86	IS:2720, Pt 21
		ii	2.44	ii	1.70	
		Avg.	**2.5**	**Avg.**	**1.78**	

5. Ultimate Analysis:

S. No.	Tests	Grain Size				Protocol/Test Method
		0 – 4.75 mm		4.75 - 80 mm		
i.	Nitrogen (as N), % by mass	i	0.23	i	0.31	ASTM D 5373 Guidelines
		ii	0.26	ii	0.28	
		Avg.	**<0.5**	**Avg.**	**<0.5**	
ii.	Carbon (as C), % by mass	i	4.13	i	4.08	
		ii	3.28	ii	3.87	
		Avg.	**3.7**	**Avg.**	**4.0**	
iii.	Sulphur (as S), % by mass	i	0.40	i	0.47	
		ii	0.25	ii	0.40	
		Avg.	**<0.5**	**Avg.**	**<0.5**	
iv.	Hydrogen (as H), % by mass	i	0.20	i	0.02	
		ii	0.07	ii	0.00	
		Avg.	**<0.5**	Avg.	**<0.5**	
v.	Oxygen (as O), % by mass	i	95.0	i	95.1	
		ii	96.2	ii	95.5	
		Avg.	**95.6**	Avg.	**95.3**	

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D.O.R.: 12.07.2018
D.O.C.: 30.07.2018

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Office of the Assistant Engineer (SLF) Okhla
Dy No. 302
Date 6/8/18

TEST CERTIFICATE NO : C1/0000136175

Issued To :
Client Code : (NDLS01O0338)
OFFICE OF THE EXECUTIVE ENGINEER (SLF) SDMC
ROOM NO. 6, GATE NO. 4, DR. AMBEDKAR
STADIUM, DELHI GATE
NEW DELHI
DELHI-110002
Kind Attn: MR. DEEPAK KUMAR,EE (SLF) SDMC

Date : 30-07-2018
Job No : 14011819/1/44
Booking No : PJ1819/1/47
Booking Date : 09-05-2018
Customer Ref No. : EMAIL
Customer Ref Dt. : 07-05-2018

Office of the Ex-Engineer (SLF) Okhla
Dy.No. 542
Date 3/8/18
South Delhi Municipal Corporation

AE/SLF 1/08/18

Sample Particulars :
One sample of Municipal Solid Waste marked as "Compacted Waste - 3B" drawn by our representative on 10.07.2018 as per details given below was received.

1. Name & Address of the Site : M/s. Landfill Site Okhla Phase-I, Okhla, Delhi
2. Site Representative : Mr. Deepak Kumar (E.E), SDMC

Results Table

1. **Density of Compacted Waste:**

S. No.	Test	Field Bulk Density	Dry Bulk Density	Protocol/Test Method
i.	Density, gm./cc (Compacted Waste)	1.74	1.56	Mechanical

2. **Moisture Content:**

S. No.	Test	Specimen (I)		Specimen (II)		Protocol/Test Method
i.	Moisture Content, % by mass	i	11.12	i	11.54	ASTM D 2974
		ii	10.84	ii	11.98	
		Avg.	11.0	Avg.	11.8	

R K Sharma
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E-mail id : customercare@shriraminstitute.org

TEST CERTIFICATE NO : C1/0000136175

3. Grain Size Distribution:

S. No.	% Fraction (mm)	Specimen (I)	Specimen (II)	Protocol/Test Method
i.	0 – 0.075 mm, % by mass	3.10	5.37	IS: 2720 Pt- 4
ii.	0.075 - 4.75 mm, % by mass	49.54	47.94	
iii.	4.75 – 20 mm, % by mass	16.81	15.70	
iv.	20 - 80mm, % by mass	5.10	11.72	
v.	80 - 300mm, % by mass	19.56	15.86	
vi.	>300mm, % by mass	5.88	3.41	

4. Physical Composition):

S. No.	Tests	Results (%Dry Basis)	Protocol/Test Method
i.	Coconut Shell / Straw / Hay / Stalk	0.78	ASTM D 5261-92
ii.	Wood	0.50	
iii.	Textiles	0.80	
iv.	Plastics	3.80	
v.	Metals	0.20	
vi.	Glass	0.39	
vii.	Sand / Soil / Earth	52.17	
viii.	Stones / Bricks / Concrete / Ceramic, etc.,	41.38	

5. Proximate Analysis:

a) Organic matter (loss on ignition at 550 °C)

S. No.	Test	Grain Size				Protocol/Test Method
		0 – 4.75 mm		4.75 - 80 mm		
i.	Organic matter (loss at 550 °C), % by mass	i	6.18	i	5.97	ASTM D 2974
		ii	6.35	ii	5.74	
		Avg.	6.3	Avg.	5.9	

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56

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TEST CERTIFICATE NO : C1/0000136175

b) Total Soluble Solids

S. No.	Test	Grain Size				Protocol/Test Method
		0 – 4.75 mm		4.75 - 80 mm		
i.	Total Soluble Solids, % by mass	i	1.94	i	1.35	IS:2720, Pt 21
		ii	1.84	ii	1.38	
		Avg.	**1.89**	**Avg.**	**1.36**	

5. Ultimate Analysis:

S. No.	Tests	Grain Size				Protocol/Test Method
		0 – 4.75 mm		4.75 - 80 mm		
i.	Nitrogen (as N), % by mass	i	0.33	i	0.23	ASTM D 5373 Guidelines
		ii	0.28	ii	0.29	
		Avg.	**<0.5**	**Avg.**	**<0.5**	
ii.	Carbon (as C), % by mass	i	3.97	i	3.16	
		ii	3.77	ii	3.71	
		Avg.	**3.9**	**Avg.**	**3.4**	
iii.	Sulphur (as S), % by mass	i	0.36	i	0.26	
		ii	0.48	ii	0.29	
		Avg.	**<0.5**	**Avg.**	**<0.5**	
iv.	Hydrogen (as H), % by mass	i	0.03	i	0.04	
		ii	0.10	ii	0.00	
		Avg.	**<0.5**	**Avg.**	**<0.05**	
v.	Oxygen (as O), % by mass	i	95.3	i	96.3	
		ii	95.4	ii	95.7	
		Avg.	95.3	Avg.	96.0	

******

D.O.R.: 10.07.2018
D.O.C.: 30.07.2018

AUTHORISED SIGNATORY
EMPLOYEE CODE: 6095

C

INDIAN INSTITUTE OF TECHNOLOGY DELHI

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Manoj Datta, Ph.D, FIGS
Professor & Head
Department of Civil Engineering

Dated: 03/04/2017
IITD/CE/MD/2017/ 33717

The Director (DEMS)
South Delhi Municipal Corporation,
2nd Level,
Dr. S.P. Mukherjee Marg,
Civic Centre Complex,
New Delhi-110002

Subject: Initial testing results for samples of aged municipal solid waste (MSW) collected from Okhla landfill

Dear Sir,

Please find attached the initial results of the grain size distribution and compositional analysis of aged MSW from Okhla landfill. The tests were conducted by my research scholar, Mr. Mohit Somani on aged waste in the month of Jan-Feb, 2017 at landfill site. These are the initial on-site test results only. Final results will be available after detailed study as part of their PhD program.

Thanking You,

Yours sincerely

(Manoj Datta)

C

RESULT OF ON SITE GRAIN SIZE DISTRIBUTION

Age of waste	Date of excavation	Time for drying	Total material excavated	Material retained (%)						
				Above 200 mm	200-80 mm	80-35 mm	35-16 mm	16-4 mm	0-4 mm	Losses (moisture, other)
20-22 years	14-01-2017	7 days	2050 kg	3	11	10	14	20.4	33.2	7.7
10-12 years	21-01-2017	7 days	3000 kg	2.1	9.6	8.6	10.6	20.7	40.6	7.6
2-3 years	28-01-2017	15 days	2460 kg	7.6	6.6	10.3	18.1	40.4	83.3	16.7

Annexure- D

INSPECTION REPORT FORMAT FOR LEGACY WASTE DUMPSITE, Bhalswa			
Item			Remarks
1		**General Information**	
	a	City & Location of Dumpsite	Near Bhalswa Dairy Village, **Bhalswa**, New Delhi
	b	Name, Designation & Contact Details of Nodal officer for Bio-mining	Sh. Sh. A. K. Gupta, SE(DEMS), M. No. 9717788033
	c	Stage of Bio-mining (Planned/Being Executed/Completed)	Being executed
2		**Volume of Waste**	
	a	Has Contour survey of Site been done (Y/N)	Yes
	b	Length (Initial-m)	
	c	Width (Initial-m)	
	d	Height (Initial-m)	62 meters
	e	Total Volume (Cub. Meter)	88 Lakh M^3 (Approx.)
3	a	**Characteristics of Waste**	Waste composition is enclosed as **Annexure-I**
4	a	**Leachate characteristics**	Leachate characteristics enclosed as **Annexure-II**
5		**Baseline survey**	
	a	Ground water analysis	Ground water analysis was done, test report attached as **Annexure-II.**
	b	Soil Analysis	Not provided
	c	**Quantity of waste processed per day (TPD)**	As informed, 65000 tons waste processed till now. Further, average waste processing is 2000-2200 TPD.
6		**Process flowsheet of Bio-mining**	Not provided
7		**Stabilization of Waste**	
	a	Types of Bio-mining method adopted (Tractor tiller, Trenchmethod; Cone method; Windrow, Thin Layer method)	Windrows method adopted. However, no windrows were observed during visit.
	b	Machinery used for Excavating Dumpsite (Tractor Tiller etc.)	Hydraulic Excavators, Tippers & JCBs
	c	Machinery used for preparing windrows (JCB etc.)	Hydraulic Excavators, Tippers & JCBs but Windrows were not observed at the time of inspection

	d	Are large objects removed prior to windrow preparation	Yes
	e	Are windrows turned every 4-5 days	Windrows were not observed at the time of inspection
	f	Duration of Stabilization	As informed, stabilization of waste has not taken place
	g	Bio-culture used	No bio culture is used
	h	Is end product stabilized (No heat/gas/leachate/Smell)	No
	i	Is leachate being generated from the waste	Leachate generation observed in legacy waste dumpsite at the time of inspection.
	j	If yes, methodology for leachate management adopted	Not provided
8		**Processing of Legacy waste**	
		Machinery used for Processing of Legacy waste	Hydraulic Excavator, JCBs & Tippers
	a	**Screening**	
		Trommel (Number & Capacity (TPD)	9 nos. Trommel having capacity of 2700 TPD (with screening size 30mm) has already been installed and working. (**Photo-1 of Annexure-III**) Further, 2 additional Trommels(with screening size 30mm) installed, but not in working condition. As informed, in addition to the above, 2 more Trommels (with screening size 30mm) will be installed within 15 days.(**Photo-2 of Annexure-III)**
		Size of screens used (Mostly used 150 mm, 80 to 100 mm, 24 to 50mm, 1216 mm & 4-6)	9 nos. with 30 mm screen size
		Vibrating Screen (No)	No
		Electromagnet (For separating ferrous metals)	No
		Air classifier (for separating light material from heavy organic.)	Yes (Air blower)
		Disc/Star (No)	No
	b	**Handling**	
		Loader (No.)	16 nos. Excavators & 8 nos. JCBs
		Conveyor (No.)	27 nos. (3 Conveyors for each trommel)
		Fork Lift (No.)	No

		Categories in which the waste is segregated (compost/Recyclables/RDF/C&D/Inerts etc.)	C&D, RDF and Inert materials
		Quantity of items which is being generated in each category	Not provided
		Quantity of items being utilized of different categories	Quantity wise information not provided. It was observed during visit that RDF collected after segregation is still dumped near trommels, C&D waste is being used in making of ramps and other waste like inert is being used to control fire.**(Photo-3 and Photo-4 of Annexure-III)**
		Documents supporting usage of different fractions (Bio-earth/Recyclable/RDF/Other wastes)	Notice inviting tender for "Empanelment of contractors for removal of RDF recovered from bio mining process at Bhalsawa dumpsite in Delhi" is enclosed as **Annexure-IV**
		Analysis results of fine earth	Not yet done , Payments for study of Biomining Waste has been completed (enclosed as **Annexure-V**)
		Frequency of testing of bio-earth	Not yet decided
9		**Miscellaneous**	
	a	Have fires being reported at the site	No fire incident during visit
	b	Methodology to tackle fires	Use of C&D and fine earth/stabilization
	c	Is fresh waste being dumped at the site	Yes
	d	Percentage land recovered so far	Waste is removed and processed from top of the dumpsite hence 0% of land recovered.
	e	Is third party audit of bio-mining being done	No.

10		**Other observations**	1. It was observed during visit that 9 nos trommel having capacity of 2700 TPD (with screening size 30mm) have already been installed and were operational. Further, 2 additional trommels installed, but were not in working condition. In addition to the above, 2 more Trommels (with screening size 30mm) will be installed within 15 days.(Photo-1 of Annexure-III) 2. Approximate 65000 tons legacy waste has been processed

			3. It was noticed that the waste stabilization through bio-remediation, use of bio culture was not practised as per the CPCB guidelines and excavated waste is spread for 2/3 days and fed into hopper for screening in the trommel. 4. It was observed that the screening of waste is not being done as per the CPCB guidelines. One type of screen of 30 mm size is being used in all 9 trommels.(photo-2 of Annexure-III) 5. Heaps of RDF were observed all over the processing area. Heaps of inert collected were dumped beside the trommels (Photo-3 and Photo-4 of Annexure-III) 6. The quantification of the recyclable materials and inert is not practiced and have not maintained any records 7. Leachate generation was observed from legacy waste and it was meeting the nearby drain. There was no leachate treatment system installed. 8. Fresh waste 2000-2100 TPD is being dump over the legacy waste.
		Name & Designation of Inspecting Officer	Yogesh Chandra, SC. "B" &Dubba Mohan Reddy, JRF
		Date of Inspection	15.01.2020

Table 52 presents the composition of three waste fractions >80 mm, 4 to 80 mm and less than 4 mm. The 4 to 80 mm fraction represented 46.5% of the total waste. **Table 53** presents the composition of three waste fractions >35 mm, 4 to 35 mm and less than 4 mm. The 4 to 80 mm fraction represented 28.5% of the total waste.

It should be noted that the full compositional data is based upon the trail pit samples, where it was possible to obtain the very large sample size required. As identified the results may not be fully representative of the waste, particularly at increasing depth.

Table 52 - Composition of waste fractions >80 mm, 4 to 80 mm and less than 4 mm

Waste Category	>80 mm	4-80 mm	<4 mm
Textile	4.5%	2.9%	
Wood	1.6%	1.0%	
Plastic	8.2%	4.8%	
Miscellaneous	1.0%	0.0%	
Glass	0.4%	0.6%	
Gravel like material (>4mm)	5.3%	35.9%	
Soil like material (<4mm)	1.6%	1.2%	31.0%
TOTAL	22.5%	46.5%	31.0%

Table 53 - Composition of waste fractions >35 mm, 4 to 35 mm and less than 4 mm

Waste Category	>35 mm	4-35 mm	<4 mm
Textile	2.1%	0.8%	
Wood	0.8%	0.2%	
Plastic	3.5%	1.3%	
Miscellaneous	0.0%	0.0%	
Glass	0.1%	0.5%	
Gravel like material (>4mm)	10.7%	25.2%	
Soil like material (<4mm)	0.8%	28.5%	31.0%
TOTAL	18.0%	28.5%	31.0%

As shown, based upon the test results the 4 to 80 mm fraction would be 35.9% stone whereas if a finer fraction is considered the 4 to 35 mm fraction would be 25.2% stone. The suitability of these materials would depend upon use and whether it was practical to use additional techniques to remove plastic etc. such as a Windsifter or picking line etc., if required.

The larger fractions, greater than 35 or 80 mm, are unlikely to comprise a suitable RDF, despite the high plastic and textile content, due to the presence of significant stone content. It is possible however that additional treatment could be provided to remove the stones / soil so

Annexure - II

GROUND WATER SAMPLING REPORT (From Hand pump)							
Testing standards		(Tested as per Drinking Water Parameters IS 10500:2012)			Avg	Drinking Water Parameters IS 10500:2012	
Tested Parameters	Unit	GW - F	GW - C	GW - A		Requirement (Acceptable Limit)	Permissible Limit in the Absence of Alternate Source
PH		7.255	7.645	7.72	7.5	6.5 - 8.5	No Relaxation
COLOR	pt.co.	0.1635	4.305	1.0559	1.8	5	15
ODOR		Not Agreeable	Not Agreeable	Not Agreeable	Not Agreeable	Agreeable	Agreeable
TASTE		NA	NA	NA	NA	Agreeable	Agreeable
TURBIDITY	NTU	0	1.745	144.5		1	5
TOTAL HARDNESS	mg/l	639.5	820	1078.5	846.0	200	600
BOD	mg/l		3.31	4	2.4	-	-
COD	mg/l	12	30.5	41.5	28.0	-	-
TDS	mg/l	1983	2020	4348	2783.7	500	2000
RESIDUAL FREE CHLORINE	mg/l	339	178	109	208.7	0.2	1
IRON	mg/l	BDL	BDL	BDL	BDL	0.3	No Relaxation
CHLORIDES	mg/l	410	400	1499	769.7	250	1000
CALCIUM	mg/l	193	176	272	213.7	75	200
COPPER	mg/l	BDL	BDL	BDL	BDL	0.05	1.5
MANGANESE	mg/l	BDL	0.21585	BDL	BDL	0.1	0.3
SULPHATE	mg/l	146.5	234.5	303.5	228.2	200	400
SULPHIDE	mg/l	BDL	BDL	BDL	BDL	0.05	No Relaxation
NITRATE	mg/l	0.95225	0.65075	0.865	0.8	45	No Relaxation
AMMONIACAL NITROGEN	mg/l	BDL	BDL	BDL	BDL	-	-
BARIUM	mg/l	BDL	BDL	BDL	BDL	0.7	No Relaxation
SILVER	mg/l	BDL	BDL	BDL	BDL	0.1	No Relaxation
FLOURIDE	mg/l	2.5733	2.17375	2.462	2.4	1	1.5
PHENOLIC COMPOUND	mg/l	BDL	BDL	BDL	BDL	0.001	0.002
ZINC	mg/l	1.7121	0.1019	0.01775	0.6	5	15
ALKALINITY	mg/l	606	438.5	481.5	508.7	200	600
ALUMINIUM	mg/l	BDL	BDL	BDL	BDL	0.03	0.2
BORON	mg/l	BDL	BDL	BDL	BDL	0.5	1
TOTAL CHROMIUM	mg/l	BDL	BDL	BDL	BDL	0.05	No Relaxation
ARSENIC	mg/l	BDL	BDL	BDL	BDL	0.01	0.05
CYANIDE	mg/l	BDL	BDL	BDL	BDL	0.05	No Relaxation
LEAD	mg/l	0.24095	0.1761	0.2229	0.2	0.01	No Relaxation
MERCURY	PPb	BDL	BDL	BDL	BDL	0.001	No Relaxation
CADMIUM	mg/l	BDL	BDL	BDL	BDL	0.003	No Relaxation
NICKEL	mg/l	0.07365	0.051065	0.07775	0.1	0.02	No Relaxation
TOTAL COLIFORM	cfu/ml	90*10^4	63*10^3	48*10^4	48.1*10^4	Shall not be detectable in any 100 ml Sample	
E-COLI	cfu/ml	PRESENT	PRESENT	PRESENT	PRESENT		
TSS	mg/l	-	-	-	-	-	-
TKN	mg/l	-	-	-	-	-	-

LEACHATE SAMPLE (FROM WASTE BOREHOLES) REPORT

Testing standards		(Tested as per Leachate standards as mentioned in MSW rules 2016 and other parameters)						Avg	Leachate Disposal Standarad as stated in MSW rules 2016		
Tested Parameters	Unit	WBH NO. 09 (Depth 12.8 mtr) R.L = 263.77	WBH NO. 07 (Depth 11.35 mtr) R.L = 270.57	WBH NO. 08 (Depth 9.28 mtr) R.L = 264.12	WBH NO. 01 (Depth 26.4 mtr) R.L = 235.99	WBH NO. 03 (Depth 20.1 mtr) R.L = 238.00	WBH NO. 06 (Depth 10.2 mtr) R.L = 236.78		Inland Surface Water	Public Water	Land Disposal
PH		8.25	7.38	7.50	7.54	7.87	8.08	**7.77**	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0
COLOR	pt.co.	493.93	215.33	46929.67	7686.67	42147.67	39684.33	**22859.60**			
ODOR		NOT AGREEBLE	NOT AGREEBLE	NOT AGREEBLE	NOT AGREEBLE	NOT AGREEBLE	NOT AGREEBLE	**NOT AGREEBLE**			
TASTE		NA	NA	NA	NA	NA	NA	**NA**			
TURBIDITY	NTU	128.67	19.80	18.03	78.30	28.10	10.40	**47.22**			
TOTAL HARDNESS	mg/l	1319.33	320.67	4503.33	2005.00	3999.33	5501.33	**2941.50**			
BOD	mg/l	500.00	85.33	2402.67	542.00	1052.67	1702.67	**1047.56**	30	350	100
COD	mg/l	2279.00	3742.00	18756.00	3612.33	14579.67	11945.33	**9152.39**	250	-	-
TDS	mg/l	19000.00	3422.33	19727.00	10973.33	35963.33	42283.67	**21894.94**	2100	2100	2100
RESIDUAL FREE CHLORINE	mg/l	BDL	1547.00	206.00	206.67	854.67	206.00	**503.39**			
IRON	mg/l	250.24	35.04	742.67	17.11	174.59	214.00	**238.94**			
CHLORIDES	mg/l	6395.00	2776.00	6081.33	6426.33	9811.33	8163.67	**6608.94**	1000	1000	600
CALCIUM	mg/l	565.00	1207.33	1044.33	604.67	883.67	722.67	**837.94**			
COPPER	mg/l	2.37	1.37	6.82	2.36	6.07	5.78	**4.13**	3	3	-
MANGANESE	mg/l	7.91	1.93	14.85	0.56	5.12	6.08	**6.08**			
SULPHATE	mg/l	49.30	451.67	1030.00	936.79	1237.68	1530.20	**872.61**			
SULPHIDE	mg/l	BDL	12.33	21.00	24.33	43.00	32.67	**22.22**			
NITRATE	mg/l	488.80	395.31	409.29	137.00	354.49	304.58	**348.24**			
AMMONIACAL NITROGEN	mg/l	1387.67	561.33	1754.67	2070.67	2435.67	2760.67	**1828.44**	50	50	-
BARIUM	mg/l	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**			
SILVER	mg/l	1.42	BDL	BDL	BDL	BDL	BDL	**BDL**			
FLOURIDE	mg/l	3.95	0.39	1.09	0.22	7.97	5.13	**3.13**	2	1.5	-
PHENOLIC COMPOUND	mg/l	BDL	0.06	0.13	0.85	0.02	1.44	**0.42**	1	5	-
ZINC	mg/l	35.36	0.87	11.89	1.26	19.29	11.49	**13.36**	5	15	-
ALKALINITY	mg/l	10030.00	1119.00	6405.33	4079.33	16080.33	13840.33	**8592.39**			
ALUMINIUM	mg/l	30.846	14.75	15.15	3.04	35.70	38.45	**22.99**			
BORON	mg/l	15.56	BDL	BDL	BDL	BDL	BDL	**BDL**			
TOTAL CHROMIUM	mg/l	3.58	1.18	8.76	1.49	9.12	9.63	**5.63**	2	2	-
ARSENIC	mg/l	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**	0.2	0.2	0.2
CYANIDE	mg/l	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**	0.2	2	0.2
LEAD	mg/l	0.82	1.39	6.90	1.14	3.71	3.61	**2.93**	0.1	1	-
MERCURY	PPb	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**	0.01	0.01	-
CADMIUM	mg/l	0.03	0.03	0.04	0.03	0.04	0.06	**0.04**	2	1	-
NICKEL	mg/l	1.44	0.13	1.29	0.35	1.23	0.90	**0.89**	3	3	-
TOTAL COLIFORM	cfu/ml	ABSENT	ABSENT	ABSENT	ABSENT	ABSENT	ABSENT	**ABSENT**			
E-COLI	cfu/ml	ABSENT	ABSENT	ABSENT	ABSENT	ABSENT	ABSENT	**ABSENT**			
TSS	mg/l	144.00	153.67	203.67	172.00	220.67	219.33	**185.56**	100	600	200
TKN	mg/l	2443.00	794.00	2016.00	2262.00	2609.00	2978.00	**2183.67**	100	-	-

LEACHATE (OPEN DRAIN) SAMPLE REPORT

Testing standards		(Tested as per Leachate standards as mentioned in MSW rules 2016 and other parameters)				Avg	Leachate Disposal Standarad as stated in MSW rules 2016		
Tested Parameters	Unit	LS1	LS2	LS3	LS4		Inland Surface Water	Public Water	Land Disposal
PH		7.485	8.095	7.26	8.55	7.85	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0
COLOR	pt.co.	1631.5	6530	164.53	21578.67	7476.18			
ODOR		Not Agreeable	Not Agreeable	Not Agreeable	Not Agreeable	Not Agreeable			
TASTE		NA	NA	NA	NA	NA			
TURBIDITY	NTU	42.9	148.5	215.00	36.47	110.72			
TOTAL HARDNESS	mg/l	2996	2724.5	518.00	2600.00	2209.63			
BOD	mg/l	144	146	14.67	2512.67	704.33	30	350	100
COD	mg/l	1427.5	2493.5	177.33	10315.80	3603.53	250	-	-
TDS	mg/l	22917.5	26659.5	2032.67	25440.00	19262.42	2100	2100	2100
RESIDUAL FREE CHLORINE	mg/l	604.5	723.5	BDL	325.67	413.42			
IRON	mg/l	3.3856	8.14475	2.43	113.00	31.74			
CHLORIDES	mg/l	12659.5	7210	395.67	6616.67	6720.46	1000	1000	600
CALCIUM	mg/l	595.5	699.5	268.00	125.05	422.01			
COPPER	mg/l	0.576	1.06235	0.12	0.28	0.51	3	3	-
MANGANESE	mg/l	0.17035	0.1668	0.27	4.21	1.20			
SULPHATE	mg/l	2331.5	2667	200.00	678.47	1469.24			
SULPHIDE	mg/l	BDL	BDL	BDL	BDL	BDL			
NITRATE	mg/l	10.8	13.3	0.70	543.33	142.03			
AMMONIACAL NITROGEN	mg/l	320	532	150.67	2913.88	979.14	50	50	-
BARIUM	mg/l	BDL	BDL	BDL	BDL	BDL			
SILVER	mg/l	2.1623	1.44505	1.06	BDL	1.17			
FLOURIDE	mg/l	3.988	5.0428	1.10	1.18	2.83	2	1.5	-
PHENOLIC COMPOUND	mg/l	BDL	0.0245	BDL	2.17	0.55	1	5	-
ZINC	mg/l	0.3145	0.5844	0.20	0.45	0.39	5	15	-
ALKALINITY	mg/l	497	3329	687.00	16012.00	5131.25			
ALUMINIUM	mg/l	BDL	BDL	BDL	BDL	BDL			
BORON	mg/l	BDL	BDL	BDL	BDL	BDL			
TOTAL CHROMIUM	mg/l	1.04565	2.1762	0.08	2.57	1.47	2	2	-
ARSENIC	mg/l	BDL	BDL	BDL	BDL	BDL	0.2	0.2	0.2
CYANIDE	mg/l	BDL	BDL	BDL	BDL	BDL	0.2	2	0.2
LEAD	mg/l	1.16375	1.22045	BDL	0.05	0.61	0.1	1	-
MERCURY	PPb	0.10655	1.37425	2.32	BDL	0.95	0.01	0.01	-
CADMIUM	mg/l	BDL	BDL	BDL	BDL	BDL	2	1	-
NICKEL	mg/l	0.67985	0.85755	0.22	4.87	1.66	3	3	-
TOTAL COLIFORM	cfu/ml	ABSENT	58*10^3	[72*10]^4	-	19.45*10^4			
E-COLI	cfu/ml	ABSENT	PRESENT	PRESENT	-	PRESENT			
TSS	mg/l	334.5	127	151.67	1641.33	563.63	100	600	200
TKN	mg/l	551	764	224.00	3249.33	1197.08	100	-	-

Annexure-III

PHOTOGRAPHS

Photo-1: 9 Trommels having capacity of 2700 TPD (with screen size 30 mm)

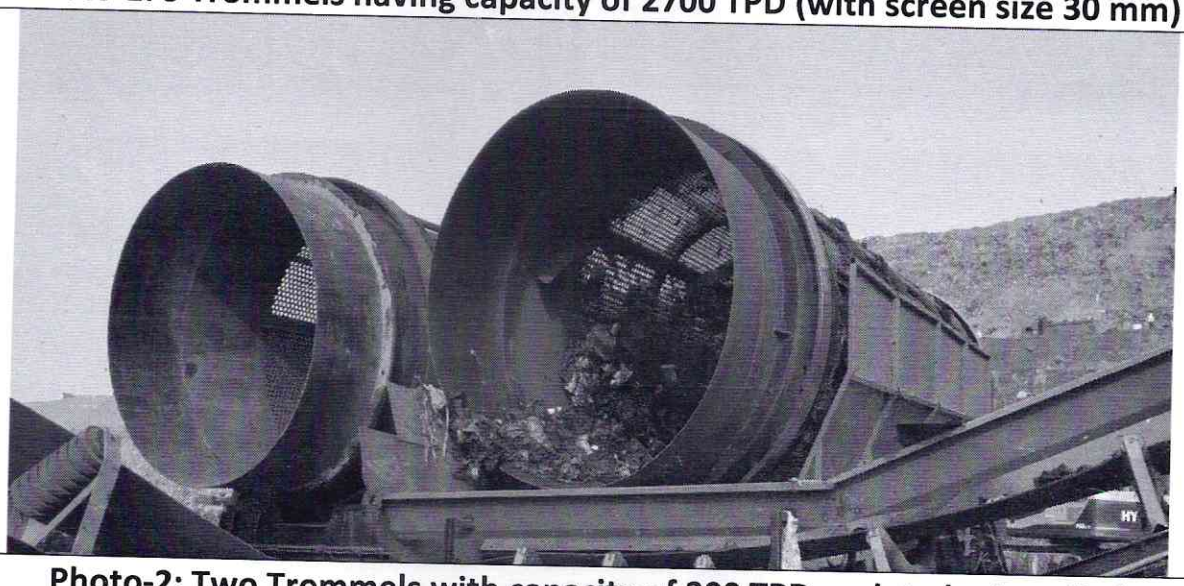

Photo-2: Two Trommels with capacity of 300 TPD each to be installed

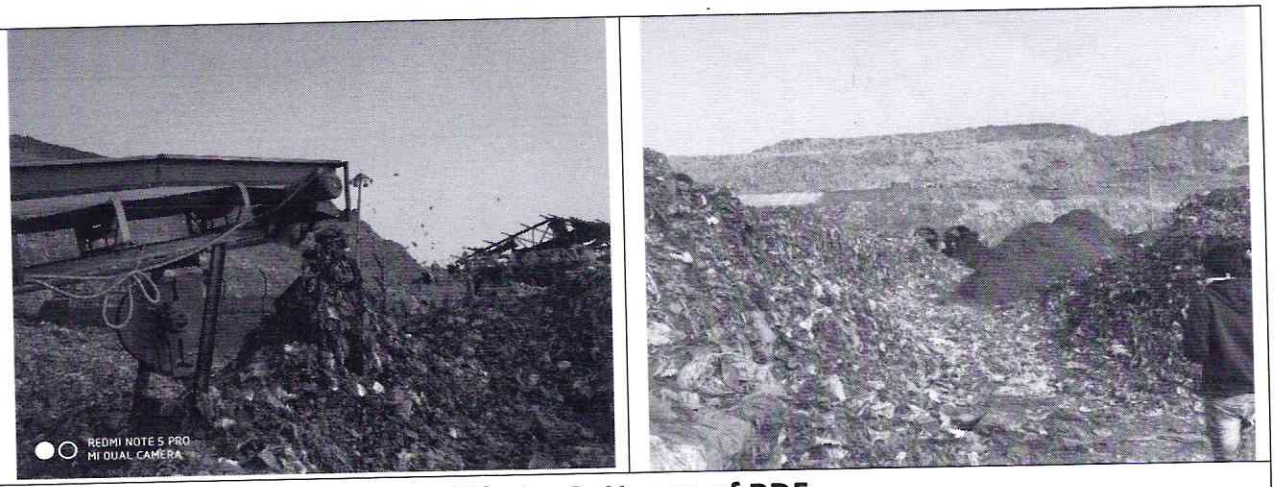

Photo-3: Heaps of RDF

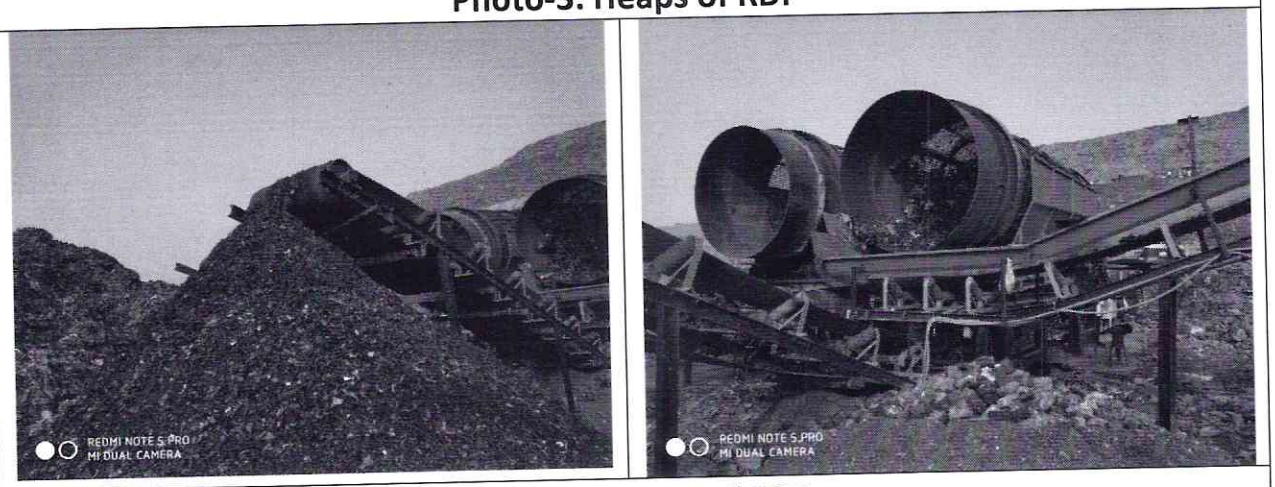

Photo-4: Inert and C&D

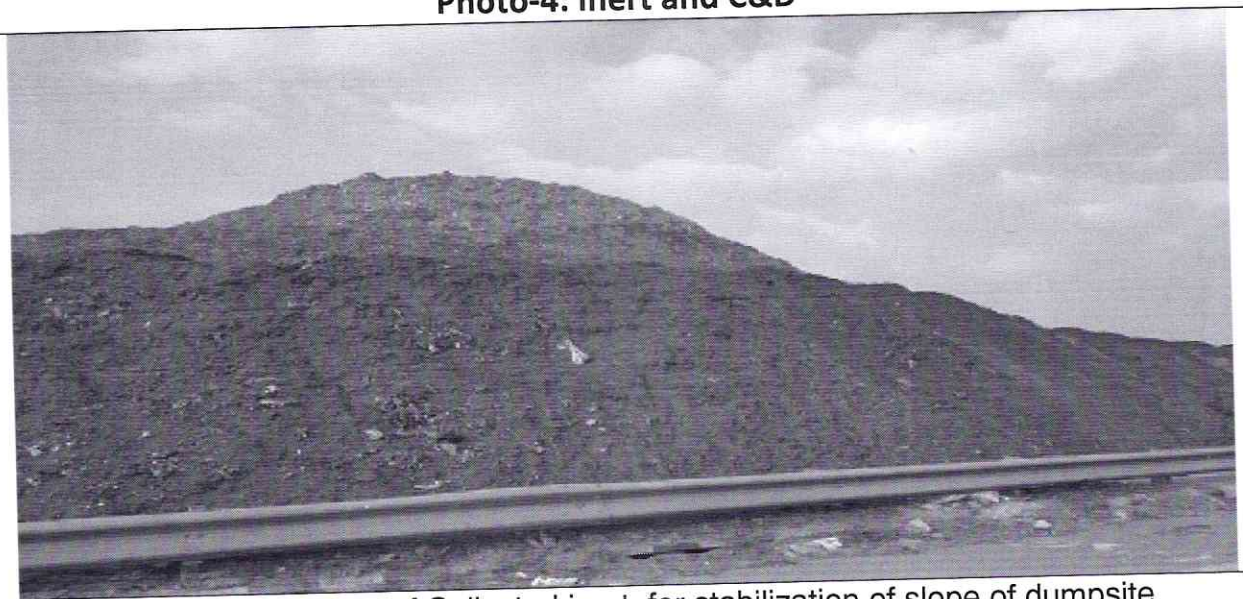

Photo-5: Utilization of Collected inert for stabilization of slope of dumpsite

Photo-6: Dumping of fresh waste at adjoining 6.2 acres (approx.) land

Annexure-IV

Empanelment of contractors for removal of RDF recovered from biomining process at Bhalswa dump site in Delhi

North Delhi Municipal Corporation

स्वच्छ भारत
एक कदम स्वच्छता की ओर

NIT No.: EE (Sp.Pr.)RZ/TC/2019-20/08

Dated: 03.01.2020

Notice Inviting Tender

North Delhi Municipal Corporation invites responses from eligible bidders for **"Empanelment of contractors for removal of RDF recovered from biomining process at Bhalswa dump site in Delhi".**

Last date of Registration with IT Department of North DMC	09.01.2020 upto 15:00 hours
Last date for downloading of tender document	09.01.2020 upto 17:00 hours
Pre Bid Meeting	07.01.2020 at 15:00 hours
Submission of Technical Bid	10.01.2020 at 15:00 hours
Opening of Technical Bid	10.01.2020 at 15:15 hours
Opening of Financial Bid	To be intimated separately
Bid Security	Rs. 1.00 lakh
Cost of Tender Document	Rs. 1,000/-
Time period after award of contract	12 Months
Bid Validity Period	06 Months

North DMC intends to follow a single stage two bid system for selection of a Bidder. The tender document can be purchased/ downloaded through website www.tenderwizard.com/NORTHDMCETENDER. If any date specified hereinabove happens to be a holiday, then next working day will be considered for that activity and time will remain same. Corrigendum or any other information, if any would appear only on the website i.e. www.mcdonline.gov.in & www.tenderwizard.com/NORTHDMCETENDER.

Executive Engineer
Special Project/Rohini Zone

Annexure-V

NORTH DELHI MUNICIPAL CORPORATION
OFFICE OF THE EXECUTIVE ENGINEER(SPECIAL PROJECT)ROHINI ZONE
3RD FLOOR, SUB-ZONAL OFFICE BUILDING
SECTOR-17, ROHINI, DELHI-110085
Tel No:011-27570699

No. D/EE(SpPr)/AE/RZ/2019-20/ 297

Dated: 14/01/20

Dr V. K.VERMA
Jt. Director
Shriram Institute For Industrial Research
19, University Road, Delhi-110007

Subject: Study/Analysis of Biomining Waste
Ref : Your Offer Dated: 06.01.2020

Dear Sir,

In reference to your offer vide letter dated: 06.01.2020 for sampling and Study/Analysis of Biomining Waste, please find enclosed herewith Demand Draft/ pay order for Rs 59,000/-(Draft No. 002968 Dated: 14/01/20).

Please acknowledge the receipt of the same.

Encl: As above

Asstt. Engineer

Copy to

1. EE(SpPr)RZ
2. Office Copy

Asstt. Engineer

ANNEXURE - E

Item No. 11 & 12 Court No. 1

BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI

Original Application No. 519/2019
With
Original Application No. 386/2019

(With Report dated 13.11.2019)

News item published in "The Times of India" Authored by Jasjeev Gandhiok & Paras Singh Titled "Below mountains of trash lie poison lakes"

With

Centre for Wildlife and Environment Litigation Applicant(s)

Versus

Union of India & Ors. Respondent(s)

Date of hearing: 19.11.2019

CORAM: **HON'BLE MR. JUSTICE ADARSH KUMAR GOEL, CHAIRPERSON**
HON'BLE MR. JUSTICE S.P WANGDI, JUDICIAL MEMBER
HON'BLE MR. JUSTICE K. RAMAKRISHNAN, JUDICIAL MEMBER
HON'BLE DR. NAGIN NANDA, EXPERT MEMBER
HON'BLE MR. SAIBAL DASGUPTA, EXPERT MEMBER

For Respondent(s): Mr. Vijay Dev, Chief Secretary, Delhi with Ms. Jyoti Mendiratta, Advocate
Ms. Geeta Luthra, Sr. Advocate, Mr. Balendu Shekhr, Advocate for EDMC
Mr. Rajkumar, Advocate for CPCB
Mr. Sanjay Poddar, Sr. Advocate with Ms. Puja Kalra, Advocate for SDMC with Commissioner, SDMC
Ms. Puja Kalra, Advocate with Ms. Varsha Joshi, Commissioner, NDMC

ORDER

1. This order may be read in continuation of order dated 17.07.2019. The issue for consideration is the disposal of 'legacy' waste dumped at Bhalswa, Ghazipur and Okhla dumpsites in Delhi where huge

73

garbage has accumulated over the period of time adversely impacting public health and environment, which requires expeditious scientific and environmentally safe disposal as per applicable rules.

2. We may note the earlier proceedings in the matter. O.A. No. 519/2019 was taken up in view of a news item published in "The Times of India" authored by Mr. Jasjeev Gandhiok & Paras Singh and titled "Below Mountains of Trash lies Poison Lakes" reporting that the said dumpsites were resulting in huge water contamination. The same were not being scientifically managed. The leachate was getting discharged into soil and also slipping to the River Yamuna, affecting its water quality. Accumulation of huge waste at the said sites posed a serious danger to the environment, life and public health in the area. The Solid Waste Management Rules, 2016 (SWM Rules) lay down statutory mandate for the manner of disposal of such old dumpsites but the same was not being done. Vide order dated 30.05.2019, this Tribunal directed North, East and South Delhi Municipal Corporations to furnish their respective action taken reports. The Commissioners of the said Municipal Corporations were required to remain present in person.

3. The matter was thereafter taken up on 17.07.2019 and it was observed:

> *"4. Accordingly, the Commissioners of the said Corporations are present in person. Mr. Vijay Kumar Dev, Chief Secretary, Delhi, Mr. Vinod Babu, Officiating Member Secretary of Central Pollution Control Board (CPCB) are also present. We have heard them and the learned counsel present at length.*
>
> *5. The action taken report of the North Delhi Municipal Corporation (North MCD) is that detailed project report (DPR) has been prepared on 08.03.2019 which has three options. One of the options is "leaving the site as it is", which is completely out of question. Second option,*

74

bio-mining for 8.8 million cubic meter waste which is said to require a period of 15 years and cost of Rs. 1178 crores. The third option is of capping. Clause-J of Schedule-I of the SWM Rules provides for reduction of waste by bio-mining and waste processing followed by placement of residues in new landfills or capping with appropriate measures. According to the Commissioner of North MCD, closure and capping of the dumpsites, without bio-mining/bio-remediation is a better option to save money and to protect environment. The report relies upon a review of the DPR by a professor from the IIT, Delhi with regard to Bhalswa landfill.

6. *According to the report dated 09.07.2017 of East Delhi Municipal Corporation (EDMC), it is stated that there was a proposal to utilize the inert material as filling material in the widening of national highways. Some of the dumpsite gas has been extracted and flared in association with GAIL. A pilot project was conducted for bioremediation of 100 TPD for both fresh and legacy waste. Experts were consulted in regard to slope stabilization and treatment of leachate. EDMC has started decentralized waste management processes with the help of urban development fund from the Govt. of India to the tune of Rs. 70 Crores.*

7. *The Counsel appearing for South Delhi Municipal Corporation (SDMC) has handed over, during the hearing, their copy of action taken report. According to the action taken report furnished by the SDMC, it consulted experts and executed some work of sterilizing the legacy waste at Okhla Phase-I.*

8. *In O.A. No. 386/2019, the grievance raised was that unscientific capping process of the Bhalswa legacy waste dumpsites was against the SWM Rules and not conducive to the environment. This Tribunal, vide order dated 04.04.2019, sought opinion from a Committee comprising CPCB and Dr. G.K. Pandey, former Expert Member of this Tribunal, who is known to have expertise in the subject. Report dated 31.05.2019 has been submitted by the said Committee after visit to the Bhalswa site, visit to Bawana Waste Processing Plant and meeting with the North Delhi MC officers. Presentation was made before the said Committee by concerned officers of the North MCD as well as experts hired by the said Corporation. Some of the observations of the said Committee are as follows:*

> *"3.5 The Cost indicated in the DPR for bioremediation is Rs.1178 Crores. However, as per CPCB Guidelines for Disposal of Legacy Waste, the cost of bioremediation and bio-mining of dumpsite is in the range of Rs.400- 700/Cum which works out in the range of Rs.440 - 560*

75

Crore. The actual cost shall be further reduced, if cost of land recovered by means of bio-mining/ bioremediation is factored in. Hence the cost indicated by NDMC seems to be very much on the higher side. Similarly, the other issues raised by NDMC need detailed assessment.

3.6 *As per CPCB Guidelines, capping of dumpsites is not advisable as it would lead to generation of more leachates and methane/landfill gas generation which would further contaminate the already heavily contaminated Groundwater (Ground/surface water reports at Annexure VIII to X). Further as per CPCB Guidelines, gas extraction is very difficult and inefficient when attempts are made to insert suction pipes into dumped waste instead of before dumping begins. Poor success at Gorai capping led to the forced refund by Mumbai city of Rs.15 crore advance carbon credits. Taking into consideration the present height (65 m) of the landfill, extraction of leachate & gas will be even more difficult. 3.7 In addition, in the present tender documents, there is no provision for onsite treatment of leachates and utilization of gas generated as also decontamination of ground water/bio-remediation have not been envisaged in spite of the fact that ground and surface water are heavily polluted as reflected by analysis of ground water and surface water reports given in the DPR. The details of analysis reports are given below:*

(a) *Table-I (Annexure-VIII) pertains to ground water sampling report of hand pumps which has indicated that average levels of BOD (2.4 mg/1), COD (28.0 mg/1), TDS (2783 mg/1) are more than the prescribed acceptable limit of zero for BOD, zero for COD and 500 mg/1 for TDS. Besides, the average high level of Residual Free Chlorine of208.7 mg/1 (limit 0.2mg/l), Chlorides 769.7 mg/1 (limit 250 mg/1), Sulphate 228.2 mg/1 (limit 200mg/l), Alkalinity 508.7 mg/1 (limit 200 mg/1), Lead 0.2 mg/1 (limit 0.01 mg/1) and Nickel 0.1 mg/1 (limit 0.02mg/l) indicates that drinking water from the hand pumps has been significantly polluted and is not drinkable.*

(b) *Table-2 (Annexure-IX) reflects ground water analysis report pertaining to 18*

boreholes. The average levels of BOD (93.11 mg/1), COD (783.72 mg/1) and TDS (6841.83 mg/1) were found more as against the acceptable limit of zero for BOD, zero for COD and 500 mg/1 for TDS indicating that ground water has been significantly. contaminated due to percolation of leachates from the landfill.

(c) *Table-3 (Annexure-X) pertains to analysis of surface water taken from Bhalsawa drain and Bhalsawa lake. The analysis report indicates that the average levels of BOD (68.40 mg/1), COD (547.51 mg/l) and TDS (4465.23 mg/l) were found higher as against the permissible limit for drinking water for BOD (0), COD (0) and TDS (500 mg/I) respectively indicating that surface water is significantly polluted due to discharge of untreated leachates. Besides, the average levels of residual free chlorine (179.60 mg/1, limit 0.2 mg/1), Iron (0.53 mg/1, limit 0.3), Chlorides (13119.04 mg/1, limit 250), Calcium (188.99 mg/1, limit 75), Alkalinity (1285.96 mg/1, limit 200), phenolic compound (0.07 mg/1, limit 0.001), Lead (0.15 mg/1, limit 0.01), Mercury (3.75 mg/1, limit 0.001) and Nickel (0.15 mg/1, limit 0.02) were found high indicating that surface water is very polluted and Bhalswa lake is not meeting the criteria for drinking water as toxic elements like phenolic compounds including heavy metals are present in the lake water. It is quite possible that the animals (buffalos, cows etc.) may be drinking lake water and as such the possibility of toxic chemicals and heavy metals entering the food chain cannot be over ruled. Therefore, lake water should not be used for drinking purposes by the human beings and the animals.*

(d) *Table-4(Annexure-XI) leachate emanating from the BLF indicates that BOD (500 mg/1), COD (2279 mg/1) & TDS (19000 mg/1) levels are higher in comparison to leachate standards of BOD (30 mg/1), COD (250 mg/1) & TDS (2100 mg/1) as prescribed in SWM Rules,2016.*

3.8 *There are various technologies available for treatment of MSW such as composting,*

biomethanation, incineration coupled with power generation, gasification, pyrolysis, plasma arc gasification, molten salt oxidation (non-flame thermal process for destroying organic materials) etc.

4.0 Recommendations

i. *NDMC should do a detailed assessment of the alternative technological options including Biomining / Bio-remediation for Bhalswa dumpsite.*
ii. *Niti Aayog has constituted a Committee to identify the technologies in Solid Waste Management for Cleaning up of Delhi (Annexure XII). NDMC may consider the outcome of this committee's report in assessing options for Remediation of Bhalswa dumpsite.*
iii. *In case, capping of Bhalswa Dumpsite (which is not advisable as per CPCB Guidelines as mentioned at point 3.6 above) is proposed as the only option due to time and space constraints as also technoeconomic reasons, the DPR should be revisited especially to look into the following conditions:*

   (a) *Bio-mining should be undertaken to the maximum extent possible without having significant adverse environmental impacts on the adjoining population.*
   (b) *Bio-remediation/decontamination of surface, ground water and soil should also be undertaken in the affected areas.*
   (c) *No dumping of MSW/Garbage (about 2000 tons/day) shall be done at Bhalswa dumpsite and alternate arrangements for disposal of this waste to be made by NDMC on priority in accordance with S WM Rules, 2016."*

9. We may note that as per information furnished during the hearing, the extent of legacy waste and the land covered by the three dump sites are as follow:

i.	***East Delhi***	***Ghazipur dumpsite- 1.4 crore metric tonne approx. on 70 acres of land.***
ii.	***North Delhi***	***Bhalswa dumpsite - 80 lakh metric tonne approx. on 36 acres of land***
iii.	***South Delhi***	***Okhla dumpsite – 55-60 lakh metric tonne approx. on 46 acres of land.***

10. *Information made available from Indore Municipal Corporation is as follows:*

> *" For screening purposes, trommels of 30 MT per hour capacities, are available in the market on rental basis. Necessary vehicles and equipments (like escavators, backhoe loaders, dumpers, vibratory screens for dust removals and bundling machines for Refused Derived Fuel) are required for bio-mining and bio-remediation purposes. Normally, 20 trommels along with necessary machines and tools can process 5000 MT of legacy waste on daily basis in two shifts operation. Recently, Indore has successfully completed bio-mining/bio-remediation of 15 lakh MT legacy waste in 1 year. Rent for trommels paid by Indore to various machine manufacturers were in tune of Rs. 7.25 Lakh per trommel per month and bio-mining/bioremediation process was followed as mentioned in the latest guidelines issued by the CPCB. Normally, the per metric tonn cost of bio-remediation process of legacy waste will range between Rs. 300- 450 depending upon area to area.*
>
> *In legacy waste sites where local bodies have space constraints can initially start the bio-mining/ bioremediation options through mobile trommels.*
>
> *Similarly, Ahmedabad Municipal Corporation has started the bio-mining/bio-remediation at Pirana dumping site and they are paying Rs. 6.40 Lakh per trommel per month.*
>
> *The trommel machines are very simple in fabrication and can be fabricated as per the design mentioned in CPCB guidelines by local fabricators.*
>
> *Instead of having multiple machines, it is advisable to have a single trommel of 16-20 MM bore size screen and reject conveyer should have blower. This will reduce the cost due to multiple trommeling. Also, to utilise the Refused Derived Fuel ('RDF') recovered from this process should be made free from dust. Thereafter RDF can be bundled and sent to waste-to-energy plant and cement industries for further utilisation.*
> *The recovered soil from the bio-mining/bio-remediation process can be used in filing the dead mines so as afforestation in the area*

there is need to increase the capacity suitably so that the garbage is cleared and land becomes available for a public purpose.

7. Since we are informed that at Bhalswa, capacity will be shortly increased to 3300 TPD. The capacity at Okhla and Ghazipur dumpsites also needs to be enhanced, the capacity for bio-mining may be further enhanced, at all the three sites. An action plan be prepared and implemented so as to clear the legacy waste in an expedited timeline but within one year as earlier directed. It needs to be ensured bio-remediation is carried out rather than mere mechanical separation. The CPCB may verify that waste clearance is as per norms and give a report. The implementation of action plan be monitored by the Chief Secretary, Delhi. The Chief Secretary, NCT Delhi may undertake monthly monitoring of the progress and take action if there is default in terms of speed of progress. Failure to comply may result in coercive action, including stoppage of salaries and entries in ACRs of the concerned erring officers.

8. The administrative difficulties need to be resolved at the administrative level by coordination with the concerned authorities. The urgency in the matter is also with a view to prevent air pollution and adverse health impact.

The status as on 15.01.2020 may be placed on record by 20.01.2020.

A copy of this order be sent to the CPCB by email.

List for further consideration on 05.02.2020.

Adarsh Kumar Goel, CP

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S.P Wangdi, JM

K. Ramakrishnan, JM

Dr. Nagin Nanda, EM

Saibal Dasgupta, EM

November 19, 2019
Original Application No. 519/2019
With Original Application No. 386/2019
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85