- Selection of plant species will be done carefully such that they are of fast growing variety, perennial and evergreen with thick canopy cover, large Leaf Area Index (LAI) and a high Pollution Attenuation Factor (PAF) for effective dry deposition of particles and fibers.
- Since the tree trunks are normally devoid of foliage (up to 3.0 m), it would be appropriate to have shrubs in front of such trees to give coverage to such portions.
- Selection of appropriate plant species will be done carefully keeping in mind the following:
    - It ensures a diverse and robust plantation
    - Species that are native to the area will be given preference.
    - Species which have pollutant absorbent potential will be given priority, i.e. trees with high foliage density, leaves with larger leaf area and hairy on both the surfaces.
    - Soil improving plants (Nitrogen fixing, rapidly decomposable leaf litter, etc.).
    - Attractive appearance with good flowering and fruit bearing.
    - Bird and insect attracting tree species.
    - Sustainable green cover with minimal maintenance

8.7.1 Source of Saplings and Plantation Requirements

The desired saplings for plantation will be obtained from the nearest Forest Department Nursery. Necessary steps to be taken for better results are as follows:

- Three to four month old seedlings will be planted for plantation
- Regular weeding, clearing and hawing of seedlings and application of oil cakes will be carried out to boost up the growth.

Spacing and Pit Size: The spacing and pit size would be varying according to the choice of species and compatibility of various species to grow together in a niche. Plant species with small spread could be planted at a distance of 2.5m x 2.5m apart, while tall varieties with spread could be planted at a spacing of 3m x 3m. The pit size would be 30cm x 30cm x 30cm for cylindrical whereas for the broadleaf species the size of 45cm x 45cm x 45cm need to be adopted. Approximately 1600 saplings will be planted per hectare of land.

Area of Greenbelt: Approx 20.% of the LANDFILL area will be utilized for greenbelt and landscaping program. Greenbelt will be developed along the slope of the embankment (8.0m width), 20m safety zone along the railway side,

Pit Preparation: Adequate quantity of soil and manure mixture at the rate of 4:1 is necessary for each pit. The soil mixture is to be filled in each pit and watered well to form a puddle before the actual transplantation

8.7.2 Green Belt Development Plan

For the purpose of pollution attenuation, the green belt shall be developed in three tiers as stated below:

First Tier – Consists of shrub species having good levels of air pollution tolerance limits which is referred to as Tolerance zone.

- *Broken or interrupted:* Trees shall be planted in between the shrub species at regular intervals in the first tier. The branching pattern and canopy formation of these species is not uniform (e.g. Palm varieties).
- *Drooping canopy:* Trees shall be planted in between the shrubs in the first tier .The branches and leaves of these species droop downwards e.g. *Polyalthia longifloia*.

Second Tier - consists of trees having fast growth potential with conical canopy identified as Dispersion Zone.

- *Rotund type:* The shape of the crown is more or less rounded; branches and leaves are closely arranged e.g. *Ficus* sp. These tree species are suitable for the second and third tiers.
- *Flat topped canopy:* The branches of the crown are uniformly shaped flat-topped crown and the spread of the crown is wide to cover a large area e.g. *Cassia fistula*. These tree species are suitable for the second and third tiers.

Third Tier - Trees having hairy leaves with thick and round canopy referred to as the Absorption Zone.

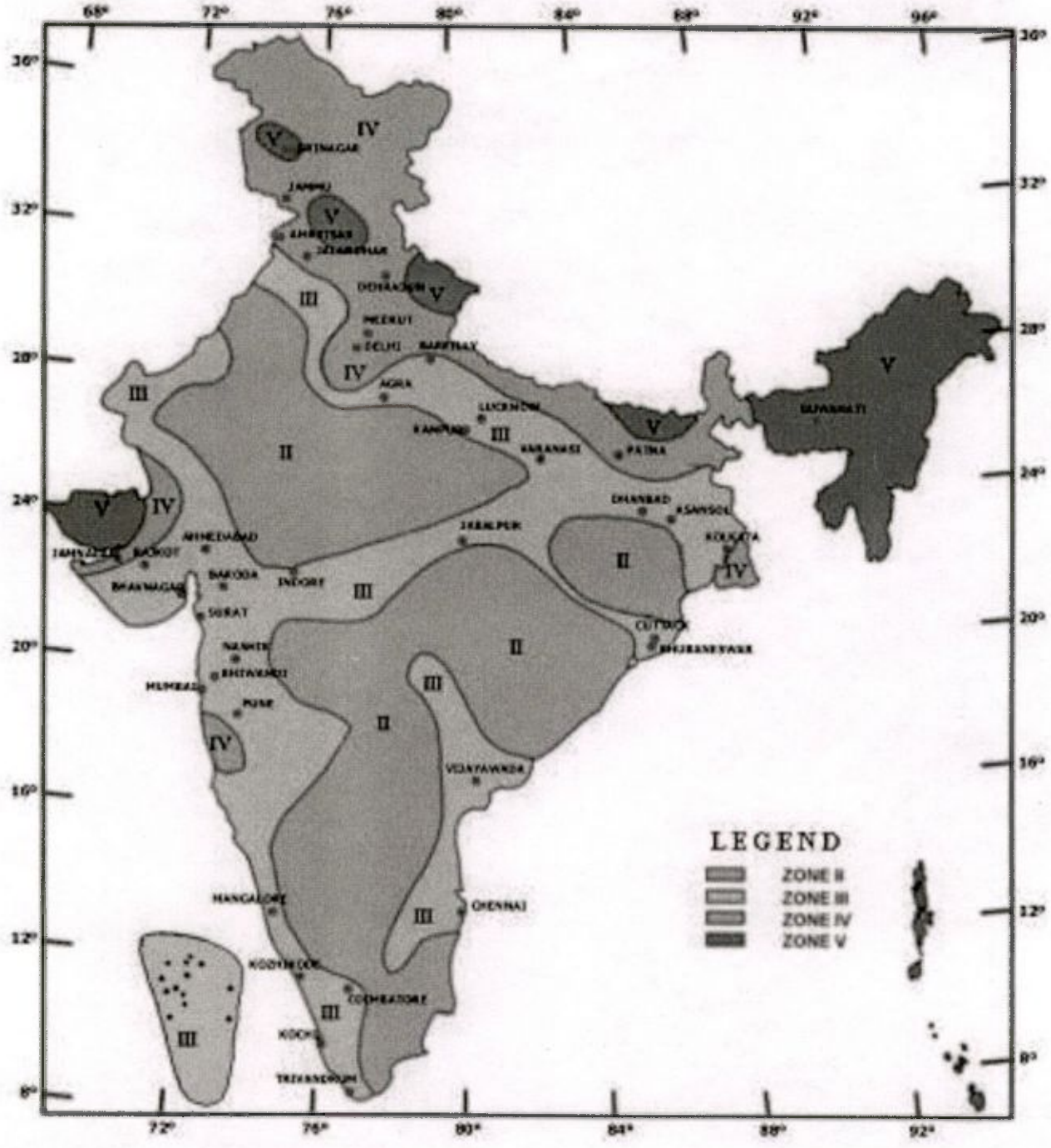
- *Cylindrical type:* The branches and leaves form a close network and give the longitudinal spread eg. *Dalbergia* sp. These tree species are appropriate in between the trees in the third tier.
- *Chimney type:* The branches give the appearance of long chimney. These tree species are apt for the outer rows of the third tier.
- *Conical type:* The growth of main stem and horizontal branches appear in the form of a cone. eg. *Casuarina* sp. These tree species are suitable in the peripheral rows of the third tier.

Table 8-2: Suitable Plant Species for Plantation

Sl. No.	Scientific Name	Common Name	Species Composition
A.	Trees		
	Aegle marmelos	Bel	10%
	Ailanthus excelsa	Mahaneem	8%
	Albizzia lebbek	Siris	5%
	Alstonia scholaris	Chatim	7%
	Azadirachta indica	Neem	10%
	Lagerstroemia flos-reginae	Jarul	5%
	Mimusops elengi	Bakul	7%
	Polyalthia longifolia	Debdaru	6%
	Cassia fistula	Amaltas	10%
	Mangifera indica	Aam	12%
	Artocarpus heterophylla	Kathal	10%
	Anthocephalus cadamba	Kadamba	5%

	Delonix regia	Gulmohar	5%
B.	Shrubs & Climbers		
	Adhatoda vasica	Bask	15%
	Bougainvillea spectabilis	Bougainvilla	15%
	Murraya paniculata	Kamini	10%
	Nerium indicum	Karabi	10%
	Vitex negundo	Nisinda	15%
	Thevetia peruviana	Kolke	10%
	Nyctanthes arbortristic	Siuli	15%
	Lawsonia inermis	Mehendi	10%

Figure 8-2: Seismic Zone Map Of India



Source: BIS; IS 1893 (Part 1); 2002

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NOTE SHEET

SUDA

2018
STATE URBAN DEVELOPMENT AGENCY
NOTE SHEET
File No. 142/2016

Sub: Request for release of balance fund for SWM Project of Kolkata MC under Mission Nirmal Bangla (U)

The PS to the Hon'ble MIC, UD & MA Department vide no. 2778/PS/2017 dated 08.12.2017 (placed at **CP-1 to 10**) forwarded the letter and enclosures of the Hon'ble Mayor, Kolkata Municipal Corporation to the Secretary UD & MA Department as per direction of the Hon'ble MIC, UD & MA Department with the request to take necessary action.

The Hon'ble Mayor informed that out of total project cost of 152.83 Crore of Integrated Solid Waste Management Project of Kolkata Municipal Corporation under Mission Nirmal Bangla (Urban), 10% of the project cost i.e. Rs. 15,28,00,000/- has been released to KMC. Accordingly, KMC went for tender procedure as per the direction of Director, SUDA dated 13.02.2017 and for this the fund has already been booked for procurement of Movable Compactors (14 CuM). At present KMC is not in a position to award the work orders for procurement of rest of the machines under SWM project due to non availability of fund.

He has requested the Hon'ble MIC to allot further fund to expedite the SWM project.

As per direction of the Secretary, UD & MA Department, the current status of the project is placed in the file at **CP-11 to 15**.

In this connection, it is to be mentioned that, in 1st installment Government of India has released Rs. 26.745 Crore and its State Share is Rs. 42.028 Crore. Hence in 1st Installment SUDA has received total Rs. 68.773 Crore for the SWM project of KMC.

Out of Rs. 68.773 Crore received in 1st Installment, Rs. 15.28 Crore has already been released to KMC.

Now, Rs. 53.493 Crore is still remaining in the hand of SUDA.

Hence, it is being proposed that the remaining **Rs. 53.493 Crore** may be released to KMC.

Placed for kind approval.

21.2.18

(Sujay Mitra)
Chief Manager-Planning & Monitoring

Additional Director, SUDA &
Additional State Mission Director, MNB (U)

Above detailed fund may be released in favour of Kolkata Municipal Corporation.

"X" above may be considered for approval.

23/2/18

Director, SUDA

21/2/2018

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NOTE SHEET

SUDA

"X" prepage may be considered for approval.

[signature] 23/2/18

Secretary UDMA Deptt.

U.O. No. SUDA: 124/18

Dated 23-02-18

Pt. 142/2016

May be approved.

[signature] 23-02.2018

Urban Development Deptt.

U/O No. 399

Dt. 26.2.18

HMK MA&UD

[signature] 26/2/18

Dir/SUDA

B.N. KOG

[signature] 27/2/18

CHPM — pl. note [signature] 28.2.18

F.O., SUDA pl. release the fund immediately.

[signature] 27/2/2018

সুডা **NOTE SHEET** SUDA

As per notes and orders at NSP-1 and prepage

As approved at prepage, to release the fund under Swachh Bharat Mission (SBM) in favour of Kolkata Municipal Corporation as detailed at NSP-1 and prepage, a Transfer Advice amounting to Rs.53,49,30,000/- (Rupees Fifty Three Crore Forty Nine Lakh Thirty Thousand) only is prepared and placed herewith for signature of Finance Officer, SUDA and Director, SUDA please for onward transmission to Axis Bank Ltd., Salt Lake Sec-II branch for electronic transfer of funds.

Finance Officer

Director

28-02-18

Signed.
28/2/18

28/2/18

FO.

FO, SUDA

Memorandum put up for signature.
06.03.2018.

Signed.
06.03.18

Tanmay Saha
2/3

06.3.18

Action taken on 07.03.2018.

07.03.18.

সুডা

রাজ্য নগর উন্নয়ন সংস্থা

SUDA

STATE URBAN DEVELOPMENT AGENCY

"ইলগাস ভবন", এইচ-সি ব্লক, সেক্টর-৩, বিধাননগর, কলকাতা-৭০০ ১০৬, পশ্চিমবঙ্গ

"ILGUS BHAVAN", H-C Block, Sector - III, Bidhannagar, Kolkata - 700 106, West Bengal

ক্রমিক নং SUDA-142/2016/6321 তারিখ 06.09.2019

To
The Special Secretary,
UD&MA Department,
Government of West Bengal
Nagarayan, Bidhannagar

Sub: Physical Progress report in respect of G.O. No. 395(Sanction)/UDMA-13014(13)/ 24/2018-BDG-MA dated 17.12.2018 for SWM Project of Kolkata MC .

Madam,

In response to your letter vide no. 833/MA/P/C-10/1G-18/2017 dated 04.09.2019, please find enclosed the physical progress report alongwith UC of the fund allotted vide G.O. No. 395(Sanction)/UDMA-13014(13)/24/2018-BDG-MA dated 17.12.2018 for your kind perusal.

Yours faithfully

6.9.19.

(Additional Director)

দূরভাষ : ২৩৫৮ ৬৪০৩ / ৫৭৬৭, ফ্যাক্স : ২৩৫৮ ৫৮০০

Tel : 2358 6403/5767, Fax : 2358 5800, E-mail : wbsudadir@gmail.com

Account Section : 2358 6408

Government of West Bengal
Department of Urban Development & Municipal Affairs
Nagarayan, Block-DF-8, Sector-I,
Salt Lake, Kolkata-700 064

No: 833/MA/P/C-10/1G-18/2017 Dated Kolkata the 4th September,2019.

From:
Special Secretary to the
Govt. of West Bengal

To
The Director,
SUDA

Sub:- Submission of physical progress report in respect of scheme as mentioned in the G.O. annexed.

Madam,

With reference to the above, I am directed to request you to send physical progress report and further requirement of fund in respect of the scheme as mentioned in the copy for further action from this end at the earliest.

With thanks,

Enclo: As stated.

Yours faithfully,

Special Secretary

No: 833/1/2 /MA/P/C-10/1G-18/2017 Dated Kolkata the 4th September,2019

Copy to:

1) Sri Santanu Mukherjee, Joint Secretary and Additional Director, SUDA.
2) D.G, Solid Waste Management (SWM), K.M.C.

Special Secretary.

File No.-MA/P/C-10/16-18/2017

GOVERNMENT OF WEST BENGAL

Tel:

Fax:

Memo No: 395(Sanction)/UDMA-13014(13)/24/2018-BDG-MA

Date: 17/12/2018

Sanction Order for Grant-in-Aid

Demand No: 72 Department Code: UM Financial Year: 2018 - 2019

1 Sanctioning Authority: Urban Development and Municipal Affairs

2 Name of the Grantee Institution: State Urban Development Agency

3 Address of the Grantee Institution: ILGUS Bhavan, Block-HC, Sector-III, Salt Lake, Kolkata - 700 106

4 Category of Grantee Institution: Others

5 Amount Sanctioned: 200564000 (in words Rs. Twenty Crore Five Lakh Sixty Four Thousand Only.)

6 Name of the DDO: DIRECTOR, SUDA

7 Department Code: UM-Urban Development and Municipal Affairs

8 Name of the Treasury/PAO: Pay & Accounts Officer-III, PAO-III

9 Nature of Grant (a) Recurring or Non-recurring: Non-Recurring

(b) Capital or Revenue: Revenue

10 Condition of Grant: Utilisation Certificate required: Yes

11 Category of Grant: Others

12 Purpose of Grant: Implementation of Swachh Bharat Mission (Urban) Programme within Kolkata Municipal Corporation

13 An amount of Rs 200564000 is hereby allotted for this period in favour of the DIRECTOR, SUDA From the head of account 2215-02-789-00-003-35-00-V from the budget provision of the financial year 2018 - 2019 under Demand No 72 Department Code UM and payable to Grantee Institution or by A/c payee cheque/By-Transfer Credit / ECS.

14 Head of Account Code: 2215-02-789-00-003-35-00-V

15 Name of the Scheme: Swachh Bharat Mission (Urban)(State Share)(OCASPS)-35-Grants for creation of Capital Assets.

16 The amount will be drawn in T.R. from No.31

17 The sanctioned amount will be payable to State Urban Development Agency by Transfer Credit to the Head of Account of the LF/PL/Deposit Account of the Grantee Institution or by A/C payee Cheque / ECS as applicable

18 Remarks: The fund is hereby released in favour of SUDA in respect of re-allotment of surrender of fund under Swachh Bharat Mission (Urban) [State Share] during 2018-19 as per statement enclosed with the concurrence of Finance (Group-R) Department U.O. No. Group R/2018-2019/0169 dated 13.12.2018. Director, SUDA will draw the same in appropriate Form for subsequent transfer to Kolkata Municipal Corporation.

19. Total released amount is within the Budget Provision of the above mentioned head of account during 2018 - 2019

20. This order issues in exercise of the power delegated under Finance Department Memo. No. 1872-F B dated-26.03.2018, 1259-F B dated-29.11.2018 & 1260-F B dated-29.11.2018with the concurrence of Finance Deptt. vide Gr. N U.O. No. 2227 Date 13/12/2018

Special Secretary
UD & MA Deptt.
Municipal Affairs Branch
Government of West Bengal

NO:- SWM-II/11/2019-20 dt 06/6/19

FORM GFR-19A

(See Government of India's Decision (1) below Rule 212)

FORM OF UTILISATION CERTIFICATE

Sl. No.	Letter No. and date	Amount (in Rs.)
01.	i) Fund allotted vide letter no. SUDA-50/2016(pt-III)/50/2016/539 dated 03.08.2017, G.O. No. 710/MA/P/C-10/IG-18/2017 dated 26.07.2017	15,28,00,000/-
	ii) Utilization given as on 30.06.2018	(-) 4,61,30,700/-
	iii) Surrender of Fund vide bill no. 899/FA/2018-2019 dt. 01.11.18	(-) 5,78,10,000/-
	Balance Fund =	4,88,59,300/-
02	i) Fund allotted vide letter no. SUDA-142/2016/1597 dated 06.03.2018	53,49,30,000/-
	ii) Utilization given as on 30.06.2018	(-) 15,47,89,318/-
	iii) Surrender of Fund vide bill no. 900/FA/2018-2019 dt. 01.11.18	(-)14,23,58,206/-
	Balance Fund =	23,77,82,476/-
03	Fund allotted vide letter no. 395(Sanction)/UDMA-13014(13)/24/2018-BDG-MA dt. 17.12.2018	20,05,64,000/-
	Total available fund	**48,72,05,776/-**

Certified that out of Rs. 20,05,64,000/- of Grants-in-Aid sanctioned during the year 2018 – 19 towards Strengthening Primary and Secondary Solid Waste Management System in Kolkata City under this Ministry / Department letter no. given in the margin and Rs. 28,66,41,776/- on account of unspent balance of the previous year, a sum of **Rs. 4,44,05,771/-** (Annexure 'A') only has been utilized in respect of Sl. No. 01, a sum of **Rs. 15,76,43,639/-** (Annexure 'B')only has been utilized in respect of Sl. No. 02 and a sum of **Rs. 18,43,76,387/-** (Annexure 'C')only has been utilized in respect of Sl. No. 03 by SWM Department/KMC in Financial Year 2018-19 for the purpose for which it was sanctioned and that the balance of Rs. 44,53,529/- in respect of Sl. No. 01, Rs. 8,01,38,837/- in respect of Sl. No. 02 & Rs. 1,61,87,613/- in respect of Sl. No. 03 remain un-utilized in the hand at the end of March 2019.

Certified that I have satisfied myself that the conditions on which the grants-in-aid was sanctioned have been duly / are being fulfilled and that I have exercised the following check to see that the money was actually utilized for the purpose for which it was sanctioned.

Kinds of Checks exercised:

1. Measurement Book for Civil works
2. Inspection Report, Trial run & commissioning Certificate in respect of equipment / vehicles

Place: 48, Market Street Kol- 87

Signature:

Date: 17.04.19

Designation: D. G. (SWM- I & II) Kol. Mpl. Corporation

Enclosure: Annexure 'A', Annexure 'B' & Annexure 'C'

Ex-Engr. (II)/S.W.M.-I. K.M.C.

EX. ENGINEER (SWM-II) KOL. MPL. CORPN.

Dy. Chief Engineer (SWM-II) Kol. M.C.

Municipal Secretary Kolkata Municipal Corpn. 31/5/19

State Urban Development Agency Received 6355 07 JUN 2019 Contents Not Verified

Name of Project: Strengthening Primary and Secondary Solid Waste Management System in Kolkata City.
Project Cost: 152,83,00,000.00
Fund Released in FY 2018-19: 20,05,64,000.00 vide GO No: 395(Sanction)/UDMA-13014(13)/24/2018-BDG-MA dt. .12.2018
Fund Utilized in FY 2018-19: 18,43,76,387.00

Sl. No.	Name of Work	Amount of bill released (Rs.)	Bill No.
1	Procurement for 7 number Truck Chassis mounted rear end auto loading movable compactor with tip cart for Central Zone of Kolkata	15081217.00	698m/IFU/SWM/18-19
2	Procurement for 6 number Truck Chassis mounted rear end auto loading movable compactor with container along with supply of 85 number 4.5 cum capacity, 170 number 240 litre and 90 number 1100 litre movable compactor compatible containers for Northern Zone of Kolkata	9395447.00	635m/IFU/SWM/18-19
		3843310.00	1010m/IFU/SWM/18-19
		1869865.00	1011m/IFU/SWM/18-19
		490518.00	1009m/IFU/SWM/18-19
		1413364.00	1008m/IFU/SWM/18-19
		2077621.00	1096m/IFU/SWM/18-19
3	Procurement for 7 number Truck Chassis mounted rear end auto loading movable compactor with container along with supply of 90 number 4.5 cum capacity, 160 number 240 litre and 90 number 1100 litre movable compactor compatible containers for Central Zone of Kolkata	10961356.00	678m/IFU/SWM/18-19
		4483861.00	697m/IFU/SWM/18-19
		461664.00	1114m/IFU/SWM/18-19
4	Procurement for 64 nos. 10.5 cum stationary compactor containers and 14 nos. Prime Mover chassis mounted hook loader capable of lifting portable compactor of capacity 10.5 cum for Northern Zone of Kolkata	37556532.00	499m/IFU/SWM/18-19
		8666892.00	653m/IFU/SWM/18-19
		6799290.00	652m/IFU/SWM/18-19
		5439432.00	707m/IFU/SWM/18-19
		6799290.00	706m/IFU/SWM/18-19
		5777928.00	883m/IFU/SWM/18-19
		12711441.00	990m/IFU/SWM/18-19
		7615205.00	991m/IFU/SWM/18-19
5	Procurement for 22 nos. 10.5 cum stationary compactor containers and 4 nos. Prime Mover chassis mounted hook loader capable of lifting portable compactor of capacity 10.5 cum for Southern Zone of Kolkata	15911380.00	498m/IFU/SWM/18-19
		5439982.00	709m/IFU/SWM/18-19
		4339467.00	711m/IFU/SWM/18-19
		2175992.00	710m/IFU/SWM/18-19
		2025084.00	996m/IFU/SWM/18-19
6	CONSTRUCTION OF ONE MODERN SCIENTIFIC WASTE COMPACTOR STATION WITH SET OF TWO COMPACTORS FOR BROROUGH-X	2847931.00	2181/IFU/SWM/18-19
7	CONSTRUCTION OF ONE MODERN SCIENTIFIC WASTE COMPACTOR STATION FOR FOUR COMPACTORS FOR BOROUGH-IX	2793629.00	2182/IFU/SWM/18-19
8	CONSTRUCTION OF ONE MODERN SCIENTIFIC WASTE COMPACTOR STATION WITH SET OF TWO COMPACTORS FOR BOROUGH-XI	1745034.00	2183/IFU/SWM/18-19
9	CONSTRUCTION OF TWO NOS. MODERN SCIENTIFIC WASTE COMPACTOR STATION WITH SET OF ONE COMPACTOR FOR BOROUGH-X	1731025.00	2771/IFU/SWM/18-19
10	CONSTRUCTION OF ONE MODERN SCIENTIFIC WASTE COMPACTOR STATION FOR TWO COMPACTORS FOR BOROUGH-XIV	2775389.00	3318/IFU/SWM/18-19

16/04/19 AE(M)

16/4/19

16.04.19
Ex-Engr.(C)/S.W.M.I.
K.M.C.

17/4/19
EX. ENGINEER (SWM-II)
KOL. MPL. CORPN.

17/4/19
Dy. Chief Engineer (SWM-II)
Kol. M... Corpn.

11	Electrical works for modern scirntific waste compactor station at 48 Canal East Road, in Ward no. 29 under Br.-III.	468973.00	984m/IFU/SWM/18-19
12	Electrical works for Modern Scirntific waste compactor station at 227 Bagmari Road, in Ward no. 14 under Br.-III.	356181.00	2630/IFU/L&E/C/18-19
13	Electrical works for Modern Scirntific waste compactor station at11/3 Canal Circular Road, in Ward no. 14 under Br.-III.	322087.00	1876/C/IFU/L&E/2018-2019
	Total bill	184376387.00	

16/4/19

16/4/19

16.04.19

Ex-Engr.(C)/S.W.M.I.
K.M.C.

17/4/19

EX. ENGINEER (SWM-II)
KOL. MPL. CORPN.

17/4/19.

Dy. Chief Engineer (SWM-II)
Kol. ?

Khalil Ahmed, IAS
MUNICIPAL COMMISSIONER

KOLKATA MUNICIPAL CORPORATION
5, S. N. BANERJEE ROAD • KOLKATA – 700 013
Phone 2286 1234 Fax 2286 1434/1334

Con/Com/29 /SWM/2019-20

Date: 16.4.2019

To

The Joint Managing Director (HIDCO).
HIDCO BHABAN
Premises No. 35-1111, Biswa Bangla Sarani.
3rd. Rotary, New Town
Kolkata – 700 156

Sub: Handing over of 20 acre land to KMC for Municipal Solid Waste Management Project at Rajarhat, Chapna/Patharghata Mouja.

Sir,

This is in reference to the meeting held on 9th April 2019 in the conference room of UD & MA Dept. (Nagarayan) under the Chairmanship of the Principal Secretary UD & MA Department. Principal Secretary UD & MA Department instructed CEO (NKDA) to complete the process of handing over the land to KMC within 12/04/2019 for planning of Scientific Solid Waste Management through cluster approach and bid process management for selection of developers and operators. Accordingly CEO (NKDA) has informed that, the matter has already been communicated to the (HIDCO) authority to handover the land to KMC.

You are also aware that UD & MA department, Govt. of WB has already deposited the full amount of lease premium to HIDCO in favour of KMC for solid waste treatment and disposal facilities of KMC. However, finally it has been decided that the land will be used for solid waste treatment and disposal facilities of a cluster formed by four nos. of ULBs viz. Bidhan Nagar Mpl. Corporation, NKDA, Nabadiganta and KMC.

Under the above circumstances you are requested to take immediate action to handover the land to KMC in compliance of the order of the Principal Secretary, UD & MA, Govt. of WB where Ch. Valuer & Surveyor, KMC, Mob-9433453470 will take over the land from HIDCO on 18/04/2019 at 11-00 AM, both deed as well as physical procession. Latter on minor modification will be made.

Thanking you,

Yours faithfully.

(Khalil Ahmed, I.A.S.)
Municipal Commissioner

Copy forwarded to:

1. Principal Secretary UD & MA, Govt. of WB for his kind information.
2. Director SUDA, ILGUS Bhawan.
3. Municipal Secretary, KMC
4. OSD to Hon'ble Mayor for his kind information of Hon'ble Mayor.
5. CMLO for necessary action
6. D G (SWM) for necessary action
7. Ch. Valuer & Surveyor for necessary action.

(Khalil Ahmed, I.A.S.)
Municipal Commissioner

JS(AI)/JS(SM) 17/IV/2019

UD/00/2019/04477
Ps. Secy, UD & MA
18/4/19

Khalil Ahmed, IAS
MUNICIPAL COMMISSIONER

KOLKATA MUNICIPAL CORPORATION
5, S. N. BANERJEE ROAD • KOLKATA – 700 013
Phone 2286 1234 Fax 2286 1434/1334

Con/Com/29 /SWM/2019-20

Date: 16.4.2019

To

The Joint Managing Director (HIDCO).
HIDCO BHABAN
Premises No. 35-1111, Biswa Bangla Sarani.
3rd. Rotary, New Town
Kolkata – 700 156

Sub: Handing over of 20 acre land to KMC for Municipal Solid Waste Management Project at Rajarhat, Chapna/Patharghata Mouja.

Sir,

This is in reference to the meeting held on 9th April 2019 in the conference room of UD & MA Dept. (Nagarayan) under the Chairmanship of the Principal Secretary UD & MA Department. Principal Secretary UD & MA Department instructed CEO (NKDA) to complete the process of handing over the land to KMC within 12/04/2019 for planning of Scientific Solid Waste Management through cluster approach and bid process management for selection of developers and operators. Accordingly CEO (NKDA) has informed that, the matter has already been communicated to the (HIDCO) authority to handover the land to KMC.

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1. Principal Secretary UD & MA, Govt. of WB for his kind information.
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4. OSD to Hon'ble Mayor for his kind information of Hon'ble Mayor.
5. CMLO for necessary action
6. D G (SWM) for necessary action
7. Ch. Valuer & Surveyor for necessary action.

(Khalil Ahmed, I.A.S.)
Municipal Commissioner

JS(SWM)
17/IV/2019

Gmail

Director, SUDA <wbsudadir@gmail.com>

Fwd:

1 message

Joint Secretary MA & UD Department <jsudmadeptt@gmail.com>
To: "Director, SUDA" <wbsudadir@gmail.com>, AMRUT westbengal <amrut.wb@gmail.com>

Tue, Nov 20, 2018 at 3:50 PM

---------- Forwarded message ---------
From: **Joint Municipal Commissioner (Development)** <jmc_dev@kmcgov.in>
Date: Tue, Nov 20, 2018 at 3:33 PM
Subject:
To: <jsudmadeptt@gmail.com>

Sir/Madam,

Please find the attachment.

Tapas Chowdhury,IAS
Special Municipal Commissioner
Kolkata Municipal Corporation

--
- Regards

Special Secretary
Urban Development & Municipal Affairs Department

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State Urban Development Agency
1154
Received
20 NOV 2018
Contents not Verified

Tapas Chowdhury, *I.A.S.*
Special Municipal Commissioner

KOLKATA MUNICIPAL CORPORATION
5, S. N. Banerjee Road • Kolkata – 700 013
Phone (Office) : 033–2286–1271
Fax : 033–2252–0003
I. C. : 271, EPABX : 2286-1000 (Extn. 2603)
email : jmc_dev@kmcgov.in

No. 50/CMFA/2018-2019
Dated: 20/11/2018

To
The Special Secretary to the Government of West Bengal,
Urban Development & Municipal Affairs Department,
"Nagarayan", DF-8, Sector – I, Salt Lake,
Kolkata – 700 064.

Madam / Sir,

Enclosed please find a statement of fund surrendered under AMRUT and SBM Schemes. All the challans in support of deposition of fund are enclosed herewith. Total amount surrendered under the said two schemes is given below:

1) AMRUM : Rs. 23.95 crore
2) SBM : Rs. 20.05 crore

Yours faithfully,

20.11.18
SPECIAL MUNICIPAL COMMISSIONER

KOLKATA MUNICIPAL CORPORATION

Details of Surrender Against AMRUT and SBM scheme

Sl No	Scheme Name	GO No and date	Surrander Amt	Date of RBI Credit	Chq No	Chq Date
1	AMRUT	50(54)/MA/AMRUT/F-7/2015 dated 17/02/2016	250000.00	05.05.2018	104612	20.04.2018
2	AMRUT	54(42)/MA/AMRUT/P-13/2016 dated 23.02.2016	3259129.00	05.05.2018	104611	20.04.2018
3	AMRUT	10(3)/MA/AMRUT/P-2/2015 DATED 08.01.2018	7152930.00	17.07.2018	104619	14.07.2018
4	AMRUT	133/MA/AMRUT/P-34/2016 DATED 12.03.2018	140254812.00	17.07.2018	104620	14.07.2018
5	AMRUT	134/MA/AMRUT/P/-35/2016 DATED 12.03.2018	80801332.00	17.07.2018	104618	14.07.2018
6	AMRUT	250(55)/MA/AMRUT/F-7/2016 DATED 17.07.2018	600000.00	17.07.2018	104615	14.07.2018
7	AMRUT	360(22)/MA/AMRUT/P-46/2016 DATED 13.10.2017	4400000.00	17.07.2018	104617	14.07.2018
8	AMRUT	93(8)/MA/AMRUT/P-2/2015 DATED 23.02.2018	2819599.00	17.07.2018	104616	14.07.2018
		TOTAL	***239537802.00***			

1	SBM	SUDA-313/2015/14(123) DATED 06.01.2016	396000.00	20.05.2018	191002	06.03.2018
2	SBM	SUDA-50/2016(PT-III)/539 DATED 08/08/2017	57810000.00	CREDIT CHALLAN YET TO BE RECEIVED	191004	02.11.2018
3	SBM	SUDA-142/2016/1597 DATED 08.03.2018	142358206.00	CREDIT CHALLAN YET TO BE RECEIVED	191005	02.11.2018
		TOTAL	**200564206.00**			

9433867733

AMRUT

2|2...

West Bengal Form No. 2380 H

T. R. FORM No.7

[See Sub-Rule.(2) (b) of T. R.3.06]

Challan for deposit of money in the account of GOVERNMENT OF WEST BENGAL

1. Name of the Bank & Branch: **Reserve Bank of India, Kolkata**

2. (a) Name of the Treasury: **Pay & Accounts Office II**

   (b) Treasury Code: **CAC**

3. Account Code:

4	2	1	7	6	0	8	0	0	9	0	1	7	0

(14_Digits must be filled up properly)

4. Detail Head of Account:

5. (a) Amount: **Rs. 2,50,000/-** (Cheque no. 104612 Dated- 20.04.2018 on Axis Bank Ltd, Garia Br.)

   (b) In Words: **Rupees Two Lakh Fifty Thousand only.**

6. By whom tendered – Name & Address: **Municipal Secretary,**
The Kolkata Municipal Corporation
5, S. N. Banerjee Road, Kolkata – 13

7. Name / Designation & Address of the Departmental Officer on whose behalf/favour money is paid: **Municipal Secretary,**
The Kolkata Municipal Corporation
5, S. N. Banerjee Road, Kolkata – 13

8. (a) Particulars' and Authority of Deposit : Surrender of unutilised fund against G.O. No. 50(54)/MA/AMRUT/F-7/2015 Date- 17.02.2016.

   * (b) T. V. No. & Date of A.C. Bill:

9. Accounts Officer by whom adjustable:

Accountant General (A&E), West Bengal.

Verified

Signature of Departmental Depositors Signature   Treasury Officer

Signature of the D.D.O
Designation

Municipal Secretary
The Kolkata Municipal Cor

Date: Treasury Receipted Challan No.

Received payment   Bank Scroll Serial No.

Receipts by Bank/ Treasury DATE   Signature with seal of the Bank

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1* In respect of Challan relating to refund of unspent amount of A.C. Bill.

Date of Tender   Date of Credit   सुपुर्दगी तिथि / Date of Delivery

– 4 MAY 2018   – 5 MAY 2018   – 8 MAY 2018

3572

no. 9433867733

AMRUT 105

21236/20

West Bengal Form No. 2380 H

T. R. FORM No.7

[See Sub-Rule.(2) (b) of T. R.3.06]

Challan for deposit of money in the account of GOVERNMENT OF WEST BENGAL

1. Name of the Bank & Branch: **Reserve Bank of India, Kolkata**

2. (a) Name of the Treasury: **Pay & Accounts Office II**

(b) Treasury Code: **CAC**

3. Account Code:

4	2	1	7	6	6	8	0	0	9	0	1	7	0

(14_Digits must be filled up properly)

4. Detail Head of Account:

5. (a) Amount: **Rs. 32,59,129/-** (Cheque no. 104611 Dated-20.04.2018 on Axis Bank Ltd, Garia Br.)

(b) In Words: **Rupees Thirty Two Lakh Fifty Nine Thousand One Hundred Twenty Nine only.**

6. By whom tendered – Name & Address: **Municipal Secretary,**
The Kolkata Municipal Corporation
5, S. N. Banerjee Road, Kolkata – 13

7. Name / Designation & Address of the Departmental Officer on whose behalf/favour money is paid: **Municipal Secretary,**
The Kolkata Municipal Corporation
5, S. N. Banerjee Road, Kolkata – 13

8. (a) Particulars' and Authority of Deposit : Surrender of unutilised fund against G.O. No. 54(42)/MA/AMRUT/P-13/2016 Date- 29.07.2015.

* (b) T. V. No. & Date of A.C. Bill:

9. Accounts Officer by whom adjustable:

Accountant General (A&E), West Bengal.

Verified

Signature of Departmental Treasury Officer
Depositors Signature

Signature of the D.D.O
Designation

Municipal Secretary
The Kolkata Municipal Corporation

Date: Treasury Receipted Challan No.

Received payment Bank Scroll Serial No.

Receipts by
Bank/

Signature with seal of the Bank

Treasury
DATE

1* In respect of Challan relating to refund of unspent amount of A.C. Bill

3462

सुपुर्दगी तिथि /
Date of Delivery

- 4 MAY 2018 - 5 MAY 2018 8 MAY 2018

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AMRUT

22204

t Bengal Form No. 2380 H

T. R. FORM No.7

[See Sub-Rule.(2) (b) of T. R.3.06]

Challan for deposit of money in the account of GOVERNMENT OF WEST BENGAL

1. Name of the Bank & Branch: **Reserve Bank of India, Kolkata**

2. (a) Name of the Treasury: **Pay & Accounts Office II**

(b) Treasury Code: **CAC**

3. Account Code:

4	2	1	7	6	0	8	0	0	9	0	1	7	0

(14_Digits must be filled up properly)

4. Detail Head of Account:

5. (a) Amount: **Rs. 71,52,930/-** (Cheque no. 104619 Dated- 14.07.2018 on Axis Bank Ltd Garia Br.)

(b) In Words: **Rupees Seventy One Lakh Fifty Two Thousand Nine Hundred Thirty only.**

6. By whom tendered – Name & Address: **Municipal Secretary,**
The Kolkata Municipal Corporation
5, S. N. Banerjee Road, Kolkata – 13

7. Name / Designation & Address of the Departmental Officer on whose behalf/favour money is paid: **Municipal Secretary,**
The Kolkata Municipal Corporation
5, S. N. Banerjee Road, Kolkata – 13

8. (a) Particulars' and Authority of Deposit : Surrender of unutilised fund against G.O. No. 10(3)/MA/AMRUT/P-2/2015 Date- 08.01.2018.

* (b) T. V. No. & Date of A.C. Bill:

9. Accounts Officer by whom adjustable:

Accountant General (A&E), West Bengal.

Verified

Signature of Departmental Treasury Officer
Depositors Signature

Signature of the D.D.O
Designation

14/7/18

Municipal Secretary
The Kolkata Municipal Corporation

Date:

Treasury Receipted Challan No.

Received payment

Bank Scroll Serial No.

Receipts by
Bank/

Signature with seal of the Bank

Treasury
DATE

1* In respect of Challan relating to refund of unspent amount of A.C. Bill.

STATE BANK OF INDIA, KOLKATA

प्राप्त रुपये
निविदा दि
Date of Tender

जमा तिथि /
Date of Credit

सुपुर्दगी तिथि /
Date of Delivery

16 JUL 2018 17 JUL 2018 19 JUL 2018

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AMRUT

Bengal Form No. 2380 H

T. R. FORM No.7

[See Sub-Rule.(2) (b) of T. R.3.06]

Challan for deposit of money in the account of GOVERNMENT OF WEST BENGAL

1. Name of the Bank & Branch: **Reserve Bank of India, Kolkata**

2. (a) Name of the Treasury: **Pay & Accounts Office II**

(b) Treasury Code: **CAC**

3. Account Code:

4	2	1	7	6	0	8	0	0	9	0	1	7	0

(14_Digits must be filled up properly)

4. Detail Head of Account:

5. (a) Amount: **Rs. 14,02,54,812/-** (Cheque no. 104620 Dated- 14.07.2018 on Axis Bank Ltd Garia Br.)

(b) In Words: **Rupees Fourteen Crore Two Lakh Fifty Four Thousand Eight Hundred Twelve only.**

6. By whom tendered – Name & Address: **Municipal Secretary,**
The Kolkata Municipal Corporation
5, S. N. Banerjee Road, Kolkata – 13

7. Name / Designation & Address of the Departmental Officer on whose behalf/favour money is paid: **Municipal Secretary,**
The Kolkata Municipal Corporation
5, S. N. Banerjee Road, Kolkata – 13

8. (a) Particulars' and Authority of Deposit : Surrender of unutilised fund against G.O. No. 133/MA/AMRUT/P-34/2016 Date- 12.03.2018 as per memo no. 1808-UD/O/M/B/MISC-05/2018(PT) Date- 15.06.2018. .

* (b) T. V. No. & Date of A.C. Bill:

9. Accounts Officer by whom adjustable:

Accountant General (A&E), West Bengal.

Verified

14/7

Signature of Departmental Depositors Signature

Treasury Officer

Signature of the D.D.O

Designation *Municipal Secretary*

The Kolkata Municipal Corporati

Date:

Treasury Receipted Challan No.

Received payment

Bank Scroll Serial No.

A. 3972

Receipts by Bank/

Signature with seal of the Bank

Treasury

DATE

1* In respect of Challan relating to refund of unspent amount of A.C. Bill.

Date of Delivery

Date of Credit

19 JUL 2018

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AMRUT

Bengal Form No. 2380 H

T. R. FORM No.7

[See Sub-Rule.(2) (b) of T. R.3.06]

Challan for deposit of money in the account of GOVERNMENT OF WEST BENGAL

1. Name of the Bank & Branch: **Reserve Bank of India, Kolkata**

2. (a) Name of the Treasury: **Pay & Accounts Office II**

   (b) Treasury Code: **CAC**

3. Account Code:

4	2	1	7	6	0	8	0	0	9	0	1	7	0

(14 Digits must be filled up properly)

4. Detail Head of Account:

5. (a) Amount: **Rs. 8,08,01,332/-** (Cheque no. 104618 Dated- 14.07.2018 on Axis Bank Ltd Garia Br.)

   (b) In Words: **Rupees Eight Crore Eight Lakh One Thousand Three Hundred Thirty Two only.**

6. By whom tendered – Name & Address: **Municipal Secretary,**
The Kolkata Municipal Corporation
5, S. N. Banerjee Road, Kolkata – 13

7. Name / Designation & Address of the Departmental Officer on whose behalf/favour money is paid: **Municipal Secretary,**
The Kolkata Municipal Corporation
5, S. N. Banerjee Road, Kolkata – 13

8. (a) Particulars' and Authority of Deposit : Surrender of unutilised fund against G.O. No. 134/MA/AMRUT/P-35/2016 Date- 12.03.2018 as per memo no. 1808-UD/O/M/B/MISC-05/2018(PT) Date- 15.06.2018. .

   * (b) T. V. No. & Date of A.C. Bill:

9. Accounts Officer by whom adjustable:

Accountant General (A&E), West Bengal.

Verified

Signature of Departmental Depositors Signature

Treasury Officer

Signature of the D.D.O
Designation
Municipal Secretary
The Kolkata Municipal Corporati

Date:

Treasury Receipted Challan No.

Received payment

Bank Scroll Serial No.

Receipts by Bank/

Signature with seal of the Bank

Treasury

DATE

1* In respect of Challan relating to refund of unspent amount of A.C. Bill.

19 JUL 2018

17 JUL 2018

16 JUL 2018

West Bengal Form No. 2380 H AMRUT

T. R. FORM No.7

[See Sub-Rule.(2) (b) of T. R.3.06]

Challan for deposit of money in the account of GOVERNMENT OF WEST BENGAL

1. Name of the Bank & Branch: **Reserve Bank of India, Kolkata**

2. (a) Name of the Treasury: **Pay & Accounts Office II**

   (b) Treasury Code: **CAC**

3. Account Code:

4	2	1	7	6	0	8	0	0	9	0	1	7	0

(14_Digits must be filled up properly)

4. Detail Head of Account:

5. (a) Amount: **Rs. 6,00,000/-** (Cheque no. 104615 Dated- 14.07.2018 on Axis Bank Ltd Garia Br.)

   (b) In Words: **Rupees Six Lakh only.**

6. By whom tendered – Name & Address: **Municipal Secretary,**
The Kolkata Municipal Corporation
5, S. N. Banerjee Road, Kolkata – 13

7. Name / Designation & Address of the Departmental Officer on whose behalf/favour money is paid: **Municipal Secretary,**
The Kolkata Municipal Corporation
5, S. N. Banerjee Road, Kolkata – 13

8. (a) Particulars' and Authority of Deposit : Surrender of unutilised fund against G.O. No. 250(55)/MA/AMRUT/F 7/2016 Date- 17.07.2017 and its corrigendum no 1808-UD/O/M/B/MISC-05/2018(PT) Date- 15.06.2018. .
   * (b) T. V. No. & Date of A.C. Bill:

9. Accounts Officer by whom adjustable:

Accountant General (A&E), West Bengal.

Verified

Signature of Departmental Depositors Signature — Treasury Officer

Signature of the D.D.O — Designation

14/7

Date: — Treasury Receipted Challan No.

Received payment — Bank Scroll Serial No.

Municipal Secretary
The Kolkata Municipal Corporation

Receipts by Bank/ Treasury DATE — Signature with seal of the Bank

1* In respect of Challan relating to refund of unspent amount of A.C. Bill.

BANKING DEPARTMENT, RESERVE BANK OF INDIA, KOLKATA

प्राप्त राशि / Recd. Rs ....

निविदा तिथि / Date of Tender	प्राप्त तिथि / Date of Credit	सुपुर्दगी तिथि / Date of Delivery
16 JUL 2018	17 JUL 2018	19 JUL 2018

Ph no. 9433867733

AMRUT

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22204/6

West Bengal Form No. 2380 H

T. R. FORM No.7

[See Sub-Rule.(2) (b) of T. R.3.06]

Challan for deposit of money in the account of GOVERNMENT OF WEST BENGAL

1. Name of the Bank & Branch: **Reserve Bank of India, Kolkata**

2. (a) Name of the Treasury: **Pay & Accounts Office II**

   (b) Treasury Code: **CAC**

3. Account Code:

4	2	1	7	6	0	8	0	0	9	0	1	7	0

(14_Digits must be filled up properly)

4. Detail Head of Account:

5. (a) Amount: **Rs. 44,00,000/-** (Cheque no. 104617 Dated- 14.07.2018 on Axis Bank Ltd Garia Br.)

   (b) In Words: **Rupees Forty Four Lakh only.**

6. By whom tendered – Name & Address: **Municipal Secretary,**
   The Kolkata Municipal Corporation
   5, S. N. Banerjee Road, Kolkata – 13

7. Name / Designation & Address of the Departmental Officer on whose behalf/favour money is paid: **Municipal Secretary,**
   The Kolkata Municipal Corporation
   5, S. N. Banerjee Road, Kolkata – 13

8. (a) Particulars' and Authority of Deposit : Surrender of unutilised fund against G.O. No. 360(22)/MA/AMRUT/P-46/2016 Date- 13.10.2017 and its corrigendum no. 1808-UD/O/M/B/MISC-05/2018(PT) Date- 15.06.2018. .
   * (b) T. V. No. & Date of A.C. Bill:

9. Accounts Officer by whom adjustable:

Accountant General (A&E), West Bengal.

Verified

Signature of Departmental Depositors Signature   Treasury Officer

Signature of the D.D.O
Designation

14/7/18

Municipal Secretary
The Kolkata Municipal Corporation

Date: Treasury Receipted Challan No.

Received payment   Bank Scroll Serial No.

Receipts by Bank/

Signature with seal of the Bank

Treasury DATE

H: 3973

1* In respect of Challan relating to refund of unspent amount of A.C. Bill.

RESERVE BANK OF INDIA, KOLKATA

निविदा तिथि / Date of Tender — 16 JUL 2018

जमा तिथि / Date of Credit — 17 JUL 2018

सुपुर्दगी तिथि / Date of Delivery — 19 JUL 2018

Bengal Form No. 2380 H AMRUT

T. R. FORM No.7

[See Sub-Rule.(2) (b) of T. R.3.06]

Challan for deposit of money in the account of GOVERNMENT OF WEST BENGAL

1. Name of the Bank & Branch: **Reserve Bank of India, Kolkata**

2. (a) Name of the Treasury: **Pay & Accounts Office II**

   (b) Treasury Code: **CAC**

3. Account Code:

4	2	1	7	6	0	8	0	0	9	0	1	7	0

(14 Digits must be filled up properly)

4. Detail Head of Account:

5. (a) Amount: **Rs. 28,19,599/-** (Cheque no. 104616 Dated- 14.07.2018 on Axis Bank Ltd Garia Br.)

   (b) In Words: **Rupees Twenty Eight Lakh Nineteen Thousand Five Hundred Ninety Nine only.**

6. By whom tendered – Name & Address: **Municipal Secretary,**
   The Kolkata Municipal Corporation
   5, S. N. Banerjee Road, Kolkata – 13

7. Name / Designation & Address of the Departmental Officer on whose behalf/favour money is paid: **Municipal Secretary,**
   The Kolkata Municipal Corporation
   5, S. N. Banerjee Road, Kolkata – 13

8. (a) Particulars' and Authority of Deposit : Surrender of unutilised fund against G.O. No. 93(8)/MA/AMRUT/P-2/2015 Date- 23.02.2018 and its corrigendum no. 1808-UD/O/M/B/MISC-05/2018 (PT) Date- 15.03.2018.
   * (b) T. V. No. & Date of A.C. Bill:
9. Accounts Officer by whom adjustable:

Accountant General (A&E), West Bengal.

Verified

Signature of Departmental Treasury Officer
Depositors Signature

Signature of the D.D.O
Designation

14/7/18

Municipal Secretary
The Kolkata Municipal Corporation

Date: Treasury Receipted Challan No.

Received payment Bank Scroll Serial No.

Receipts by Bank/

Signature with seal of the Bank

Treasury
DATE

1* In respect of Challan relating to refund of unspent amount of A.C. Bill

RESERVE BANK OF INDIA, KOLKATA

Date of Tender 16 JUL 2018 | Date of Credit 17 JUL 2018 | Date of Delivery 19 JUL 2018

390

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SBM

West Bengal Form No. 2380 H

T. R. FORM No.7

[See Sub-Rule.(2) (b) of T. R.3.06]

Challan for deposit of money in the account of GOVERNMENT OF WEST BENGAL

1. Name of the Bank & Branch: **Reserve Bank of India, Kolkata**

2. (a) Name of the Treasury: **Pay & Accounts Office II**

   (b) Treasury Code: **CAC**

3. Account Code:

2	2	1	7	0	5	8	0	0	9	0	0	7	0

(14_Digits must be filled up properly)

4. Detail Head of Account:

5. (a) Amount: **Rs. 3,96,000/-** (Cheque no. 191002 Dated- 06.03.2018 on Union Bank of India, Dharmattola Br.)

   (b) In Words: **Rupees Three Lakh Ninety Six Thousand only.**

6. By whom tendered – Name & Address: **Municipal Secretary,**
   The Kolkata Municipal Corporation
   5, S. N. Banerjee Road, Kolkata – 13

7. Name / Designation & Address of the Departmental Officer on whose behalf/favour money is paid: **Municipal Secretary,**
   The Kolkata Municipal Corporation
   5, S. N. Banerjee Road, Kolkata – 13

8. (a) Particulars' and Authority of Deposit : Surrender of unutilised fund against G.O. No. SUDA-313/2015/14(123).
   * (b) T. V. No. & Date of A.C. Bill:
9. Accounts Officer by whom adjustable:

Accountant General (A&E), West Bengal.

Verified

16/3/18

Signature of Departmental Treasury Officer
Depositors Signature

Signature of the D.D.O
Designation Municipal Secretary
The Kolkata Municipal Corporation

Date:

Treasury Receipted Challan No.

Received payment

Bank Scroll Serial No.

Receipts by Bank/

Signature with seal of the Bank

Treasury DATE

19 MAR 2018

1* In respect of Challan relating to refund of unspent amount of A.C. Bill.

SBM 102 23618/2

ngal Form No. 2380 H

T. R. FORM No.7

[See Sub-Rule.(2) (b) of T. R.3.06]

Challan for deposit of money in the account of GOVERNMENT OF WEST BENGAL

1. Name of the Bank & Branch: **Reserve Bank of India, Kolkata**

2. (a) Name of the Treasury: **Pay & Accounts Office II**

   (b) Treasury Code: **CAC**

3. Account Code:

2	2	1	7	0	5	8	0	0	9	0	0	7	0

(14_Digits must be filled up properly)

4. Detail Head of Account:

5. (a) Amount: **Rs. 5,78,10,000/-** (Cheque no. 191004 Dated- 02.11.2018 on Union Bank of India, Dharmatala Br.)

   (b) In Words: **Rupees Five Crore Seventy Eight Lakh Ten Thousand only.**

6. By whom tendered – Name & Address: **Municipal Secretary,**
   The Kolkata Municipal Corporation
   5, S. N. Banerjee Road, Kolkata – 13

7. Name / Designation & Address of the Departmental Officer on whose behalf/favour money is paid: **Municipal Secretary,**
   The Kolkata Municipal Corporation
   5, S. N. Banerjee Road, Kolkata – 13

8. (a) Particulars' and Authority of Deposit : Surrender of unutilised fund of SBM vide memo no. SUDA-50/2016(PT-III)539 Date- 03.08.2017 as per memo no. 1808-UD/O/M/B/MISC-05/2018(PT) Date- 15.06.2018.

   * (b) T. V. No. & Date of A.C. Bill:

9. Accounts Officer by whom adjustable:

Accountant General (A&E), West Bengal.

Verified

Signature of Departmental Depositors Signature

Treasury Officer

Signature of the D.D.O
Designation

12/11/18

Date:

Treasury Receipted Challan No.

Municipal Secretary
The Kolkata Municipal Corporation

Received payment

Bank Scroll/Serial No.

15 NOV

Receipts by Bank/

Signature with seal of the Bank

5152

Treasury
DATE

7 NOV 2018

1* In respect of Challan relating to refund of unspent amount of A.C. Bill.

Ph no. 9433867733

SBM 101 23618/2

West Bengal Form No. 2380 H

T. R. FORM No.7

[See Sub-Rule.(2) (b) of T. R.3.06]

Challan for deposit of money in the account of GOVERNMENT OF WEST BENGAL

1. Name of the Bank & Branch: **Reserve Bank of India, Kolkata**

2. (a) Name of the Treasury: **Pay & Accounts Office II**

(b) Treasury Code: **CAC**

3. Account Code:

2	2	1	7	0	5	8	0	0	9	0	0	7	0

(14_Digits must be filled up properly)

4. Detail Head of Account:

5. (a) Amount: **Rs. 14,23,58,206/-** (Cheque no. 191005 Dated- 02.11.2018 on Union Bank of India, Dharmatala Br.)

(b) In Words: **Rupees Fourteen Crore Twenty Three Lakh Fifty Eight Thousand Two Hundred Six only.**

6. By whom tendered – Name & Address: **Municipal Secretary,**
The Kolkata Municipal Corporation
5, S. N. Banerjee Road, Kolkata – 13

7. Name / Designation & Address of the Departmental Officer on whose behalf/favour money is paid: **Municipal Secretary,**
The Kolkata Municipal Corporation
5, S. N. Banerjee Road, Kolkata – 13

8. (a) Particulars' and Authority of Deposit : Surrender of unutilised fund vide memo no. SUDA-142/2016/1597 Date- 08.03.2018 as per memo no. 1808-UD/O/M/B/MISC-05/2018(PT) Date- 15.06.2018.

* (b) T. V. No. & Date of A.C. Bill:

9. Accounts Officer by whom adjustable:

Accountant General (A&E), West Bengal.

Verified

Signature of Departmental Depositors Signature

Treasury Officer

Signature of the D.D.O 12/11/18

Designation

Municipal Secretary
The Kolkata Municipal Corporation

Date:

Treasury Receipted Challan No.

Received payment

Bank Scroll Serial No.

Date of Entry / Date of Credit

15 NOV 2018

Receipts by Bank/

Signature with seal of the Bank

5151

Treasury DATE

Date of Realisation

17 NOV 2018

1* In respect of Challan relating to refund of unspent amount of A.C. Bill.

সুডা

রাজ্য নগর উন্নয়ন সংস্থা

SUDA

STATE URBAN DEVELOPMENT AGENCY

"ইলগাস ভবন", এইচ-সি ব্লক, সেক্টর-৩, বিধাননগর, কলকাতা-৭০০ ১০৬, পশ্চিমবঙ্গ

"ILGUS BHAVAN", H-C Block, Sector - III, Bidhannagar, Kolkata - 700 106, West Bengal

ক্রমিক নং SUDA-142/2018/1597 তারিখ 06/03/2018

From: Finance Officer, SUDA

To: Mayor, Kolkata Municipal Corporation

MEMORANDUM

Sub: Release of balance fund for SWM Project of Kolkata MC under Mission Nirmal Bangal (U) / Swachh Bharat Mission (U)

Sir,

In response to your vide no:- 2778/PS/2017 Dated- 08.12.2017, has been released Rs. 534930000 for SWM Project of KolkataMC under Mission Nirmal Bangla (U) / Swachh Bharat Mission (U).

Sl No.	Name of the Payee	Amount (In Rs.)	Payees Bank Details
01.	Kolkata Municipal Corporation	534930000	Union Bank Of India, Dharmatalla Branch, A/C No. 301301010013093, IFS Code:- UBIN0530131

Yours faithfully,

06-3-18

Finance Officer, SUDA.

দূরভাষ : ২৩৫৮ ৬৪০৩ / ৫৭৬৭, ফ্যাক্স : ২৩৫৮ ৫৮০০

Tel : 2358 6403/5767, Fax : 2358 5800, E-mail : wbsudadir@gmail.com

Account Section : 2358 6408

The release of fund is also subject to the following conditions:

1) The fund should be utilized only for the purpose for which it is released and for no other purpose.
2) Works for the released amount should be executed strictly as per scheme Guidelines.
3) Monthly report of Physical and Financial progress should be sent to SUDA and MED by the 7th of the following month.
4) The amount released herein should be kept in the dedicated Bank Account for SBM maintained by the ULBs.
5) A subsidiary Cash Book should be maintained for keeping accounts (deposits and withdrawals) of funds.
6) Money receipt in Form 42 may be sent immediately after receipt of the online transfer.
7) Appropriate amounts should be sub allotted to the concerned ULBs.

06.03.18

Finance Officer, SUDA.

SUDA-142/2016/1597/1(4) 06.03.18

Copy Forwarded for kind information of:

1. **Secretary, UD & MA Dept, Govt. of West Bengal.**
2. **Sri B.N.KAR, Addl. Dir. SBM and Addl. Dir. ILGUS.**
3. **Chief Engineer, M.E. Directorate.**
4. **Cashier, SUDA.**

06.03.18

Finance Officer, SUDA.

সুডা

রাজ্য নগর উন্নয়ন সংস্থা

SUDA

STATE URBAN DEVELOPMENT AGENCY

"ইলগাস ভবন", এইচ-সি ব্লক, সেক্টর-৩, বিধাননগর, কলকাতা-৭০০ ১০৬, পশ্চিমবঙ্গ

"ILGUS BHAVAN", H-C Block, Sector - III, Bidhannagar, Kolkata - 700 106, West Bengal

SUDA-142/2016/ 1582 — 28.02.2018

ক্রমিক নং ..... তারিখ .....

From : Director, SUDA

To : The Branch Manager,
Axis Bank Ltd.,
Salt Lake, Sector-II Branch,
BJ-110, Sector-II,
Salt Lake City, Kolkata - 700 091.

Sub : Electronic Transfer of Fund debiting this office Current Account No.916010072244925.

Swachh Bharat Mission (SBM)

Sir,

You are requested to kindly arrange for electronic transfer of funds as per details given below debiting the amount from this office Savings Account No.916010072244925 lying with your branch in respect of Swachh Bharat Mission (SBM).

Sl.	Name of Payee	Amount in Rs.	Bank Details
01.	Kolkata Municipal Corporation	**53,49,30,000.00**	Union Bank of India, Dharmatalla Branch, A/C No.301301010013093 IFS Code.UBIN0530131
(Rupees Fifty Three Crore Forty Nine Lakh Thirty Thousand only)			

(Md Asif Sardar)
Finance Oficer
SUDA

(Sutanu Prasad Kar)
Director
SUDA

28/02/18

দূরভাষ ঃ ২৩৫৮ ৬৪০৩ / ৫৭৬৭, ফ্যাক্স ঃ ২৩৫৮ ৫৮০০

Tel : 2358 6403/5767, Fax : 2358 5800, E-mail : wbsudadir@gmail.com

Account Section : 2358 6408

সুডা

রাজ্য নগর উন্নয়ন সংস্থা

SUDA

STATE URBAN DEVELOPMENT AGENCY

"ইলগাস ভবন", এইচ-সি ব্লক, সেক্টর-৩, বিধাননগর, কলকাতা-৭০০ ১০৬, পশ্চিমবঙ্গ

"ILGUS BHAVAN", H-C Block, Sector - III, Bidhannagar, Kolkata - 700 106, West Bengal

SUDA-142/2016/ 1582 — 28.02.2018

ক্রমিক নং ..... তারিখ .....

From : Director, SUDA

To : The Branch Manager,
Axis Bank Ltd.,
Salt Lake, Sector-II Branch,
BJ-110, Sector-II,
Salt Lake City, Kolkata - 700 091.

Sub : Electronic Transfer of Fund debiting this office Current Account No.916010072244925.

Swachh Bharat Mission (SBM)

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You are requested to kindly arrange for electronic transfer of funds as per details given below debiting the amount from this office Savings Account No.916010072244925 lying with your branch in respect of Swachh Bharat Mission (SBM).

Sl.	Name of Payee	Amount in Rs.	Bank Details
01.	Kolkata Municipal Corporation	**53,49,30,000.00**	Union Bank of India, Dharmatalla Branch, A/C No.301301010013093 IFS Code.UBIN0530131
(Rupees Fifty Three Crore Forty Nine Lakh Thirty Thousand only)			

(Md Asif Sardar)
Finance Oficer
SUDA

28/2/18

(Sutanu Prasad Kar)
Director
SUDA

28-02-18

দূরভাষ ঃ ২৩৫৮ ৬৪০৩ / ৫৭৬৭, ফ্যাক্স ঃ ২৩৫৮ ৫৮০০

Tel : 2358 6403/5767, Fax : 2358 5800, E-mail : wbsudadir@gmail.com

Account Section : 2358 6408

(15)

Status Report of the sanctioned project **"Strengthening Primary and Secondary Solid Waste Management System in Kolkata City"** approved by SUDA under Mission Nirmal Bangla as on 25.01.2018

Sl. No.	Details of Item	Sanctioned Quantity	Sanctioned value (lakh)	Final offered value (lakh)	Status
1.0	(A) Primary collection and storage system				
1.1	Push carts with bins	3000	270.00		
1.2	Wheel barrow	500	15.00		
1.3	6 container pedal tricycle van	2000	300.00		
1.4	Auto Tippers for house to house collection of segregated materials: 1. Procurement of 15 numbers. Auto Tippers for Northern Zone of Kolkata including operation & maintenance for 05 years. **(NIT No. – KMC/SWM-II/HQ/016/17-18/1)** 2. Procurement of 15 numbers. Auto Tippers for Northern Zone of Kolkata including operation & maintenance for 05 years. **(NIT No. – KMC/SWM-II/HQ/016/17-18/2)** 3. Procurement of 15 numbers. Auto Tippers for Northern Zone of Kolkata including operation & maintenance for 05 years. **(NIT No. – KMC/SWM-II/HQ/016/17-18/3)**	45	225.00	301.50	Tender complete
1.5	10.5 cum portable/ stationary compactor containers and Prime mover chassis mounted hook loader capable of lifting portable compactor of capacity 10.5 cum: 1. Procurement for 64 nos. 10.5 cum stationary compactor containers and 14 nos. Prime Mover chassis mounted hook loader capable of lifting portable compactor of capacity 10.5 cum for Northern Zone of Kolkata including operation and maintenance for 5 years. 2. Procurement for 77 nos. 10.5 cum stationary compactor containers and 18 nos. Prime Mover chassis mounted hook loader capable of lifting portable compactor of capacity 10.5 cum for Central Zone of Kolkata including operation and maintenance for 5 years. 3. Procurement for 22 nos. 10.5 cum stationary compactor containers and 4 nos. Prime Mover chassis mounted hook loader capable of lifting portable compactor of capacity 10.5 cum for Southern Zone of Kolkata including operation and maintenance for 5 years.	163 nos. portable compactors and 36 nos. hook loaders	4727.00 + 1368.00 = 6095		2nd time e-tender will be invited shortly.

6/2/18
D. G. (SWM)
Kolkata Municipal Corporation

6.2.18
OSD (SWM)
Kol. Mpl. Corpn.

06/2/18
Dy. Chief Engineer (SWM-II)
Kol. Mpl. Corpn.

06/2/18
EX. ENGINEER (SWM-II)
KOL. MPL. CORPN.

6/2/18
Ex. Engineer (C) / SWM-I
Kol. Mpl. Corporation

06/02/18
AE(M)

2.0	(B) Transfer Stations				
	Modern scientific waste compactor stations with containers (including civil works, electrical and mechanical works etc.) as per WB PWD SoR 2010 applicable on 03.03.2014				
2.1	For one container	31	558.00		List attached as **ANNEXURE – 'A'**
2.2	For two container	39	1092.00		
2.3	For three container	4	124.00		
2.4	For four container	4	148.00		
3.0	(C) Transportation				
3.1	Truck mounted rear end auto loading movable compactors with tip cart: 1. Procurement for 12 number Truck Chassis mounted rear end auto loading movable compactor with tip cart for Northern Zone of Kolkata including operation and maintenance for 5 years. **(NIT No. – KMC/SWM-II/HQ/033/2016-17/1)** 2. Procurement for 7 number Truck Chassis mounted rear end auto loading movable compactor with tip cart for Central Zone of Kolkata including operation and maintenance for 5 years. **(NIT No. – KMC/SWM-II/HQ/033/2016-17/2)** 3. Procurement for 4 number Truck Chassis mounted rear end auto loading movable compactor with tip cart for Southern Zone of Kolkata including operation and maintenance for 5 years. **(NIT No. – KMC/SWM-II/HQ/033/2016-17/3)**	23	874.00	763.83 (Procurement cost) + cost implication due to GST rules to be finalized.	Fund booked & Provisional Work Orders have been issued as per approval of MIC in its meeting vide Item No. M-53.9 Dt. 17/11/17 and subsequently Mpl. Corporation Meeting vide Agenda No. 33 Item No. 11 Dt. 13/12/2017. Final Work Order will be issued after consideration of cost implication due to Gst rules.
3.2	Truck mounted rear end auto loading movable compactors with tip container along with 4.5 cum, 240 litre & 1100 litre movable compactor compatible containers: 1. Procurement for 6 number Truck Chassis mounted rear end auto loading movable compactor with container along with supply of 85 number 4.5 cum capacity, 170 number 240 litre and 90 number 1100 litre movable compactor compatible containers for Northern Zone of Kolkata including operation and maintenance for 5 years. **(NIT No. – KMC/SWM-II/HQ/034/2016-17/1)** 2. Procurement for 7 number Truck Chassis mounted rear end auto loading movable compactor with container along with supply of 90 number 4.5 cum capacity, 160 number 240 litre and 90 number 1100 litre movable compactor compatible containers for Central Zone of Kolkata including operation and maintenance for 5 years. **(NIT No. – KMC/SWM-II/HQ/034/2016-17/1)** 3. Procurement for 3 number Truck Chassis mounted rear end auto loading movable compactor with container along with supply of 25 number 4.5 cum capacity, 170 number 240 litre and 20 number 1100 litre movable compactor compatible containers for Southern Zone of Kolkata including operation and maintenance for 5 years. **(NIT No. – KMC/SWM-II/HQ/034/2016-17/1)**	16 + (200 nos. 4.5 cum. + 500 nos. 240 litre + 200 nos. 1100 litres movable compactor compatible containers).	902.5	773.86	Fund of Rs. 764 lakh have been booked & Provisional Work Orders have been issued as per approval of MIC in its meeting vide Item No. M-53.9 Dt. 17/11/17 and subsequently Mpl. Corporation Meeting vide Agenda No. 33 Item No. 11 Dt. 13/12/2017. Final Work Order will be issued after consideration of cost implication due to GST rules.

D. G. (SWM)
Kolkata Municipal Corporation

6.2.18
OSD (SWM)
Kol. Mpl. Corpn.

Dy. Chief Engineer (SWM-II)
Kol. Mpl. Corpn.

EX. ENGINEER (SWM-II)
KOL. MPL. CORPN.

Ex. Engineer (C) / SWM-I
Kol. Mpl. Corporation

4.0	(D) Disposal				
4.1	Construction of sanitary landfill		4163.00		Not yet floated for Tender. May like to see the latest status report in the letter addressed to GM(Marketing) / HIDCO vide Ref. No. NIL/2017-2018 Dt. 13/01/2018 attached as **ANNEXURE - 'B'**
5.0	(E) Treatment				
5.1	Composting, Material Recovery Facilities (MRF) and RDF facilities on PPP basis.		Nil		
	Sub-Total		14766.5		
	Contingency @3%		443.00		
	Administrative Charges @ 0.50%		73.83		
	Total		15283.33		

6/2/18
D. G. (SWM)
Kolkata Municipal Corporation

6.2.18
OSD (SWM)
Kol. Mpl. Corpn.

06/2/18
Dy. Chief Engineer (SWM-II)
Kol. Mpl. Corpn.

06/2/18
EX. ENGINEER (SWM-II)
KOL. MPL. CORPN.

6/2/18
Ex. Engineer (C) / SWM-I
Kol. Mpl. Corporation

06/02/18
AE(M)

ANNEXURE - 'A'

Sl. No.	Name of work	Tendered Amount (Rs.)	Remarks
1	Construction of two nos. modern scientific waste compactor station with set of one compactor for Borough-I. **(NIT No. KMC/SWM-I/CS/C-I/1/17-18)**	3476225.00	Tender complete
2	Construction of two nos. modern scientific waste compactor station with set of two compactors for Borough-I. **(NIT No. KMC/SWM-I/CS/C-I/2/17-18)**	5736623.00	Do
3	Construction of two nos. modern scientific waste compactor station with set of one compactor for Borough-II. **(NIT No. KMC/SWM-I/CS/C-I/3/17-18)**	3480333.00	Do
4	Construction of one modern scientific waste compactor station with set of two compactors for Borough-II. **(NIT No. KMC/SWM-I/CS/C-I/4/17-18)**	2854877.00	Do
5	Construction of five nos. modern scientific waste compactor station with set of one compactor for Borough-III. **(NIT No. KMC/SWM-I/CS/C-I/5/17-18)**	8741906.00	Do
6	Construction of one modern scientific waste compactor station with set of two compactors for Borough-III. **(NIT No. KMC/SWM-I/CS/C-I/6/17-18)**	2847040.00	Do
7	Construction of one modern scientific waste compactor station with set of three compactors for Borough-III. **(NIT No. KMC/SWM-I/CS/C-I/7/17-18)**	3218271.00	Do
8	Construction of one modern scientific waste compactor station with set of two compactors for Borough-IV. **(NIT No. KMC/SWM-I/CS/C-I/8/17-18)**	2854877.00	Do
9	Construction of two nos. modern scientific waste compactor station with set of two compactors for Borough-V. **(NIT No. KMC/SWM-I/CS/C-I/9/17-18)**	5727666.00	Do
10	Construction of four nos. modern scientific waste compactor station with set of one compactor for Borough-VI. **(NIT No. KMC/SWM-I/CS/C-I/10/17-18)**	7009956.00	Do
11	Construction of one modern scientific waste compactor station with set of one compactor for Borough-VII. **(NIT No. KMC/SWM-I/CS/C-I/11/17-18)**	1744958.00	Do
12	Construction of one modern scientific waste compactor station with set of two compactors for Borough-VII. **(NIT No. KMC/SWM-I/CS/C-I/12/17-18)**	2854877.00	Do
13	Construction of one modern scientific waste compactor station with set of one compactor for Borough-X. **(NIT No. KMC/SWM-I/CS/C-I/13/17-18)**	1744274.00	Do
14	Construction of one modern scientific waste compactor station with set of two compactors for Borough - X. **(NIT No. KMC/SWM-I/CS/C-I/14/17-18)**	2848159.00	Do
15	Construction of one modern scientific waste compactor station with set of two compactors for Borough-XI. **(NIT No. KMC/SWM-I/CS/C-I/15/17-18)**	2854877.00	Do
16	Construction of two nos. modern scientific waste compactor station with set of two compactors for Borough-XII. **(NIT No. KMC/SWM-I/CS/C-I/16/17-18)**	5714232.00	Do
17	Construction of one modern scientific waste compactor station with set of three compactors for Borough-XIV. **(NIT No. KMC/SWM-I/CS/C-I/17/17-18)**	3208159.00	Do
18	Construction of two nos. modern scientific waste compactor station with set of one compactor for Borough-I. **(NIT No. KMC/SWM-I/CS/C-I/18/17-18)**	3485809.00	Do
19	Construction of one modern scientific waste compactor station for two compactors for Borough-VII **(NIT No. KMC/SWM-I/CS/C-I/19/17-18)**	2852638.00	Do
20	Construction of one modern scientific waste compactor station for four compactors for Borough-IX **(NIT No. KMC/SWM-I/CS/C-I/20/17-18)**	3987499.00	Do
21	Construction of two nos. modern scientific waste compactor station with set of one compactor for Borough-X **(NIT No. KMC/SWM-I/CS/C-I/21/17-18)**	3487179.00	Do
22	Construction of one modern scientific waste compactor station for two compactors for Borough-XIV **(NIT No. KMC/SWM-I/CS/C-I/22/17-18)**	2853981.00	Do
	Total =	**83584416.00**	

6/2/18
D. G. (SWM)
Kolkata Municipal Corporation

6.2.18
OSD (SWM)
Kol. Mpl. Corpn.

6/2/18
Dy. Chief Engineer (SWM-II)
Kol. Mpl. Corpn.

6/2/18
EX. ENGINEER (SWM-II)
KOL. MPL. CORPN.

6/2/18
Ex. Engineer (C) / SWM-I
Kol. Mpl. Corporation

ANNEXURE - 'B'

o/c

Tapas Chowdhury, IAS
Joint Municipal Commissioner

Kolkata Municipal Corporation
5, S. N. Banerjee Road, Kolkata – 13
Phone (Office) : 2286-1271
EPABX : 2286-2603 (Extn.2872) I.C: 271

Ref. No.: /2017-2018
Date : 13/01/2018

To
The General Manager (Commercial), HIDCO.
HIDCO BHABAN
Premises No. 35-1111, Biswa Bangla Sarani.
3rd. Rotary, New Town
Kolkata- 700 156

Sub: Execution of lease agreement and joint Measurement for handing over of land to KMC for the project of "Electricity Generation through Municipal Solid Waste" on PPP mode and Construction of Engineered Land Fill on 20 acre land at Rajarhat, Chapna Mouja"

Ref: Memo No. 562 (Sanctioned)-UD/P/M/B/2F41/2017, dt. 15/12/2017 and Memo No. 506 (Sanctioned) UD/P/M/B/2F-41/2017, dt. 28/11/2017

Sir,

This is in reference to the above mentioned subject, KMC has already deposited the amount of Rs.23, 50, 00000/- on 30/11/2017 and Rs.18, 85, 00000/- on 29/12/2017 to the WBHIDCO as received from the UD department, Govt. of WB as lease premium for the above mentioned land.

A discussion regarding the above subject matter was also held in the chamber of the Hon'ble Mayor in presence of the Secretary MA & UD, Govt. of WB and Mpl. Commissioner, KMC regarding hand over of the land to KMC.

Now WBHIDCO is requested to take following actions for handing over the land to KMC:

1. Finalisation of the land lease agreement with necessary modification as suggested by KMC, vide letter of Jt. Mpl. Commissioner (G & D) no. 107/2017-2018, dated.21/09/2017.
2. Demarcation of the land boundary after necessary joint measurement.

You are requested to please expedite the matter in view of early disposal.

RECEIVED
16 JAN 2018
HIDCO LTD.

Thanking you,

Yours faithfully,

(Tapas Chowdhury, IAS)
Joint Municipal Commissioner
Joint Municipal Commissioner (G&D)
The Kolkata Municipal Corporation

Copy forwarded to:

1. Secretary MA & UD, Govt. of WB for his kind information
2. Municipal Commissioner for his kind information

(Tapas Chowdhury, IAS)
Joint Municipal Commissioner
Joint Municipal Commissioner (G&D)
The Kolkata Municipal Corporation

UD/001/2017/02689 Sec/UD&MA 11/12/17.

सत्यमेव जयते

8144
12 DEC 2017

Arupratan Mukhopadhyay
WBCS (Exe.)
P.S. to Minister -in-Charge
Department of Urban Development & Municipal Affairs
Government of West Bengal
Writers' Buildings, Kolkata-1

698
13/12/17

No.2778 /PS/2017 Dated: 8th December, 2017

To
The Secretary to the
Government of West Bengal
Department of Urban Development & Municipal Affairs
Nagarayan
DF – 8, Sector –I
Bidhannagar
Kolkata – 700 0064

Sir,

I am desired by Hon'ble Minister-in-Charge, Department of Urban Development & Municipal Affairs, Government of West Bengal to forward a letter addressed to Hon'ble Minister-in-Charge, Department of UD & MA by Shri Sovan Chatterjee, Minister-in-Charge, Department of Fire & Emergency services, Department of Environment and Department of Housing Govt. of West Bengal & Mayor, KMC along with enclosures regarding allotment of fund for SWM under Mission Nirmal Bangla for kind perusal.

Thanking you,

Yours faithfully,

08/12/17

(Arupratan Mukhopadhyay)
Arupratan Mukhopadhyay, WBCS (Exe.)
Private Secretary to Minister-in-Charge
Department of Urban Development
& Municipal Affairs
Government of West Bengal

Enclos. : As stated.

Tel : (033) 2214-5497 /1778 Fax (033) 2214-3853

Sovan Chatterjee
Minister-in-Charge
Department of Fire & Emergency Services, Department of Environment and Department of Housing
Government of West Bengal
&
Mayor
The Kolkata Municipal Corporation

শোভন চ্যাটার্জী
ভারপ্রাপ্ত মন্ত্রী
দমকল ও জরুরী পরিষেবা দপ্তর,
পরিবেশ দপ্তর ও আবাসন দপ্তর
পশ্চিমবঙ্গ সরকার
এবং
মহানাগরিক
কলকাতা পৌরসংস্থা

To
Janab Firhad Hakim
Municipal Affairs and Urban Development Department
Govt. of West Bengal
Writer's Buildings, Kolkata 700 001

Re: Allotment of fund for SWM projects under Mission Nirmal Bangla.

Sir,

May kindly recall the outcome of the meeting held in Borough-IX KMC Office on 16.10.17. It has been decided that department will expedite the matter of procurement of conservancy machineries and vehicles under Mission Nirmal Bangla fund.

DPR for SWM Projects of KMC under Mission Nirmal Bangla under SBM(U) was approved by State High Power Committee vide 1st meeting held on 5.1.2017 at Nabanna.

Accordingly, KMC went for the tender procedure as per the direction of Director, SUDA dated 13.2.17. In the mean time State High Power Committee released 10% of the total project costs vide order no. 710/MA/C-10/1G-18/2-017 dated 16.7.2017, as such KMC received Rs.15 crores only for SWM projects, and fund has already been booked for procurement of Movable compactors ($14M^3$). It is now impossible for KMC to award the work orders for procurement of rest of the machineries under SWM Project due to non availability of fund.

In view of the above, fund may kindly be allotted to expedite the SWM projects under Mission Nirmal Bangla.

Thanking you,

Yours faithfully,

Sovan Chatterjee

Fire & Emergency Services
Bikash Bhavan, DF Block, Sector-1
Salt Lake City, Kolkata - 700064
Phone : 033 23592719, 23345805

The Kolkata Municipal Corpn.
5, S.N.Banerjee Road.
Kolkata - 700013, .
Phone : 033 2286 1000

Dept. of Environment
Poura Bhawan, 4th floor, FD-415A,
Bidhan Nagar, Kolkata - 700106
Phone:033 2358 2763

Dept. of Housing
New Secretariate Building
1, Kiran Sankar Roy Road, Kolkata - 700001
Phone 9830056697

Sub:- Status of works of Drainage, SWM, Lighting and Social Sector Departments of KMC as per the discussions held in presence of Hon'ble MIC, UD & MA Department, Govt. of West Bengal, on 16/10/2017.

SL. No. as per the minutes	Works as per the decision taken in the Special Meeting	Status of works till date
	Drainage	
1.	DPR for the proposed drainage development works for Wd. 75 & 76 will be submitted by 18.10.2017. Action to be taken DG (Projects /KEIIP).	DPR submitted. DG (Projects/KEIIP) to pursue with Hon'ble Mayor's Office. Tender will be invited by CO (P&D) within ten days. Fund will be sought from the State Govt. Work Order will be issued as per fund availability.
2.	DG (S&D) to go ahead for tender for the work of zero de-silting of box drain along C.G. R. Road upto Boat Canal and portion of Ramanath Pal Road.	Tender will be opened on 04.12.2017. Proposal was sent to UD &MA, Deptt. Go.W.B. on 12.10.2017 alongwith the DPR and work estimate of Rs.4.33 crore.
3.	DG (S&D) to submit the estimate for allotment of fund and to undertake the work of enlargement of existing sewer on B.K.Road from C.G.R. Road to Harabas More crossing.	There is an existing 600mm to 900mm dia. sewer line at B.K. Road from C.G.R. Road at Harabas More crossing and detailed survey is needed to assess the present condition. De-silting may be done by the sewer cleansing machine in both 600 mm dia and 900 mm dia sewer line. DG (S&D) will inform both the Councilor and DG (Roads) about the requirement of laying of sewer line at B.K. Road within 15 days. There is a problem of Khattal which may be taken up at Borough level.
4.	Complete de-silting of the entire brick sewer from C.G.R. Road to Mominpore Pumping Station upto zero level of the existing network for proper functioning Mominpore Pumping Station - Action to be taken by CO (P&D).	Survey started by CO (P&D). DPR will be submitted within one month by Consultant.
5.	DPR for the construction of proposed pumping station in Ward 76 will be submitted by DG (Projects/KEIIP). P&D Department of KMC will implement the work including thorough de-silting of the existing sewer network from CGR Road to Mominpur Pumping Station including Dr. Sudhir Bose Road and delivery line of Mominpur P.S. upto Boat canal and Meher Ali Mondal Street and thorough de-silting of Boat canal in Ward 75 & 76. DG (S&D) and DG (Projects/KEIIP) will extent necessary support like preparation of DPR in	Survey started by CO (P&D). DPR will be submitted within one month by Consultant.

	ward 75 & 76 and sharing relevany information of the brick sewer. - Action to be taken by CO (P&D).	
6.	Construction of Pumping Station at Bodyguard Line will be undertaken by DG (Projects/KEIIP).	Tender completed. Work order will be issued by mid December. Work estimate Rs.72.00 crore.
7.	Executive Engineer Br. IX to submit DPR for construction of footpath and development of the existing surface drain on Hide Road although the road belongs to KoPT – Action to be taken by E.E. Br. (IX) – DG (Civil)	Inspection will be done on 09.11.2017 and DPR will be submitted by E.E. (C), Br. IX within ten days.
8.	Park Street leading to Park Circus- Proper beautification of the existing kutcha flank on the southern side of 4 No. Bridge portion. Cost will be borne by Govt. West Bengal - Action to be taken by E.E. Br. (VII) – DG (Civil)	Inspection completed. Retaining wall is to be done. DPR will be prepared within 15 days.
9.	S&D Department will undertake thorough de-silting work of Dhankhety Nikashi under Br. XV immediately including covering. - Action to be taken by DG (S&D).	File has to be submitted to Jt. MC (G&D). Work estimate Rs. 75.00 lakh. Fund will be sought from the Government of West Bengal.
10.	Land indentified as KMC land beside Hindustan Petroleum on C.G.R Road is lying vacant. Proposal was placed for construction of new community hall for Br. XV after verification and clearance from Chief Valuer and Surveyor Department and approval of the competent authority of KMC – Action to be taken by Ch. V&S, E.E. Br. (XV) – DG (Civil)	KMC will seek the approval from the UD & MA Deptt. for permanent closure of Road as per the provision of Section 353 of KMC Act, 1980. Ch.V&S will place the letter for Municipal Commissioner's signature for sending to UD & MA Deptt. on 09.11.2017.
	SWM	
1.	Hon'ble MIC, MA & UD Department, Govt. of West Bengal had expressed dis-satisfaction on the conservancy work under Br. IX such as Chetla Hut Bazar area of Ward-74 and directed to arrange (2)two numbers Auto Tippers for primary collection immediately and fund will be arranged by UD & MA Deptt. As informed by the Department the tender procedure is almost complete but yet not finalized due to non-submission of documents by the bidder. However 02nos. Auto Tippers will be delivered at the earliest.	The rate offered by the latest bidder for supply of Auto Tippers is too high therefore, department has already sent the file before the Authority to call for the re-tender. In the meantime as per the direction of the Hon'ble MMIC (SWM) we have already provided 3 Nos. of Battery Operated Vehicles by engaging 4 Nos. men power to remove the garbage generated from the household level as well as from the market to avoid any storage of garbage in vat point. Moreover, department will one movable compactor mid size as soon as possible on and before 20.11.2017.

2.	Under Mission Nirmal Bangla (SBM) Scheme, SWM Department received only Rs. 15 crore out of the total project cost of Rs.152.83 crore. Most of the work could not be processed due to non-availability of fund although the department has already completed the tender procedure for an amount of Rs.80.96 crore. Hon'ble Minister has directed for processing the remaining works and UD & MA Department will release sufficient fund to expedite the project.	Hon'ble Mayor and Hon'ble MIC, Housing, Fire & Environment Deptt., Go.W.B. has already issued a letter to Hon'ble MIC, MA & UD Deptt., Go.W.B. for releasing more fund under Mission Nirmal Bangla (SBM) so that KMC may expedite the project under the Mission Nirmal Bangla.
3.	Compactor machine near Asbestos More is not working with optimum utilization. Department informed that small vats have been removed and generated garbage has been diverted to the compactor station for optimum utilization.	KMC has already removed Eight nos. of vat points for optimum utilization of compactor machine near Asbestos More.
4.	SWM Department to submit the DPR on 39, C.G.R. Road after demolition of the existing old building. It has been decided that one Compactor Station will be set up on the ground floor and other offices on the upper floors. Fund for demolition and construction of 4 storied building will be arranged by UD & MA Department. A revised DPR will be prepared at the earliest and will be submitted to UD & MA Deptt.	The revised DPR will be submitted on 10.11.2017.
5.	Hon'ble MIC, UD & MA Deptt. had assured that the cost of acquisition of land will be considered for the DPR for the propossed land fill site at Rasaipunja Mouza, under Green City Mission. Shifting of small vehicles from the Br-XV office and necessary shed and flooring works will be constructed by the Engineering Dept. of Br-XV. All sorts of security and safety measures will be provided by the Secretary Deptt.- Action to be taken by DG (SWM)	Hon'ble Mayor has already sent a letter to the Hon'ble MIC, UD & MA Deptt, Go.W.B. for incorporation of the cost involved for land acquisition at Rasaipunja Mouza, Bisnupur, South 24-Pgs and also requested to clear SWM Project under Green City Mission. Since no shed was constructed by the Engineering Deptt, Br.XV therefore at this moment department was unable to shift the small vehicles from the Garden Reach Br. XV Office. However, Inspection will be done Jointly with Engineering Department and Ch. V&S on 20.11.2017 at 11:00 am after return of Hon'ble Chairman, Br.XV for identification of location.

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6.	Hon'ble Minister informed to the concerned department to pick up pigs so that swine flu do not spread – Action to be taken DG (SWM).	Department will start to pick up the pigs by engaging agency within two days so that Swine Flu do not spread.
	Compactor Station at Chetla Lock Gate	One Compactor Station will be installed at Chetla Lock Gate for which SWM will process for tendering immediately.
	Lighting	
1.	It is reported that due to inadequate illumination at C.G.R. Road & Taratala Road people are facing problem. DG (Lighting) has been directed to submit the estimate for necessary funding.	DPR with work estimate for Rs.57.00 lakh for Installation and improvement of lighting systems at CGR road has been prepared and will be forwarded to UD & MA Dept. shortly. For illumination of Taratala Road DG (Lighting) will place the issue in MIC meeting.
2.	Due to shortage of material the maintenance work of the lighting department could not be undertaken as there is unavailability of materials in Central Store. In this circumstance DG (Lighting) is directed to purchase material from market to take up the said work.	Poor quality igniter. Material purchased locally. Supply Deptt. will take corrective measure in regard to purchase of material especially branded equipments
	Social Sector	
1.	More man-power is required for Br. IX. Steps to be taken for distribution un-distributed Ration Cards. Five employees who are incompetent are required to be changed/replaced – Action to be taken by Chief Manager (SW&UPA/HQ)	85% Ration Card distributed in Br. IX and 89% in Br. XV.

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31/10/17

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OFFICE OF THE CHAIRMAN BOROUGH IX
11, BELEVEDERE ROAD, KOLKATA – 700027

In presence of the following Councillors and officers a special meeting was held on 16.10.2017 at 12 noon regarding Drainage, SWM, Lighting and Social Sector at Br.-IX office under Mr. Firhad Hakim, Hon'ble Minister of Urban Development & Municipal Affairs.

Members present :

1. Mr. Firhad Hakim, Hon'ble Minister, U.D. & MA., Govt. of West Bengal.
2. Mr. Ram Peary Ram, Hon'ble MMIC (WBUES)
3. Mr. Debasish Kumar, Hon'ble MMIC (Park & Square)
4. Smt. Indrani Saha Banerjee, MMIC (Health Insurance Scheme, BPL)
5. Municipal Commissioner, KMC
6. D.G.(Project), KEIIP
7. D.G. (Civil)
8. D.G.(S&D)
9. D.G.(Lighting)
10. D.G.(Bustee)
11. D.G. (SWM)
12. Mr. Ratan Malakar, Chairman-IX
13. Mr. Ranjit Sil, Chairman- XV
14. Mr. Sasti Das, Councillor, Ward No. 76
15. Shamima Rehan Khan, Councillor, Ward No. 77
16. Mr. Nizamuddin Shams, Councillor, Ward No. 78
17. Mr. Anwar Khan, Councillor, Ward No. 80
18. Councillor, Ward No. 133,134 & 135.
19. Sri Souvik Sikdar, Chief Manager
20. Chief Manager (Personnel)
21. . Ex.Engr., Br.-IX & XV.

Hon'ble MIC, UD & MA department, Govt. of West Bengal presided over the meeting and requested Municipal Commissioner to initiate the discussion. After threadbare discussions regarding drainage problem at Khidderpore and Garden Reach area among the concerned councilors as well as senior officials of K.M.C. the following decisions have been arrived:

Re: Drainage

1. D.G. (Project) KEIIP informed that the DPR for the proposed drainage development work for wd. 75 & 76 will be submitted by 18th October, 2017. – **Action to be taken by D.G. (Project) KEIIP**
2. D.G. (S&D) informed that DPR for zero de-silting of the existing box drain along CGR road and up to Boat Canal and portion of Ramanath Pal road has already been submitted before the UD&MA department, Govt. of West Bengal. Hon'ble MIC, UD & MA directed D.G. (S&D) to go ahead for tender so that the said work may be undertaken at the earliest. He also informed that the

administrative approval and financial sanction will be sent immediately. – **Action to be taken by D.G. (S&D)**

3. Sri Ram Peary Ram, Councillor Wd. 79 requested for enlargement of existing sewer on B.K. Road from CGR road to Harabas More crossing to give relief to the said locality. D.G. (S&D) was requested to submit the estimate before Govt. of West Bengal for allotment of fund and to undertake the said work simultaneously. - **Action to be taken by D.G. (S&D)**

4. Mr. Nizamuddin Shams, Councillor Wd. No. 78 as well as Shamima Rehan Khan, Councillor Wd. 77 expressed their problem for stagnation of water for a considerable period of time in wd. 77 throughout the year. They requested Hon'ble MIC, UD & MA for his kind intervention and officials of K.M.C. confirmed that unless the entire brick sewer from CGR Road to Mominpur Pumping Station is thoroughly desilted (zero desilting) including brick sewer of Dr. Sudhir Bose road as well as outlet of the Mominpur Pumping Station particularly from Mominpur Pumping Station to Boat Canal the problem will not be solved. Due to existence of water-main, high tension line and brick sewer there is no scope for further laying/enlargement of the brick sewer. Therefore to give relief to the said locality at this stage there is no other option is lying with us except complete desilting up to zero level of the existing network for proper functioning of Mominpur Pumping Station. - **Action to be taken by Controlling Officer of P&D.**

5. It has been decided that the construction of the proposed pumping station in wd. 76 for which the DPR will be submitted by the D.G. (Project) KEIIP will be implemented by the Planning & Development department of K.M.C including thorough desilting of the existing sewer network in wd. 75 & 76. It has also been decided that as the P&D department has already undertaken similar nature of work like Mechanical desilting under JNNURM. The desilting of the existing brick sewer as mentioned i.e. from CGR road to Mominpur Pumping Station including Dr. Sudhir Bose road and delivery line of Mominpur P.S upto Boat Canal and Mehar Ali Mondal St and thorough desilting of Boat Canal. may also be undertaken by the P&D department. D.G. (S&D) and D.G. (Project) KEIIP will extend necessary support like preparation of DPR in wd. 75 & 76 and other relevant information of the brick sewer etc. etc. - **Action to be taken by Controlling Officer of P&D.**

6. D.G. (Project) KEIIP informed that construction of the pumping station at Bodyguard line will be undertaken from their end. - **Action to be taken by D.G.(Project), KEIIP.**

7. Councillor Wd. No. 80 requested Hon'ble MIC, U.D. & MA to undertake the construction of footpath as well as development of the existing surface drain on Hide road. Hon'ble MIC, UD & MA agreed and asked Ex. Engr. Bor. IX for submission of the DPR considering the public safety although the roads belong to KoPT. - **Action to be taken by E.E.Bor-IX-D.G.(Civil)**

8. As the Park Street is one of the important roads leading to Park Circus connector Hon'ble MIC, U.D. & MA requested Municipal Commissioner for proper beautification of the existing kutcha flank on the southern side of 4No. bridge portion, necessary cost will be given by Govt. of West Bengal. - **Action to be taken by E.E. Bor. VII – D.G. (Civil)**

9. Chairman, Bor. XV requested for thorough desilting work of Dhankhety Nikashi, accordingly, it has been decided S&D department will undertake the said work immediately including covering. - **Action to be taken by D.G. (S&D)**

10. Councillor wd. no. 134 and Borough Chairman -XV mentioned that a land beside Hindustan Petroleum on C.G.R Road is laying vacant and they identified this KMC land and proposed for construction of new community hall for BR.XV after verification and clearance from Chief Valuer and Surveyer Deptt. and approved the competent authority of KMC. Hon'ble M-I-C , U.D. &

M.A. Govt. of West Bengal requested Mpl. commissioner , KMC to look after the matter . - **Action to be taken by Ch. Valuer & Surveyor, E.E. Bor. XV- D.G. (Civil)**

Re: SWM

1. Hon'ble Minister of UD &MA expressed his dissatisfaction regarding the conservancy work under Br-IX area such as Chetla Hut bazaar area of Ward-74 where half road is very dirty till date. He has also directed to arrange 2 No. of Auto tippers for primary collection immediately and fund will be arranged by MA & UD. Department replied that tender procedure almost completed but not yet finalized due to non submission of documents by the bidder. However 2 No.of Auto tippers will be delivered at the earliest. - **Action to be taken by D.G. (SWM)**
2. SWM deptt. has already completed the tender procedure for an amount of Rs. 80.96 crores out of Rs. 152.83 Cr. under Mission Nirmal Bangla (SBM) scheme. But SWM deptt. receives only 15 Cr. i.e 10% of the total project cost. However most of the work could not be processed due to non availability of fund. In the meeting it has been directed by the Hon'ble Minister (UD &MA) for processing the remaining works by SWM deptt and UD &MA deptt. will release sufficient fund to expedite the project. - **Action to be taken by D.G. (SWM)**
3. Hon'ble Minister stated that compactor machine near Asbestos More is not working with optimum utilization. Department replied that they have already removed some small vats and generated garbage diverted to the compactor station for its optimum utilization. - Action to be taken by D.G. (SWM)
4. Hon'ble Minister has directed the SWM department to submit the DPR on 39, C.G.R Road after demolition of the old existing building. It has also been decided a compactor station will be set up at the ground floor and other offices will be allotted in the upper floors. Fund for such demolition and construction of 4 storied building will be arranged by UD &MA department. For the purposing question SWM deptt. replied that a revised DPR will be prepared at the earliest and will be submitted to the UD & MA deptt. - **Action to be taken by D.G. (SWM)**
5. SWM Deptt. expressed their great concern regarding the saturation of the existing Dhapa disposal site and needs another multiple disposal sites for land filing and other processing facilities.KMC has dentified a land at Rasaipunja mouza, Bishnupur, South 24 Pargana and also submitted a DPR to the UD &MA department under Green City Mission. Hon'ble Minister has given assurance for consideration of cost for acquisition of land and also give clearance of DPR as early as possible. Mr. Ranjit Sil, Chairman BR-XV requested to the Hon'ble Minister for shifting the GR Unit garage from the Br-XV office. In this context SWM deptt. informed that it is impossible to shift all the vehicles due to safety and security and obstacle due to narrow passage. However has directed to shift the small vehicles and necessary shed and flooring works will be constructed by Engineering deptt. of BR-XV. All sorts of security and safety measures will be provided by the Secretary deptt. – **Action to be taken by D.G. (SWM)**
6. Hon'ble Minister (U.D. & M.A.) informed to the concerned department to pick up pigs so that Swine flu cannot be spread. – **Action to be taken by D.G. (SWM).**

Re: Lighting

- It is reported by the Chairman Borough XV & Councillor, Wd. 80 that due to inadequate illumination from C.G.R.Road & Taratala Road, people are facing problem, accordingly, Hon'ble Minister, UD & MA Deptt., Govt. of West Bengal directed D.G. (Ltg.) to take up

Secy, UD&MA

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necessary action and submit the estimate for necessary fund at the earliest. - **Action to be taken by D.G. (Ltg.)**

- It is reported by the Councillor that due to shortage of materials the maintenance work are suffering very badly, officials of Lighting department informed that due to non-availability of the materials at the Central Store they could not undertake the maintenance work. Municipal Commissioner directed D.G. (Ltg.) to purchase materials from market in such circumstances to take up the said work. - **Action to be taken by D.G. (Ltg.)**

Re: Social Sector

- Dy. Manager, Social Sector mentioned that more man power is required for Br.-IX. All steps to be taken with distribution of undistributed ration card. He also requested to change the five men who are incompetent. - **Action to be taken by Chief Manager, SW&UPA(HQ)**

The meeting ended with a vote of thanks to and from the chair.

FIRHAD HAKIM
MIC, UD &MA DEPTT
GOVT. OF WEST BENGAL.

Copy to : All concerned.

Municipal Commissioner, KMC.

Workflow Based File Tracking System

Government of West Bengal

Finance - Group R

File No : MA/P/C-10/1G-1/2015(Pt-II)

Subject : SWACCHA BHARAT MISSION OPENING OF HEAD OF ACCOUNT AND RELEASE OF FUND PROJECT OF KOLKATA MUNICIPAL CORPORATION.

Department : Municipal Affairs

File No.MA/P/C-10/1G-1/2015(Pt-II)

We may have no objection to the proposal of towards the project "Integrated Solid Waste Management Project for Kolkata Municipal Corporation" with an estimated cost of Rs. 152.83 Crore with funding pattern Govt. of India : Govt. of WB : ULB is 35:55:10 pertaining to Demand No. 72 subject to condition that State Share may be released as and when Central Share will be released.

Sd/- S. Hasan 16/05/2017
Sd/- D. Bhattracharyya 16/05/2017
Sd/- P. Yadav 22/05/2017
Sd/- H. K. Dwivedi 22/05/2017
Sd/- A. Mitra
(Minister-in-Charge)
Group – 'N' U.O. No. 0396 25/05/2017
U.O. Date : 30/05/2017

UO NO : Group R/2017-2018/0049
UO Date : 01/06/2017

01.6.17
S.O, Finance Department
01/06/2017

Sumon Mukherjee
U.D.A., Cell-10.
6.6.17

put up early
05/6/17

Government of West Bengal
Department of Urban Development & Municipal Affairs
Poura Prashasan Bhavan, DD-I, Sector- I,
Salt Lake City,Kolkata – 700 064

No. 524/MA/C-10/1G-1/2015 Pt. II Dated, Kolkata, the 7th day of June, 2017

From : Joint Secretary to the Government of West Bengal

To : The Director,
State Urban Development Agency,
ILGUS Bhavan, Block HA, Sector III, Salt Lake
Kolkata 700 106

Sub: Administrative Approval for Implementation of Integrated Solid Waste Management Project

Sir,

With reference to above, I am directed to inform you that ~~in principal~~ Administrative approval for the scheme as stated in Annexure – I is hereby accorded to take necessary steps for Implementation of Integrated Solid Waste Management Project in Kolkata Municipal Corporation subject to strict observance of all relevant rules & regulations of the State Government issued time to time including e-tendering.

Necessary fund will released in due course as per availability of fund upon receipt of the copy of the e-tender notice, work order and certificate regarding e-tender/-procurement from ~~concerned ULBs~~.

This letter is issued with the approval of appropriate authority of this Department

Enclo. As stated

Yours faithfully,

Special Secretary to the Government of West Bengal

Government of West Bengal
Department of Urban Development & Municipal Affairs
Poura Prashasan Bhavan, DD-I, Sector- I,
Salt Lake City,Kolkata – 700 064

No.522/MA/P/C-10/1G-1/2015 Pt. II

Dated, Kolkata, the 7th day of June, 2017

From : Special Secretary to the Government of West Bengal

To : The Director,
State Urban Development Agency,
ILGUS Bhavan, Block HA, Sector III, Salt Lake
Kolkata 700 106

Sub: Administrative Approval for Implementation of Integrated Solid Waste Management Project under Kolkata Municipal Corporation

Sir,

With reference to above, I am directed to inform you that Administrative approval for the scheme as stated in Annexure – I is hereby accorded to take necessary steps for Implementation of Integrated Solid Waste Management Project in Kolkata Municipal Corporation subject to strict observance of all relevant rules & regulations of the State Government issued time to time including e-tendering.

Necessary fund will be released by Director, SUDA in due course as per availability of fund upon receipt of the copy of the e-tender notice, work order and certificate regarding e-tender/-procurement from Kolkata Municipal Corporation.

This letter is issued with the approval of appropriate authority of this Department

Enclo. As stated

Yours faithfully,

07/6/17

Special Secretary to the Government of West Bengal

Enclosure of No. 522 /MA/P/C-10/1G-1/2015 Pt. II

Dated, Kolkata, the 7th day ofJune, 2017

Name of the Project including ULB	U.O. No. & Date of F.D. (Gr'N')	Total Estimated Cost (Rs. In lakh)	Central Share (Rs. In lakh)	State Share (Rs. In lakh)	ULB Share (Rs. In lakh)
Integrated Solid Waste Management Project for Kolkata Municipal Corporation	0396 30.05.2017	15283.00	5349.00	8406.00	1528.00

Special Secretary 07/6/17

Administrative approval for SWM,KMC
07.06.2017

Enclosure of No.522/MA/C-10/1G-1/2015 Pt. Dated, Kolkata, the day of June, 2017

Name of the Project including ULB	U.O. No. & Date of F.D. (Gr'N')	Total Estimated Cost (Rs. In lakh)	Central Share (Rs. In lakh)	State Share (Rs. In lakh)	ULB Share (Rs. In lakh)
Integrated Solid Waste Management Project for Kolkata Municipal Corporation	0396 30.05.2017	15283.00	5349.00	8406.00	1528.00

Special Secretary

STATEMENT – A

Administrative Approval and Plan Release

(For CS/CN form 'C' and for EAP form 'D' should also be used)

1.	Name of the scheme with locational details	:	Solid Waste Management Project in Kolkata Municipal Corporation
2.	Type of the Scheme	:	Centrally Sponsored Scheme
3.	Whether a new scheme of the year or an ongoing scheme (Furnish a copy of G.O. regarding Administrative Approval in case of On going Scheme)		New Scheme
4.	Date of Administrative Approval	:	
5.	Original Project Cost	:	
6.	Date of commencement of work	:	
7.	Expected Duration	:	
8.	Phasing of Expenditure	:	
		Year	Amount to be Spent
9.	Whether clearance from authorities like SPB/ SLSSFC/ GFC etc obtained, if so whether copies of their approval attached	:	Not required
10.	Budget Provision (Excluding Incentive) Head of Account-wise	:	1. 39-2215-02-789-SP-002-35-00 Rs.15000.00 lakh 2. 39-2215-02-789-SP-003-35-00 Rs.10000.00 lakh
11.	Cumulative Release Head of Account-wise (Proposed)	:	1. 39-2215-02-789-SP-002-35-00 Rs.1950.662 Lakh 2. 39-2215-02-789-SP-003-35-00 Rs. 8406.78655 Lakh
12.	Balance Available Head of Account-wise	:	1. 39-2215-02-789-SP-002-35-00 Rs. 13049.338 lakh 2. 39-2215-02-789-SP-003-35-00 Rs. 1593.02135 Lakh
13.	Expenditure Incurred Head of Account-wise	:	1. 39-2215-02-789-SP-002-35-00 Nil 2. 39-2215-02-789-SP-003-35-00 Rs. 7756.97865 Lakh
14.	Physical Achievement	:	
15.	Amount for which Utilisation Certificate submitted	:	
16.	Amount requested for Release Head of Account-wise	:	1. 39-2215-02-789-SP-002-35-00 Rs.2700.00 lakh 2. 39-2215-02-789-SP-003-35-00 Rs. 525.00.00 lakh
17.	Detailed Justification of the Project	:	Solid Waste Management Project in Kolkata Municipal Corporation to keep the city clean.

25/1/17

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Gautam De, WBSS
Deputy Secretary
Municipal Affairs Deptt.
Govt. of West Bengal

STATEMENT – C

In case of Centrally Sponsored/Central Sector Schemes

1.	Funding Pattern – Ratio of Central Share & State Share	:	35:55 10% of estimated cost will be borne by KMC
2.	Total Amount sanctioned (*) by GOI	:	GOI has been approached to release a sum of Rs. 5349.00 lakh
3.	Total Amount credited to State Account	:	N.A
4.	Matching State Share	:	Rs. 8406.00 lakh
5.	Total amount (*) released so far	:	Nil
	a) Central Share	:	Nil
	b) State Share	:	Nil
6.	Whether copies of GOI sanction letter enclosed	:	N.A.

(*) Cumulative figures or the year to be furnished.

25/1/17

25.1.17

Gautam De, WBSS
Deputy Secretary
Municipal Affairs Deptt.
Govt. of West Bengal

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NOTE SHEET

SUDA

Now, as per decision of the State High Powered Committee (SHPC) under Mission Nirmal Bangla (Urban)/Swachh Bharat Mission (Urban), the above mentioned proposal for Fund Sharing pattern between State Government and ULB may be moved to Finance Department, Government of West Bengal for concurrence.

Placed for kind approval.

16/1/2017

(B. N. Kar)
Additional Director, ILGUS &
Additional State Mission Director, MNB (U)

Director, SUDA &
State Mission Director, MNB (U)

proposal may kindly be appd.
17/1/17

Secretary/UD&MA Deptt and Chairman, SUDA

U/O - 44/2017
dt - 17-01-17
File. 142/2016.

Please process in department file for obtaining concurrence of F.D.
17.01.2017

JS(SD)

FA

Sumanbabu (C-10)

Pl. process

17/1/2017

Dy. No:- 11(C-10)
dt. 25.01.17

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NOTE SHEET

SUDA

Sub: DPR of Solid Waste Management Project of Kolkata Municipal Corporation

The Detailed Project Report (DPR) for implementation of Solid Waste Management Project in Kolkata Municipal Corporation (Placed at **CP-2**) was prepared by the ULB itself and CPHEEO of Government of India has appraised the DPR (placed at **CP-4 to CP-14**) and it has finally been approved (placed at **CP-92 & 95**) in the 1st Meeting of the State High Powered Committee (SHPC) under Mission Nirmal Bangla (Urban)/Swachh Bharat Mission (Urban). Order of Constitution of SHPC and the Minutes of the 1st meeting are placed at **CP-29** to **CP-30** and **CP-87** to **CP-95** respectively.

The Salient features of the Project are:

- Primary Collection and Storage System including procurement of Push Carts, Wheel Barrow, Pedal Tricycle Van, Auto Tippers, Movable & Stationary Compactors etc.
- Transfer Stations for one, two, three and four container Compactor Stations.
- Transportation: Procurement of Hookloaders, Movable Compactors with Tip Cart and Container.
- Disposal: Composting materials recovery facilities and RDF facilities
- Land available 100 hector, owner is KMC.
- Population Coverage: 4496694 no. of population of Kolkata MC
- Project Implementation Period: 1.5 Years
- Total anticipated Project Cost is Rs. 152.83 Crore

Government of India, in the Guideline of Swachh Bharat Mission (Urban) at Para-7.10 & 7.10.5 [placed at **CP-73 & 74**] and in the Office Memorandum for Revision/Modification of MoUD [placed at **CP-86**] mentioned that for Solid Waste Management Projects GoI share will be 35% of the total project cost subject to the condition that the State contribution will be minimum 25% funds to match 75% Central Share i.e. 1/3rd of Central Share.

Hence, out of the anticipated total project cost of Rs. 152.83 Crore, GoI Share is Rs. 53.49 Crore (35%) and Mandatory State Share is Rs. 17.83 Crore.

In the1st Meeting of the State High Powered Committee (SHPC) under Mission Nirmal Bangla (Urban)/Swachh Bharat Mission (Urban) under the Chairmanship of the Chief Secretary to the Government of West Bengal, it was decided that (placed at **CP-94**) beyond the Government of India share i.e. 35% or as admissible of the Project Cost, the remaining will be borne by the State Government and ULB. This fund sharing pattern is approved in principle and UD & MA Department will finally obtain approval from Finance Department.

Hence, the following Fund Sharing pattern of State Government and Kolkata Municipal Corporation may be proposed for this Standalone Project of Solid Waste Management:

a) Fund Share of **Kolkata Municipal Corporation** may be **10%** of the total Project Cost i.e. **Rs. 15.28 Crore**, and

b) Fund Share of **State Government** may be remaining **55%** of the total Project Cost i.e. **Rs. 84.06 Crore**

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NOTE SHEET

SUDA

7. Approval of the model plan and estimate (Rs. 10,990/-) for IHHL unit adopted in the other Districts.
8. Release of Rs. 126 Lakh to District Authorities and Rs. 646.31 Lakh to individual ULBs for undertaking activities under IEC.
9. Release of Rs. 165.50 Lakh to individual ULBs for undertaking activities under Capacity Building.
10. Approval of Action Plan for IEC (Rs. 24 Crore) for Capacity Building (Rs. 13 Crores) for the year 2016-17 since submitted to Government of India.
11. Approval of model plan s and estimates for Community Toilet and Public Toilet prepared by ME Directorate.
12. Approval of prioritization of ULBs for preparation of DPRs under SBM.
13. Miscellaneous

If approved, the above proposal may be forwarded to Secretary for kind consideration and onward transmission to Chief Secretary for a date and time of next meeting of the Apex Committee.

J. Mukherjee
20.09.16

Sri B.N. Kar
Addl. SMD SBM

Dir.

May be approved.
22/9/16

Director, SUDA

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NOTE SHEET

SUDA

Notes and Orders on NSP 02 ante.

It may kindly be recalled that P&RD Department has since reconstituted the Apex Committee under Mission Nirmal Bangla vide their Order no. 3681/RD/PH&S/S/1C-1/2015 dated 09.08.2016 with the induction of a representative from the Ministry of Urban Development, Government of India. Copy of the G.O. is placed in file below.

As desired a date and time may be sought from Chief Secretary for the next meeting of the Apex Committee under Mission Nirmal Bangla which will function as the State High Powered Committee under SBM(U). As per Guidelines of SBM all proposals to Government of India seeking Central Share should have the prior approval of State High Powered Committee. But as the order reconstituting the Apex Committee under P&RD Department was issued on August 2016 certain actions have been taken in anticipation which need to be ratified in the next meeting of the Committee.

The Agenda of the meeting may include the following broad subjects:

1. Approval of Integrated Solid Waste Management Project for Kolkata Municipal Corporation with a total project cost of Rs. 152.83 Crore earlier appraised by CPHEEO.
2. Procurement of 186 Movable Compactors and 82 Stationary Compactors with 18 Hook Loaders for Urban Local Bodies across the State including construction of compactor stations with a total outlay of Rs. 107 Crores.
3. Release of a sum of Rs. 488.80 Lakh of Central Share and Rs. 733.20 Lakh of State Share (regular and additional State Share) to District Magistrate, Nadia for construction of 12,220 units of IHHL in 10 ULBs of the District. The District was declared ODF in June 2015.
4. Release of a sum of Rs. 5402.36 Lakh of Central Share and Rs. 5388.84 Lakh of State Share (regular and additional State Share) to District Magistrates of North 24 Parganas, Hooghly and Purba Medinipur Districts with a target number of about 1,40,000 units of UHHL in 45 ULBs in the three Districts. The Districts are likely to be declared ODF by September 2016.
5. Release of a sum of Rs. 3295.38 Lakh of Central Share and Rs. 1099.02 Lakh of State Share (regular State Share) to District Magistrates of Bardhaman and South 24 Parganas for construction of 1,64,000 units of IHHL in 15 ULBs in the said Districts with a view to declare the Districts ODF.
6. Approval of the model plan and estimate (Rs. 13,000/-) adopted for construction of IHHL in Nadia District.

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সুডা **NOTE SHEET** SUDA

It may subsequently be ratified in the HPC.

[signature]
31/8/2016

Director, SUDA

Note from pre-pages.
As stated at 'x' pre-page, KMC has submitted two DPRs of SWM Projects with total Project cost of Rs. 152.83 Crore, which were earlier appraised by CPHEEO under Ministry of Urban Development, Govt of India in earlier Mission. As stated further at 'y' the Apex Committee under Mission Nirmal Bangla (High Power Committee), which will sanction such SWM Project, has recently been reconstituted. Also as stated at 'Z' pre-page, Ministry of UD, GoI has increased the GoI share recently from earlier 20% to 35% of Project Cost subject to ceiling. The KMC is pursuing for approval of project and release of fund.
In view of above, it may be considered to place the proposal before Chief Secretary, WB. the Chairman of High Power (Apex) Committee as proposed at 'A' for his kind approval after taking decisions of sharing of balance fund between KMC and State Government and availability of the same.

[signature]
31/8/2016

Secretary, M.A Deptt
& Chairman, SUDA

U/O No- 642/16
dt 31-08-16
U.O. No. SUDA: .... Dated ....

Please initiate a file note seeking date & time of CS for HPC meeting. Suggest Agenda.

[signature]

Fd to- 142/2016

U/O- 664/16
dt 05-09-16
Director SUDA

Addl. MD (SBM)

Order above. Pl process early.

[signature] 5/9/16

TA [signature] 5/9/2016

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Sub: DPR for Integrated Solid Waste Management Project for Kolkata Municipal Corporation at a cost of Rs. 152.84 Crore

Memo No. Con/Com/168/2015-16 dated 04.07.2015 from the Municipal Commissioner, Kolkata Municipal Corporation alongwith two DPRs for an Integrated Solid Waste Management Project in Kolkata Municipal Corporation placed in file below may kindly be seen.

The first part of the DPR at a proposed cost of Rs. 99.85 Crores includes primary collection and storage, transfer stations and transportation. The complementary DPR for treatment and disposal of Municipal Solid Waste envisages construction of sanitary landfill and composting Material Recovery Facilities (MRF) and RDF facilities. The proposed cost of sanitary landfill is Rs. 43.77 Crore while composting, Material Recovery Facilities and RDF facilities have been proposed to be implemented on PPP basis. Thus the total cost of the integrated projects combining the two parts of the DPR comes to Rs. 148.65 Crores including Contingency and Administrative Charges.

It may further be seen that the two DPRs were originally meant for inclusion under JNNURM and accordingly appraised by CPHEEO, the appraisal agency of the Ministry of Urban Development. **The appraised cost of the integrated projects vide reference no. K-14012/9(45)/13/N-1 of CPHEEO comes to Rs. 152.83 Crore.** The two DPRs were approved in the 133rd CSMC meeting held on 04.03.2014 but funds could not be released by the Ministry of Finance. Municipal Commissioner, KMC has hence requested for consideration of the project under SBM.

It is now for kind consideration if the matter will be placed in the next meeting of the reconstituted Apex Committee under Mission Nirmal Bangla vide Order No. 3681-RD/PH&S/S/1C-1/2015 dated 09.08.2016 of the P&RD Department (copy placed in file). In the alternative the proposal may be placed before Chief Secretary who is the Chairperson of the Apex Committee for approval whereafter we may move Government of India seeking appropriate Central share.

It may be mentioned in this connection that as per revised funding pattern the Central share for Solid Waste Management projects is 35% of the project cost. The remaining 65% may be shared between State Government and the concerned ULB (KMC) in a pattern to be decided by competent authorities. A copy of Memo No. 20/1/2016-SBM-1 dated 18.07.2016 of the Ministry of Urban Development, Government of India in connection with revision of funding pattern is placed in file for ready reference.

Submitted for approval.

B.Das 30/08/16
B.Das
TUO

S.K. Mukherjee 30.08.16
S.K. Mukherjee
TA

B.N. Kar,
Addnl. State
Mission Director,
SBM

The proposal may be placed before the Chief Secretary and chairman, HPC for kind approval.

GOVERNMENT OF WEST BENGAL
DEPARTMENT OF URBAN DEVELOPMENT AND MUNICIPAL AFFAIRS
"NAGARAYAN", DF-8, SECTOR-1
SALT LAKE CITY, KOLKATA-700064

No: 2490-UD/O/M/HID/2A-24/2016; Dated: 20.08.2018.

From: The Joint Secretary to the
Government of West Bengal.

To: The Joint Managing Director,
West Bengal Housing Infrastructure
Development Corporation Ltd.

Subject: - Proposal of Kolkata Municipal Corporation(K.M.C)for leasing out of 20(Twenty) acres of land, identified for Solid Waste Management Project in Mouza-Chhapna in Plot No IIID/6 in New Town, Kolkata

Sir,

With reference to above, I am directed to say that the proposal of 50% waiver of lease premium for the land identified for Solid Waste Management Project in Mouza-Chhapna in Plot No IIID/6 in New Town, Kolkata was sent to the Finance Department of this Government for consideration and the Department vide their UO NO Group R/2018-2019/0077, dated 17/08/2018, has agreed to accord administrative approval for waive of balance 50% of the lease premium amounting to Rs.42.35 Cr. (total premium being Rs.84,70,00,000/-) which is payable by KMC to HIDCO Ltd. for execution of lease deed in compliance of the suggestions of Ld LR towards allotment of 20 acres of land at Plot No. IIID/6 New Town, Kolkata in Mouza-Chhapna on a lease of 99 years for establishment of Solid Waste Management project for waste disposal of entire New Town, Kolkata, subject to Cabinet Approval.

This is for information and taking necessary action at your end.

Yours faithfully,

Joint Secretary to the
Government of West Bengal

No: 2490/1(3) -UD/O/M/HID/2A-24/2016; Dated: 20.08.2018.

Copy forwarded for information to:-

1) The Commissioner, Kolkata Municipal Corporation.
2) The O.S.D to the M-I-C, U.D. &M.A. Department;
3) The P.S. to the Principal Secretary, U.D. &M.A. Department;

Joint Secretary to the
Government of West Bengal

61e

File No.UDMA-22011(12)/1/2018-LS-UD SEC-Dept. of UDMA

I/2810/2018

GOVERNMENT OF WEST BENGAL
Urban Development & Municipal affairs Department
"NAGARAYAN", 3rd Floor, Block – DF-8,
Sector- 1, Salt Lake, Kolkata- 700 064

No. 1069(2)-UD/O/M/HID/2A-24/2016 **Dated: 06/04/2018**

From: The Joint Secretary to the
Government of West Bengal

To: 1. The Commissioner,
Kolkata Municipal Corporation.

2. The Joint Managing Director,
WBHIDCO Ltd.

Sub: Solid Waste Management Project in Mouza- Chhapna
in Plot No. IIID/6 in New Town, Kolkata.

Sir,

With reference to the above, I am directed to say that in principle this has been agreed that WBHIDCO Ltd. has to give possession of lands and sign lease agreement with Kolkata Municipal Corporation immediately so that projects can be executed as per approval accorded by the State Government.

However, in order to resolve issues related to lease premium as well as approval of the draft Lease Deed, a meeting will be held on 10.04.2018 at 1.00 p.m. in the Conference Hall of Urban Development & Municipal Affairs Department at "Nagarayan" Building.

You are requested to attend the said meeting on the scheduled date and time.

Yours faithfully,

Joint Secretary to the
Govt. of West Bengal

No. 1069(2)/1(3)-UD/O/M/HID/2A-24/2016 **Dated: 06/04/2018**

Copy forwarded for information to the:-

i. Director, SUDA – He is requested to attend the said meeting.
ii. OSD to the Hon'ble MIC of this Department.
iii. PS to the Secretary of this Department.

Joint Secretary to the
Govt. of West Bengal

CONTENT

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LIST OF FIGURES

LIST OF ABBREVIATIONS

BOD	Bio- Chemical Oxygen Demand
BOOT	Build Own Operate and Transfer
BOT	Build Own and Transfer
Br.	Borough
BS IV	Bharat Stage IV
C/N	Carbon / Nitrogen
COD	Chemical Oxygen Demand
CPHEEO	Central Public Health and Environmental Engineering Organization
CUDP	Calcutta Urban Development Project
DPR	Detail Project Report
EIRR	Economic Internal Rate of Return
EKW	East Kolkata Wetland
ELF	Engineered Landfill
EMP	Environmental Management Plan
GHG	Green House Gas
GIS	Geographical Information System
gpcd	gram per capita per day
HDPE	High Density Poly Ethylene
KMA	Kolkata Metropolitan Area
KMC	Kolkata Municipal Corporation
MIS	Management Information System
MoEF	Ministry of Environment and Forest

MSW	Municipal Solid Waste
MSWM	Municipal Solid Waste Management
NGO	Non Government Organization
NIMBY	Not In My Back Yard
PM	Preventive Maintenance
PMC	Project Management Consultant
RPP	Rubber Plastic and Polymer
SLF	Sanitary Landfill
SWM	Solid Waste Management
t/d	Ton per day
TPD	Ton Per Day
ULB	Urban Local Body
WBPCB	West Bengal Pollution Control Board
WTE	Waste To Energy

INTRODUCTION

Background

Solid Waste Management (SWM) is one of the most essential services for maintaining the quality of life in the urban areas and for ensuring better standards of health and sanitation. In India, this service falls short of the desired level, as the systems adopted are outdated and inefficient. Institutional weakness, shortage of human and financial resources, improper choice of technology, inadequate coverage and lack of short and long term planning are responsible for the inadequacy of service.

Kolkata city is one of the four metropolitan cities of India and is the capital of the state of West Bengal. The city is centered on latitude 22° 34' North and longitude 88 ° 24' East. Elevation ranges from 1.5 to 9.0 m. above sea level. The river Hooghly is the principal waterway and forms the western boundary of Kolkata. The region contains numerous low-lying areas, marshes, wetlands and shallow lakes of jheels. The Kolkata Municipal Corporation (KMC) area comprising about 187.33 sq.km. having population of approximately 90,00,000 including floating population and has a density of 24429 per sq.km. Recently 3 wards of Joka area have been included. The city of Kolkata has made a good effort to modernize.

For maximizing efficiency and effectiveness of this service, it is necessary to tackle this problem systematically by going into all aspects of the Solid Waste Management and devise cost effective system which may ensure adequate level of SWM services to all class of citizens, and collection, transportation and disposal of waste in an environmentally acceptable manner in terms of Hon'ble Supreme Court Committee's recommendations as well as Municipal Solid Waste (Management & Handling) Rules,2000.

With a view to improving the efficiency of SWM system in the city of Kolkata, Kolkata Municipal Corporation has prepared the Detailed Project Report (DPR) as "Strengthening primary and secondary Solid Waste Management system in the Kolkata City" and suggests improvements. The report envisages modernization of SWM practices, improvement of services and practices in the city.

Need of the Project

Average waste generation rate is 450-500 gram/capita/day (gpcd). Quantity of municipal solid waste (MSW) generation in the city is about 3800 ton per day (t/d) including silt/rubbish. The city is developing at a rapid pace and the population is expected to reach about 12 million by the year 2020. Kolkata city though has made a good effort to modernize, with the help of private sector, it still has these deficiencies in varying degrees and there is a need to make substantial improvement in the SWM practices prevailing in the city to raise the standards of health, sanitation and urban environment keeping pace with the rapid urbanization and growing population. Hence there is a need for

strengthening and modernization of the present practice with increasing level of private sector participation. Government of India launched urban infrastructure development mission as Jawaharlal Nehru National Urban Renewal Mission (JnNURM) which also encourages preparing Detail Project Report (DPR) for strengthening of solid waste management for Kolkata city.

Objectives

The broad objectives of the Detail Project Report (DPR) are to determine a technically and economically viable solid waste management project for a phased implementation to meet the requirements of the year 2035. Following are the specific objectives:

1. To devise a system of storage of food / biodegradable waste as well as recyclable waste separately at the source of generation of waste;
2. To devise cost effective systems for primary collection of waste from the city in general and from the slums in particular;
3. To devise efficient system of day to day cleaning of streets and public places;
4. To devise systems to eliminate the age old practice of throwing garbage on the streets or outside the dustbins causing nuisance to the people and posing a threat to the health of the community at large;
5. To modernize system of wastage storage depots which may synchronize with the system of primary collection as well as transportation of waste and simultaneously eliminate manual loading of the waste into open transportation vehicles;
6. To improve the system of transportation of waste by following the principle of 'handle waste once only;
7. To promote processing of waste for deriving bio-organic fertilizer, reduce quantity of waste going to landfill site, derive income from the processing of waste and help agricultural production;
8. To ensure safe disposal of waste;
9. Planning for projects identified for JnNURM;
10. Project scheduling and cost estimates;
11. Project phasing;
12. To prepare operational plan;
13. Organizational and financial studies;

Scope & limitations of the study

1. The study is limited to Kolkata city admeasuring area approximately 187.33 Sq. Km;

2. The study is limited to strengthening of the primary collection, development of modern scientific waste compactor stations as transfer stations (storage points) and modernization of transportation in solid waste management system for Kolkata city which are identified and reflected in the DPR.

CHAPTER EXECUTIVE SUMMARY

Introduction

Solid waste management usually refers to the collection, transfer, recycling, resource recovery (composting, waste to energy, etc.,) and disposal of municipal solid waste, "Municipal solid waste is again defined to include refuse from households, hazardous solid waste from industrial and commercial establishments, refuse from institutions, market waste, yard waste and street sweeping (World Bank, 1994). Management of municipal solid waste involves (a) development of an insight into the impact of waste generation, collection, transportation and disposal methods adopted by a society on the environment and (b) adoption of new methods to reduce this impact. (CPHEEO Manual, Jan, 2000). Accordingly, waste management should be an integrated affair, which must include:

- Minimizing waste;
- Maximizing environmentally sound waste re-use and cycling;
- Promoting environmentally sound waste disposal and treatment and;
- Extending the coverage of waste management services;

Need of the Project

The board objectives of the DPR are to determine to strengthen the present level of collection, transportation of Municipal Solid Waste by following the guidelines and practices recommended in "MSW Rules 2000" notified in the Gazette of Government of India by the Ministry of Environmental and Forest (MoEF).
The important steps in formulation of DPR are as under,

- Recognizing the key problems that exists;
- Collecting and analyzing data;
- Addressing the existing situation in light of the analyzed data;
- Suggested action to correct the problems;
- Assessing future need and evolving suitable strategy for implementation with respect to time frame;

- Recommended solution and action plan;
- Possibility of private sector participation in setting up, operation and management of compost plant and Controlled/Sanitary landfill as also in sweeping, collection and transportation arrangement in certain area;
- Community participation and publicity campaign for waste segregation, house-to-house collection and waste minimization programme;
- Recommendation for institutional strengthening;
- Projection of operation and maintenance cost and revenue/resource generation to sustain improved system;
- Implementation schedule and performance evaluation;

City of Kolkata

Kolkata is one of the four metropolitan cities of India and is the capital of the state of West Bengal. The city is centered on latitude 22° 34′ North and longitude 88° 24′ East. Elevation ranges from 1.5 to 9.0 m above sea level. The river Hooghly is the principal waterway and forms the western boundary of Kolkata, however, the natural drainage of the KMC area is away from the river, to the east and south. The region contains numerous low-lying areas, marshes, wetlands, and shallow lakes or jheels. The KMC area comprising about 187.33 km^2, having population of 45, 80,544 as per the 2001 census and has a density of 24429 per sq.km. The day population inclusive of floating population is close to 9 million. The city is divided into 15 boroughs and 141 electoral wards. Quaternary sediments consisting of clay silt and various grades of sand gravel and pebbles underlie the city. The climate of Kolkata is hot and humid. Average temperature ranges between 15° C and 35° C. Relative Humidity varies between 85 percent in August and 68 per cent in March. On an average, the city receives 1650-mm rainfall annually.

Solid Waste Generation, Primary Collection and Segregation of Waste

➢ Municipal Solid Waste Generation

Field survey was carried out to assess the status of MSW generation in each of the 15 boroughs on the basis of waste collection from various collection points. The rate of waste generation varies from 623.97 gpcd (Borough – VII) to 1235.97 gpcd (Borough V) in Borough I to IX classified as Cluster – I. The rate of waste generation from Borough X to XV, classified as Cluster II, is found to be varying from 262.80 gpcd (Borough- XII) to 523.91 gpcd (Borough – X). The average commercial waste generation is about 365-

g/shop/day. The average generation of market waste is around 250g/shop/day. In Borough, I to IX the average generation of waste was 2310 MT/ day (790 gpcd). The household waste generation is 790 MT/day i.e. 270 gpcd, sweeping waste: 527 MT/day i.e. 180 gpcd, Institutional waste: 146 MT/day i.e. 50 gpcd and commercial and market activities including floating population: 847MT/day i.e. 290 gpcd. From Borough X to XV average waste generation from all sources assessed as 609 MT/day i.e. 360 gpcd. It is estimated that total waste generation within the KMC is 3800 MT/day. It is further noted that waste generated by resident population, sweeping and institution activities in Cluster I is 500 gpcd. In Indian conditions this indicated that the generation of garbage has already reached a saturation level and no further increase is anticipated. In case of Cluster II, the business and commercial activities are primarily for consumption of the resident population of this Cluster and thus does not attract considerable floating population from outside the Cluster. Present average rate of generation of waste is around 360 gpcd. It has been considered that with the development of infrastructure and growth of population, an average generation rate of MSW in Cluster II would increase to 500 gpcd by 2017. It is calculated that projected generation of waste will be 3200 MT/day (excluding silt/rubbish) in 2013 and which would be increase to 3465 MT/day in 2035.

A weighted average shows that around 25.3% (w/w) of MSW is made up of such recyclable waste out of the total solid waste being generated in the households. Commercial establishments generate about 51.0% (w/w) of recyclable waste out of the total solid waste generated by them. In both the cases paper is the major recyclable component, followed by plastic and Polythene. Therefore, there is large potentiality of recovery of recyclable waste from the mixed municipal solid waste.

➢ Existing and Proposed Primary Collection System

There are about 10,305 conservancy mazdoor (sweepers) employed to sweep major roads of about 1850 kms, to clean open drains and waste collection from houses/buildings. For SWM service each ward is divided into 7 to 10 blocks and each block is provided with 8 – 10 sweepers. Each sweeper is provided a handcart or tricycle (altogether 6750 nos presently available), a broom and a scrapper to sweep the roads, lane & bye lanes, to clean open drain, collect the waste, load it into the handcart and transfer the same to secondary collection point in form of open vat or Dumper Placer container. Containerized handcart having 4 buckets of 40 to 50 litres has been introduced in some wards to transfer the waste collected into containers (4.5 m^3 & 7.0 m^3). Sometime the waste is directly loaded into vehicles (Direct Loading system) by handcart buckets avoiding double handling of waste.

There is some deficiency in primary collection system, which is summarized below.

- Sweeping and collection in core city area (Borough I to X) is done regularly and is fairly well but sweeping and collection in added area (Borough XI to XV) is not attended regularly and overall services provided by KMC in these areas are not upto the mark.

- Though sweeping and collection in core / old city is done regularly, householders particularly in slum, low-income group and middle - income group as also the shopkeepers throw the waste on streets, roads, open space or open drain after collection hours.

- Storage of waste in container by the householders mainly in slum, low- income group and some middle- income group are not done properly and the waste is dumped outside the vat/containers. Segregation of waste is also not done in any area and mixed waste covering biodegradable, recyclable, demolition / construction and inert waste are disposed of by householders and commercial establishments.

- Above 60 % of primary collection and storage is in the form of open vats, which develop unhygienic condition, foul smell and odour, proliferation of flies, and other diseased vectors.

- A large number of bulk containers and vats with dwarf wall around are in very bad shape needing repair or replacement. In some cases wall of the vat is damaged due to operation of Pay Loader;

Based on Statutory Requirement specified in MSW Rules, 2000 the following action plan would be taken up.

- Stakeholder awareness, segregation of waste at source in rest of the134 words and 100% door to door collection;
- Replacement of open vat and optimization of collection points and shifting of collection point from congested area based on the field study and detailed consultation with SWM officers and municipal councilors;
- Replacement of existing handcart by containerized handcart to avoid double handling and less manpower/ productivity;

- Open vats to be converted into closed body containers or modern scientific waste compactor stations or by movable compactors. Where open vats can not be totally eliminated, the same shall be kept clean after waste collection by providing screen wall and gate and posting vat attendant;
- KMC shall notify waste collection time to avoid littering of waste;
- To introduce penal charges for throwing waste on roads, street, or in open drain;
- Bio-medical and Industrial waste are not allowed to be mixed with MSW and KMC to take stringent action against the defaulters;
- Debris, silt and construction/ demolition waste to be stacked separately and transferred to landfill site and use as cover material;
- To introduce superimposed inspection and monitoring system;

The primary collection models as developed and considered are given below:

- Collection of mixed bio-degradable and recyclable waste into containerized handcart by KMC sweepers and transferred to collection points. Debris and silts to be stacked separately and loaded directly to vehicles.
- Collection of mixed waste from residential area (households) in a containerized handcart by municipal sweeper and transferring to bulk container, open vat or directly loaded to vehicle. Hotel, restaurant and market waste to be collected separately from the source into vehicles and transported to compost plant site. Commercial waste to be collected by NGOs by their own handcart/ tricycle, carried to their godown for sorting and selling for recycling. Debris and silt to be stacked separately on road and collected by KMC vehicles transported to landfill.
- To introduce segregation of waste at sources. Segregated bio-degradable waste from households, hotels and restaurants to be collected by KMC from house to house, transferred to modern scientific waste compactor stations, movable compactors in a containerized handcart and transporting onward to compost plant. Segregated recyclable waste from residential and commercial areas as from institutions to be collected by NGOs from house to house twice in a week for sorting and transporting onward to bulk trader or industry directly. Debris, silt etc. to be stacked separately on roads by the citizen and collected directly into vehicles by KMC.

Model (c) is recommended to be implemented in a phased manner within 5 years. Till such time model (c) is fully implemented, model (b) is recommended to be adapted for borough I to X and model (a) for added areas (borough XI to XV). As per proposed collection model projected requirement of primary collection equipment like containerized handcart and tricycle have been worked out.

➢ Assessment of Municipal Solid Waste Quality

Physical and chemical analysis of household waste, market waste, commercial and hotel and restaurant waste have been carried out. Domestic municipal solid waste samples contain 45.1% fruit and vegetable waste part followed by 8.8% paper. Average density of solid waste is around 400 kg/m^3. Waste from market contains 32.4% leaves, hay and straws, followed by 25.7% fruits and vegetable waste. Waste from the commercial area contains about 51% recyclable waste. Recyclable waste percentage in domestic waste comes out to around 25%. Chemical properties of the waste indicate that C/N ratio is the maximum (22.0) in market waste and minimum (9.3) in hotel waste. Average moisture level in city waste is around 60 %. Average Calorific value from all source of waste is 1832 K Cal/kg. Heavy metals like lead, chromium, zinc, copper and nickel are present in solid waste sample.

➢ Costing –Primary Collection & transfer Stations

Cost of primary collection equipments like push cart with bins, pedal Tri-cycle vans, 4.5 Cu.M containers, 240 litres bins, 1100 litres bins, 78 number of modern scientific waste compactor stations as transfer stations has been worked out and mentioned in Chapter 3.

Existing and Proposed Secondary Collection and Transportation System

➢ Existing Situation

Presently mixed wastes (bio-degradable and recyclable) are collected from residential, commercial and market area and brought to secondary collection points which are in form of 4.5 m^3 and 7.0 m^3 capacity bulk containers or open vats. There are about 662 such collection points of which about 388 i.e. 58 % are open vats and the rest (42%) are in form of bulk containers or direct loading. About 60% of the total collected waste is transported from collection point by Private agency. They are carrying on an average about 5.5 MT/ trip. The remaining 40% of the collected waste is transported by KMC own vehicles, carrying on an average about 3.5 - 4 MT / trip. The vehicles used by KMC are tipper trucks of 6 – 8 m^3 and 10 – 12 m^3 capacity (manually and mechanically

loaded) and Dumper Placer of 4.5 m^3 and 7.0 m^3 capacities. Around 40% of the total waste collected by KMC is transported by Dumper Placer and the rest by tipper trucks. About 70 % of the municipal vehicles are more than 8 years old. Cost of transportation by private agency varies from Rs. 310 per MT to Rs. 370/-per MT. There are 11 garages and workshop deploying about 450 staff for servicing, repairs and maintenance of about 400 vehicles including jeep, breakdown van, water tanker, bulldozer etc. Total number of conservancy vehicles transporting / helping in collection of Municipal Solid Waste such as trucks, tipper trucks, dumper placer vehicles, tractor trailer, refuse collector, pay loader etc. are about 245, of which about 180 are in working condition. Out of these 180 vehicles in working condition, on an average 120 – 130 vehicles are presently operated daily.

❖ Deficiencies in the present transportation system

- About 58 - 60% of collection points are in the form of open vat and the waste is lifted daily. However number of collection points remains in bad condition due to citizen dropping the waste haphazardly at the collection point after the clearance is done.

- In case of Dumper Placer container points, all containers are not cleared on day-to-day basis. More than 30% of the containers are lifted twice in a week to once in a week creating there by unhygienic condition and inviting public complaints. This is partly due to shortage of Dumper Placer vehicles.

- Dumper placer containers and KMC vehicles are not washed daily or periodically even once a week. This results in heavy corrosion giving ugly appearance and reduced life.

- Average O&M cost (excluding depreciation and interest on capital) of KMC vehicle is more than private vehicles.

- Fuel consumption is not monitored as kilometer-reading meters of all vehicles are damaged and fuel is issued on trip basis, which is very high. The fuel issued on ad-hoc basis is nearly twice the standard fuel consumption. The loss to KMC because of non monitoring of fuel consumption.

- Due to bad conditions of roads and facility at waste disposal site, the wear and tear on vehicles is very high.

- Preventive maintenance (PM) schedules and programmes are not in existence. Preventive maintenance is not introduced in KMC garages.

- Superimposed inspection and monitoring of vehicle and work performance are not in practice.

With a view to suggest improvements in transportation system fulfilling the requirements laid down under MSW Rules, 2000, the existing system and available data (secondary) were reviewed and required primary data generated. This includes:

- Survey of existing collection points, to assess waste generation at each point and feasibility of converting open vats into modern scientific waste compactor stations or implementation of number of movable / mobile compactors and also to assess minimization of collection points;

- Conduct sample surveys for resident households, major markets, commercial centers, hotels and restaurants, institutions, hospital and health units to ascertain their preferred option for primary and secondary collection of waste as also their willingness to pay for the improved system;

- Assessing potential of segregation and quantity of recyclable waste that can be processed and reused reducing there by the waste quantity to be transported to landfill;

- Assessing the status of existing vehicles garage wise, to assess their condition and performance and to determine their future utilization or not;

- Carrying out cost economics analysis for various type and capacity of vehicles to select best option;

- Assessing the preference of KMC regarding mode of transportation;
- Assessing feasibility of private participation;
- Based on the above mentioned studies and analysis of primary and secondary data generated, Borough wise collection and transportation plans are prepared.

- Considering assessed waste generation, proposed collection points, requirement of average vehicle trips, standby vehicles as 15%, the present (2013) vehicle requirements are worked out and shown under Table 2.9.

➢ Costing - Secondary Collection and Transportation

36 numbers, Prime mover-chassis mounted hook loader capable of lifting portable compactor of capacity 10.5 m^3, 30 numbers Truck-chassis mounted rear end auto loading movable compactor with tip cart and 20 numbers truck-chassis mounted rear end auto loading movable compactor with 4.5 Cu.M containers / different capacities of bins are suggested. Cost of these items is mentioned in Chapter 3.

➢ Solid Waste Treatment and Disposal System

➢ Present Status

More than 95% of total waste generated in KMC area is disposed at Dhapa landfill site and the rest at Garden Reach dumping ground. It can be seen from the survey that about 21.5 Ha of land is now available for waste disposal. Remaining areas are occupied vegetable cultivation, composting, slum clusters etc.

500 TPD compost plant is set up by M/S. Eastern Organic Fertilizer Ltd. with technical back up of Excel Industry, Mumbai and MSW is processing by Windrow method.

❖ Deficiencies in the Present Disposal System

- The method of operation of Dhapa waste disposal site is also uncontrolled without providing earth cover, liner and leachate collection and treatment.
- Mechanized compost plant of 500 TPD capacities set up by Excel Industry which needs further augmentation.
- Rag picking carried out at Dhapa site for recycling and reuse of recyclable waste is most unorganized, hazardous and unhygienic way, affecting seriously the health and safety of rag pickers.

➢ Processing and Treatment Options for Disposal of Solid Waste

Treatability for the processing of solid waste depends on the Physico-chemical characteristics of the waste. Due to nutrient value of organic matter, percentage of

biodegradable component in MSW is the most important factor influencing the treatability. Municipal Solid Waste collected from household, market and commercial areas is analyzed recently and the results show that that the waste contains large quantity (48.6%) of biodegradable components and hence is suitable for composting. Further it also contains large quantity of inert matters and sizeable quantity recyclable matter. If silt and debris are not mixed with household and market waste and segregation of recyclable and biodegradable waste at source is adopted, the composting can be carried out efficiently and economically and the waste going to landfill can be reduced by 25 to 30% and life of the landfill site at Dhapa can be extended saving there by a huge investment on land acquisition.

The biodegradable waste can be processed by aerobic composting, vermi -composting, anaerobic digestion or any other appropriate biological processing for stabilization of waste. It should not be sent directly for disposal. Regarding municipal solid waste to energy, it should be either thermally treated or biologically treated. The other options are Pyrolysis and Plazma technology which are not cost effective. A short description of methods of treatment like aerobic composting, incineration, pelletization, bio-methanation , Pyrolysis and plazma and processing technologies with their merits and demerits, overall review of technologies adopted in India but feedback on their performance are not discussed in DPR. In view of the above scenario, we are left with the following two technologies which are more suitable for treatment and disposal of MSW generated in KMC area.

- Windrow composting

- Sanitary (Engineered) landfill at decentralized or centralized location

Both these technologies are the least cost and economically viable if segregation of waste into biodegradable and recyclable components at source is adopted and inert matters like silt, debris and sweepings are not mixed with household and market waste.

➢ Recommendations for Treatment and Disposal of MSW Collected by KMC

- Vigorous campaign for public awareness, segregation of waste and placing biodegradable waste into community bin. Segregation of waste into recyclable and biodegradable waste at source to be introduced particularly in major markets, hotels, restaurants & catering houses, marriage/ceremony halls,

housing colonies / complexes and high income group areas and extending to entire KMC area in next 3 to 4 years.

- Silt, debris and sweeping not to be mixed with household and market waste and to be stacked, collected and transported separately to the disposal site for using as cover material.

- To develop an Engineered Landfill following the guidelines incorporated in Municipal Solid Waste (Handling and Management) Rules, 2000 issued by MoEF, G.O.I. to provide leachate treatment facility in form of waste stabilization pond. Active landfill will be developed with 1(V) : 7.5 (H) slope and would have life of 25 years.

- To upgrade the present waste disposal site at Garden Reach following MSW Rules, 2000 and develop into Engineering landfill (ELF) for disposal of waste generated in borough XIV and XV.

Strategy for Future Planning for the First 10 yrs of the Project Horizon (i.e upto 2023)

KMC plans to set up an Engineered Landfill. This waste disposal facility would last for about 25 years.

- Existing 500 TPD compost plant was set up by private entrepreneur presently needs its augmentation.

- Segregation of waste at source to be introduced in remaining 134 wards immediately and to be completed in next 2 to 3 years. This would reduce the waste quantity brought to landfill site considerably.

- To set up 1000 TPD capacity "waste to energy" waste treatment facility on pilot basis. KMC has already received two proposals and now under consideration.

- To set up 4 to 5 vermi-composting plant at decentralized locations in borough XI to XV as demonstration project preferably on BOT or BOOT basis through NGO or private entrepreneur.

- **Economic Analysis and Measures to Generate Additional Revenue**

The purpose of the economic analysis is to test justification of the project by assessing whether the anticipated benefit of the project exceeds or falls short of the cost. The Economic Internal Rate of Return (EIRR) is used as a measure to assess the extent to which the project exceeds or falls short of the required performance measures of the opportunity cost of capital. Economic analysis has been performed on SWM programme proposed in Chapter 7 & Chapter 8.

Financial projection of revenue and recurrent expenditure of KMC's SWM services have been carried out. Basic assumptions of cash flow have also been mentioned in Chapter 8. Tariff and cost will be recovered as per KMC revenue model.

- **Solid Waste Management-Institutional Aspects and Capacity building Including Training**

In order to improve the solid waste management services it is essential to adopt modern methods of waste management and to have a proper choice of technology, which can work in the given area successfully. Simultaneously, measures would be taken for institutional strengthening and internal capacity building so that the investment and efforts made to improve the services can be sustained over a period and the system put in place can be well managed. Institutional strengthening can be done by adequately decentralizing the administration, delegating adequate powers at the decentralized level, inducting professional into the administration and providing adequate training to the existing staff. It is also necessary to fix norms for the work force as well as for supervisory staff to improve the manpower and productivity/optimum output expected from the vehicles and machinery utilized. NGO/private sector participation also needs to be encouraged to make the service competitive and efficient. In order to make SWM services efficient and to assess and monitor efficiency and performance of the workforce and machineries as per the norms fixed as also to control and monitor O&M cost of the entire SWM system.

- **Solid Waste Management – Management Information System (MIS)**

Good management requires collection of critical information, which is not just for keeping the records upto-date but used effectively for taking corrective measures as

well as proper planning for future. Some information is, therefore, required to be collected to have an overall idea of the prevalent situation, deficiency in the system. With the advancement of information Technology, Geographic Information System (GIS) could be introduced in large cities and MIS may be integrated in this system. Similarly, there is a need for a citizen interface to seek comments, suggestions, utility services etc.

Presently online central server system and CCTV networking system have been introduced at the disposal site. Online grievance on SWM system (complain module) is also available. Introduction of MIS particularly for upgradation of information time to time, general information on SWM, monitoring of SWM services, daily and weekly report requirement, vehicle log book etc. which would improve the performance of SWM department of KMC.

➢ Private Sector Participation in Solid Waste Management

➢ Present Scenario

Private sector has so far not been attracted in this important area of municipal service. However, private sector participation is being attempted by a few local bodies in the country for the last two decades, which has remained restricted in the area of awarding contract for transportation of waste from waste storage depots/dust bins.

➢ Area Where Privatization can be Attempted- Recommendations

Private Sector participation in Solid Waste Management is recommended for KMC in the following areas:

- Door to door collection of segregated recyclable and biodegradable waste from large colonies / complexes, commercial areas, markets, hotels and restaurants on cost recovery basis.
- Setting up and operation of compost plant with suitable financial model.
- Transportation of waste by stationary compactors, movable compactors etc. which eliminates open vat points or containers.
- Operation and maintenance of KMC owned vehicles particularly garbage collectors and compactors for collection and transportation of waste from commercial and market areas. Alternatively, to award the collection and transportation of waste from specified residential, commercial and market areas

on cost recovery basis by private agency with their full investment on equipment and labour.

- Operation of waste disposal / engineered landfill facility by private entrepreneur using KMC machinery and their own labour force.
- Periodical maintenance and painting of dumper placer containers and other vehicles by private agency.

CHAPTER 1 SECTOR BACKGROUND CONTEXT & BROAD PROJECT RATIONALE

1.1 City Profile

1.1.1 Location and Topography

Kolkata is one of the four metropolitan cities of India and is capital of the state of West Bengal. It lies within the tidal reaches of the Hooghly (Ganges), an area that is mostly flat and slopping in general from north to south. The city is centered on latitude 22° 34′ North and longitude 88° 24′ East. Elevation ranges from 1.5 to 9.0 m above sea level. The river Hooghy is the principal waterway and forms the western boundary of Kolkata, however, the natural drainage of the KMC area is away from the river, to the east and south. The city is approximately 30 km from the Bay of Bengal and river tides at Kolkata range over 4 m.

The region contains numerous low-lying areas, marshes, wetlands, and shallow lakes or jheels. The East Kolkata Wetlands (EKW) was originally formed from tidal action leaving salt lakes and marshes (CMWSA, 1994). The KMC area is now the nucleus of Kolkata Metropolitan Area (KMA). KMA comprises three municipal corporations, 38 municipalities and several Panchayet Samitee. It has an area of 1700 km² and a population of about 12.5 million. The KMC area is small part of KMA comprising about 187.33 km², having population 90,00,000 including floating population and has a density of 24429 per sq.km.

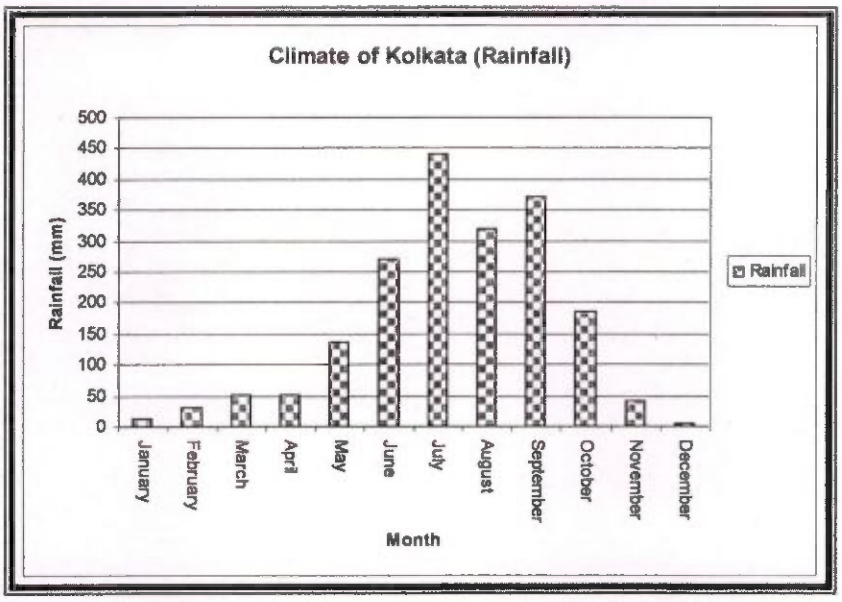
1.1.2 Soils / Geology

The city is underlain by quaternary sediments consisting of clay, silt and various grades of sand gravel and pebbles. Litho logical logs show the presence of clay bed at the top of the geological succession with thickness varying from 10 to 40 m. There is a further clay bed between 250 and 650 m approximately below ground level. A group of granular aquifers is found between these layers, and these are being tapped as a ground water resource. The area is seismically stable.

1.1.3 Climate

The climate is hot and humid. Average temperature and precipitation are shown in Figure 1.0. The winter begins in November and continues to February, followed by summer season, which continues until mid-June. The monsoon starts from mid-June and continues up to mid-September and sometime extending up to October. Relative Humidity ranges between 85 percent in August and 68 percent in March. On an average, the city receives 1650 mm of rainfall annually. Fog is frequent in the city during winter indicating high relative humidity and the presence of

aerosols in abundance. The winds are predominantly southerly, south westerly and south easterly during the summer and monsoon seasons. The wind speeds are higher during the seasons. In winter months North, North West and North East directions are predominant with comparatively few Calm periods.



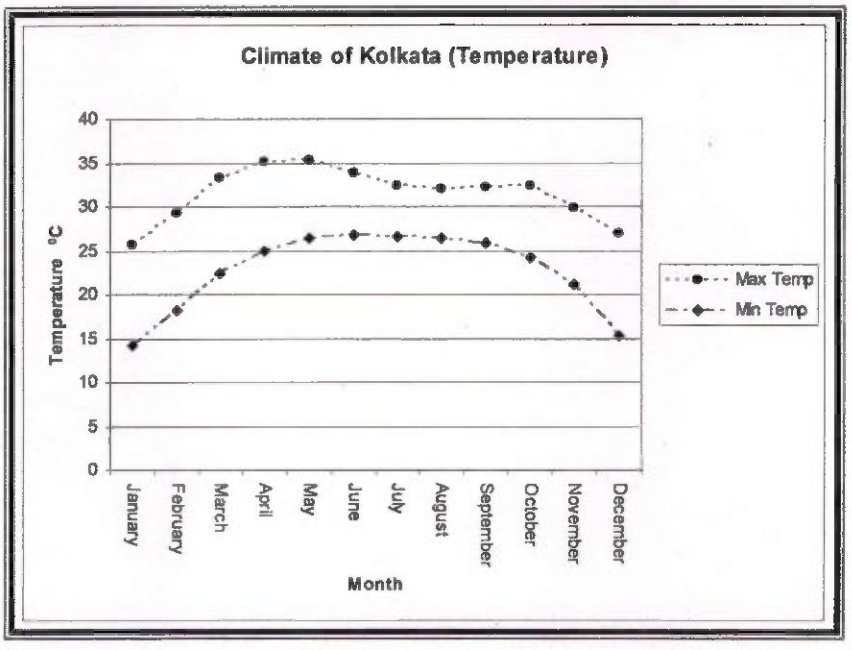
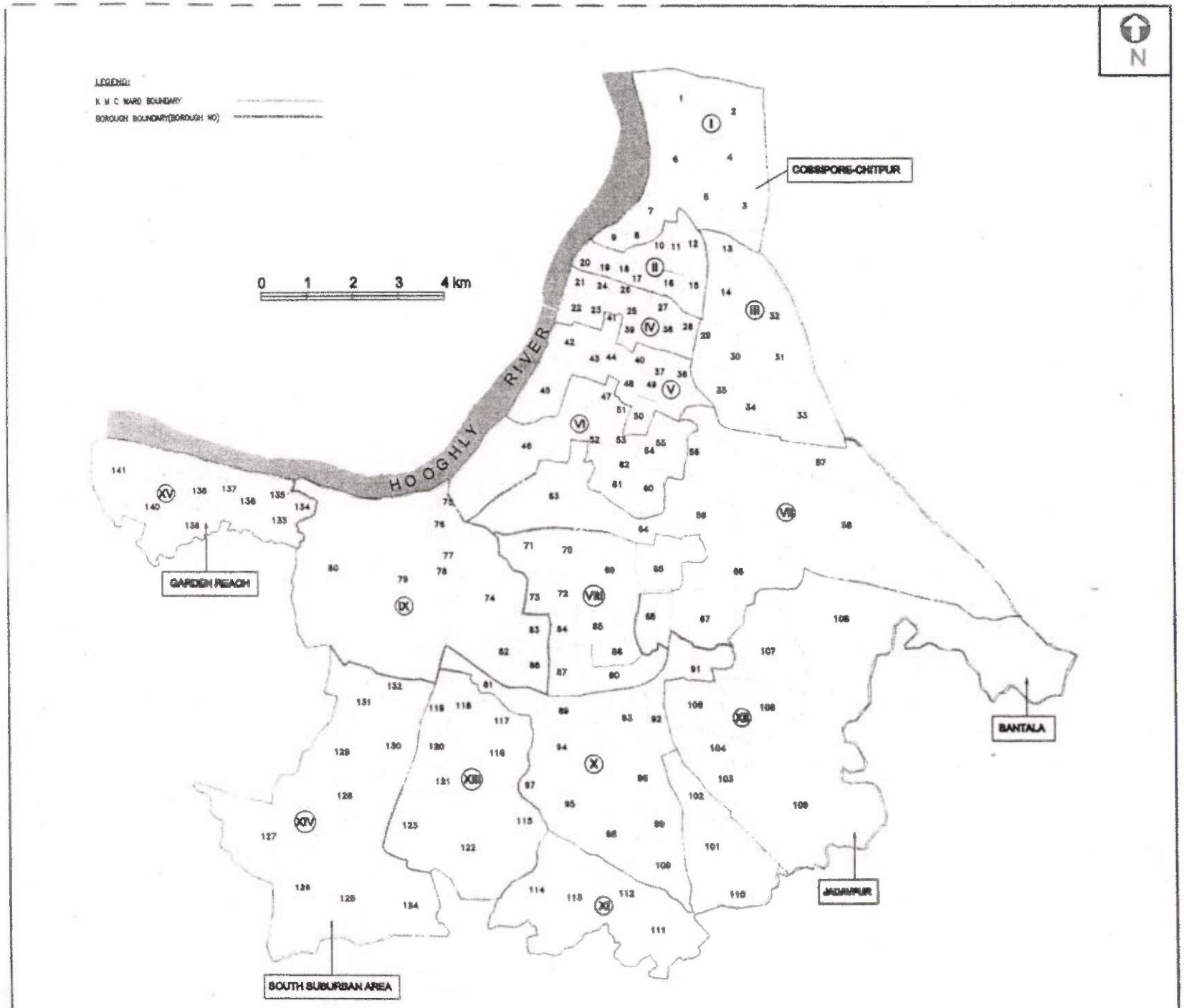


Figure 1.0: Climate of Kolkata



SWM MASTER PLAN: Kolkata City Overview

1.1.4 History of Development of Kolkata & SWM in KMC Area

The city of Kolkata was formally established by Job Charnok, a leading English merchant, in August 1690, on the banks of the river Hugly, primarily to promote the trade and business interests of the East India Company.

The discovery of coal and iron in Kolkata's hinterland in the later part of the 19th Century encouraged Britain to set up engineering, jute and manufacturing industries in and around Kolkata. The subsequent industrial growth and rapid urbanization in Kolkata led to working class people from all over eastern and northern India pouring into the city in search of employment. The city started growing in a somewhat haphazard manner, leading to unplanned spatial development and incongruous mix of land uses. People found cheap accommodation mostly in huts made up of mud and bamboo constructed by middleman. A sharp increase in the number of these huts without basic Infrastructural facilities eventually led to the growth of the slums in certain parts of the city. The partition of the Bengal in 1947 resulted in large scale migration of refugees from the erstwhile East Pakistan (now Bangladesh) to Kolkata. Economic compulsions forced a large number of refugees to take shelter in slums. Besides, relatively better prospects of income and employment opportunities in the city encouraged a good number of people from the rural areas of West Bengal to migrate to the city. This led to added pressure on the existing slums and new slums started coming up on vacant land, usually in low lying areas which regularly got flooded during the monsoons. The densification of slums in the Kolkata Metropolitan Area (KMA) went on unabated and more and more vacant areas got filled up.

The unplanned urbanization of the city has resulted in existence of areas of affluence and misery side by side. It is a common sight to find modern multi-storied buildings situated in close proximity to undeveloped slums in different areas of the city.

The low lying area to the east of Kolkata is the back swamp region of the river Hooghy. The tidal creek Bidyadhari was the main spill channel for the river. The tidal channel completely silted up and the area turned into a marshy land. With silting up of Bidyadhari vast Salt Lakes were formed in the eastern part of the Kolkata. In the latter part of the 19th century, sewerage and garbage came to be disposed in this area. The old reports of the then Calcutta Corporation mentioned that dumping was resorted to , for raising and reclaiming the embankment "Square mile" acquired by the justices in 1866.

From 30th April, 1879, the Local Administrator, Metcalf made a contract with Bhabanath Sen for disposal of garbage. The condition laid was that the corporation would arrange the city garbage by Circular Railway and Sen Company would unload it. In addition, he would enjoy the right to cultivate the reclaimed lands. The Sen Family distributed the land to local cooli / majdoors who had migrated from neighboring Bihar and Orissa, and also from Midnapore and other parts of the state.

Up to 1968 about 110 wagons of garbage per day were distributed in this area. This system has been replaced since 1974 by tipper trucks and pay loader vehicles.

In the early seventies, the non-delivery of basic waste collection services in Kolkata was causing considerable concern to the civic authorities. To address this problem, the SWM component of the first World Bank aided-Calcutta Urban Development Project (CUDP) concentrated mainly on the provision of vehicles and equipment to enable CMC to provide at least a basic service.

This having been established by 1979, CUDP II attempted to upgrade CMC's capability to maintain its vehicle fleet by the provision of two new garages cum workshops and the rehabilitation of three of the existing district garage cum workshops. Investments were also made on all-weather roads and plants as a first step in moving from crude dumping to semi-controlled landfill for the increased quantities of wastes being collected. Management was strengthened by combining the Motor Vehicle and Conservancy Sections into a single Department under the control of an experienced and qualified Chief Engineer recruited from the private sector. Additionally, the All India Institute of Hygiene and Public Health (AIIH&PH) was commissioned to undertake a pilot project to test out improved primary collection systems based on the "handle-once-only' principle.

The SWM component of CUDP II, from 1984 onwards, was designed to build on what had already been achieved in CMC by the construction of ward depots, introducing a primary door-to-door collection service and extending containerization to obviate roadside waste dumps.

Improvements made in SWM service delivery during 1981 to 1988 could not be maintained. During 1999-2000 efforts were made to improve collection and transportation system by procurement of new vehicles (Tipper trucks and Dumper placer with container). House to house collection was also introduced in number of wards. Under private sector participation initially 750 ton per day capacity semi-mechanized compost plant was set up to treat municipal solid waste and converting into manure/soil enricher. Segregation at source, collection and disposal of Bio-medical waste was also introduced. In spite of the some measures mentioned above, SWM services could not keep pace with the increased development and waste generation.

The Municipal Solid Waste (Handling and Management) Rules were notified by the Ministry of Environment & Forest (MoEF) in September 2000, making it mandatory for ULBs to improve their waste management systems, as envisaged by the Rules. Now with reference to provisions and guidelines prescribed in MSW Rules, 2000 KMC has prepared the DPR to strengthen and modernization of primary collection and transportation sector of MSWM in Kolkata.

a) Promoting stakeholder awareness for better waste management, segregation and storage of waste at source by public participation and involving NGOs as also education and training to trash sorters (rag pickers).

b) Extending house to house collection system to the entire KMC area to keep the roads and street clean.

c) Introducing segregation of waste at source in a phased manner to improve reuse and recycling of waste and to maximize compost plant capacity and efficiency.

d) Use of containerized handcart to avoid manual and double handling of waste and make handling of waste more hygienic.

e) Conversion of unhygienic open vats into modern scientific waste compactor stations.

f) Introduction of mechanical sweeper to make sweeping operation efficient, dust free and reducing manpower.

g) Providing adequate primary collection equipment and fuel efficient closed body vehicles like 10.5 Cu.M stationary compactors, 14.0 Cu.M mobile / movable compactors etc. for transfer and transport of waste making collection and transportation system safe, hygienic and efficient.

h) Improvement and modernization of garages and workshop facilities and introduction of route planning to improve the performance of staff and equipment.

i) Improvement of infrastructure at waste disposal ground and providing safe, economical, environmental law compliant treatment and sanitary landfill facilities.

j) Providing improved handling, transport and cost effective and safe disposal of bio-medical and hazardous waste facilities as per the Rules by KMC or through public private partnership.

k) Institutional strengthening and improved financial management achieving sustainability by effective resource mobilization.

1.2 Present Scenario of Solid Waste Management in Kolkata

General: Solid waste generated in the city (KMC area) is in the range of 3200 TPD (excluding silt / rubbish) and average collection about 90% of total waste generation. Per capita generation of waste is approximately 450-500 grms/capita/day. Bio-medical waste generation is approximately 1 to 1.2 kg /bed/day.

1.2.1 Sweeping and Waste Collection

There are about 10,305 conservancy mazdoor (sweepers) employed to sweep major roads of about 1850 kms, to clean open drains and waste collection from

houses/buildings. The city is divided into 15 boroughs and 141 electoral wards. Figure 1.1 shows distribution of wards in the 15 boroughs. For SWM service each ward is divided into 7 to 10 blocks and each block is provided with 8-10 sweepers. Each sweeper is provided a handcart, a broom and a scrapper to sweep the roads, lane & bye lanes, to clean open drain, collect the waste, load it into the handcart and transfer the same to secondary collection point in form of open vat or Dumper Placer container. Containerized handcart having 4 buckets of 40 to 50 litres was introduced in some wards to transfer the waste collected into containers (4.5 m^3 & 7.0 m^3). Sometime the waste is directly loaded into vehicles (Direct Loading system) by handcart buckets avoiding double handling of waste.

To achieve full collection from households and to avoid waste throwing on the road, street or open drain, a system of house to house collection has been introduced (in some area) wherein the sweeper move along a road or street of locality with handcart and alert householder by whistling so that they can put their waste into the handcart. The waste collected by sweeping and house collection is then transferred to the specified secondary collection point or vat for its onward transportation to the waste disposal ground. The system is found to be working satisfactorily. KMC has recently modernized 4 number of modern scientific waste compactor stations at Kalighat Park, Lake Kalibari (Southern Avenue), Tala Park and Ballygunge Circular Road opposite to AAEI club and installed 16 number of stationary compactors (Figure 1.2).

Figure 1.2: Modern scientific waste compactor station at Kalighat park

1.2.1.1 Features of Portable Compactors

Portable or stationary compactor is flexible for limited installation space requirements with novel appearance within the city. There are many different options for the tipping device to fit with different loading methods, such as bag collection, ISO standard bin collection, manual cart collection and small motor vehicle collection. Portable compactors are mainly used for waste collection and transportation at urban waste collection points, residential areas, communities, hospitals and comprehensive sports facilities. It's the ideal choice for new stations and modification of old waste collection points with limited space.

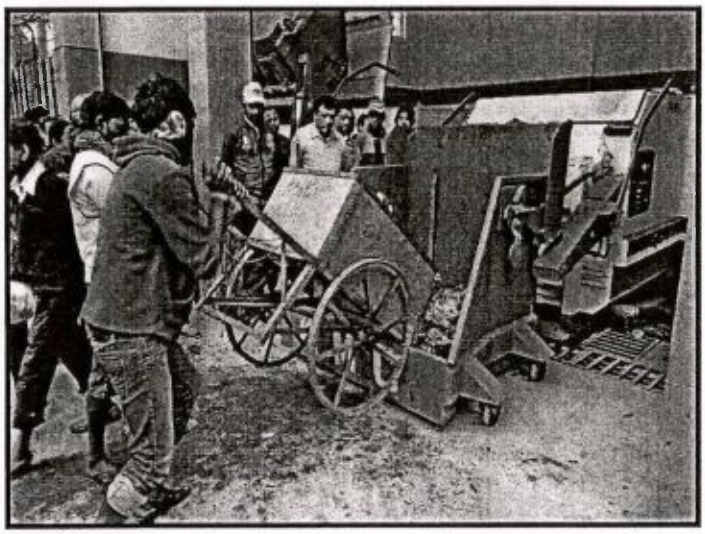


Figure 1.3: Transfer of MSW from handcart to compactor bin cart

1.2.1.2 Functioning and Work Flow

A compactor compresses wastes into a smaller volume so that less storage capacity is required. These units are fixed and used in conjunction with a removable fully enclosed skip. The compacting operation will result in a greater density and therefore, greater weight of waste in a given value. Static compactors are suitable in these locations where a considerable volume of wastes is likely to be produced. The space required will vary depending on the skip capacity. Static compactors can achieve volume reductions in the region of 4:1. The site is designed to accommodate the compactors.

The portable compactor and compactor station, a modern scientific eco friendly system being introduced for garbage handling & disposal is an ideal system for Kolkata. Without disturbing the present primary collection system being maintained by the existing KMC mazdoors, the garbage will be directly unloaded into the bin cart (Figure 1.3 & 1.4) and then into the compactor for automatic compaction inside the compactor (Figure 1.5). Garbage will be continuously loaded and compacted into the compactors during the day time i.e. from early morning to evening.

Figure 1.4: MSW in compactor bin cart

Figure 1.5: Transfer of MSW from bin cart to compactor for automatic compaction

During the night, the prime movers fitted with hook loading system will lift the compactor filled with garbage and will drive down to disposal site and unload the garbage and return back with the empty compactor and place the same in the compactor station. The prime mover will then lift the next loaded compactor and thus the process will be repeated till all the loaded compactors are emptied at disposal ground. The water contents coming out of the compacted garbage will be drained out through proper drainage system. The compactor station will be maintained neat and clean throughout the day and night.

1.2. 2 Transportation System

Presently mixed waste (bio-degradable and recyclable) are collected from residential, commercial and market area and brought to collection points which are in form of 4.5 m^3 and 7.0 m^3 capacity bulk containers or open vats. There are about 662 such collection points of which about 388 i.e. 58% are open vats and the rest are in form of bulk containers or direct loading. About 60 % of the total collected waste (total amounting to about 3200 TPD) is transported from collection point by private agency. The vehicles used by private agency are mainly open trucks loaded manually by 3 to 4 labourers and covered with tarpaulin or plastic sheet during the transport to dumping site. They make about 260 trips carrying on an average about 5.5 MT/ trip. The vehicles used are mainly old vehicles. The remaining 40 % of the collected waste is transported by KMC own vehicles, making about 330 trips carrying on an average about 4 MT / trips. The vehicles used by KMC are Tipper Trucks of 6 – 8 m^3 and 10 – 12 m^3 capacity (manually and mechanically loaded) and Dumper Placer of 4.5 m^3 and 7.0 m^3 capacities. Around 40 % of the total waste collected by KMC is transported by Dumper Placer and the rest by Tipper Trucks.

KMC has already introduced prime mover chassis mounted hook loader capable of lifting portable compactor of capacity 10.5 m^3 (Figure 1.6).

Figure 1.6: 10.5 M^3 portable / stationary compactor

1.2. 3 Treatment and Disposal System

There are presently two sites for solid waste disposal, out of which Dhapa waste disposal ground receives approx. 95% of total waste collected from the city. Waste is regularly levelled and dressed by bulldozers.

For converting biodegradable waste into manure/soil enricher, a 500 TPD capacity semi-mechanized compost plant has been set up under private-public partnership. The operator is responsible to sell the compost.

1.2. 4 Bio-medical Waste

KMC was earlier collecting the waste from those bio-medical generators who did not have the treatment facility and disposing the same at waste disposal site by deep burial method. Now a private enterprise has come forward and is permitted to set up bio-medical waste treatment and disposal facility and provide collection and transportation services, as per Bio-medical Waste (Handling and Management) Rules, 1998 on payment basis. The private entrepreneur will make the full capital investment, however Municipal Corporation has provided land at nominal rent and the private operator would charge per bed per day for treatment and disposal of bio-medical waste to hospital, nursing home, clinics etc. availing of the services. From 1st April 2004 collection and treatment of bio-medical wastes of KMC and other areas, has been started at Howrah by the SEMBRAMKY a private organization and the processes are used (i) Autoclaving and (ii) Incineration.

1.3 Projects Proposed for the MSW Sector in the CDP

KMC endeavours to provide a safe and environmentally benign sanitation and municipal solid waste services to its citizens. To this extent many initiatives have been taken up for improvement of MSW collection practices. The provision of services in future would be in compliance with the applicable statutes including the "Municipal Solid Waste Management and Rules, 2000. The projects proposed for MSW sector in the City Development Plan are set out in this section.

a) Collection and Transportation of MSW

The activities would include collection of MSW from the different waste generators such as domestic households, commercial establishments, hotels, institutions etc., sweeping of streets and subsequent transportation of the waste collected, to the processing facility or the final disposal site. The activities envisaged would be undertaken with the assistance of private agencies / NGOs and with participation of local populace.

b) **Treatment and Disposal of MSW**

KMC also desires to increase the efficiency of existing compost facility and development of a sanitary landfill facility in accordance with the MSW Rules. The rehabilitation and development works could be undertaken under an appropriate public private partnership framework.

c) The proposed project for MSW management system in the city includes streamlining of MSW collection & transportation system. The project aims at achieving 100% efficiency in collection & transportation of MSW. The proposed project is hence in line with the strategy for MSW management set out in the CDP.

1.4 Other Capital Expenditure Projects (ongoing and sanctioned)

KMC has no such ongoing and sanctioned project on solid waste management. KMC has now, therefore prepared a DPR for modernization and strengthening of primary collection and transportation sector of municipal solid waste management of Kolkata for assistance of JnNURM funding.

1.5 Existing Tariff & Cost Recovery Methods

The existing cost recovery scenario for the services provided by KMC with respect to MSW management is discussed below.

1. **Past five year trends**

   For the services provided by KMC for collection and transportation of MSW, there are no service charges / user charges that have been collected from residential houses in the past five years. However, KMC has been collecting user charges from commercial areas as per the tariff set out in the KMC budget of every year.

2. **Existing cost recovery methods**

   In order to recover part of the service delivery costs incurred for delivery of MSW management services, KMC had passed a resolution in every year's budget, specifying the user charges payable by the citizens/bulk generators. The resolution is under implementation and the collections of user charges from various generators are attached in chapter 7.0.

1.6 Areas of Private Sector / Community Participation

KMC has taken initiatives towards privatizing MSW management activities in parts of the city. The scope of work of the operators involves sweepings of roads and streets in the added areas of Borough XI, XII, XIII, XIV and XV, operation & maintenance of prime mover and stationary compactors in transportation of the waste to the designated disposal point, as indicated by KMC. The areas where collection and transportation of MSW are privatized are set out in Table 1.0.

Table 1.0 Details of privatized MSW management activities

Description of works	Wards	Value (Rs)	Vehicles engaged by the operators
1. Collection of segregated inorganic waste from each and every house and other establishments including regular awareness campaign in different wards under SWM department.	33,47,64, 103,110, 115&130	Rs. 2,72,37,912/- per annum.	7 number vehicles
2. Sweeping in primary collection	5,6,13,14 ,29,31,34 ,35,57,59 and 101 to 141	Rs. 21,71,10,372/- per annum.	About 2067 number Handcarts and Tricycles
3.Transportation			
3(a) Transportation of Garbage/ Stilt Rubbish /Tree branches etc. from vats place within the KMC area and disposal at Dhapa dumping ground.	1 to 141	Rs. 42,00,000,00/- per annum.	230 number open trucks.
3(b) O&M for 10.5 Cu.M portable compactors at (i) Kalighat park (ii) Southern Avenue.		Rs. 2,61,079/- per annum Rs. 2,61,079/- per annum	5 number prime movers

(iii) Tala Park (iv) Ballygunge Circular Road		Rs. 2,61,079/- per annum Rs. 2,61,079/- per annum	
3(c) For covered tipper truck		Rs 1,00,000,00/- per annum	19

1.7 Other Qualitative Information

The key issues with respect to the current MSW management practice in KMC are set out below:

a) Segregation of different MSW streams in all wards is not being practiced in the city.

b) The current collection and transportation practice involves multiple handling of MSW which is not in accordance with the MSW Rules.

c) Open vats are accessible to birds, animals and rain water.

d) Odour problems fro open vats and container points and from open trucks or dumper placer during transportation.

e) Scattering of waste at the vats when rag pickers search recyclable materials

f) The road length to be covered per sweeper in street sweeping is about 2.2 km per sweeper, which has resulted in inadequate sweeping of the main roads, while interior roads and bye lanes are often left unattended.

g) Lack of periodic medical checkups for mazdoors and absence of standard accessories/equipment for street sweeping, has resulted in exposure to health hazards.

h) Spilling of garbage during transportation.

CHAPTER 2 PROJECT DEFINITION, CONCEPT AND SCOPE

A state policy on integrated MSW management ("State Policy") has been prepared and guidelines have been set out for the service provider for collection, transportation, treatment and disposal of MSW and the ULBs in the state are required to adopt these guidelines for management of MSW. The touchstone principles of the State Policy are set out below. The touchstone principles, which govern the future approach to provision of MSWM services, include the following:

- Promoting awareness of waste management principles among citizens and other stakeholders.
- Minimizing multiple and manual handling of waste, and designing a system to ensure that MSW does not touch the ground till treatment and final disposal.
- Defining the roles and responsibilities of various stakeholders and putting in place an operating framework, which would include appropriate contractual structures.
- Developing systems for effective resources utilization and deployment.
- Promoting recovery of value from MSW; developing treatment and final disposal facilities, which, while adhering to the statutory requirements, are sustainable, environmentally friendly and economical.

Management of MSW, to reduce the impact on the environment, requires an integrated approach involving components such as collection from various generators, segregation of MSW at source, recycling of the waste, reuse, disposal, etc. Healthy environment demands an integrated approach that involves complementary use of a variety of practices to handle the MSW stream safely and effectively with the least adverse impact on human health and the environment. Integrated approach would need to be adopted to amalgamate three stages of MSWM, namely collection & transportation, treatment and disposal. The adoption of this approach would stream line MSWM.

Based on the guidelines set out in the MSW Rules and the State Policy, action plan for strengthening of primary and secondary solid waste management system in Kolkata city has been prepared. The tools and equipment recommended for implementation of the collection & transportation system is in accordance with the action plan. Door to door collection systems including segregation of recyclable materials as per the action plan would be through the use of auto tipper vehicles and pushcarts. Street sweeping, silt would be directly transferred to the sanitary landfill site using other vehicles. Open vats would be eliminated by constructing modern scientific waste compactor stations. Introduction of the stationary compactors and movable compactors would facilitate the following points:

- Restriction of accessibility of birds, animals and rain water.
- Transport more garbage due to compaction system.
- Odourless transportation from compactor station to disposal site.
- Stoppage of rag picking.
- No spilling of garbage during transportation.
- No seepage of water during transportation due to water tight system.
- Eradication of open vat.
- Facilitates night transportation of solid waste etc. etc.

2.1 Land

For delivering the MSW services, the primary requirement of land would be for transfer station, compost facility for treatment of MSW and sanitary landfill facility for disposal of MSW. Land for all the proposed modern scientific waste compactor stations belongs to Kolkata Municipal Corporation. KMC has given land to the M/s Eastern Organic Fertilizer Private Limited for processing of compost on PPP basis and KMC itself maintain the waste disposal facility at its own land.

2.1.1 Collection and Transportation of MSW

With respect to collection of MSW and its transportation to treatment facility there is no requirement of land. However, with respect to secondary storage of MSW in secondary containers, the same would need to be placed on the road sides, for which indicative locations have been identified. As such lands belong to KMC; hence, there is no requirement for additional land / land acquisition for implementation of proposed collection and transportation activities.

2.1.2 Processing of MSW

KMC has developed 500 MT capacity compost plant at Dhapa, Kolkata. There is no question of rehabilitation of the existing compost facility and hence additional land would not be required.

2.1.3 Disposal of MSW

KMC has its own disposal site and for future, KMC has identified 100 ha, of land at Kharambha mouza for development of a sanitary landfill.

2.2 Physical infrastructure components

The MSW management strategy has been designed for the estimated generation of MSW upto 2035. This has been suitably escalated to estimate the population in 2013. The estimated population of the city by 2035 would be approximately 52,68,304 (night population).

The number of households and estimated MSW generation in year 2013 is set out and MSW that would be generated by other sources in the city has also been set out. The strategy for collection, transportation, treatment and disposal of MSW, requirement of physical infrastructure components and the basis for the estimation of the same are discussed in this section.

2.2.1 Existing collection and transportation plan

In order to plan, design and operate a solid waste management system, a thorough knowledge of the quantities generated the composition of wastes and its characteristics are essential. Major category and sources of Municipal Solid waste generated everyday are as follows:

- **Domestic / residential waste**

This category of waste comprises the solid wastes that originate from single and multi-family household units. These wastes are generated as a consequence of household activities such as cooking, cleaning, repairs, hobbies, redecoration, empty containers, packaging, clothing, old books, writing/new paper and old furnishing. Households also discard bulky wastes such as furniture and large appliances, which cannot be repaired and used.

- **Street sweeping**

This term applies to wastes that are collected from streets, walkways, alleys, parks and vacant plots. In the more affluent countries manual street sweeping has virtually disappeared but it still commonly takes place in developing countries, where littering of public places is a far more widespread and acute problem. Mechanized street sweeping is the dominant practice in the developed countries. Street wastes include paper, cardboard, plastic, dirt, dust, leaves and other vegetable matter

- **Commercial waste**

Included in this category are solid wastes that originate in offices, wholesale and retail stores, warehouses and other commercial establishments. Some of these wastes are further classified as garbage and others as rubbish.

- **Market waste**

This term applies to wastes that are collected from the waste collection points at vegetable, fruit, meat and fish markets.

- **Hotel / restaurant waste**

Included in this category are solid wastes that originate in hotels and restaurants.

2.2.2 Municipal solid waste generation for different horizon years

Based on historical population figures, development pattern and related issues, the projected population for the period upto 2035 is worked out and shown in Table 2.0.

Table 2.0: Projected Population of the Boroughs (upto 2035)

Year	Cluster I - Borough I to IX	Cluster II - Borough X to XV	Total (Borough I to XV)
2013	2907765	1917068	4824833
2015	2903133	1961729	4864862
2017	2899166	2005886	4905052
2019	2895200	2050042	4945242
2021	2891233	2094199	4985432
2023	2887555	2138119	5025674
2025	2883873	2182035	5065908
2027	2880538	2225762	5106300
2029	2877204	2269489	5146693
2031	2873869	2313216	5187085
2033	2870918	2356781	5227699
2035	2867963	2400341	5268304

Field survey was carried out to assess the Municipal Solid Waste (MSW) collected at different collection points within the KMC area from Borough I - XV. Table 2.1 indicates the status of MSW generation in each Borough for the base year 2003 along with calculated rate of generation.

Table 2.1 indicates that rate of waste generation as also the collection level varies from Borough to Borough. In Borough I to IX the collection is around 95% whereas in Borough XI to XV overall collection is around 85%. In Borough X, the collection level is around 90%. The rate of waste generation varies from 623.97 to 1235.97 gpcd in Borough I to IX classified as Cluster – I. The rate of waste generation in added area i.e. borough X to XV, classified as Cluster - II, is found to be varying from 262.80 to 523.91 gpcd.

Table 2.1: Borough wise MSW generation and per capita generation

Cluster	Borough	Population (2003)	Waste generation (tpd)	Per capita generation (gpcd)
I	I	322,316	203.05	629.98
	II	236,130	171.05	724.40
	III	339,755	225.05	662.40
	IV	289,363	279.47	965.82
	V	262,227	324.11	1,235.97
	VI	311,883	327.58	1,050.33
	VII	517,398	322.84	623.97
	VIII	291,391	210.53	722.49
	IX	355,285	246.42	693.59
	I to IX	**2925748**	**2310.0**	**Average: 790.0**
II	X	413,132	216.44	523.91
	XI	208,155	64.47	309.72
	XII	229,209	60.24	262.80
	XIII	254,372	93.88	369.08
	XIV	302,513	89.76	296.73
	XV	288,524	84.47	292.77
	X to XV	**1695905**	**609.26**	**Average: 360.0**

tpd: ton per day; gpcd: gram per capita per day

Sample survey conducted to assess commercial and market waste, showed that average commercial waste generated is about 365 gm/ shop/day and average market waste generated is about 250 gm/ shop/ day. However, in absence of the reliable data regarding total number of shops generating commercial waste and market waste, the quantity of commercial and market waste could not be assessed. Further, a considerable waste is also generated by the floating population visiting primarily the core municipal area but no statistical data is available regarding pattern of waste generation by floating population.

The per capita generations from different sources are derived from the sample surveys and secondary data collected as elaborated above and are summarized below.

Detailed analysis of Table 2.1 shows that waste generation is very high in Cluster I and particularly in Borough IV to VI ranging from 965.82 to 1235.97 gpcd, which is mainly due to heavy concentration of business and commercial offices and shops. Most of the city's wholesale markets are also located in this Cluster I. Such heavy concentration of markets and commercial activities in Cluster I area causes visiting of large number of people from outside the Cluster I area (floating population) during day time for purchase, business etc. and leaving the core city area by evening. Table 2.1 also shows that waste generation in Cluster II i.e. Borough X to XV is very low (average 360 gpcd) and ranges from 262.8 gpcd to 309.72 gpcd in borough XI to XV and in Borough X it is 523.91 gpcd. This high rate of generation in the Borough X could be attributed to increase in commercial activities in the area.

Waste generated by markets, commercial activities and the related floating population, who visit the city for various causes, contains large amount of recyclable waste like paper, plastic, jute, cloths, metal etc. The percentage of biodegradable waste and /or non-recyclable waste generated in those areas can not be same as that of the residential population.

Sample survey has been conducted in all the wards to ascertain the nature and physical characteristics of the waste. It can be noted that recyclable waste generated in the commercial area is around 51.0% of the total waste generated in these areas. Thus it can be reasonably estimated that for about 50% of the waste produced by such commercial activities and floating population would be recyclable waste which can be collected in litter bins, to be placed in this business district, directly for recycling plants, and thus need not be brought to landfill site.

Household waste generated by resident population, sweeping and institution waste in Cluster I works out to 500 gpcd. In Indian conditions, this indicated that the generation of garbage has already reached a saturation level and no further increase is anticipated. Therefore in borough I to IX generation level of 1463 TPD or 500 gpcd waste can be treated as waste contributed by fixed resident population and the balance waste of 847 TPD or equivalent to 290 gpcd can be treated as commercial and market waste generated by resident and floating population. Further as elaborated, 50 % of this 290 gpcd waste (i.e. 145 gpcd) excluding waste generated by resident population would be recyclable waste which would be transferred to recyclable plants and the rest 50 % i.e. 145 gpcd would be biodegradable waste which would be transported to compost plant/ landfill site.

In case of Borough X to XV, designated as Cluster II, the picture however is entirely different. The business and commercial activities in this Cluster are primarily for consumption of the resident population of this Cluster and thus does not attract considerable floating population from outside the Cluster. Present average rate of generation of waste is around 360.0 gpcd. It has been considered that with the development of infrastructure and growth of population, an average generation rate of MSW in Cluster II would increase to 500 gpcd by 2017. Individual Borough wise per capita waste generation for resident population (Population accounted in Census) is calculated based on percentage of individual waste contribution with respect to total waste generation. Per capita waste generation changes from the year 2003 to 2017 and after that, it would stabilize.

Summary of projected generation of solid waste (cluster wise) irrespective of the borough within the entire KMC area is furnished below (Table 2.2). Generation of silt and debris is not considered here, since those are collected directly by secondary transporting vehicles.

Table 2.2: Projected Generation of Waste within the KMC Area

Year	Cluster- I			Cluster- II			Total waste Generation (MT/ day
	Population (Projected)	Average Per capita waste generation (gpcd)	Waste Generation (MT/ day)	Population (Projected)	Average Per capita waste generation (gpcd)	Waste Generation (MT/ day)	
2013	2907765	790	2297.13	1917068	460	881.85	3178.98
2015	2903133	790	2293.48	1961729	480	941.63	3235.11
2017	2899166	790	2290.34	2005886	500	1002.94	3293.28
2019	2895200	790	2287.21	2050042	500	1025.02	3312.23
2021	2891233	790	2284.07	2094199	500	1047.10	3331.17
2023	2887555	790	2281.17	2138119	500	1069.06	3350.23
2025	2883873	790	2278.26	2182035	500	1091.02	3369.28
2027	2880538	790	2275.63	2225762	500	1112.88	3388.51
2029	2877204	790	2272.99	2269489	500	1134.74	3407.73
2031	2873869	790	2270.36	2313216	500	1156.61	3426.97
2033	2870918	790	2268.03	2356781	500	1178.39	3446.42
2035	2867963	790	2265.69	2400341	500	1200.17	3465.86

2.2.3 Status of non-biodegradable (Recyclable) waste

Wastes generated by commercial activities mostly contain recyclable waste like paper, plastic, jute, cloths, metal etc. The chances of generating biodegradable waste and /or non-recyclable waste in these areas can not be same as waste generated in predominantly residential area. During the survey conducted under KMC it has been observed that waste such as rubber, plastic and polymer (RPP); glass, ceramic and crockery constitute nearly 5.80 % (w/w) of mixed MSW daily reaching at Dhapa disposal site of Kolkata Municipal Corporation. However, at source, the percentage is obviously higher since a considerable portion of the RPP waste is taken away by the rag pickers directly from roads and the MSW storage points. Further, studies show that the percentages of such recyclable wastes depend on the type of communities.

From 2013 and onwards upto 2035 projected year 20% source segregation of recyclable waste is considered.

2.2.4 Existing Primary Collection System

2.2.4.1 Existing Situation

There are about 10,305 conservancy mazdoor (sweepers) employed to sweep major roads of about 1850 kms, to clean open drains and waste collection from houses/buildings. The city is divided into 15 boroughs and 141 electoral wards. For

SWM Service each ward is divided into 7 to 10 blocks and each block is provided with 8 – 10 sweepers. Each sweeper is provided a handcart, a broom and a scrapper to sweep the roads, lane & bye lanes, to clean open drain, collect the waste, load it into the handcart and transfer the same to secondary collection point in form of open vat or Dumper Placer container. Containerized handcart having 4 buckets of 40 to 50 litres have been introduced in some wards to transfer the waste collected into containers (4.5 m^3 & 7.0 m^3). Sometime the waste is directly loaded into vehicles (Direct Loading system) by handcart buckets avoiding double handling of waste.

2.2.4.2 Collection from Households

To achieve full collection from households and to avoid waste throwing on the road, street or open drain after sweeping, a system of house to house collection has been introduced in some of the wards, wherein the sweeper move along the road or street of locality with handcart and alert the households by whistling so that they can place their waste into the handcart. The waste collected by sweeping (Figure 2.0 & Figure 2.1) and house collection is then transferred to the specified collection point or vat for its onward transportation to the waste disposal site. The system has been found quite successful

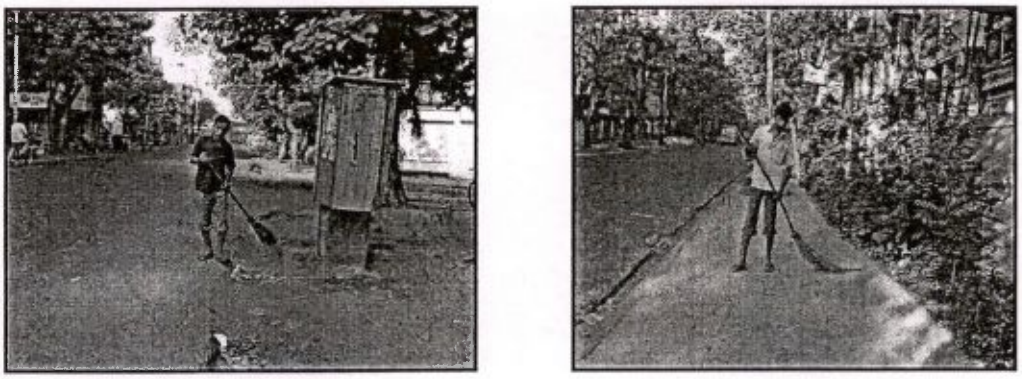


Figure 2.0: Street Sweeping

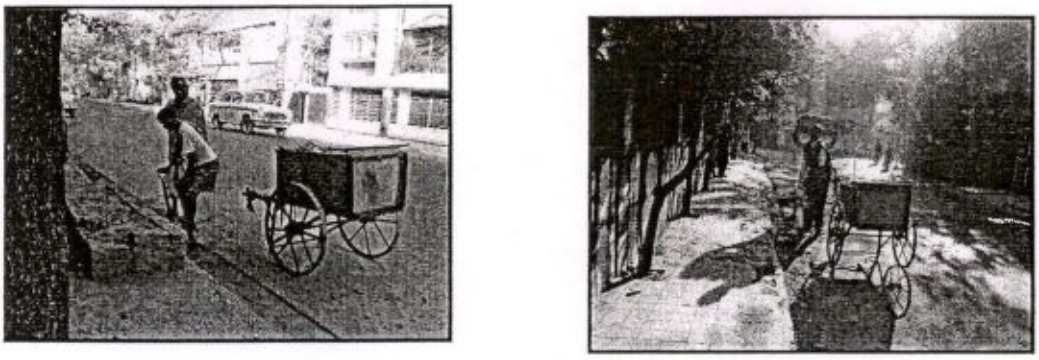


Figure 2.1: Kerb side collection system

In certain areas where waste generation is high and space for large number of bulk containers to accommodate large volume of waste not available, a large open vat is provided for collection of waste, which is lifted manually, or with front-end loader (mechanical loading) into the vehicles. However, these large open vats create ugly, unhygienic condition emitting foul smell. Further cattle, dogs, cats and birds also create a nuisance.

Where containers or open vats cannot be provided due to limited space and traffic problem in busy and congested area, a system of direct loading and collection by KMC/private vehicles is introduced. Under this system, a vehicle is parked at a convenient location in the locality and the waste is collected and brought by sweepers in handcart and loaded into the vehicles avoiding thereby the community collection point. The borough wise number and types of collection points is given below in Table 2.3.

Table 2.3: Borough wise Existing Numbers and Type of Collection Points

Borough No	Total collection points	Type of collection points		
		DL points	Open vat/ open space	Container points (Nos. N/B)
I	58	3	35	20(12B, 16 N)
II	19	0	12	7(14B)
III	33	0	16	17(30B, 2N)
IV	22	0	14	8(19B)
V	22	0	17	5(9B)
VI	20	1	13	6(12B)
VII	57	7	27	23(34B)
VIII	34	3	11	20(36B)
IX	53	6	31	16 (23B)
X	81	18	53	10(11B, 6N)
XI	52	2	19	31 (33N)
XII	48	5	11	32(33N)
XIII	63	0	43	20(4B, 18N)
XIV	52	1	38	13(13B, 2N)
XV	48	0	48	0
Total	**662**	**46**	**388**	**228(217B, 110N)**

Note: N – Normal container 4.5 m^3 capacity, B – Big Container 7.0 m^3 capacity, DL – Direct Loading

2.2.4.3 Collection from Commercial Establishment

The other major contribution in the city solid waste is from the markets and commercial establishments including hotels, restaurants and institutions. On an

average about 20 percent of the total solid waste is from those areas. There are altogether 252 markets in the city as per information available from KMC. Out of these 96 are registered private markets, 23 KMC owned markets and nine wholesale markets, which are producing large quantity of biodegradable waste. In addition, there are about 124 nos of unregistered roadside markets, which are spread all over the city (Table 2.4). The roadside markets are disorganize and grew up at random to meet the needs of local people. A few registered markets have vat in the market area whereas in most of the other markets wastes are either collected in the nearby vats/containers or simply dumped on roadside. The roadside dumps are collected by the KMC mazdoor and transported to the disposal site or find its way to nearby open drains, resulting malfunctioning of the normal drainage system in certain areas.

There are nine numbers of wholesale markets, of which only two are owned by KMC. The solid waste generated from day to day activities of these markets is not collected on a regular basis and in systematic manner. This results in creating unhygienic conditions within and around the markets. Management of solid waste generated from wholesale markets needs special attention.

Table 2.4: Borough wise Distribution of Fruit and Vegetable Markets in Kolkata

Borough	Registered Private Market	Unregistered Roadside Market	KMC Owned Market	Wholesale Private Market	Total	% of Total Markets	% of Total Population
I	3	11	-	1	15	6.0	7.6
II	9	6	1	1	17	6.8	5.6
III	5	10	3	-	18	7.1	8.0
IV	12	7	1	2	22	8.7	6.8
V	16	6	1	2	25	9.9	6.4
VI	7	7	2	1	17	6.8	6.8
VII	9	10	1	-	20	7.9	11.0
VIII	4	8	3	-	15	5.9	7.2
IX	7	9	-	1	17	6.8	9.7
X	8	10	2	-	20	7.9	8.0
XI	2	7	1	-	10	4.0	3.8
XII	2	10	3	-	15	6.0	3.6
XIII	2	3	1	-	6	2.4	5.0
XIV	10	14	4	1	29	11.5	5.4
XV	-	6	-	-	6	2.4	5.2
Total	**96**	**124**	**23**	**9**	**252**	**100.00**	**100.00**

2.2.4.4 Collection of Solid Waste Generated from Hotels, Shops (Traders) and Institutions including Medical Institutes

The shops (Traders) normally start their business after 9: 30 – 10 a.m. Some shops

sweep their premises and dump the waste on the road before starting of their daily business hours. These timing do not synchronize with the work schedule of the sweepers, as by this time most of the collection of solid waste from main streets and roads is over. Waste from these business communities again accumulates on streets and road that is why city road does not appear clean particularly in business/ market area. Particularly in some business / market areas, Corporation gives the second sweeping service to clean the area. Some shops sweep their premises and dump the waste on the road before closing their daily business at night. Sweepers appointed by Corporation collect the waste at the next morning during their road sweeping work and dispose the waste in the nearby vat.

Big hotels store their daily wastes in their own bins or a closed room. Corporation gives only transportation service to transport the waste from these hotels to disposal site on annual charge basis. Medium and some small hotels & restaurants stored their daily waste in their own container and dumped the waste in the nearby vat by their own sweeper or Corporation sweeper. Some roadside small hotels and restaurants throw their waste on the road during their daily business hours.

Institutions/offices have their own sweeper to sweep and collect the waste. Some Institutions store their daily waste in their own vat within their premises and Corporation provides only transportation service to transport the waste from collection point to disposal site on charge basis. In some Institutions where transportation service of the Corporation is not available, they dumped their daily waste at the nearby vat by their own sweeper.

2.2.4.5 Facilities and Implements Available

a) Handcarts and brooms:

The brooms used are of two types, long and short. There are about 6000 handcarts and 250 tricycles distributed, covering all the wards in KMC. The type of handcart and tricycle presently in use is shown in Figure 2.2 and Figure 2.3. The capacity of handcart and tri-cycles are 250 litres (approx.) and 500 litres (approx) respectively. In some wards, containerized handcarts with FRP containers were introduced but due to improper design, the same were not found to give satisfactory performance and life.

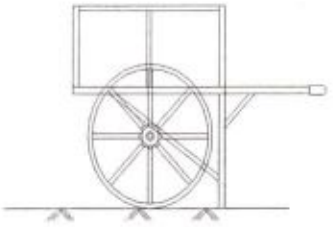


Figure 2.2: Hand Cart

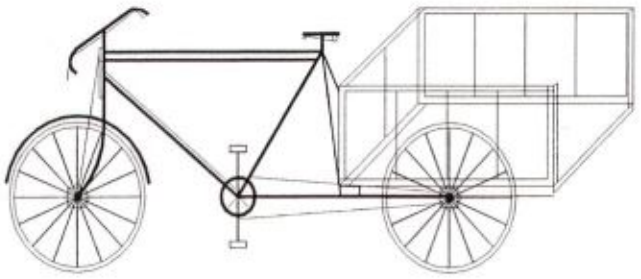


Figure 2.3: Tri cycle van

b) Ward offices:

The ward office is the authorized place where the ward level activities are controlled. The tools and implements are also stored there. The Conservancy Sub- Overseer and Conservancy Overseer are in charge of the ward office. Depending upon population and area of the ward one or two Overseers are provided in each ward. There are ward offices in 84 wards. Remaining wards do not have ward offices. Large no of ward offices are in very bad shape, needing repairs and renovation. Some of them do not have adequate furniture such as table, chairs etc.

c) Workforce:

Total numbers of Conservancy Mazdoors (CM) deployed in all the 15 boroughs for sweeping and collection activities are 10,305. In addition to Conservancy Mazdoor, there are 286 Methor and 107 Domes. On an average, there are 2.3 sweepers for every 1000 population, which is comparatively much higher than in other metro cities. For supervision of sweeping and collection, there are 870 Sub- Overseer & 258 Overseers working in the borough. On an average one Sub-Overseer supervise the work of one Block covering 8 to 12 sweepers and one

Overseer supervise the work of 3 to 4 Sub - Overseer. Despite such a large workforce the situation is not quite satisfactory in large number of wards particularly in added areas (Borough XI to XV) which is partly due to improper distribution of Conservancy Mazdoor, ward wise and improper distribution of sweepers in each Block (without any norms and ad-hoc basis), high absenteeism, low productivity and poor supervision and monitoring. The present situation is also partly attributed to public attitude and habits as also due to poor enforcement and absence of penal action against defaulting citizen. Work-study has been undertaken to assess workload of each Block of the ward and to work out realistic requirement of Conservancy Mazdoor.

2.2.4.6 Waste Collection by Private Contractors / NGOs

Due to increasing number of new housing projects and to extend the municipal solid waste services in those areas, the Municipal Corporation has engaged some Private contractor/NGOs for solid waste collection. Private contractors/NGOs are engaged in those areas where strength of Conservancy Mazdoors is insufficient. They are appointed by the KMC on yearly contract basis. The responsibilities of Private Contractors/NGOs sweepers are as follows.

- House to house collection from the housing project are;
- Sweeping of all the roads within the project area;
- Transfer of wastes to the nearby vat point;
- Transport the waste from vat to disposal site;

In some places, waste is collected directly from house and transfer to dumping ground through Private contractor/NGOs;

2.2.5 Deficiency in Primary Collection System

2.2.5.1 Primary Collection

- Sweeping and collection in core city area (Borough I to X) is done regularly and is fairly well but sweeping and collection in added area (Borough XI to XV) is neither on daily basis nor regularly. Overall services provided by KMC in these areas are not upto the mark.

- Though sweeping and collection in core/ old city is done regularly, householders particularly in slum, low-income group and middle- income group as also the shopkeepers throw the waste on streets, roads, open space or open drain after collection hours.

- Storage of waste in container by the householders mainly in slum, low-income group and some middle- income group are not done properly and the waste is dumped outside the vat/containers. Segregation of waste is also not done in any area and mixed waste covering biodegradable, recyclable, demolition/ construction and inert waste are disposed of by householders and commercial establishments.

- Above 60 % of primary collection and storage is in the form of open vats, which develop unhygienic condition, foul smell and odour, proliferation of flies, and other diseased vectors.

- A large number of bulk containers and vats with dwarf wall around are in very bad shape needing repair or replacement. In some cases wall of the vat is damaged due to operation of Pay Loader.

2.2.5.2 Work Force

- Work force in comparison to other metro cities is more.

- Conservancy Mazdoor are not distributed to each ward and block on any fixed norm basis but on ad-hoc basis resulting in uneven distribution of work and poor average productivity.

- Allocation of Conservancy Mazdoor in added area is much less compared to old city area (Borough I to X).

- There is no system of superimposed inspection and monitoring performance of the sweepers.

2.2.5.3 Double Handling of waste

Sweeping and household waste are collected in the handcarts, transfer and unloaded on ground at open vats and again manually lifted the load into the vehicles resulting in loss of productivity

2.2.5.4 Handcarts

- The capacity of present handcart is 9 cubic fit. (250 litres approx.) and it carries on an average 100 kgs (approx.) of waste / trip and make 3 to 4 trips on an average in a day

- Presently containerized handcarts are not used, resulting in double handling of waste and loss of productivity

- The handcarts do not have bush or ball bearing resulting in extra effort and loss of productivity

2.2.6 Proposed Primary Collection System

The Municipal solid waste (Management & Handling) Rules, 2000 issued by MoEF, G.O.I has laid down the compliance criteria and the procedures for management of solid waste has also to be followed for strengthening of primary collection system.

- Continuation of existing source segregation in two-bin system (biodegradable and non-biodegradable) in 7 wards and to be covered for the rest 134 wards in a phased manner.

- The system of waste collection would be primarily door-to-door based, and would be managed under service contracts with private operators and active involvement of NGOs, wherever possible. The primary collection would be carried out by deploying a combination of auto tippers and pushcarts. The design specifications for Pushcarts and auto tippers are set out in Chapter 3.

- All open vats or waste storage points should be abolished expeditiously and all small unhygienic dust bins and other cement and masonry uncovered bins if any should also be replaced in a phase manner by stationary compactors and movable compactors.

- HDPE bins would be increased at heritage areas and areas where floating population would be concentrated.

Alternative Models for Primary Collection

The following models are considered:

a) Collection of mixed biodegradable and recyclable waste into containerized handcart by KMC sweepers and transferred to collection points. Debris and silts to be stacked separately and loaded directly to vehicles.

b) Collection of mixed waste from residential area (households) in a containerized handcart (Figure 2.4) by municipal sweeper and transferring to bulk container, open vat or directly loaded to vehicle. Hotel, restaurant and market waste to be collected separately from the source into vehicles and transported to compost plant site. Commercial waste to be collected by NGOs by their own handcart/ tricycle, carried to their godown for sorting and selling for recycling. Debris and silt to be stacked separately on road and collected by KMC vehicles transported to landfill.

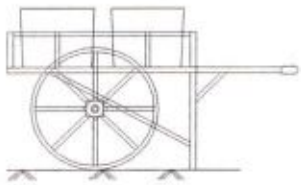


Fig. 2.4 Proposed Containerized Hand cart

c) To introduce segregation of waste at sources. Segregated biodegradable waste from households, hotels and restaurants to be collected by KMC by push carts, pedal tricycle vans and auto tipper vehicles from house to house and transferred to modern scientific waste compactor stations (Figure 2.5 & Figure 2.6) or in movable compactors with attachment of tipcarts and different capacities of 4.5m^3 containers and 240 litre and 1100 litre bins capacity.

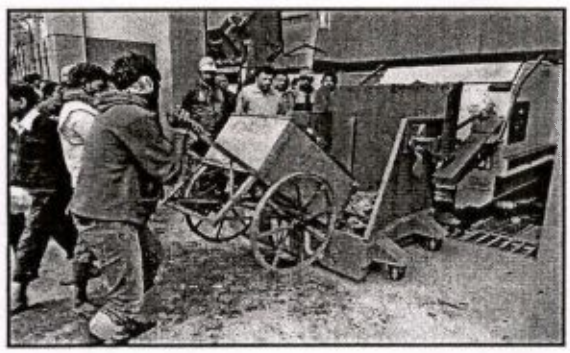


Figure 2.5: Improvement of primary collection system by installation of stationary compactors

Figure 2.6: Improvement of transportation system

d) Segregated recyclable waste from residential and commercial areas as also from institutions to be collected by NGOs with auto tipper vehicles from

house to house twice in a week for sorting and onward site to bulk trader or industry directly. Debris, silt etc. to be stacked separately on roads by the citizen and collected directly into vehicles by KMC.

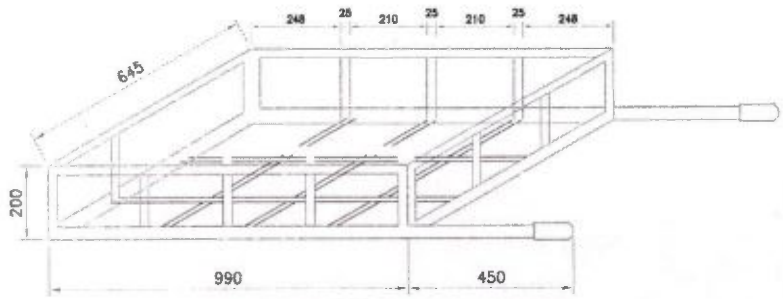
Model (c) is recommended to be implemented in a phased manner within 5 years. Till such time model (c) is fully implemented, model (b) is recommended to be adapted for borough I to X and model (a) for added areas (borough XI to XV).

2.2.6.1 Action Plan and Recommendation for Primary Collection

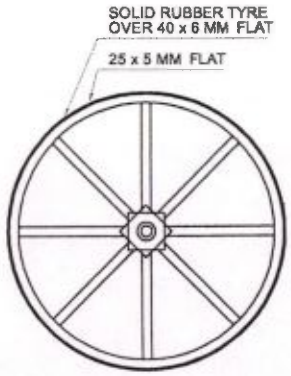
- Enhance stakeholder awareness including informal education and training to trash sorters;
- Extend door to door collection to cover entire KMC;
- Encourage waste generators to manage and segregate recyclable and biodegradable waste at source;
- Elimination of open vat points by modern scientific waste compactor stations as transfer stations;
- Implementation of 10.5 Cu.M stationary or portable compactors (Figure 2.7) and 14 Cu.M movable compactors;
- Use of containerized handcarts to avoid double handling of waste;
- Phasing out open truck and replacing by prime mover-chassis mounted hook loader capable of lifting portable compactor of capacity 10.5 m^3, truck-chassis mounted rear end auto loading movable compactor with tip cart, and truck chassis mounted rear end auto loading movable compactor with 4.5 Cu.M container, 240 lit & 1100 lit bins;

Figure 2.7: 10.5 Cu.M portable compactor carrying waste on road side

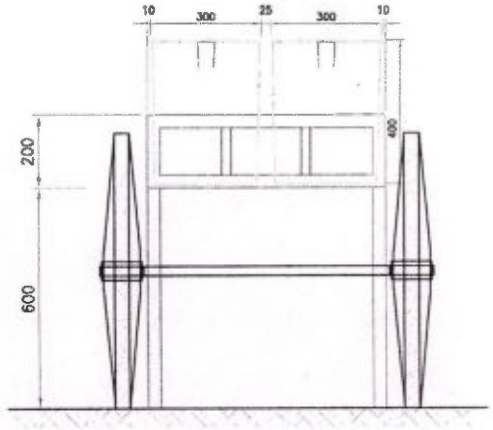
- Mechanical sweeping by the existing 12 number of mechanical sweepers;



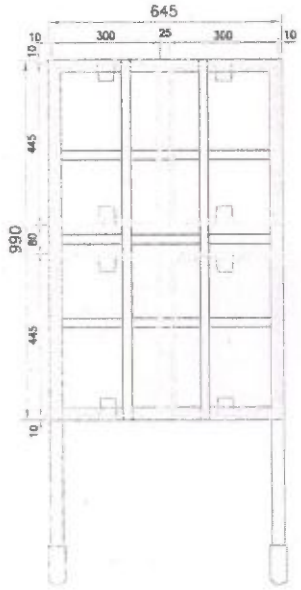
DETAILS OF BODY OF THE HANDCART



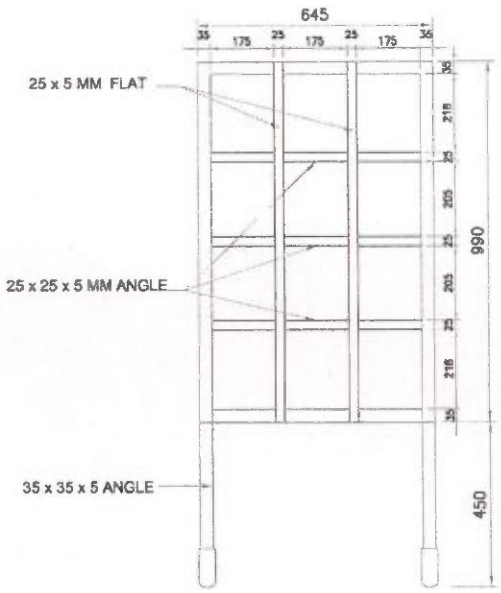
WHEEL 750MM
OUTER DIAMETER



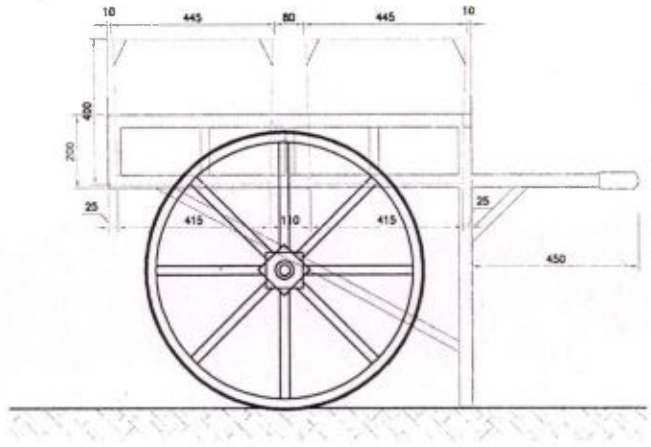
FRONT VIEW



TOP VIEW CONTAINERISED HANDCART



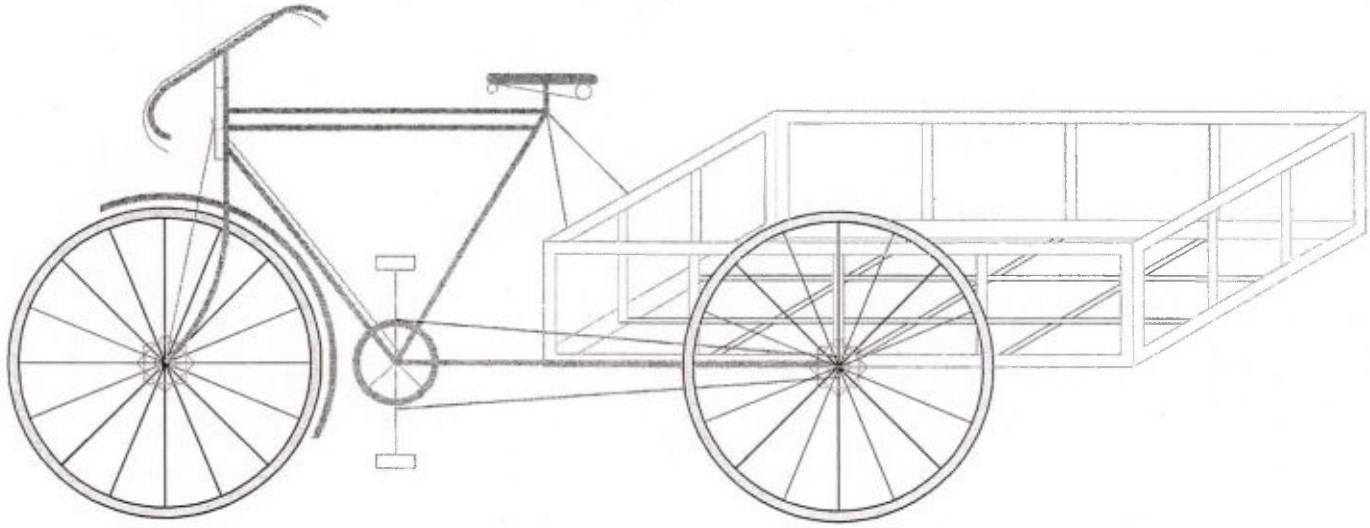
BOTTOM REINFORCEMENT



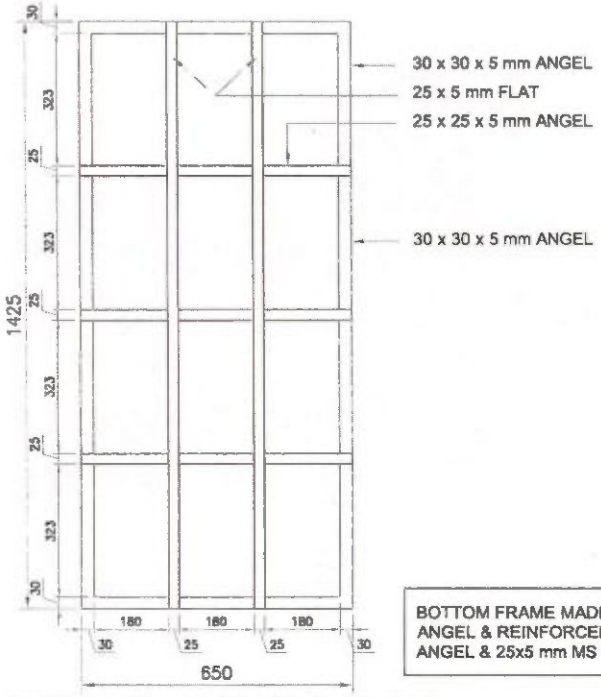
SIDE VIEW

NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETER UNLESS OTHERWISE STATED.

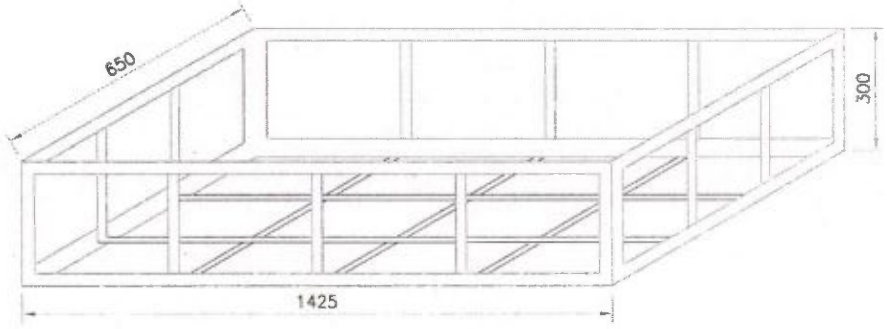


TRICYCLE VAN



BOTTOM FRAME MADE 30x30x5mm MS ANGEL & REINFORCED BY 25x25x5 mm ANGEL & 25x5 mm MS FLAT.

CARRIER PLAN OF CYCLE VAN

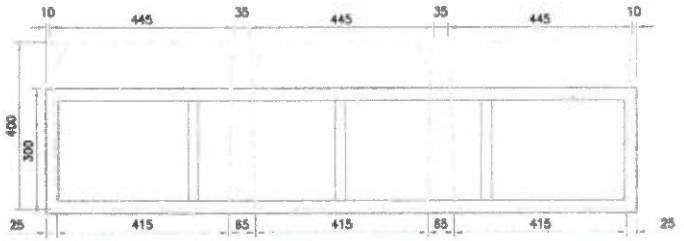


CARRIER OF CYCLE VAN

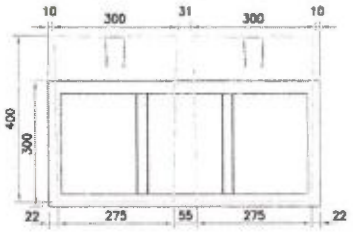
NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETER UNLESS OTHERWISE STATED.

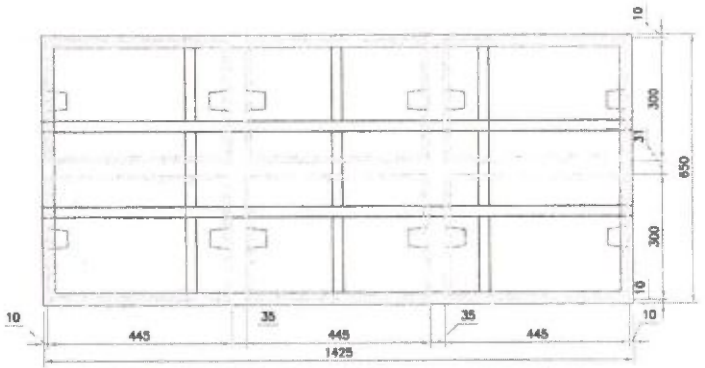
Municipal Solid Waste Generation, Primary Collection & Segregation of Waste



LONG SIDE VIEW OF GENERAL ARRANGEMENT OF SIX CONTAINER



SHORT SIDE VIEW OF GENERAL ARRANGEMENT OF SIX CONTAINER



TOP VIEW OF GENERAL ARRANGEMENT OF SIX CONTAINER

NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETER

   UNLESS OTHERWISE STATED.

Municipal Solid Waste Generation, Primary Collection & Segregation of Waste

Based on statutory requirement specified in MSW Rules, 2000 the following action plan and recommendation are given below;

i) **Stakeholder awareness, segregation of waste at source and door to door collection**

A detailed plan has been prepared for strengthening of primary collection system.

ii) **Replacement of open vat and optimization of collection points**

Detailed studies of waste generation at each of existing collection points (approx. 662 nos.), feasibility of converting open vat into modern scientific waste compactor stations or providing direct loading arrangement by movable compactors eliminating open collection point are carried out. Based on the field study the location, number of collection points and mode of collection and transport system are finalized.

iii) Borough wise collection plan has been prepared for implementation. Replacement of existing handcart by containerized handcart is needed to avoid double handling and less manpower/ productivity.

iv) Open vats to be eliminated by movable compactors and stationary compactors. Where open vats cannot be totally eliminated, the same shall be kept clean after waste collection by providing screen wall and gate and posting vat attendant.

v) KMC shall notify waste collection time to avoid littering of waste

vi) To introduce penal charges for throwing waste on roads, street, or in open drain.

vii) Bio-medical and Industrial waste would not be allowed to be mixed with MSW and KMC will take stringent action against the defaulters.

viii) Debris, silt and construction/ demolition waste to be stacked separately and transferred to landfill site and use as cover material.

ix) To fix sweeping norms for different type of area according to population, commercial activity, type and length of road and reallocate the staff in each block and ward due to modernization of collection system. The surplus staff resulted on account of reallocation of staff, introduction of house - to - house collection through NGOs, introduction of auto tipper vehicles, truck-chassis mounted rear end auto loading movable compactor with tip cart, and truck chassis mounted rear end auto loading movable compactor with container (reduction of loader Mazdoors), should be transferred to other boroughs where Conservancy Mazdoor strength is low and sweeping & collection services are poor (mainly the added areas).

2.2.7 Proposed Plan on Segregation of Waste at Source

2.2.7.1 Necessity of Segregation of Waste at Source in other wards

Existing segregation system is continuing in 7 wards and needs to be introduced in other wards since the benefits that are likely to be accrued because of segregation of waste at source and door-to-door collection of segregated waste.

- ❖ Improved level of sanitation
- ❖ Reduction in number of collection points
- ❖ Relief to KMC sweepers as they would be required to handle reduced volume of waste from roads and streets
- ❖ Reduction in waste volume, which will require less space at disposal site as a fair degree of recyclable materials, will be sorted out at source.
- ❖ Once segregation of biodegradable and non-degradable materials at source is achieved, composting could become financially viable.
- ❖ Optimization of transport vehicles resulting in saving in transportation cost.

2.2.7.2 Proposed Model for Segregation of Recyclable Waste

There are three models, which are generally used for collection and segregation of waste

a) Collection of mixed waste from households, commercial establishment and other sources, and recyclable waste segregated by rag pickers at secondary collection points and waste disposal sites and sold to Kabadiwala, retailers or wholesalers dealing in recyclable waste.

b) Collection of mixed waste from households and other sources and transported to central sorting yard located close to waste disposal site, sorting of recyclable waste done through mechanical plant into various components and the remaining waste sent to landfill site.

c) Segregation and storage of waste by householders, commercial and other establishments into two separate bags or containers at source – one for storing recyclable waste like paper, plastics, rubber etc.
and other for storing biodegradable waste. Biodegradable waste to be collected by Municipal sweepers during the sweeping period and transferred to secondary collection point for onward transportation to waste treatment or waste disposal site. Recyclable waste to be collected by

NGO or Private agency appointed by KMC once or twice a week from house to house and transported to their godown or sorting yard for sorting into various components and sold to wholesalers or recycling plants.

Model (a) is presently being operated through unorganized sector (ragpickers) but is done in crude, haphazard manner and in unhygienic condition in most of the KMC area.

Model (b) is the best but involves large capital investment on the plant. No private sector is willing to set up such a central sorting plant. In western countries, large numbers of such central sorting plants are operating successfully.

Model (c) is the most suitable for Indian condition and is successfully operated in 7 wards. By adopting these models, recyclable waste from households and commercial establishment can be recovered for recycling and reuse by industrial sector. The proposed model of this type is developed after extensive field observations and assessment is made regarding potential of recycling, recycling facilities and chain of available purchaser of such segregated recyclable waste and its processing as also its financial viability.

2.2.7.3 Phase wise Plan of Operation

KMC has already introduced segregation of recyclable materials in 7 wards and to be implemented in other wards in a phase manner.

Training should be provided for the other wards using the following media.

a) Demonstration:

Waste segregation would be demonstrated in each locality involving resident association, co-operative of Housing Societies, CBOs, NGOs or other Social Organization active in the locality, Councillor and party workers.

b) Pamphlets, Posters and Street meeting:

Awareness campaign for segregation and collection of waste, proper disposal and keeping the collection point area clean and hygienic should be carried out with the help of pamphlet, posters and holding street meeting. The publicity material should be prepared by Public Relationship (PR) Consultants.

c) **Use of Newspaper, TV, Radio & Other Media**

Short article giving importance of segregation of waste at source and collection from house to house, advantage of segregation and pictorial view showing method of segregation etc. can be issued in local newspaper periodically once in three months. Small message or pictorial view of segregation and its advantage can also be shown on TV periodically. Short interview with KMC conservancy officers on the above subject can also be recorded and shown on TV. A 10 minutes film showing the method of segregation, collection waste house to house, its advantage etc. be made and shown to residents of the locality particularly in lower income group, slum, etc.

d) **Use of School Children:**

Demonstration, issue of pamphlet and posters and showing of short film to schoolchildren at school would be very effective. Schoolchildren can also be involved in Prabhat Pheries, procession with poster, banners, placard showing catchy slogans, pictorial view of segregation and house-to-house collection, advantages/benefits of segregation etc.

2.2.7.4 Action Plan of Implementation

The following steps may be considered for phase wise implementation of segregation programme.

- Discussion on proposed plan of source segregation in a workshop inviting NGOs, Community Organization and municipal officers of SWM to get their opinion / comments on the plan.
- Modify the plan based on discussion in the workshop and background papers.
- Separate discussion is necessary for motivating NGOs to come forward and participate in the programme (decide agency, mode/ method)
- Select NGOs (about 8–10 agencies) after observing their willingness to participate and clear understanding of the segregation programme.
- Invite offers from selected NGOs for finalizing term of condition including compensation offered by NGOs / agency to KMC.
- Issues authorization letter to NGOs with term of conditions. Particularly time and frequency of collection should be clearly mentioned.
- Issues public notice mentioning "segregation of waste compulsory for citizen", method of segregation, agencies / NGOs appointed. Rate / amount for different items to be paid by NGOs to stakeholder, timing and

frequency of collection and other important conditions

- Define the role of municipal sweepers and NGOs regarding daily collection of biodegradable waste.

- Also define role and responsibility of Sub-Overseer, Overseer and other senior officers of KMC in monitoring the proposed system / plan for segregation. At least one review meeting in a month with NGOs should be held for successful implementation of the programme.

2.2.8 Projected Requirement of Primary Collection Equipment

MSW is required to be transferred from the source of generation to nearby community bin/collection points/modern scientific waste compactor stations. The different types of equipment such as containerized handcart, containerized pedal tricycle, auto tipper vehicles etc. can be used depending upon type of access roads/streets/lanes, distance to be travelled and quantity of waste to be transferred to the community bins. The type of collection equipment proposed for transfer of waste in different areas is as under.

a) Containerized Handcart with Buckets:

The containerized handcart will have removable plastic buckets. Conservancy mazdoor (sweeper) will collect waste from household after road sweeping and place into containers. When all containers are filled, conservancy mazdoor will drive the handcart up to the community bin or vehicle and unload directly into the same. This type of handcart can operate within a radius of 200 to 400 m and can make 4 trips in a shift. This type of handcart will avoid double handling and will improve productivity of the sweeper mazdoor. The life of handcart would be 2 years. Drawings are depicted in Figure 2.8. In addition to the existing conventional handcars, KMC needs 3000 number push carts/handcarts with bins to strengthening the primary collection system.

b) Containerized Tricycle with six Buckets:

In added area where roads are narrow and distance to be covered from the sources to the collection point is more, containerized tricycle is recommended. The tricycle will have 6 removable plastic buckets of about 50 litres capacity. A tricycle would carry 120 kg of waste. Conservancy mazdoor (sweeper) will collect after road sweeping, the waste from household and place into containers. When all containers are filled, conservancy mazdoor will drive the tricycle up to the community bin or vehicle and unload directly into the same. This type of tricycle will avoid double handling and will improve productivity of the sweeper mazdoor. This type of tricycle can operate within a radius of 500 m to 1000 m and

can make 3 trips in a day. The life of such tricycle is 3 years. Drawings are shown in Figure 2.9.

c) **Wheel barrow:**

500 number wheel barrows are also required for primary collection especially in slum areas.

d) **Auto tipper vehicles:**

45 number of auto tipper vehicles (1.8 Cu.M capacity) will be required for garbage collection.

2.2.8.1 Basis of working out requirements of primary collection equipment:

Following assumptions are made for estimating numbers of handcart and tricycle:

- Pilot scheme for segregation of waste at sources covering domestic as well as commercial areas was launched in the year 2009 for 7 (seven) wards like 33, 47, 64, 103, 110, 115 and 130. Under the pilot scheme, all householders and occupants of commercial areas are requested to store day's waste into two containers of 5 to 10 litres capacity. One container to store degradable waste from kitchen and other food waste and other container to store non-degradable waste such as paper, plastic, cardboard, leather, metal, glass etc. The degradable wastes are collected by KMC mazdoors daily through door-to-door collection. Non-degradable wastes are separately collected, transported and sent to the recycle units periodically by the private agencies. Hazardous waste is to be stored separately. Commercial establishments are to make their own arrangements for segregated storage of waste in their premises in containers of size not more than 50 litres. Waste from Slums, markets and bulk waste producers will be stored in dumper placer containers and selectively in compactors which are to be provided in their premises itself.
- Organized source segregation system will be extended phase wise through vigorous campaigning and stakeholder's consultation process.
- Segregated recyclable waste will be collected from the sources by NGOs and sold to wholesale market or recyclable plant.
- Recyclable waste generated by commercial and market activities of Cluster I will be collected through NGOs.
- Average waste collection efficiency is assumed to be 95%.
- Containerized handcart with four numbers of buckets will be introduced for collection of waste. Four trips per day would be made by each sweeper.

- Containerized tricycle with six numbers of buckets will be introduced for collection of waste. Capacity of each bucket is 50 litres. Each tricycle can handle 120 kg of waste. Three trips per day would be made by each sweeper.

- 70% waste will be collected through handcart and 30% through tricycle at Borough XI and XII.

- 20% waste will be collected through handcart and 80% through tricycle at Borough XIII and XIV.

- 100% waste will be collected through handcart and Auto tipper vehicles at Borough I to X and XV.

- Recyclable waste generated through commercial activities by floating population (Cluster I) will be collected in litterbin.

Containerized handcart will be introduced for all the Boroughs whereas containerized tricycle will be introduced in Borough XI to XIV and Joka.

Projected requirement of primary collection equipments are given in Table 2.5, and Table 2.60 below.

Table 2.5: Requirement of Handcarts for Cluster I & Cluster- II

Year	Requirement of Handcarts (No)		Total Requirement of Handcarts
	Cluster I	Cluster II	
2013	5363	1599	6962
2015	5352	1687	7039
2017	5342	1778	7120
2019	5332	1811	7143
2021	5323	1844	7167
2023	5313	1876	7189
2025	5304	1908	7212
2027	5296	1940	7236
2029	5287	1972	7259
2031	5279	2004	7283
2033	5271	2036	7307
2035	5263	2068	7331

Table 2.60: Requirement of Tricycle van for Cluster- II

Year	Required Nos of Tricycle
2014	749
2017	852
2020	885
2023	917
2026	949
2029	982
2032	1014
2035	1046

2.2.8.2 Realistic Requirements of Sweepers and other Manpower Based on the Norms

Considering average sweeping norms 300 RM/sweeper, 30% additional provision for Sundays, holidays, leaves etc. and considering total major road length (excluding lanes and bye lanes) in KMC area to be 3275 km approx., the requirement of sweepers worked out to 7800 Nos. as against present strength of 10305 nos. approx. For working out the sweepers requirements the norms based on density of population of each borough is considered as specified in SWM Manual. Further number of collection point have been considered based on 250 m radial command areas and where the distances of collection points are more than 250 m radial distance (inadequate collection points due to space constraints), the sweeping norms have been relaxed.

Norms for distribution of other manpower are developed (Table 2.70), considering present and proposed staffing pattern.

Table 2.7: Norms for Calculation of Number of Conservancy Staff

Sr No.	Category	Norms
1	Methor	2 persons per ward
2	Dome	1 person per ward
3	Sub-Overseer	1 person for 12 conservancy mazdoor
4	Overseer	1 person per 4 Sub-Overseer
5	Supervisor	2 persons per borough
6	Administrative cum clerical	2 persons for each 100 supervisory and Conservancy staff or minimum 13 persons
7	Assistant Director	1 person for each borough

2.2.9 Secondary Collection & Transportation

Secondary collection and transportation is the second important stage of solid waste management system after primary collection. This stage can be defined as transportation of stored and collected waste from secondary collection points in a specially designed covered / closed body vehicle in an acceptable hygienic way. The objective of the system can be considered as removal and transportation of collected refuse by the prime mover-chassis mounted hook loader capable of lifting portable compactor of capacity 10.5 Cu.M from the modern scientific waste compactor stations, 14 Cu.M truck-chassis mounted rear end auto loading mobile compactor with tip cart, and 14 Cu.M truck chassis mounted rear end auto loading mobile compactor compatible with 4.5 Cu.M container/240 litre capacity bins/1100 litre capacity bins at regular intervals to disposal site at minimum cost in an environment friendly manner. Transportation is a very important element of SWM system because large proportions of capital and O&M costs are associated with this system. Moreover, performance of transportation system has impact on primary collection, treatment and disposal of solid waste.

2.2.9.1 Existing Situation

Presently mixed waste (bio-degradable and recyclable) are collected from residential, commercial and market area and brought to secondary collection points which are in form of 4.5 m^3 and 7.0 m^3 capacity bulk containers or open vats. There are about 662 such collection points of which about 388 i.e. 58 % are open vats and the rest are in form of bulk containers or direct loading. About 60 % is transported from collection point by Private agency. The vehicles used by private agency are mainly open trucks loaded manually by 3 to 4 labourers and covered with tarpaulin or plastic sheet during the transport to dumping site. The vehicles used are mainly old vehicles. The remaining 40 % of the collected waste is transported by municipal vehicles, making about 330 trips carrying on an average about 4 MT / trips.

2.2.9.2 Transportation by KMC vehicles

There is no well-defined and separate area of operation for KMC and private operators. In most of the wards, KMC and private vehicles both are operating for transporting the waste. The existing system has an advantage. It is flexible i.e. if KMC is not able to provide the required number of vehicles due to breakdown, or other problem, private operators can be asked to supply more vehicles and remove the waste.

There are 11 garages and workshop deploying about 450 staff for servicing, repairs and maintenance of about 350 vehicles including jeep, breakdown van, water tanker, bulldozer etc. The details of age wise total

vehicles under KMC (consider 2013 as base year) are shown in Table 2.8.

Table 2.8: Available strength of vehicles in different garages under KMC (KMC, 2013)

Sl No	Type of Vehicle	Available Strength of vehicles in different garages of KMC										
		Dist. I	Dist. II	Dist. III	Dist. IV	Dh apa	Pool	SR C	J.P. unit	SSU	GRU	Tot al
1	Dumper Placer	30	23	24	27	6	-	-	14	13	-	137
2	Refuse Collector	-	-	-	-	-	-	3	-	-	-	3
3	Tipper Truck	18	18	13	15	22	2	-	4	8	5	105
4	Mechanica l Road Sweeper	3	-	-	3	6	-	-	-	-	-	12
5	Pay Loader	3	1	2	3	6	-	-	-	-	2	17
6	Bulldozer	-	-	-	-	8	-	-	-	-	-	8
7	Breakdow n Van	1	-	-	-	-	-	-	-	1	-	2
8	Wrecker Van	1	1	1	1	1	1	1	1	-	-	8
9	Water Tanker/St reet Washing	6	6	2	5	3	5	3	2	-	-	32
10	Night Soil/ Cesspool	3	-	3	2	1	-	-	-	2	-	11
11	Tractor	-	-	-	-	-	-	-	-	3	12	15
	Total	65	49	45	56	53	8	7	21	27	19	350

2.2.9.3 Transportation by private agencies

Private contractors are transporting average 5.5 MT of waste per trip. The cost of transportation by open truck manually loaded from the collection point depending upon the distance to be covered is in the range of Rs. 310/- to Rs. 370/- per MT. During transportation, waste is covered by polythene sheet.

In certain areas where the collection points are in the form of open vat or where bulk container cannot be provided, there is a system of direct loading. Under this system, the vehicle is parked at a convenient place on the main road and waste is brought by KMC mazdoor in handcart, unloaded temporarily on the ground and loaded into private vehicles by contractor's labours. Since vehicles, has to wait for about 2 to 3 hours

till all waste from the area is collected and brought by KMC mazdoors, the contractor charges on trip basis instead of ton basis.

2.2.9.4 Statutory Requirement

As per MSW Rules, 2000 the waste shall be transported in closed body vehicles. Further, the vehicle emission standard shall be as per the State Pollution Control Board's rules. Presently the emission standard shall be Bharat Sage IV (BS-IV) for heavy duty vehicles used for waste transport. A present a few SWM vehicles in the present fleet of Municipal vehicles is meeting the emission standard (BS-II) prescribed by State Pollution Control Board.

2.2.9.5 Deficiencies in the present transportation system.

- About 58 - 60% of collection points are in the form of open vat and the waste is lifted daily. However number of collection points remains in bad condition due to citizen dropping the waste haphazardly at the collection point after the clearance is done.

- In case of Dumper Placer container points, all containers are not cleared on day-to-day basis. More than 30% of the containers are lifted twice in a week to once in a week creating there by unhygienic condition and inviting public complaints. This is partly due to shortage of Dumper Placer vehicles.

- Dumper placer containers and KMC vehicles are not washed daily or periodically even once a week. This results in heavy corrosion giving ugly appearance and reduced life.

- Average O&M cost (excluding depreciation and interest on capital) of KMC vehicle is more than private vehicles.

- Fuel consumption is not monitored as kilometer-reading meters of all vehicles are damaged and fuel is issued on trip basis, which is very high. The fuel issued on ad-hoc basis is nearly twice the standard fuel consumption. The loss to KMC because of non monitoring of fuel consumption.

- Due to bad conditions of roads and facility at waste disposal site, the wear and tear on vehicles is very high.

- Preventive maintenance (PM) schedules and programmes are not in existence. Preventive maintenance is not introduced in KMC garages.

- Superimposed inspection and monitoring of vehicle and work performance are not in practice.

2.2.9.6 Strategy and Action Plan for Improvement of Secondary Transportation System

With a view to suggest improvements in transportation system fulfilling the requirements laid down under MSW Rules, 2000, the existing system and available data (secondary) were reviewed and required primary data generated. This includes:

- Survey of existing collection points, to assess waste generation at each point and feasibility of converting open vats into modern scientific waste compactor stations or implementation of number of movable compactors and also to assess minimization of collection points
- Conduct sample surveys for resident households, major markets, commercial centres, hotels and restaurants, institutions, hospital and health units to ascertain their preferred option for primary and secondary collection of waste as also their willingness to pay for the improved system.
- Assessing potential of segregation and quantity of recyclable waste that can be processed and reused reducing there by the waste quantity to be transported to landfill.
- Assessing the status of existing vehicles garage wise, to assess their condition and performance and to determine their future utilization or not.
- Carrying out cost economics analysis for various type and capacity of vehicles to select best option
- Assessing the preference of KMC regarding mode of transportation.
- Assessing feasibility of private participation.
- Based on the above mentioned studies and analysis of primary and secondary data generated, borough wise collection and transportation plans are prepared.

2.2.9.7 Selection of Vehicles and Development of Transportation Plan

For selection of vehicles and development of transportation plan for MSW in Kolkata city, following aspects has been considered;

1. Relevant Statutory Rules/Regulation or National Code of practice for transportation of MSW;
2. Numbers and type of collection points with their locations in the city;

3. Access to the collection point and manoeuvring of vehicles;

4. Average generation / collection of waste ward/borough wise, collection point and category wise such as domestic, commercial, silt, debris etc.

5. Physical composition and density of waste category wise;

6. Average distance from each borough to the disposal site;

7. Average number of trips made by different type of vehicle borough wise;

8. Number and type of vehicle available with the KMC, their age and condition;

9. Comparative cost (Capital and O&M) analysis of different types of vehicles

10. Feasibility of offloading part load to private entrepreneurs to minimize capital investment and create healthy competition

11. In house capability of the organization to operate and maintain the vehicle fleet including workshop and garaging facility

2.2.10 Present Vehicle Requirements

Considering assessed waste generation, proposed collection points, requirement of average vehicle trips, standby vehicles as 15%, the present (2013) vehicle requirements are worked out and shown under Table 2.9.

Table 2.9: Illustrative list of items for additional vehicles

Sl. No	Item of expenditure	Quantity (Number)
1	Prime mover-chassis mounted hook loader capable of lifting portable compactor of capacity 10.5 m^3	36
2	Truck-chassis mounted, rear end auto loading movable compactor with tip cart	30
3	Truck-chassis mounted, rear end auto loading movable compactor with container	20

2.2.11 Capital Cost & Operation & Maintenance Cost for Secondary Collection and Transportation

Capital cost of the proposed secondary collection and transportation system is worked out to be Rs 9985.50 lakhs. Rate analysis of O & M cost for different category of the vehicles is worked out and shown in Chapter 7.

2.2.12 Existing Waste Processing Technology

Mechanized compost plant of 500 TPD capacities is presently run by KMC in collaboration with M/S Eastern Organic Fertilizers (India) Pvt. Ltd.

1. **Location of site:** The existing compost plant of KMC is located at Dhapa.

2. **Name of the waste processing technology:** Composting by Windrow method

3. **Details of processing technology:**

   Municipal solid wastes carried by trucks are received in the compost plant. Larger sized materials, particularly construction and demolition wastes are manually separated. Then the remaining solid wastes are placed in position as windrows.

   Here inoculums are added to it @ 1 kg/ton of garbage and water is sprayed by pipes. The windrows are turned for 4 times at 7 days interval by pay-loaders. Temperatures inside the windrows were found 50°C - 60°C in the first 5 to 7 days after formation, which kills most of the pathogenic bacteria. In some cases rise of temperature up to 70°C were also measured. Almost after a month the windrows are broken and the total contents are dried and shifted to a maturity yard, were these are kept for certain days.

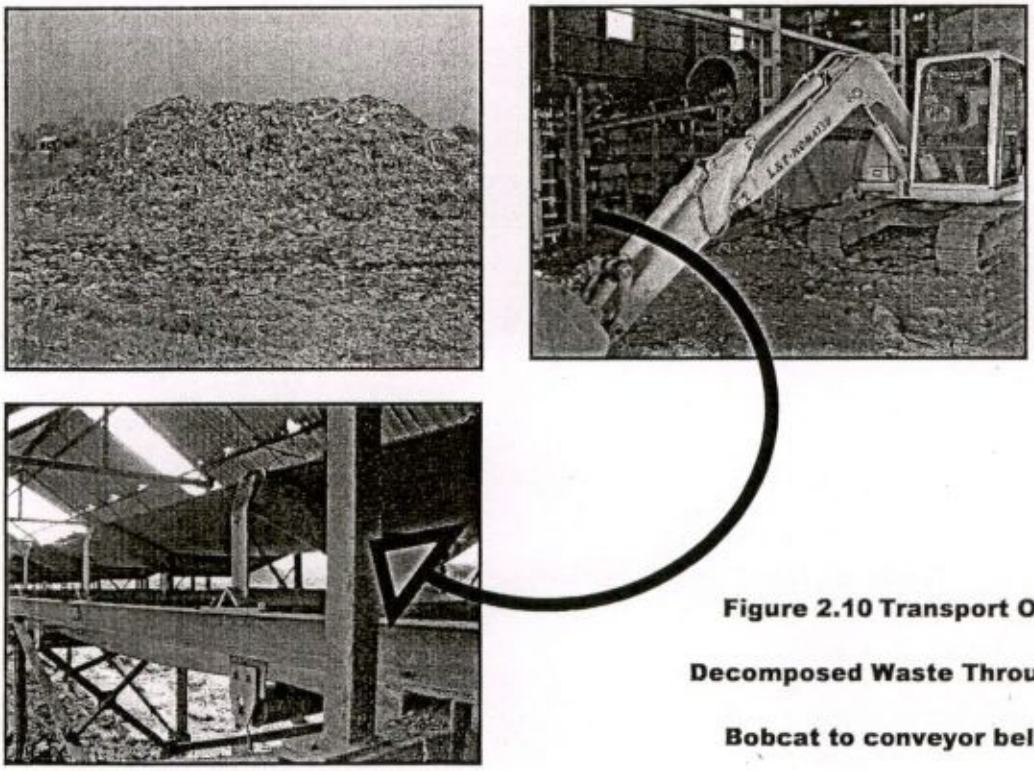


Figure 2.10 Transport Of Decomposed Waste Through Bobcat to conveyor belt

After that materials are lifted on a conveyor belt by a small pay-loader / bobcat and passed through different Trommels and finally finished manure, after one month of maturity, conveyed for weighing and bagging (50 kg/bag).

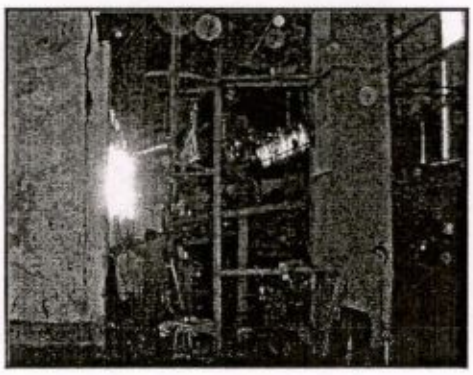


Figure 2.11 Conveying upward and passed through 4 mm strainer

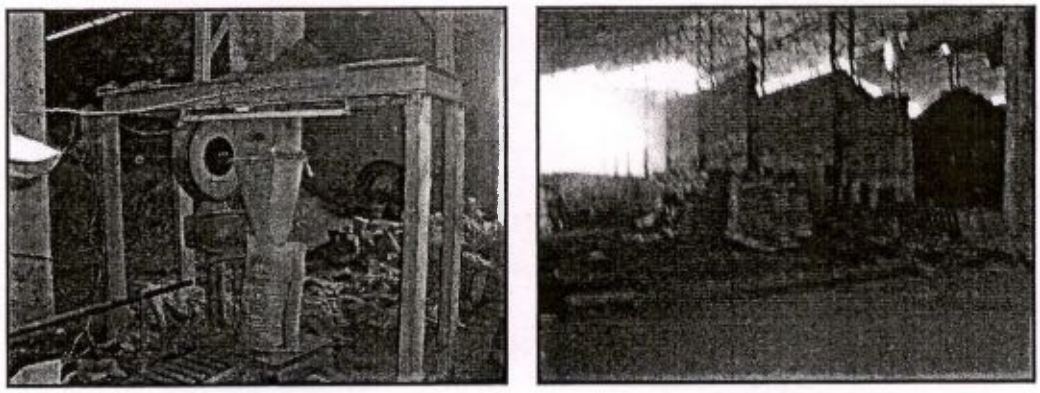


Figure 2.12: Finished manure bagging & stored under shed

2.2.13 Essentiality of Existing Compost Plant

In view of the above, it is extremely essential that we return back in resource recovery of compost to nourish our depleting soil. This establishment of composting plant is a national need and a step for food security. This is the reason that scientific handling and bioconversion of city waste as compost is essential and priority activity for the urban local body. The Hon'ble Supreme Court and Ministries of Agriculture, Environment, Health, and Urban Development have realized magnitude of problem. Under the Supreme Court directive, an Inter Ministerial Task Force was created on the subject of municipal solid waste – its composting and utilization for balancing of "Ill-effects" of chemical fertilizers alone especially in our food crops. This Task Force has submitted recommendations for composting of city waste and its fruitful utilization. In the light of the above, it is proposed to update and augment for bio composting facility for Kolkata. Proposal has been made for re-establishment of a State-of–the–Art compost plant by replacing and updating existing compost plant. It is also proposed the quality of present compost shall be upgraded to grade V compost with necessary input of additives as per FCO 2006. All the short term biodegradable organic matter content of MSW will be converted into "Organic Fertilizer" which will serve as lifeline for enhancing the productivity of soils of alluvial plains and adjoining districts.

Action plan

1. The biodegradable wastes shall be processed by composting in the existing compost plant of M/s Eastern Organic Fertilizer Private Limited

located within the Dhapa disposal site. The production capacity of the existing plant shall be augmented to treat the biodegradable content for which KMC will deliver additional waste over and above usual 500 MT as and when will be required by M/s Eastern Organic Fertilizer Private Limited.

2. A specific agreement between KMC and M/s Eastern Organic Fertilizer Private Limited shall be made detailing the capacity enhancement programme, regular waste supply mechanism, compost reject disposal, treatment of leachate, prevention of air pollution and ground water contamination, compost quality etc.

3. In order to prevent pollution problems from compost plant and other processing facilities, the following shall be complied with, namely:-

- To the extent possible, the waste storage area shall be covered. If, such storage is done in an open area, it shall be provided with impermeable base with facility for collection of leachate and surface water run-off into lined drains leading to the leachate treatment plant;
- Necessary precautions shall be taken to minimize nuisance of ordour, flies, rodents, bird menace and the fire hazard;
- In case of breakdown or maintenance of plant, waste intake shall be stopped and arrangements to be worked out for diversion of wastes to the landfill site;
- Pre-process and post-process rejects shall be removed from the processing facility on regular basis and shall not be allowed to pile at the site. Recyclables shall be routed through appropriate vendors. The non-recyclables shall be sent to the landfill site;
- The windrow area shall be provided with impermeable base made of concrete. The base shall be provided with a slope and circled by lined drains for collection of leachate or surface run-off;
- Ambient air quality monitoring shall be regularly carried out particularly for checking odour nuisance at down wind direction on the boundary of compost plant;

4. The following specifications for compost quality shall be met, as prescribed in Municipal solid waste (Management & Handling) Rules, 2000 and subsequent amendments, if any.

5. Each batch of compost shall be analyzed for the above mentioned parameters and record of the same shall be maintained and made available before the Board officials during inspection.

i) Augmentation of the existing compost plant capacity 500 MT/day at

Dhapa;

ii) The proposed composting will be "State – of – the – Art" Facility with 3 stage processing and expanded intake capacity.

iii) If the steps are implemented, requirement of land fill area and its O&M costs will be substantially reduced.

2.2.14 Sanitary Landfill

2.2.14.1 Essentiality

Under the MSW rules vide Gazette Notification Number 648 extra ordinary under schedule II Sr. No. 6 and Schedule III requirements for sanitary landfill have been specified. Development and operation of SLF is integral part of MSW processing. The remnants from processing and unusable waste have to be disposed off in SLF on daily basis.

2.2.14.2 Development of Sanitary Landfill

Landfill is vital component of any well designed SWM system. It is the ultimate repository of all other SWM options. This section provides detailed information of the proposed landfill facility based on baseline features at the selected site. The overall approach to the development of the common sanitary landfill is formulated to satisfy the regulatory requirements of MOEF, CPHEEO guidelines with objectives of environmental protection. Considering the above protection of the quality of the ground water in the site and release of treated leachate is of paramount importance. The finalized approach considers the principles of containment technology aimed at minimizing the following:

1. The generation of leachate, its subsequent outflow and uncontrolled dispersions into the surrounding aquatic environment.

2. The accumulation, migration and uncontrolled release of landfill gas into the atmosphere.

Since the waste to be land filled is mostly inert after composting, the generation of leachate and gas will be within permissible limit.

2.2.14.3 Design Life

The landfill design life comprises of an active period, a closure and post closure period. Design life of sanitary landfill will be considered for 25 years.

2.2.14.4 Waste Volume and Landfill Capacity

The quantum of inert collected in the project area and inert from the compost facility will be land filled in the proposed landfill. The activity is to be undertaken in 2 phases, the first phase comprising 10 years from the base year and phase II and beyond to be developed later.

2.2.14.5 Landfill Design for Phase-I

Requirement of land is estimated separately for phase-I and the height of the landfill has been fixed at 15 m above ground level for the period of 10 years

Design criteria for phase I

i)	Active life of Phase I	:	5 years
ii)	Topography	:	Central Sloping to all directions
iii)	Subsoil Conditions	:	Primarily clay.
Iv)	Water table	:	2m below (subject to bore results)
v)	Average Rainfall	:	1650mm
vii)	Density after compaction	:	900kg/m3 (as recommended in CPHEEO)
viii	Base year	:	2014

2.2.14.6 Construction phase

The development of the entire landfill site is proposed to be constructed sequentially in 2 phases, one phase every five years. This allows the progressive use of the entire site, such that at any given time a part of the site may have a final cover, a part being actively filled, a part being prepared to receive waste, and a part remain undisturbed. The development of each land fill section is to be constructed sequentially in a series of stages and restored progressively. Each phase will be enclosed by a structural barrier fully engineered and will be subdivided into cells. There will be (two) cells in the first phase and have been oriented in the direction of highest contour. The waste will be deposited from the lowest contour with benching of 10 m width at every 3m height and with side slopes of 1:3, to ensure easy movement of vehicles and to trap leachate from higher elevation. Advance site clearance and drainage works will be taken up progressively for all parts of the site undergoing development. At the start of the construction, the access road for phase I will be

constructed. As the capacity of the Phase I area nears its complete utilization, the phase II area needs will be prepared.

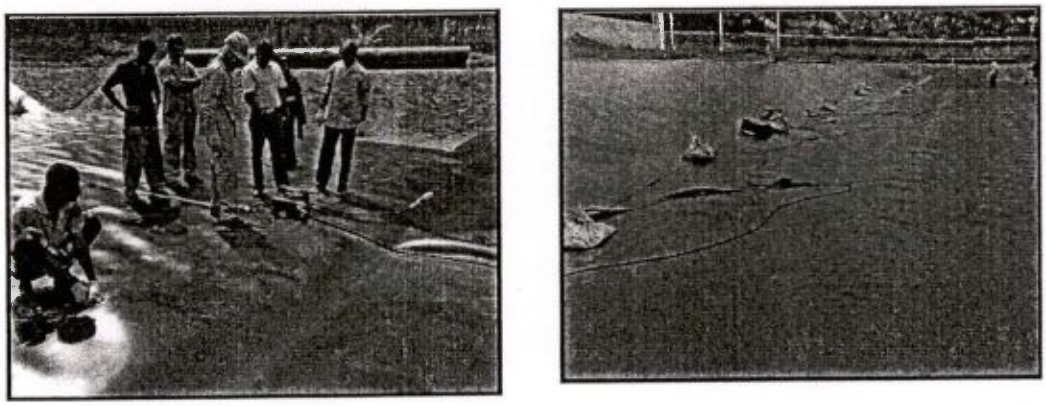


Figure 2.13 Laying of HDPE liner

2.2.14.7 Design Considerations

Assumptions

a) Landfill is meant for remnants from compost plant and other debris directly from the city and non recoverable matter after processing

b) Compost plant will recover majority of the biodegradable material

c) Other wise 50 % shall be disposed in the fill

d) Landfill covers are exclusively from the last screen of the compost plants

e) Present level of waste generation is 450-500 gm per day / per cap.

2.2.14.8 Volume and Area of Landfill

Volume and area of landfill are shown in Table 2.12.

Table 2.10: Landfill design

Landfill component	Design specifications
Capacity	
Cell 1	400 x 110 mt = 44000 sq.mt.
Cell 2	400 x 110 mt = 44000 sq.mt.
Cell 3	400 x 110 mt = 44000 sq.mt.
Cell 4	400 x 110 mt = 44000 sq.mt.
Leachate generation rate	965 m^3/day

Leachate generation rate (peak)	2000 m^3/day
Leachate generation rate after closure of landfill site	200 m^3/day
Leachate collection sump	1 number of 20m x 10m x 2.5m
Leachate dilution sump	1 number of 10m x 10m x 2.0m
Feeder pipes Spacing Size	 30m 100mm NB
Feeder and header pipe material	HDPE perforated pipes of 6 kg/cm^2 (ISI 4333 PN 6)

2.2.14.8 Liner System

- The proposed liner system will comprise:
- 900mm drainage layer of course sand;
- 2 mm Composite liner or double liner;
- Compacted natural clay barrier (bottom).
- **Preparation of the Soil Liner**

  The required level of excavation shall be done as per final checking. The soil is then compacted with road roller and an even surface is prepared. A bought out quantity of clay is then laid in layers for total thickness of 900 mm for an permeability co efficient of 10^{-7} cm/sec. Locally available soil is suggested but in case of non availability 20% of Sodium or calcium bentonite is required to be mixed to achieve the impermeability.

- **Installation of the geo-membrane liner**

  In order to strengthen the base to avoid any seepage of generated leachate a layer of 2 mm thickness composite liner is laid over the clay liner. This liner is laid with the help of double wedge hot shoe welder to prevent leakage and testing is done for the same. Although 2 layer of HDPE liner are considered for hazardous waste management rules of 1989, in consultation with WBPCB, a two liner system can be laid as a special requirement for EKW considerations.

- **Drainage layer**

  At the bottom of the liner coarse sand would be spread. The thickness of the sand would be enough to cover leachate collection pipe diameter. The sand also acts as filtered media for the leachate.

- **Leachate pipe**

HDPE perforated pipes 6 kg/cm^2 (ISI 4333 PN 6) will be laid at the base of landfill to all the leachate. They would lie horizontally and laterally connected towards one side of the land fill .The pipes are laid to a slope of 2-3 degree, 150 mm NB.

- **Installation of monitoring well collection**

Geotextile layer has been proposed in the slopes primarily for the stability of slopes. The geotextile is used also for separation of protective soil layer from the geonet. This would also act as a filter for the leachate. This filtered leachate would then be collected through pipes to collection sump.

- **Installation of pumps for removal of leachate (provision)**

A pumping arrangement of the leachate collected has been proposed to shift the quantity to the leachate tank as and when required particularly in the 2nd phase landfill.

- **Leachate treatment ponds**

The leachate shall be treated for malodorous effects only with biological methods as well as dilution for reduction of BOD & COD and quantity shall be large as rainfall is high.

2.2.14.9 Pond Construction

The terrain is absolutely levelled , soil is mostly mixed with clay and sandy clay with high impermeably index , low porosity having a permeability coefficient of 10^{-5} cm/sec , the lagoon constructed with 1.5 mm thick HDPE may not be vulnerable to damage within a short period , and preparation of impermeable clay strata would not incur additional cost.

2.2.14.10 Pumping Arrangement

Suitable pumping arrangement shall be made if the difference of level is not large however we prepare a gravity flow of discharged effluent in the Kestopur canal.

2.2.14.11 Preparation of Roads, Weigh Bridge, Washing Place, etc.

- 3 numbers Weigh Bridge with 30 ton capacity each to be installed with computerized recording system & one 30 ton capacity weighbridge shall be provided on the return circuit.

- As per MSW (M&H) 2000, it is essential to prevent entry of storm water from surrounding area into active landfill area. As artificial bund shall be created only direct precipitation is expected minimizing the leachate quantity for treatment. Peripheral drain has been considered.

- A 16 m wide box culvert shall be constructed on the existing entry point & a service road for accommodating the vehicles carrying garbage, before weighment. An entrance road of 16m wide shall be constructed leading to the weighment section & beyond up to the landfill site & connecting the other components like compost plant etc. Following facilities are proposed in the package

a) Main entrance gate

b) Watchman's quarter

c) Tube well with pump and tank

d) Washing platform with mechanical washing system

e) Sheds for vehicles with repair facilities

f) Fire protection facilities

g) Leachate collection & treatment plant tank.

h) A maturation tank for the treated leachate.

2.2.14.12 Buffer Zone

A buffer zone shall be created around the treatment and disposal facility for environmental benefit. This would be developed in the areas shown in the layout over a period of time. It no specific end use e.g. parks, garden is envisaged then long term vegetative stabilization will be undertaken to return the land to its original and natural vegetative landform. Vegetation is by far the most common and usually preferred stabilization option after closure of landfill. If a self perpetuating vegetative cover can be established not only can wind and water erosion be minimized, but also the landfill can be returned to some semblance of its original appearance and land use.

2.2.14.13 Landfill Cover

Monthly cover of the land fill is proposed with the residues of 4 mm screen of the compost plant as earth for cover is not available and expensive. Only final cover of bought out earth has been considered. This would also be a necessity as final cover requires to be enhancing vegetative growth. The following are also kept in mind while