



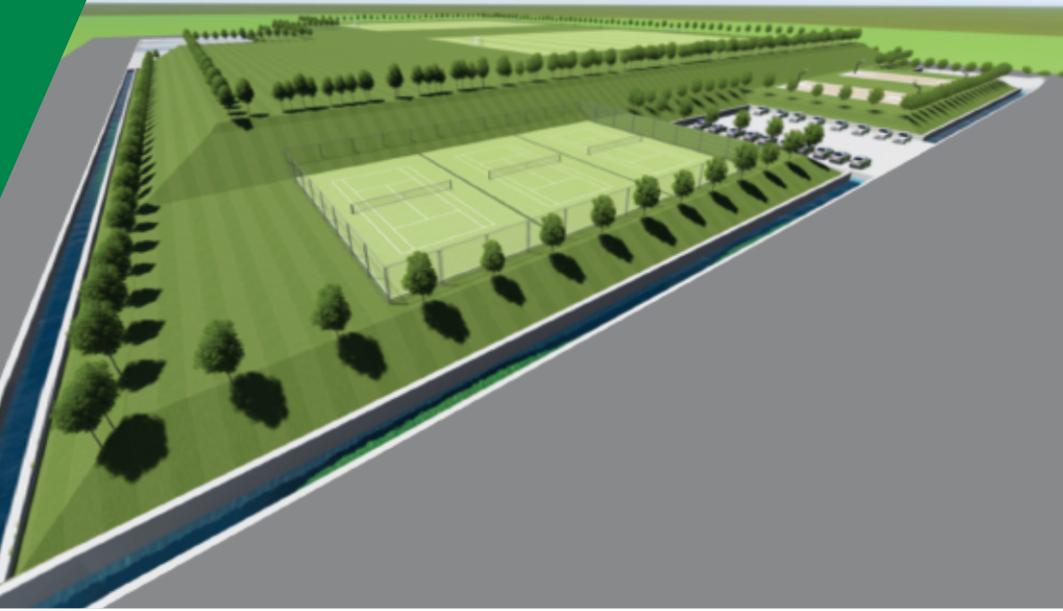
DHAKA NORTH CITY CORPORATION

WASTE REPORT

2016-2017



Landfill Post-closure impression



WASTE FACTS

- Area: 82.638 sq km
- No. of Wards: 36
- Population (DNCC) (2016-2017): 47,51,617 ¹
- Population density (DNCC): 57, 499
- Population density (Ward):
 - ⇒ Highest 1,10,863 (Ward No. 36)
 - ⇒ Lowest 22,300 (Ward No. 19)
- Actual volume of waste generation:
 - ⇒ Unknown
- Total waste collected:
 - ⇒ 683,174 ton (2015-2016)
 - ⇒ 852,391 ton (2016-2017)
- Waste collection growth (2016-2017): 24.77%
- Share of total waste transportation:
 - ⇒ DNCC vehicles: 62 % (28 Wards)
 - ⇒ Contractors' vehicles: 38 % (8 Wards)
- Highest waste collection in a day:
 - ⇒ 3,520 ton on 17 June 2017
- Highest waste collection in a month:
 - ⇒ 86,594 in June 2017
- Per capita waste collection/day:
 - ⇒ 0.513 Kg
- Waste transportation cost:
 - ⇒ DNCC: Tk. 665.00 per ton
 - ⇒ Contractors: Tk. 553.00 per ton
- Landfill operating cost:
 - ⇒ Tk. 134.00 per ton
- Aggregate load per trip:
 - ⇒ DNCC Vehicles: 3.7 ton
 - ⇒ Contractors' vehicles: 7.8 ton
- Estimated waste volume 2017-2018 to 2021-2022
 - ⇒ 6 million ton (Approximately)

¹ There are different opinions about the population of Dhaka North City. Opinion varies between 10 and 15 million. Population of Dhaka North City in 2016-2017 is based on the National Population Census 2011.

HONOURABLE MAYOR'S MESSAGE



Waste Report is a good start toward qualitative waste management. It's a way to get insight into the future of waste situation. It will also help the authority to take informed decision on waste management. Such scholarly approach should inspire professionalism in the Waste Management Department (WMD). Dhaka North City Corporation's (DNCC) services are people centric and people should be the ultimate beneficiary of any development in the management system.

DNCC mainly focuses on Municipal Solid Waste (MSW) in its waste management. DNCC has crossed six year long journey dealing with MSW and the management has taken a shape which now collects, transports and dumps about a million ton waste in a year. Yet, it remains a challenging function because of population dynamism and different sorts of wastes that they generate in large quantity.

Principal challenge in waste management is the environment friendly disposal of all wastes. Other challenges include managing current landfill, constructing new landfill, collection and transportation of increasing volume of waste, taking measures to reduce waste volume etc. Now it's time to look beyond the management of MSW as other types of wastes are being generated in significant volume.

Waste management has come a long way serving the people. Waste Management Department should add value to the service every day. We are committed to make Dhaka North a clean city and waste management is its prerequisite. With people's support, we can make it happen.

Annisul Huq
Mayor

CHIEF EXECUTIVE OFFICER'S MESSAGE



Waste management is an important part of the urban infrastructure as it ensures the protection of the environment and of human health. It is not only a technical environmental issue, but also a highly social one. Waste management is closely related to a number of issues such as urban lifestyles, resource consumption patterns, jobs and income levels, and other socio-economic and cultural factors.

However, important visible progress has been made in the waste management sector of DNCC over the last few years. The most important improvement is the increased level of awareness among both the public and public representatives. Now that, DNCC is enthusiastically committed to provide healthier, time bound and effective waste management services to its citizens.

While we work for the public welfare, we are obligated to keep our activities transparent and accountable to the citizens. This Waste Report is a testimony of our obligation. The report being first of its kind has been kept simple; yet, it succinctly portrays DNCC's heartiest waste management activities and challenges ahead, and also the endeavor to further improvement.

People's cooperation is a precondition to 'waste management' and 'waste management' is a prerequisite to 'Clean Dhaka', committed by DNCC to its citizens. Here in DNCC, we are heartiest to the devotion to materialize Hon'ble Mayors vision to 'Green, Clean, safe and Smart Dhaka'. This Waste Report will help us finding the future challenges we are going to win over with the support of our dear citizens.

Md. Mesbahul Islam
Chief Executive Officer



INTRODUCTION TO WASTE REPORT

Waste Report 2016-2017 has been prepared with the primary aim to inform people about the developing situation in DNCC area. Waste management functions are directly related to populace because where there is population there is waste generation. Therefore, the report first attempted to assess current population situation and population five years from now. Results reveal that each of the 36 Wards is thickly populated and population density in each ward is prone to increase with resultant impact on the management system. In 2016-2017, highest population density 1,10,863 per sq km was found in Ward-36 (Noyatola, Mogbazar) and lowest 22,300 per sq km in Ward-19 (Gulshan, Banani).

DNCC has been experiencing waste growth which is the consequence of rapid population growth. In 2016-2017 DNCC transported 852,391 ton waste to landfill at Boliarpur, Savar which is 24.77% higher than 2015-2016. It is contemplated in the context of addition of 18 new wards combined with population growth, DNCC will have to manage environment friendly disposal of approximately 6 million ton waste in next five years. Given the current organizational strength of the Waste Management Department (WMD), it will be extremely challenging.

DNCC's focus has been the management of Municipal Solid Waste (MSW) although other categories of wastes like medical wastes, electronic wastes, different types of industrial wastes, construction wastes etc being generated in the city. These wastes, like the MSW, are also hazardous to public health and the environment and needs environment friendly disposal. But DNCC does not have the organizational strength to undertake regulatory management of these wastes. Another grey area in regulatory waste management has been the absence of law appropriate to a waste category.

Besides managing MSW, WMD performs another important responsibility to keep the city free of sight pollutants like billboards, posters, graffitis, banners and festoons etc. WMD's drive could refrain to some extent the private enterprises from spoiling the city with these pollutants. Little could be done on the political and government posters, graffitis, banners and festoons. If all these pollutants can be stopped, city's beauty will increase by 25%.

The report is expected to give some idea to the public to appreciate the waste situation in the future. WMD will endeavor to make Waste Report to be one of the regular annual publications of DNCC with more facts, figures and analyses.

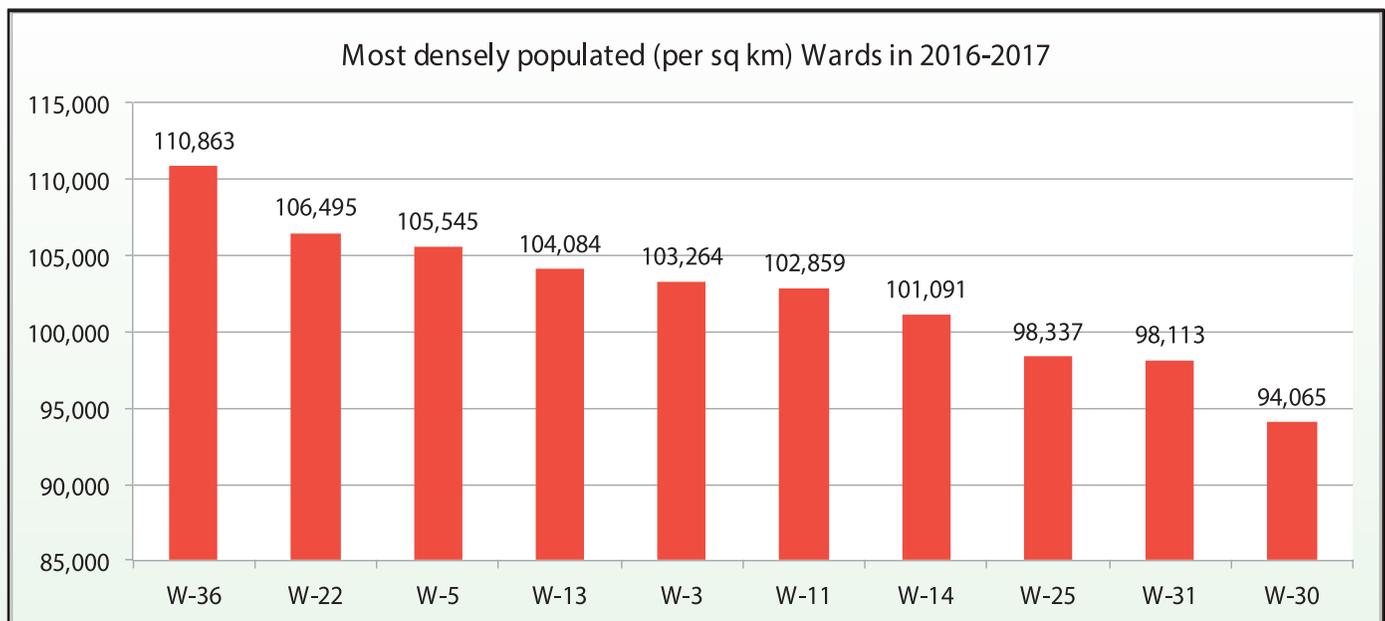
Commodore Mohammad Abdur Razzak, NUP, ndc, psc, M Phil
Chief Waste Management Officer
E Mail: safera690@yahoo.com

POPULATION

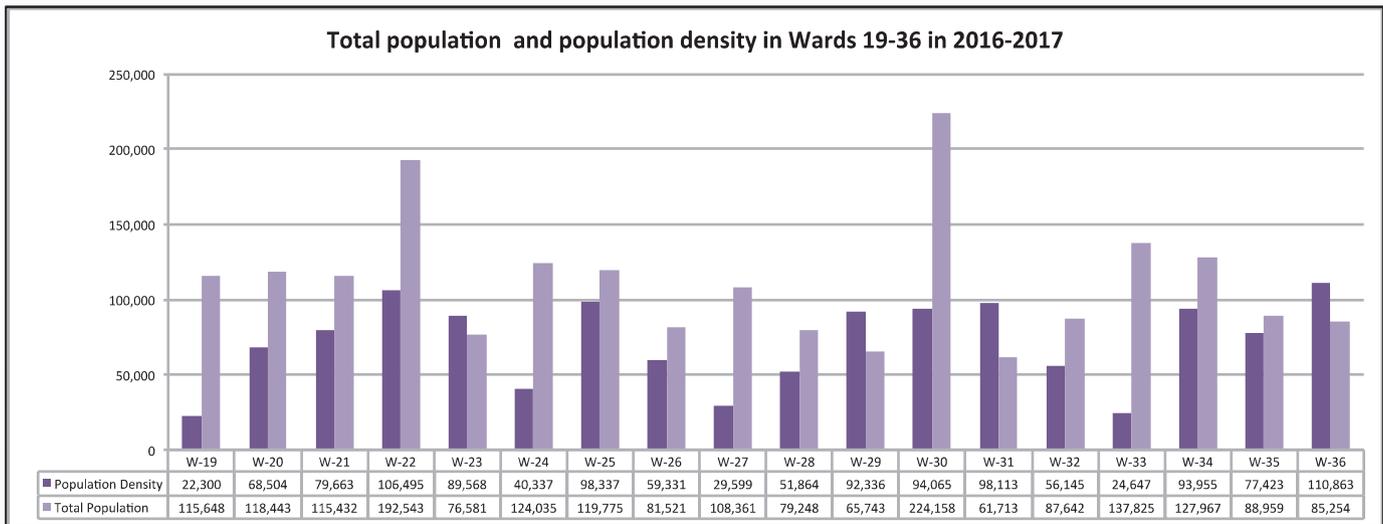
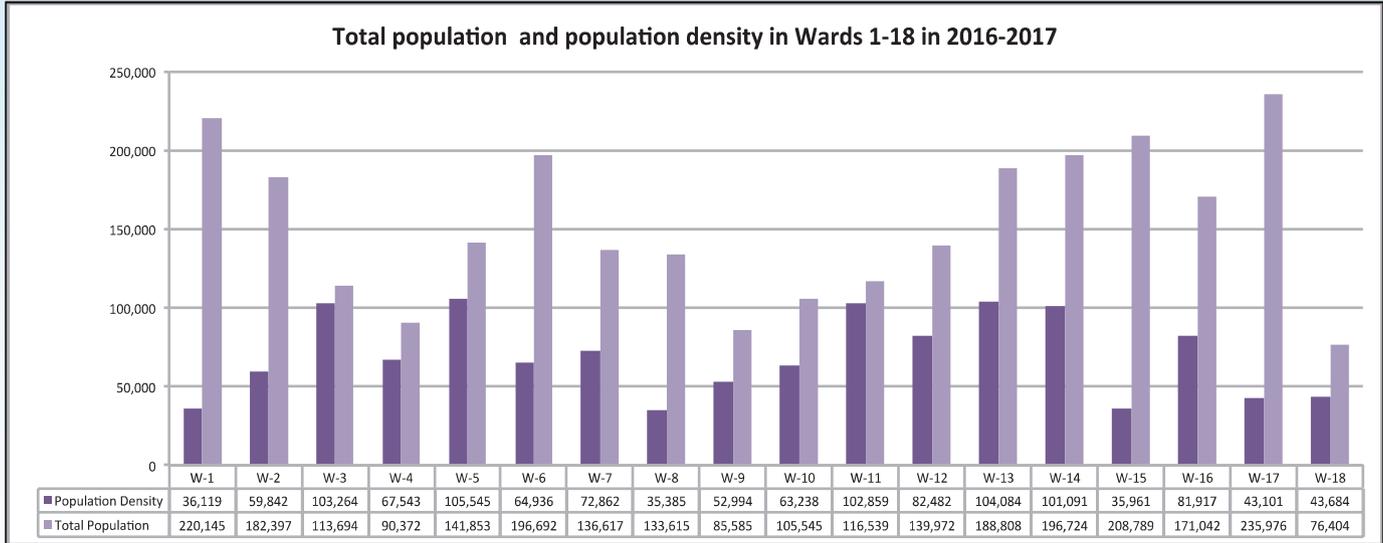
There is inseparable relationship between human habitation and waste generation. It is the human being who generates diverse wastes for its livelihood, amenities and comforts. Pattern of waste changes as the society transforms. In the DNCC we experience exponential population growth, economic development so we see increase in waste generation with diversity.

Dhaka is the most densely inhabited city in the world. In terms of population size, it is one of the largest cities in the world. Population density of Dhaka North City in 2016-2017 has been estimated at 57,499 per sq km. Population density in wards are much higher than over all population density. Ward-36 (Noyatola in Mogbazar area) has the highest population density with 110,863 per sq km. Ward-19 has the lowest population density with 22,300 per sq km. Wards 3, 5, 11, 13, 14 (in Mirpur area), Wards 30, 31 (in Mohammadpur area), Ward-25 (Nakhla Para) and Ward-22 (in Rampura Area) are top ten populous Wards.

Human settlement in Dhaka city shall continue to increase due to the quest for employment opportunities, health care services and educational opportunities making it more and more crowded. Population pressure in the context of waste management needs to be offset by both vertical and horizontal organizational development. Organizational development processes are quite lengthy. Slow organizational development at the backdrop of fast population growth, is feared to be a major impediment in dealing with mountainous task looming large on the horizon.



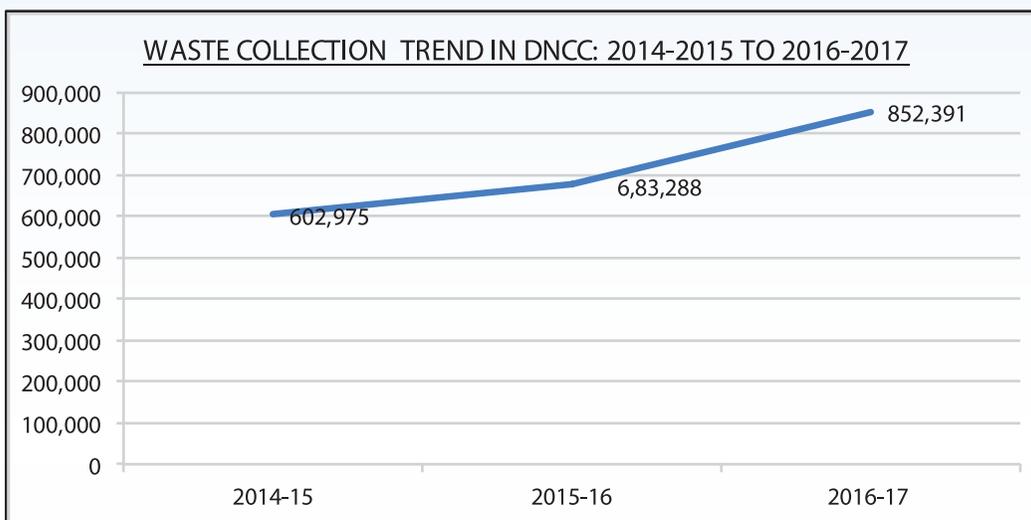
Following charts give a comparative view of current population density and total population in each Ward.



SOLID WASTE MANAGEMENT

Managing the Municipal Solid Waste (MSW) is the principal task of Waste Management Department (WMD). Main activities in waste management functions have been the collection, transportation and crude dumping of waste in the landfill. WMD has been performing these functions with a weak organogram.

Dhaka city has been experiencing incremental growth in waste generation and collection. In 2016-2017, DNCC transported 852,391 ton waste to the landfill which is 24.77 % higher than 2015-16. Waste collection trend since 2014-2015 and growth percentage are presented in the charts below.



It is evident from facts, figures and developing situation that waste volume will continue to climb the graph. Factors likely to influence waste volume are - population growth, life style change and addition of 113 sq km new area to current 82.638 sq km.. Projected waste volume during the period between 2017-2018 and 2021-2022 is appended in the chart below. The projection suggests that DNCC might have to manage over 5,637,728 ton waste in next five years.



To manage growing volume of waste, DNCC will need robust collection and transportation network. DNCC has engaged private entrepreneurs to meet the growing challenges of waste management. Currently four entrepreneurs in eight wards (25.976 sq km; 31.43% of DNCC area) sweep streets and transport waste from Secondary Transfer Stations (STS) to landfill.

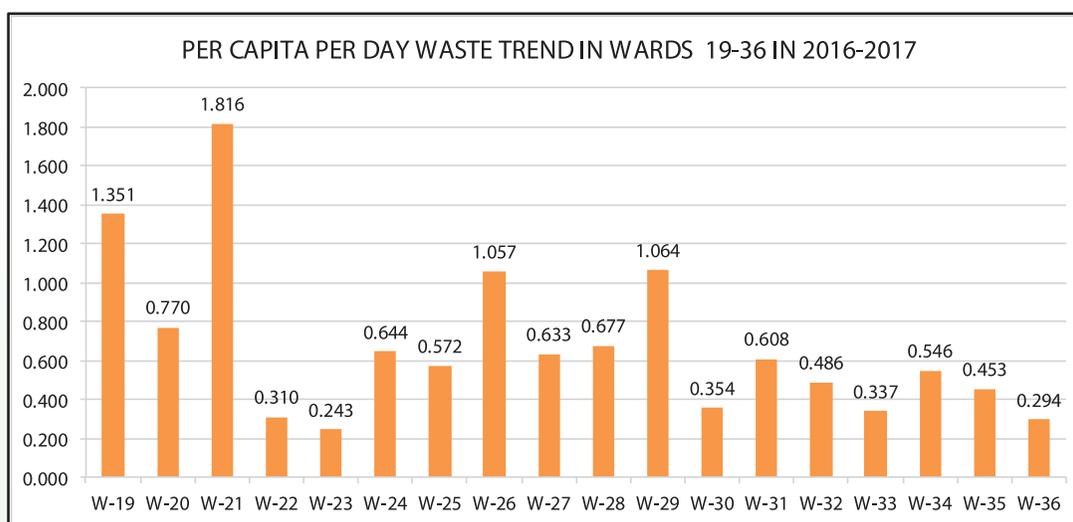
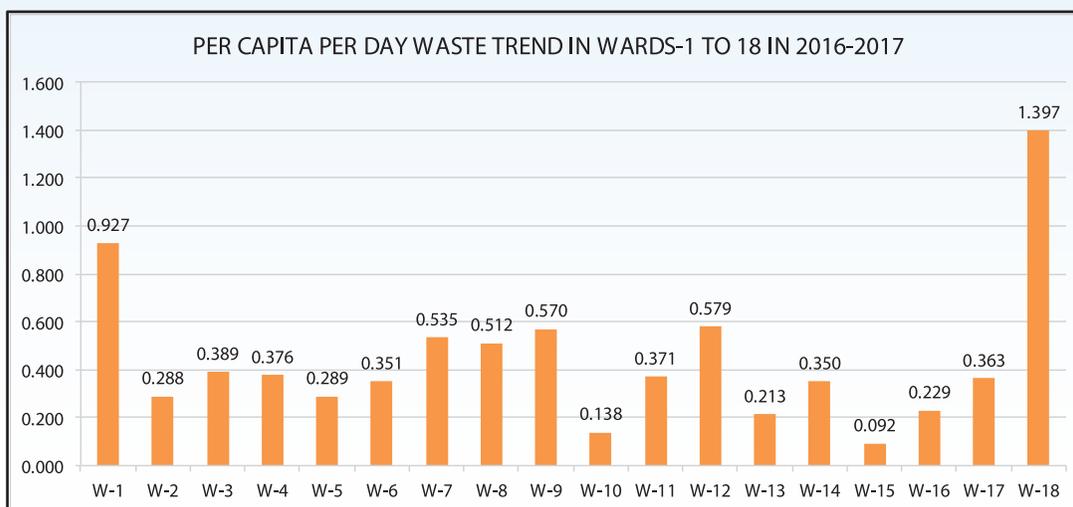
DNCC does not know actual waste generation in a day in the city but it knows per capita per day waste collection. In 2015-2016 and 2016-2017 per capita waste collection/day was 0.391 Kg and 0.513 Kg respectively. It is to be noted that in the context of DNCC the term “waste” comprises of all throw away things that have been transported to landfill.

Wards-1, 18, 19, 21, 26, 29 have very high per capita/day waste collection. Horirampur, Uttar Khan and Dokkhin Khan are three unions abutting Ward-1. Although these areas have the status of Union, they are quite populated and almost built up area. Wastes from some parts of these Unions are discharged into different areas of Ward-1, which cannot be separated from the wastes actually generated within the boundary of Ward-1. However, population of those Unions was not included in the calculation. Therefore, per capita per day waste collection appeared very high in Ward-1.

Similarly, Ward-18 has couple of populated and built up Unions like Satarkul, part of Beraid, Vatara etc as its neighbours. These Unions share border at Progati Sharani of Ward-18. Wastes from these Unions come into the city, which cannot be separated from the wastes actually generated within Ward-18.

Large quantity of garden waste is generated in Ward-19, which includes Gulshan and Banani. Garden waste includes tree branches, which are quite heavy. Within the city area, waste from one Ward goes into another due to the proximity of STS to a ward. That is why per capita waste per day collection in Ward-21, 26, 29 are high and low in Ward-22, 23, 10 and 15.

However, following per capita per day waste data gives an idea about the waste generation in each Ward, which could help future planning of ward based waste management.



Construction of 52 STS has been the notable development in waste management. This has enabled DNCC to remove large number of waste containers/open dumping spots from the street, which was much desired relief for the people. Containers/dumping spots on the street were bottlenecks in vehicular movements, which was also solved through the construction of STS. DNCC has plan to build 2-4 STS in each of the 36 Wards. Implementation of the plan will depend on the availability of land.



View before STS construction



View after STS construction



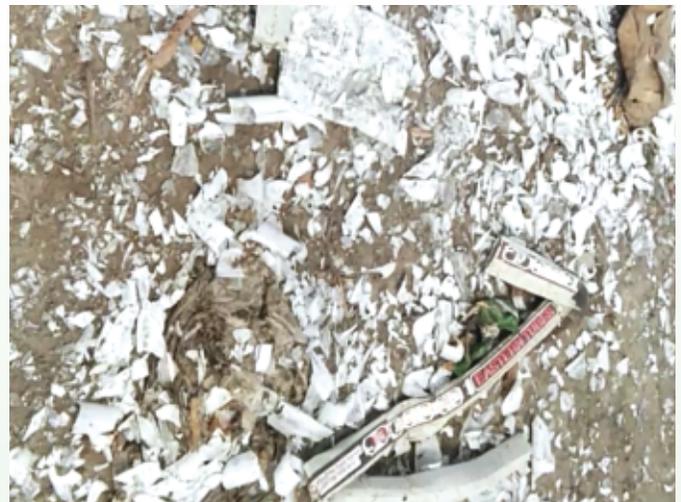
Inside of a STS

In the areas of primary collection, Primary Waste Collection Service Provider (PWCSPP), an NGO is coordinating collections from households to STS. In 2016-2017, 340 private operators were registered with the PWCSPP. There are also unregistered operators collecting wastes from households to STS.

Besides solid waste, Medical Waste, Electronic Waste, Construction Waste, Food Waste, and different types of Industrial Wastes are generated in the city. DNCC does not have the capacity to perform regulatory management of these wastes. Besides lack of capacity, there are no laws to regulate the management of Electronic Waste, Construction Waste, Food Waste and Industrial Wastes.

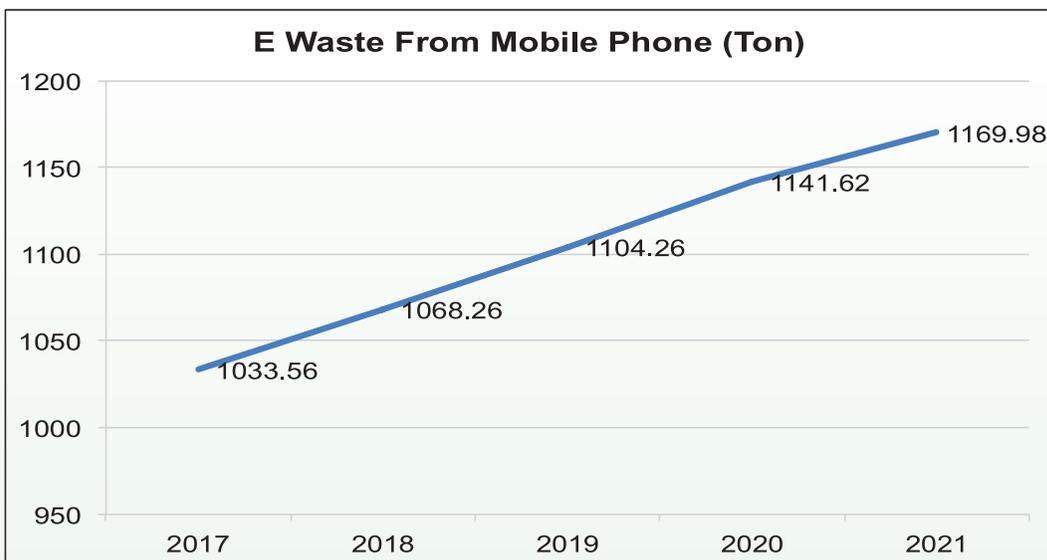
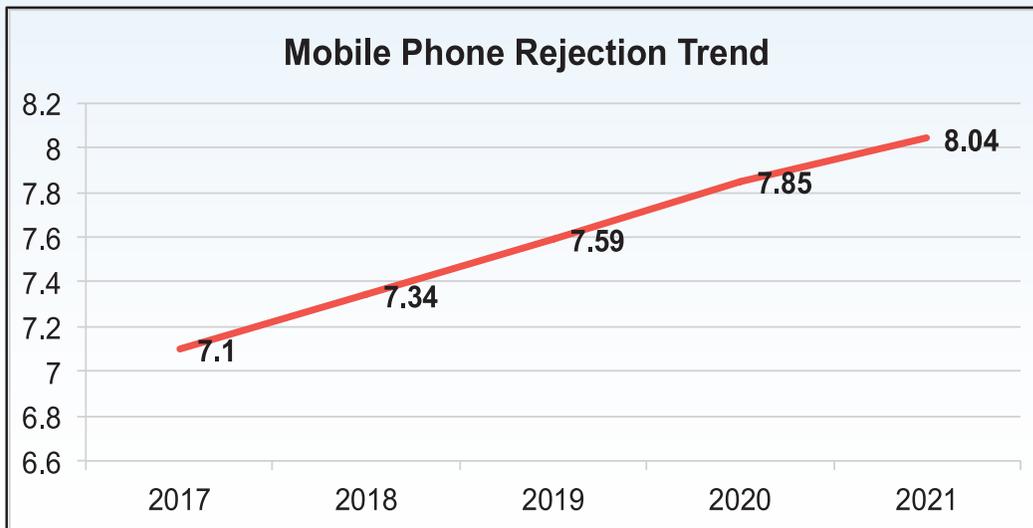


Cathode Ray Tube came into the landfill with MSW



*Compact Fluorescent Lamp (CFL) in the Landfill.
CFL contains mercury*

As of February 2017, there were 129.584 million mobile subscribers in Bangladesh. Mobile phone is a source of electronic waste. Each mobile phone contains nickel cadmium battery comprising between 6% to 18% cadmium, which is toxic heavy metal and requires special treatment for disposal. But these batteries go into the environment untreated. The chart below shows mobile phone rejection trend in Dhaka Cities and waste generated from mobile phones. (Source: Survey by ReTem Corporation of Japan).



WASTE DISPOSAL SITE

Landfill, the back yard of DNCC, is an integral part of waste management. It is the final disposal site for wastes. Landfill at Boliarpur, Savar is the only landfill where DNCC dumps waste. Dhaka City Corporation (DCC) built the landfill on 52 acres land in 2005. According to the projection of JICA, capacity of the landfill was to exhaust in 2017. The process to acquire land for a new site just began in Feb 2017. It will take couple of years to start the operation of new landfill.



Satellite image of landfill at Bliarpur (Amin Bazar), Savar

In the context of current waste growth and additional waste from 113 sq km new area, it is estimated that DNCC will have to manage approximately 6 million ton waste in next five years. In future, finding land on the periphery of Dhaka city for waste dumping will be extremely difficult. In this critical situation, incineration perhaps will be the best possible option to reduce the volume of waste. Incineration can reduce waste volume by 80%-90%. Use of ash in the cement industry can ultimately reduces waste volume by 90%-95%.

Anyway, until a new site is ready, current landfill is the only option to dump waste. As the landfill is at the fag end of its life and new landfill is not in sight, it has been, therefore, decided as a matter of short-term measure, to extend the service life of the current disposal site. Given all these limitations, disposing off the huge volume of waste in environment friendly way, let alone crude dumping, is likely to be the worst possible challenge for DNCC.



Landfill operation at Bliarpur, Savar

Like any disposal site, landfill at Boliarpur has operating cost. Generally a sanitary landfill involves high operating cost. But the landfill at Boliarpur has very low operating cost. Because, important hygienic activities like periodic soil cover over the waste, methane gas recovery, etc are not done. Cost breakdown of DNCC's landfill operation is appended below.

Landfill operation cost

Item of Expenditure	Million Taka
Fuel cost for landfill equipment	50
Equipment depreciation cost	10
Outsourcing and infrastructure cost	30
Staff salary	15
Miscellaneous	10
Total	115
Waste handled	8,52,391 ton
Landfill Operating cost per ton	134.00

At the end of service life, a landfill must not be left exposed to environment. It must be covered hygienically. Land being scarce and precious, next use for such big chunk of land should be planned. As the landfill is in the last year of its service life, DNCC has conceived a post closure plan to use the land as sports complex. Implementation of end use plan should start after the landfill has settled completely, which may take 30 years.



Sports complex: An option in post closure use

GLIMPSES OF LANDFILL OPERATION



Senior management inspects operational activities in the landfill.



Landfill equipment in operation



Waste dressing increases space



Dump truck in the landfill



Chain dozer in waste dressing

GLIMPSES OF LANDFILL OPERATION



Chief Waste Management Officer inspects layout before casting internal road



Chief Waste Management Officer inspects landfill operation at night



Equipment used in landfill operation



Landfill operation



Waste dressing



Use of heavy equipment increases landfill operation

MEDICAL WASTE MANAGEMENT (MWM)

At the backdrop of growing population, numbers of Primary, Secondary and Tertiary Health Care Establishments (HCE) in Dhaka City have increased many folds. These HCEs generate large quantity of hazardous medical waste in addition to MSW. Medical waste, if disposed off improperly, is a threat to public health and the environment. DNCC does not have the capacity to under take regulatory enforcement of medical waste management in the HCEs. Further Medical Waste Management Rule-2008 has not given local government bodies any role and responsibility to oversee medical waste management of HCEs.

Prism Bangladesh Foundation (PBF), an NGO, was engaged by the then Dhaka City Corporation (DCC) for collecting and disposing off medical waste generated in DCC area. After the creation of DNCC in 2011, PBF has been continuing its service in DNCC area also. Visits to couple of HCEs revealed that all HCEs do not have proper in house medical waste management and do not receive formal MWM services. Presence of medical waste in municipal solid waste or general waste confirms the revelation. There is also no reliable information as to the number of operating HCEs and actual volume of waste generated in DNCC area.



Un-identified HCE disposed off medical waste with general waste



Untreated medical waste found in the landfill



Officers from Waste Management Department visit a hospital to see in-house waste management



Medical waste on the rooftop of a residential building thrown from a HCE in Mohammadpur. Disposal is not in line with DG Health's guideline and relevant law.



Medical waste in-house collection arrangement in a Hospital in Mohammadpur. It did not follow DG Health's guideline.

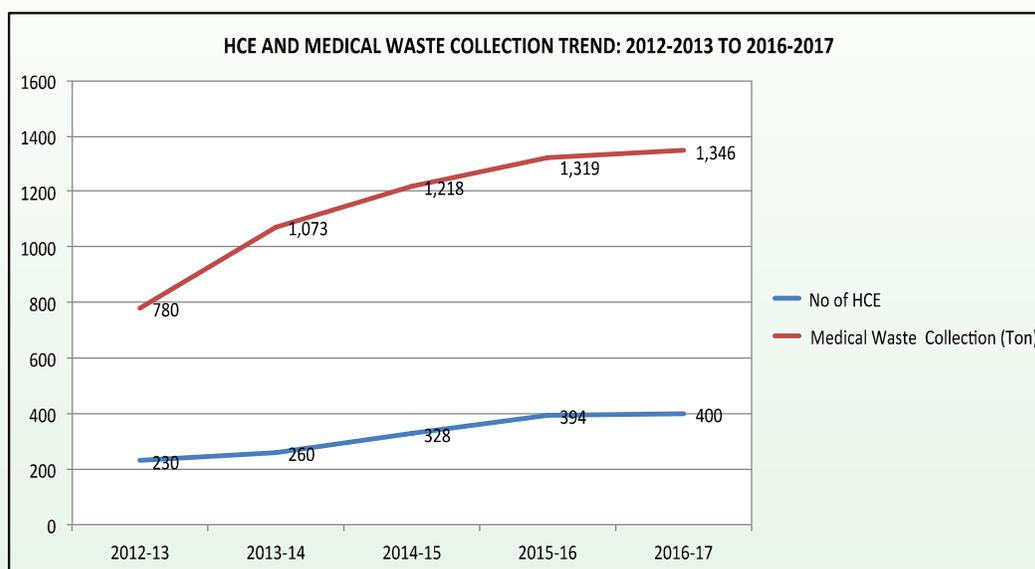


Medical waste in-house collection arrangement in a Hospital in Gulshan. It did not follow DG Health's guideline.

HCEs, which generate medical waste in Dhaka North City, are:

- Hospitals
- Clinics
- Diagnostic Centers
- Dental Clinics
- Pharmacy
- Pharmaceutical Factories
- Medical research institutes

Trend of HCEs receiving formal medical waste management services and waste collection and disposal is presented in the chart below.



Source: Prism Bangladesh Foundation

WASTE TRANSPORTATION COST

Wastes are transported to landfill by DNCC vehicles and DNCC's Contractors vehicles. In 2016-17 DNCC vehicles transported 5,25,963 ton (62%) waste from 28 Wards and Contractors transported 3,26,428 ton (38%) from 8 Wards (Ward-1,17,18,19,20,21,24 and 25). DNCC vehicles generated 141,890 trips. Aggregate load per trip for DNCC vehicles was 3.7 ton. Contractors' vehicles generated 41,837 trips with 7.8 ton aggregate load per trip.

Costs of waste transportation by DNCC and contractors' vehicles are different. Landfill operation cost elements included following elements:

Items of Expenditures	Million Taka
Petroleum, Oil, Lubricant	200
Vehicle Maintenance Cost	45
Drivers and maintenance staff's wasges	55
Vehicle Depreciation Cost	50
Total	350

Total waste Transported by DNCC vehicles: 5,25,963 ton

Cost per ton of waste transportation by DNCC in 2016-2017 was Tk. 665.00

Contractors' cost in DNCC's context is fixed. During the period between July 2016 to June 2017, contractors transported 326,428 ton waste and DNCC paid Tk. 180,631,002.00.

Thus cost of per ton waste transportation through contractor was Tk. 553.00.

Comparative performances of DNCC and contractors' vehicles are given in the table on next page.



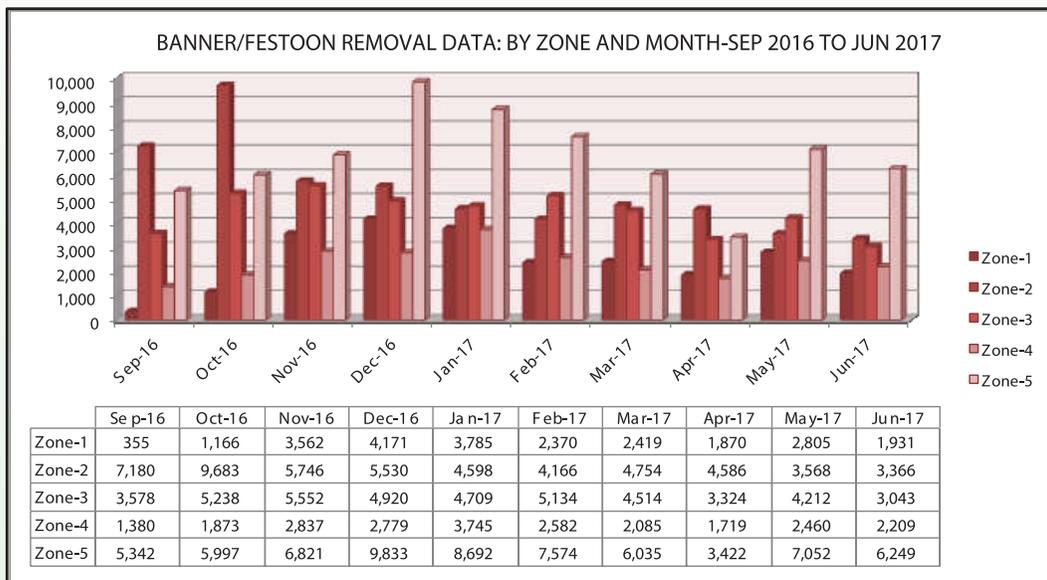
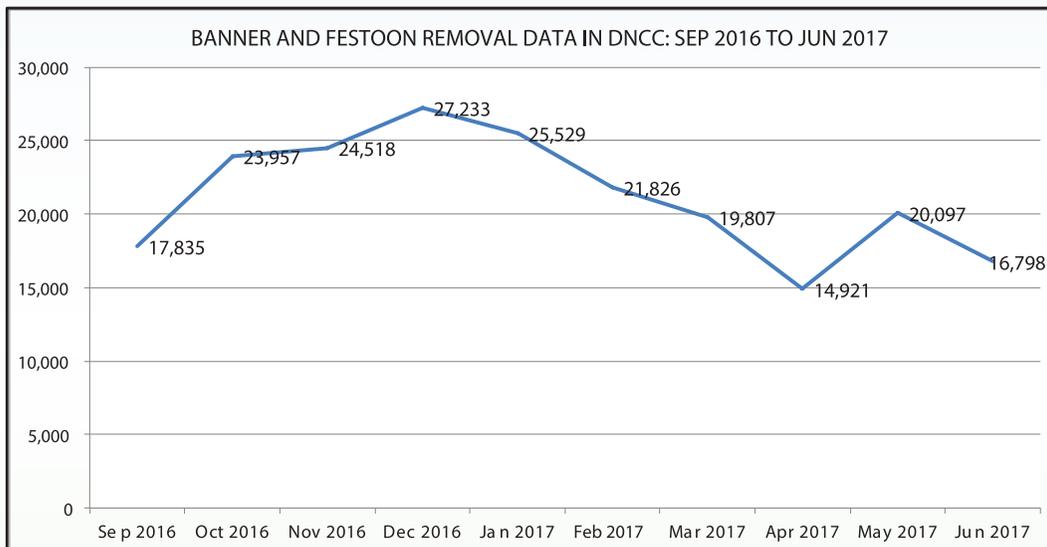
COMPARATIVE PERFORMANCE OF DNCC'S AND CONTRACTORS' WASTE TRANSPORT FLEET

Month	Total Waste	Total Trip	DNCC's Load	Contractor's Load	DNCC's Trip	Contractor's Trip	DNCC's Aggregate Load/Trip	Contractor's Aggregate Load/Trip	DNCC's Load Share (%)	Contractors' Load Share (%)
July	65,966	14,187	50,870	15,096	11,748	2,439	4.3	6.2	77	23
August	74,853	15,508	55,415	19,438	12,368	2,870	4.5	4.3	74	17
September	67,408	15,291	43,673	23,735	11,833	3,458	3.7	6.9	65	35
October	66,485	15,307	40,174	26,311	11,735	3,572	3.4	7.4	60	40
November	63,493	15,673	39,041	24,452	12,242	3,431	3.2	3.6	61	19
December	66,200	15,890	40,509	25,691	12,227	3,663	3.3	3.3	61	18
January	69,142	16,251	42,036	27,106	12,371	3,880	3.4	7.0	61	39
February	63,446	14,581	37,525	25,921	10,870	3,711	3.5	7.0	59	41
March	72,948	15,870	42,823	30,124	11,842	4,028	3.6	7.5	59	41
April	71,780	14,500	40,989	30,790	11,320	3,180	3.6	9.7	57	43
May	84,076	15,935	47,617	36,459	12,260	3,675	3.9	9.9	57	43
June	86,594	15,004	45,290	41,304	11,074	3,930	4.1	10.5	52	48
Total	852,391	183,997	525,963	326,428	141,890	41,837	3.7	7.8	62	38

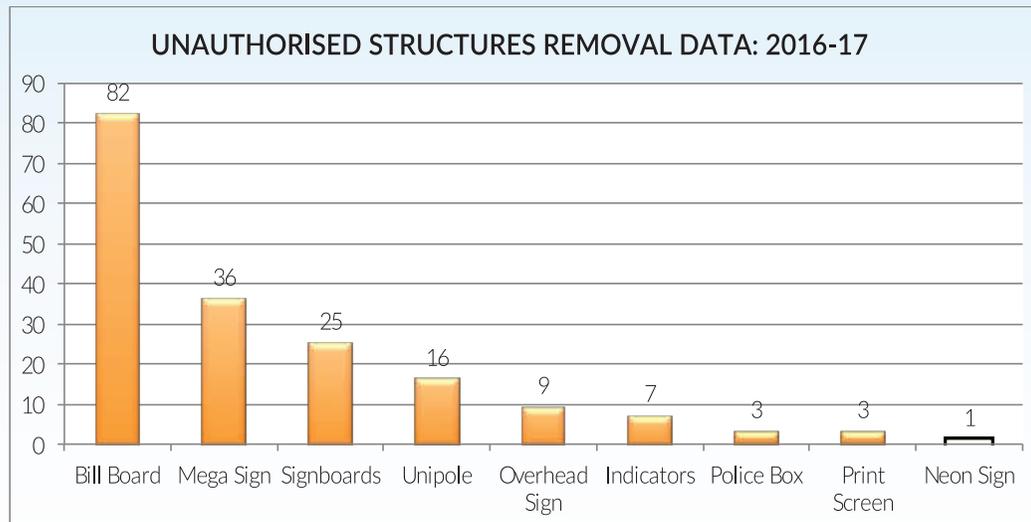
REMOVING SIGHT POLLUTANTS

Banners, festoons, graffitis, posters, overheads, unauthorized structures etc are dirty path of branding and publicity. These pollutants, besides spoiling the beauty of a city, also causes sight pollution. Government organizations, political parties, private enterprises and individuals; all take this dirty path for branding and publicity.

Besides, applying relevant laws through mobile court, DNCC had been removing banners and festoons every day. During the period between Sep 2016 and Jun 2017, DNCC removed 212,521 banners and festoons weighing about 46,753 Kg. To remove this huge number of city spoilers and sight pollutants, DNCC spent 30,300 man-hour. Banner and festoon removal trend by month and zones is presented in the charts below:



Besides banners and festoons, DNCC also removed 192 unauthorized displays. Different types of structures/displays removed during the period between Sep 2016 and Jun 2017 is presented in the chart below.



A billboard removal action in Mohammadpur in Feb 2017

NEEDS TO BE DONE

DNCC is gradually encountering new challenges in terms of waste volume and waste diversity. To handle upcoming challenges, DNCC will need a robust and dynamic waste management organization backed by law. Development of following areas has been identified as waste management imperatives for environment friendly disposal of wastes.

- *Organizational capacity development*, which implies organizational expansion and human capacity development.
- *Enact waste management law* to follow consistent waste management practices.
- *Formulate landfill operation policy* to guide staffs to manage the landfill complying with the environmental needs.
- *Volume reduction through incineration* is an option to reduce growing waste volume and ease pressure on scarce land.
- *Environment Education Program* in the school, which should motivate young students to keep own environment clean.
- Waste segregation at source can reveal economic value of waste.
- *Develop capacities of Waste Management Department* to undertake regulatory management of:
 - ⇒ Medical waste
 - ⇒ Electronic waste
 - ⇒ Food waste
 - ⇒ Construction waste
 - ⇒ Industrial waste
 - ⇒ Municipal Solid Waste (MSW)

"A view of a waste Incinerator, Beijing, China"





**Waste management
complements green growth**