

A REVIEW ON SALT LAKE CITY, KOLKATA*, INDIA: MASTER PLANNING AND REALIZATION

Dobrivoje Tošković

Motivation for construction of Salt Lake City comes from the circumstances characterizing life in Calcutta known by its social, political and cultural activities. Among many problems, the City was faced with poverty and overcrowding. West Bengal Government realized that serious steps have to be taken to resolve the situation. One of the biggest actions of the Government was creation of so called "NEDECO" Plan for reclamation certain area of the Salted Lakes, followed by the tender for urban planning. The enterprise for water ways Ivan Milutinović was considered the most convenient for both: reclamation and planning. The Conceptualization covers the Main Aims and interests forming plan basis where three factors were selected: urban character, new vs old town, inhabitants and town growth. Follows Existing Land Use Pattern of the Municipal Area. The realization of the Salt Lake Master Plan, as a part of the Municipal Area, is shown through an Overview of Achieved Infrastructure covering Roads, Water Supply, Sewerage, Area Level Storm Water Drainage, Solid Waste Management and, finally, through the Other Municipal Services, such as: Administrative Infrastructure, Health Infrastructure, Greeneries, Water bodies, Socio-Cultural Infrastructure.

Key words: Motivation, Reclamation, Master Planning, Realization

MOTIVATION FOR CONSTRUCTION OF NEW CALCUTTA*

Calcutta - the biggest town of India - is situated between the river Hooghly at the West and Salt Lakes at the East borders; it grew in the worst way - in width.

Having in mind that the key for the economy of the whole India lays in Calcutta - West Bengal Government realized that serious steps have to be taken to resolve the situation.

One of the biggest actions of the Government was creation of so called "NEDECO" Plan for leveling certain area of the Salted Lakes followed by the tender for urban planning of this space. After a few attempts the proposal of the Central Metropolis organization for planning and the enterprise Ivan Milutinović from Belgrade was considered. According to the Jury of 9 members, the Government of

West Bengal accepted our proposal on 9 April 1964.

NORTH SALT LAKES REGION: ADVANTAGE AND CONVENIENCE OF THE LOCATION

By leveling the North Salt Lakes region, the territory of 3.3/4 square miles is gained about 4 miles away from Dalhousie Square. This region has direct access to Sealdah station and trade centre Bow Bazaar.

The Salt Lakes region will have excellent road connection which will be realized by the proposed super-highway to Dum Dum, one of the most important and the quickest growing centre of heavy and medium industry in the whole Metropolitan region. By Krishnapur channel, the region gets water traffic. The region can easily be connected with the railway leading to Sealdah station.

The size and location of the North Salt Lakes suggests development plan that would satisfy more urgent needs of the town.

First, the region would enable release of the town overcrowding. It is immediately possible to secure accommodation for 3 loch /300,000 people inside the region, leaving more space at disposal in the existing region of the town.

Second, the region would enable expansion of the significant activities within the Central region.

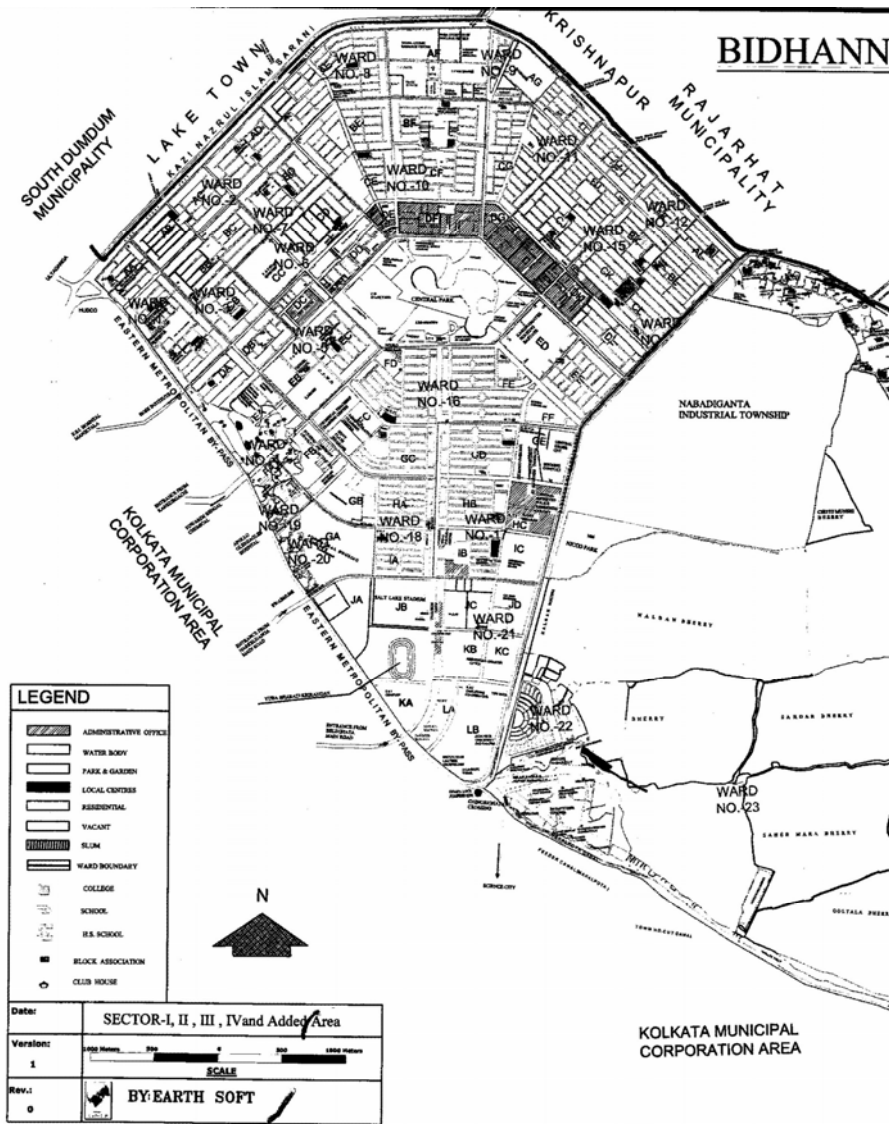
Securing the modern office space at the Salt Lake will satisfy the urgent needs for enterprises and administration and easy overcrowding in the existing town centre.

Third, there is an opportunity to secure space for service industry important for development of any modern town.

SALT LAKES RECLAMATION, CALCUTTA, INDIA

Client: Government of West Bengal Completion period: 1961 to 1970.

* formerly Calcutta



horticulture and the relation at the urban macro-level, between vertical emphasize of structures around the central zone and horizontal development within the external ring which should dominate the town area should be achieved.

Central zones, by its shape should be depended as much as possible to inhabitation and micro-climate of the central zone as pleasant as possible.

B) New and old town

A town should be outlined as a separate whole which is at the same time complementary with the old - existing town. Acquire easy connections with the existing centre and direct approach to railway station Sealdah.

Town structure and shape

Balancing the aims for coherent and compact structure with standard for the open space function and attempt to secure diversity of residential areas, as culmination of this idea, it led to the concept of centralized town core.

Around this linear shaped core the residential units of higher density are grouped, which together with the central functions make vertical accent of the town. Behind this inside belt, the units which present the horizontal stamp to the town are lined up.

The compactness of the town tissue is achieved through the big scope of residential areas lined up in continuity distributed town core at one side and through maximum density within the residential zones and concentration of open space at the other side.

Town structure, besides the core (with administration, social and trade marks, industry, scientific and educational and health points and big town park) comprises of 49 residential units some of which are outlined within one block, while in other cases 2, 3 or even 4 blocks make one residential unit which is a result of individual size of some blocks and the distance from the town centre. Likewise, the number of inhabitants differs between the minimum of 3000 up to the maximum of 12000 which is also in line with the percentage of school children in this town which equals 20%.

The overpopulated city of Calcutta confined between the Hooghli River and the Salt Lakes, found the solution for its expansion by filling marshes and brackish lakes.

The realization of this hundred years' old idea was entrusted to "Ivan Milutinović" in cooperation with "Invest-Import", Belgrade. The scheme included reclamation of 3.75 sq.miles of flooded land for city expansion. The above work commenced in 1961 and was completed in 1967, about a year ahead of schedule.

Reclamation was performed with material dredged: from the shoals of the Hooghli River. Material was leaded on the barges and transported to the unloading dredger. The mixture of sand and water was unloaded from the barges and hydraulically transported to the site by means of a 26" pipeline.

Total length of the pipeline varied from 2.5 to 5 miles.

CONCEPTUALIZATION

Main aims and interests - plan basis

Researching the leading, basic demands of this new town plan and its architecture - three factors were selected as the influential (in our proposal):

A) Urban characteristic

A town has to have a coherent structure - easily understandable, main elements of the plan have to be combined so that they make a unique whole. Ideas leading towards dispersion of residential units mutually divided by greenery should be abandoned. The urban character in terms of architecture and

Traffic communications connect all these structural elements in the way that secures natural main streams and at the same time maximum segregation of pedestrian and motor traffic.

Residential streets are such planned that the slipped down system and widening the cross roads prevent fast traffic and in the sense of shape they form a small square as a gathering place. Six types of streets are planned, of which I-IV come under the town avenues and collecting streets, while V and VI are residential streets of which one part makes short, blind streets.

Projection of inhabitants

Totally estimated inhabitants in both phases: 328,000.

Planned accommodation for the I phase is 218,000 inhabitants of which 129,141 inhabitants within the individual construction and 88,859 inhabitants within the collective arrangement of land.

After the adoption of the General Master Plan, by direct engagement within the same Institution, detailed urban plans of the I phase are completed (1964-1966). They included main projects of the street network (including water supply and the system for waste and rain waters channels). The new town has to accept new functions and has to have a wider meaning for the needs of inhabitants that are going to live there (scientific, educational, health and administrative).

C) Inhabitants and town growth

Town growth is conceived in two main phases partially overlapping (phase I 15-20 years). During the first years of construction, the inhabitants would be mainly filled in from migrations, while the second phase would cover natural growth which would result in the difference between the newly born and died in relation to immigrants.

Characteristics of employment

The experience from Chandigar show lack of selection of the economic activities, specially industry, leaving unpleasant consequences to the town characteristics. Therefore the problem of employment has to get an important significance through securing points for

development of industry and adequate possibilities for employment in non-economical branches. It is counted that this would attract households of the middle age which would secure greater participation of this group in active population of New Calcutta.

Master Plan

General concept reflects determined principles and certain limits of the locality at one side and the way and financing at the other. As such it is a result of different influential factors but also is a CONDITION and OBJECT of the specific way of urbanization: the town content consists parallel and adequate significance of versatile human activities apart from the function of inhabitants' accommodation. In this way the possibility for self development is offered and a danger that town becomes "a settlement for sleeping" is escaped.

In this sense it has its characteristics:

- has its structure
- it carries processes with existing relations
- quality measures can be added
- it is divided into phases

Combined matrix model effects

New Calcutta is combined by three types of urban matrices - radial, orthogonal and linear, characterized by the typical urban tissue and unity in diversity. Its completeness is emphasized by specific, by one axis prolonged shape of two dimensional matrix, bordered wide avenues and partially green strips /water channels which are separated from the rest tissue of Calcutta and noticed as clear borders.

The urban structure of New Calcutta is easily understood because of its expressed entity characterized by different types of construction and different functions. Further, the territory which it possesses is not too big and that is one of the reasons for good readability. Silhouette, on which the residential tissue can be recognized, homogenous by altitude and emphasize verticals of business and trade objects, achieves good orientation and readability.

EXISTING LAND-USE PATTERN OF THE MUNICIPAL AREA

Situation Assessment

Urban expansion has very serious impact on the scarce land resources. In other municipalities, urban expansion/ encroachment into rural and agricultural areas are possible. But the case is different for Bidhannagar, which is already a planned township. Bidhannagar was basically conceived in the form of five Sectors-I, II, III, IV & V. Later, in 1995 an added area of 20.98 sq km was added to it. This area is remarkable for its vast wet land resource with pockets of habitable land within. In 2006, Sector V, which is the Industrial Sector was separated from Bidhannagar to form a new Municipal area 'Naba-Diganta'.

The Sectors are further sub-divided in Blocks, 73 in numbers (Sector-I,II & III) Sector IV includes slum of Sukantagar (Ward no.22) & Nalban Bherry. However large vacant areas are found in all blocks. There are fifteen markets in the planned area of the Municipality- seven in Sector-1, three in Sector-2 and five in Sector-3 Besides these, there are two other commercial Centres, one in Sector-1 (City Centre) & the other in Sector-3 (Charnock City) .

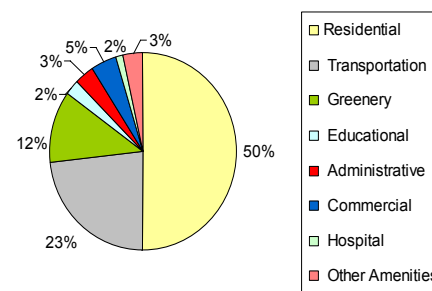


Figure 1: Land-Use Pattern Planned and Built up Salt Lake City

As Salt Lake City is a pre-planned township, the Land-Use Pattern was fixed beforehand. The percentage of land-use is as follows:

The most inevitable aspect of urbanization is horizontal growth of the town and change in land uses. Bidhannagar is basically comprised of the planned township of Salt-Lake with an area of 12.50 sq km and with an added area of 21 sq km with a population 164,221. The area remaining same, the number of houses in the

planned area has increased from 44,656 in 2001 to 47,884 in 2006.

This Regulatory Control over land already exists in the planned township area of the Municipality. But the main problem which Bidhannagar faces is that the Municipality has no authority over the land within the Municipal area.

The land is under the control of Urban Development Department of State Govt. and the function of the Municipality is to maintain its land and provide service to the lessee.

Moreover, lands are allotted on leasehold basis; resulting in restriction of land transfer.

OVERVIEW OF ACHIEVED INFRASTRUCTURE

Roads:

Transport infrastructure forms the backbone of economy. It plays a very significant role in the growth and development of a city. It is also responsible, besides other factors, for the spatial growth of the city by increasing the accessibility of sites on the periphery of the city. The road sector plays a very significant role in Bidhannagar Municipal Area and the surrounding region.

Regional Linkages: Bidhannagar, the most important township of the city of Kolkata is situated in the eastern fringe of the city. The South-West boundary of the planned Bidhannagar area is demarcated by the Eastern Metropolitan By-Pass, which is the eastern boundary of the city of Kolkata. Bidhannagar Junction Rly. Station located within Kolkata

Municipal area is situated nearby. This station connects the city not only with other Municipalities in the northern half of the KMA but also with other districts of West Bengal. The newly developing Greater Kolkata i.e. Rajarhat- Newtown area is just beside. The city Airport which is the main regional linkage to the city of Kolkata is also within 10 km. Besides roads & railways, revitalization of the Kestopur Canal is being done at present. This will be an added advantage, as along with other transport modes the water transportation will also be introduced in the transportation system.

- **City level road network:** The Bidhannagar Municipal Area has approximately 23% roads, which is more than sufficient for any Medium Sized Town (For metro cities % of road is 20-25% acc. to UDPFI Guidelines).

At the beginning, the planned township area was designed to have 7 entry points. Among these, 3 (Near Hudco i.e. 1st entry, near Phool Bagan, i.e. 4th entry and near Beliaghata crossing i.e. 5th entry) are function properly.

- **Intersections**

The area has nearly 46 road intersections, among which 12 are most important in the network of Arterial & Sub-Arterial roads. The roads are mainly maintained by the Municipality. There are Roundabouts in most of the intersections. Out of these, two (the PNB & the Karunamoyee) are signalized.

- **Traffic characteristics**

Vehicle growth: The travel needs in the city are catered mainly through Roads by a variety of modes of transport in the form of buses

operated by CTC, CSTC & WBSTC, pvt. buses, mini buses & Chartered buses run by Private operators, auto rickshaws, cycle rickshaws and private vehicles such as cars, 2-wheelers and cycles. As the residents are mostly from a higher socio-economic status, private vehicles are adequate in numbers. But there is scarcity of good public transport in the Municipal Area.

Proposed Metro Rail Corridor from New town-Rajarhat to Ramrajatala-Howrah is expected to join this Municipal Area with the Central Business District (Esplanade-Dalhousie Square area) of the city of Kolkata in near future.

River transport: Restoration of the Kestopur Canal in order to initiate water transportation at Kestopur canal forming the northern boundary of Bidhannagar at present has been taken up by Govt. depts. like Irrigation & Waterways Directorate, Canal Div.

Traffic

Due to this easy accessibility, the Traffic Demand of this area is increasing at a fast rate. In order to face this heavy demand the capacity of the Major Arterials should have to be increased to ensure easy flow of traffic.

Parking: Parking is a major and an emergent issue in the Bidhannagar Municipal Area. Though, land-use patterns are predetermined, there is a tendency of commercialization in the Area along the main roads. Initially, the plots along these roads were residential in nature but with increasing land value and traffic on these roads, they got commercialized. The commercialization led to an increase in parking demand along these roads which in turn

Type of road Tip puta	Length duž. h (km)	Width in m (incl. Footpath & divider) Širina u m (uklj. trotoare)	No. of Lanes Broj traka	Service lane Uslužna traka
I-Spl	9.525	42.97	2	On both sides
I	4.600	42.67	2	On both sides
I-Spl-II		46.936	2	On both sides
II	20.15	26.211	2	Nil
III	20.935	20.725	2	Nil
IV, IV-spl	10.845	17.067/ 19.50	2	Nil
V	28.974	11.581	1	Nil
VI, VI-spl	120.196	9.143	1	Nil
Bituminous	17.050	2.4-3.3		Nil
Non-bituminous	18.000	1.8-3m	1	Nil
Un-Surfaced Motorable road	150	1.8-3m	1	Nil
Non-motorable road	100	1.2-1.8	1	Nil

reduced the effective carriage way.

On Street Parking: On-street Parking is a very common phenomenon and is highly responsible for the decrease in the width of the Carriage-Way. Taxis and Auto-Rickshaws not only have their Terminal points on the streets but also at important and populated public places giving rise to congestions. Even more, school Buses and Mini-buses also have their terminus on the major Arterials.

Public Transport System

The public transports that are available for the general public in the Municipal Area are buses operated by Calcutta Tramways Corporation (CTC), private buses, mini buses run by private operators, auto – rickshaws, Trackers and cycle rickshaws in the form of Intermediate Public Transport and personalized modes such as cars, two-wheelers and cycles. The CTC bus caters to the travel needs of the city as well as regional areas. Private and government bus operators make regular services there. 8 mini bus routes, 22 short distance bus routes and 18 long distance bus routes operate now in the total Municipal Area. There are 4 bus terminuses. At present there are 58 bus routes operating in the city.

The bus routes mainly ply on the main arterial roads of the city. As, WBSTC buses do not have a good coverage and the Private buses do not run on time, people are highly dependent on Autorickshaws. These vehicles are mainly responsible for Traffic congestion at important intersections and roads. Rickshaws ply mainly inside the Municipal Area to cover short distances.

WATER SUPPLY

Introduction

In any settlement water supply is the first & foremost necessity to the inhabitants. The Municipal Areas in all over West Bengal are mainly dependent on the Ground water resources. But, due to constant use of this ground water and lack of consciousness in recharging water to the soil, the water table is lowering down. This table goes down more during the summer. As a result, scarcity of water occurs not only during summer months,

Summer Timings Letnje vreme	Winter Timings Zimsko vreme
6am-9am	6am-9am
11am-12pm	11am-12pm
4pm-6pm	4pm-6pm
9.30pm to 10.30pm	9.30pm to 10.30pm If necessary

but also chances of arsenic Contamination increases multiply.

Being conscious of these problems the Govt is on its way to serve the people with Surface Water. In the KMA, this surface water source is the river Hoogly. This water, after being treated is being supplied to KMC area & some of the other Municipalities. Bidhannagar is within one of those. But the supplied surface water cannot fulfill the total water supply requirement, so ground water is also used.

Present Status of Demand and Supply

According to 2001 census the population of Bidhannagar Municipality was 1.68 lakhs¹. This has been estimated to rise to 2.76 lakhs in 2011 and gradually to 4.72 lakhs in the year 2025. The water demand according to that was 4.99MGD in 2001 and will be 13.72 in 2025 (acc. to KMDA water supply Master Plan).

Extent of coverage

Extent of Coverage: At present the entire population within the planned portion of the Municipal Area is dependent on both Surface and Ground Water. Water in all the Wards are served through Municipal pipelines partially. The added areas are also served by Hand Tube wells.

Service levels: The total quantity of water supplied at present in Bidhannagar Municipal area is 85 mld (acc. to CES report). This worked out to a per capita supply of 125 litres per capita per day.

Surface water source: Bidhannagar Municipal area is within the Palta Service District (PSD) of KMDA water supply area and is thus served by the Palta Treatment Plant with an existing capacity of 220MGD.

The quantity of supplied water to the Bidhannagar Municipal Area amounts to 6.5 MGD.

Treatment

Chlorination is done to the supplied surface water at the rate of 3kg/hr for 2hrs in the morning and 3hrs in the afternoon/evening. The chlorine solution is injected at 6points before the supplied water enters in the central reservoir (as per KMDA project report).

Supply mechanism (Planned city portion):

The treated water from Tala-Palta is first stored in the 5MG Capacity Central Water Reservoir located in the Central Park. This arrangement is controlled by KMDA, though the supply of water is delivered by KMC. The water is then pumped to the 15 UGRs with capacity 9-18,000 & 6-60,000 Gal each, operated by Bidhannagar Municipality. From these UGRs water is lifted to the 15 OHRs with capacity 1,20,000 Gal each and then supplied to the households through distribution network under gravity pressure. There are also 6 direct supply Booster Pumping stations in addition to the OHRS supply.

Supply Hours: Supply of Water in Bidhannagar Municipal Area is done on intermittent basis. At present the water is supplied three to four times daily for a total period of 6 to 7hrs approximately.

Distribution network: The Distribution network is of Grid-Iron pattern i.e all the pipes are interconnected. The total length of pipelines is 450 km and the diameter of pipes varies from 100mm to 250mm. (as directly supplied to grid by 8 DTWs within the network).

SEWERAGE

Present Status:

The Bidhannagar Municipal town has an underground sewerage system along with some non-sewerage area also. The 277.1 km long sewerage system along with the metal

¹ A lakh is a unit in the Indian numbering system equal to 100,000

road has varying diameter of 8"-33" and serves an area of 12.5 sq.km. There are Sewage Pumping Stations, 8 in number, to lift the sewage. The sewage is then pumped to the Bagjola Sewage Treatment Plant through a double-barrel Sewer line.

Existing System:

The total system has been functioning since 70's. As no thorough cleaning has been done since then, the prevailing problem is siltation. The pumping equipments are also old and have poor efficiency.

Besides these, due to the lack of public awareness, in various places and also in individual premises, storm-water line is connected with the sewer line transferring sediments into the system & causing the major source of blockage into the system.

The sewer system within the Blocks is planned in such a way, so that every 4 premises have a common Master trap at the rear open space and the sewer line passes through the back yard. This results in a problem of cleaning as most of the time access to premises is denied.

AREA LEVEL STORM WATER DRAINAGE

Besides Water Supply, the most important factor on which the persistence of an Urban Area depends is its Drainage System. In Developing Countries like India very few Cities are planned in prior stage. Bidhannagar, being such a planned township has a proper underground separate drainage system (not combined). As a result practically very little problem is faced by the Municipality in its planned area..

Present Status:

According to the topography & outfall system, the catchment areas within KMA are broadly divided into 25 numbers according to the 'Master Plan of Drainage, Sewerage & Sanitation' for 2001 - 2025. The Bidhannagar Municipal area is within the Northern Salt Lake Basin.

The outfalls of the planned township are two in number.

Kestopur Canal forms the Northern boundary of Bidhannagar Municipal area. It is directly

connected to river Hoogly in the West through New-cut canal & Beliaghata-Circular Canal and to the river Kultigung in the East. There is a bifurcation near R.G.Kar Hospital in the Beliaghata-Circular Canal. The eastern part being connected to Kestopur Canal & the southern part is extended upto Chingrighata, E.M Bye-pass. From there it is connected with an excavated channel, the **Eastern Drainage Channel** along the South-Eastern boundary of Salt-Lake city under Bidhannagar Municipal area. This Eastern Drainage channel also has its outfall in the Kestopur Canal.

Existing condition of:

Kestopur Canal: From Drainage point of view, it is the lifeline of the Bidhannagar Municipal area especially the planned township of Salt lake. There was high congestion in Kestopur canal resulting in water logging, environment pollution, and mosquito menace around its vicinity. But very recently with the objective of making all these canals navigable, Kestopur Canal has been dredged and revitalized.

Municipal Drainage system: The Bidhannagar Municipal area can be broadly classified into three areas according to the infra-structural facilities & socio-economic background. They are:

- The planned Salt Lake City
- The Slum area of Dattabad
- The Slums in the added area of Bidhannagar Municipality mainly comprising Ward no.14 & 23 (part of 22).

Both of these Wards are environmentally important as they are enriched with the Wetlands of East Kolkata, a Ramsar Conservation Site.

The planned Salt Lake City: This area has completely separate underground drainage network with 184 km of pipe lines & a lifting/pumping station. The drainage water of sector I & Sector -II (Part) is made to discharge directly to the Kestopur canal through a number of outlets and drainage water of Sec-III is also being discharged into Eastern Drainage Channel through a number of outlets excepting Part of Sec.-III through drainage pumping

station leading to Eastern Drainage Channel.

Existing System

Existing condition of:

The under ground drainage system of the Planned Area: The Drainage network though well designed is facing several problems:

- The pipelines have not been thoroughly cleaned ever since it has been laid which has resulted in heavy siltation.

SOLID WASTE MANAGEMENT

Present Status

At present solid Waste Management is a burning issue in the Municipal areas. With rapid urbanization the various types of wastes generated in towns and cities are also increasing at an alarming rate. Handling all of these wastes in a hygienic manner can not be properly done by the Municipalities due to various financial and infrastructural constraints and also due to the lack of awareness among the residents.

With the Urban agglomeration of the KMA, the Municipalities within the region are facing huge problems regarding their various Infrastructural services.

Initially being a planned township Bidhannagar had a demarcated Dumping Ground. The location of disposal site is at "MOLLAR BHERI", a low lying area, which is 5 km away from the core sector of the city.

The land started functioning as a dumping ground from the year 1982-83.

In general the system of Solid Waste Management is based on the three consecutive systems of:

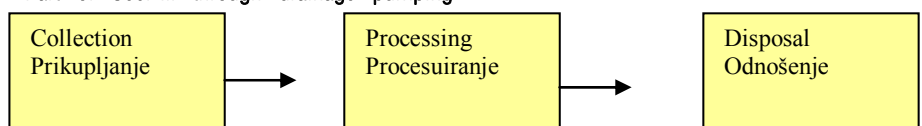
a) Solid waste generation

The type of waste generated within the municipal areas can be largely classified as

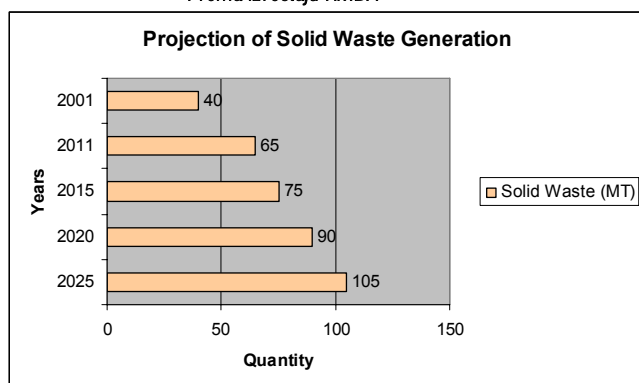
- MSW (Municipal Solid Wastes): These include Wastes from

- Individual House holds

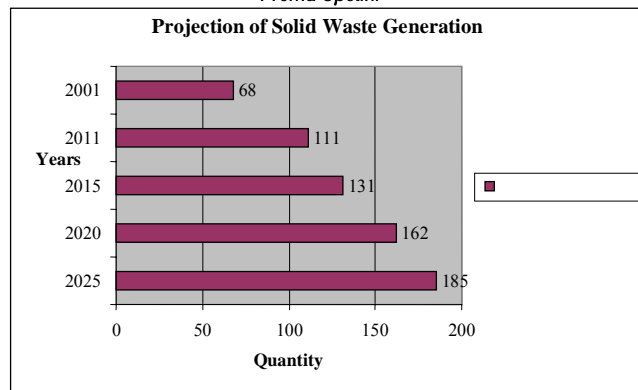
Most of the solid wastes from these sources



(As per KMDA report)
Prema izveštaju KMDA



(As per Municipality)
Prema Opštini



are collected regularly (365 days) by Municipal personnel and disposed off by the Municipality.

- Markets

Wastes from eight different markets are being collected regularly by the municipality.

- Hotels & Eating Houses

There are few big/ small hotels within Bidhan Nagar Municipal area. The wastes are being collected by the municipality.

- Industrial wastes

The industries at Sector IV & V of Bidhan Nagar Township are mainly electronic industries. Wastes generated from these types of industries are mainly non bio-degradable materials. Special attention for removing solid waste from these industries is required. Quantity generated by these industries has been taken into account with the total quantity of the municipal solid waste generated.

Except the Processing system, the other two are carried on efficiently in the Bidhannagar Municipal area.

In the following subsections the detail SW management system like waste generation, waste collection, waste transportation, and waste disposal has been narrated subsequently.

- Domestic Hazardous Waste

The domestic hazardous waste collected from time to time in the town may be disposed off, following the directives of Central Pollution Control Board in the framed Rules for disposal of hazardous waste disposal. Some domestic hazardous wastes are listed

- Nuclear wastes

Bhaba Atomic Research Centre (BARC) and Saha Institute of Nuclear Physics (SINP) have their complexes at AF Block of municipality. Radio active Wastes, produced by those organizations are being taken care by themselves following the requisite international guidelines.

- Bio-Medical Wastes

There are approximately two hospitals & big/small nursing homes within the Municipal Area. Major portion of the wastes generated from the Hospitals/Nursing Homes are disposed off by the municipality following the Govt. of India guidelines. The wastes generated from medical activities are called Bio-Medical Wastes. These wastes are hazardous, toxic and even lethal because of their high potential for diseases transmission.

- Construction and Demolition Wastes

These have not created any problem until now and they are mainly used for filling up of low lying areas.

b) Waste Generation

The waste generated at present seems to be approximately 400 gms per capita per day. The estimated amount according to the Municipality thus differs from the KMDA report, (Table follows).

c) Collection & Transportation system

In the Bidhannagra Municipal Area, at present, the collection is generally done by 2 methods:

- Door-to-door collection and disposal of the same in roadside vats/bins/containers by the labour directly deployed by the Municipality. Wastes from the eight different markets are collected regularly by the municipality.

- Collection from these vats and disposal to the Mollar Bherry is also done by Private Agencies authorized by the Municipality

- Sweeping on roads is done by the Municipality itself by deploying daily labours. The collected wastes in both the cases are directly transported to the disposal ground.

- The vehicles used for this purpose are:

- Primary Vehicles

- Tri-cycle - 160 nos.
- Hand cart -

- Secondary Vehicles

- Tractor - 8 nos.
- Trailer - 8 nos.
- Trucks - 2 nos.

OTHER MUNICIPAL SERVICES

This term broadly includes all types of services provided or to be provided by the Municipality other than those discussed before. But at present this term mainly includes Greeneries, Social & Cultural buildings, Religious places, Slaughter houses, fire brigades etc.

Present status of:

- Administrative Infrastructure

The Bidhannagar Municipality has in its jurisdiction one Municipal office and twenty three Ward offices for the execution of its Municipal duties and liabilities through a decentralized Planning system. Out of all of these Ward offices, nine (5, 6, 7, 8, 9, 12, 13, 14, 18) have no permanent office space and have accommodated themselves in the markets. These offices buildings need to be constructed. Some others also require repair and maintenance.

Beside these, a number of Office Buildings under Government and Private Jurisdiction exists within Salt Lake City.

- Health Infrastructures

The Physical asset of Health infrastructure of Bidhannagar Municipal Area includes:

- One Health Administrative Unit at Matri Sadans .
- Seven Health Sub-centres.

Out of these seven sub-centres, three are in quite good infrastuctural condition. These are at Wards no.4,19 & 23.

Within Salt Lake City functions a number of Government and Private health institutions.

- Greeneries

In Other Municipal Services greeneries i.e. Parks and playgrounds play a very significant role in enhancing the quality of urban environment. Within Salt Lake City - the Central Park is the most important, being under jurisdiction of Gvt. Forest Department. In Bidhannagar Municipal Area, these are mainly maintained by the Municipality. These greeneries thus are required to be maintained to keep the ecological balance and a healthy atmosphere. For proper maintenance, private partnership may be explored in the form of Nursery in a portion of the park or advertisement.

- Waterbodies/ Wetlands

The planned township area has only one water-body within the Central Park under the jurisdiction of the Forest Dept. Govt. of West Bengal. According to the Standard of Land-use (UDPI Guidelines), percentage of water body is much less if only the planned township area is considered. Moreover, the Central area of the town which is the Administrative zone comprising of various public buildings has no special provision of water to fight against fire hazard. The most notable feature of the Bidhannagar Municipality is the co-existence of natural features of wet-lands along with its planned township. The added area of the Municipality (20.98 sq km) has nearly 15.5 sq km of water body. These water bodies are responsible for the ecological balance of the city of Kolkata and are to be preserved according to the Ramsar Conservation Act.

Socio-Cultural Infrastructure

Swimming pool

The Bidhannagar Municipal area is quite rich in its Social & Cultural Patronizing Assets. It has:

Sport

- A Stadium of International Standard under Govt. of West Bengal
- Privately owned Tennis Academy, Cricket Coaching & Karate Coaching Centre
- Municipal Sports Academy
- Swimming pool at BF.

Culture

- Eastern Zonal Cultural Centre
- A hall for theatrical performances at BD
- An open air performing centre at Nabapally, Ward no.23

For socio cultural upliftment of any urban area, physical activities are essentially needed for a healthy environment.

Bidhannagar Municipal Area is quite enriched in this. But there is no local cultural centre under the Municipality.

Markets

There are fifteen markets in the planned area of the Municipality- seven in Sector-1, three in Sector-2 and five in Sector-3. Besides these, there are two other commercial Centres, one at Sector-1 & the other at Sector-3.

Bibliography

Salt lake City Master Plan, approved on 9th April 1964

Bidhannagar Municipality Data, representing 40 years of implementation