
**Biratnagar Metropolitan City (BMC)
Regional Urban Development Project (RUDP)
Project Implementation Unit (PIU)
Biratnagar, Nepal**

Revised City Sanitation Plan

<p>Funding Agency: Asian Development Bank & Government of Nepal</p>	<p>Executing Agency: Government of Nepal, Ministry of Urban Development, Department of Urban Development and Building Construction</p>
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Municipal sewer connection system and Tariff Structures

Abbreviations

CSP	City Sanitation Plan
ADB	Asian Development Bank
BMC	Biratnagar Metropolitan City
CBO	Community Based Organization
CGD	Child Gender and differently-abled
CLTS	Community Led Total Sanitation
DDC	District Development Committee
DSC	Design Supervision Consultants
DSO	District Sanitation Officer
D-WASH-CC	District Water, Sanitation and Hygiene Coordination Committee
DWDO	District Women Development Office
DWSS	Department of Water Supply and Sewerage
DWSSCC	District Water Supply and Sanitation Coordination Committee
I/NGO	International/ Non- Government Organization
IEC	Information, Education and Communication
IYS	International Year of Sanitation
JMP	Joint Monitoring Program
LPCD	Liter per capita per day
MDG	Millennium Development Goal
MLD	Ministry of Local Development
M-WASH-CC	Municipal Water, Sanitation and Hygiene Coordination Committee
NHSSC	National Hygiene and Sanitation Coordination Committee
NPC	National Planning Commission
NRCS	Nepal Red Cross Society
NSW	National Sanitation Week
ODF	Open Defecation Free
O & M	Operation and Maintenance
PIU	Project Implementation Unit
R-WASH-CC	Regional Water Sanitation and Hygiene Coordination Committee
RUDP	Regional urban Development Project
RWSSFDB	Rural Water Supply and Sanitation Fund Development Board
SACOSAN	South Asian Conference on Sanitation
SLB	Service Level Bench-marks
SOPHEN	Society of Public Health Engineers in Nepal
STIUEIP	Secondary Town Integrated Urban Environmental Improvement Project
SWC	Social Welfare Council
RMC	Rural Municipal Committee
VO	Variation Order to Consultants
V-WASH-CC VDC	Water, Sanitation and Hygiene Coordination Committee
WASH	Water Sanitation and Hygiene
WSSD/SDO	Water Supply and Sanitation Division/Sub Division Office
NWSC	Nepal Water Supply Corporation
WWTP	Waste Water Treatment Plant

1. Introduction and Background

SMEC International Pty., Australia in association with Brisbane City Enterprise Australia, AQUA consultant and Associates Ltd. Bangladesh, Building Design Authority (P) Ltd., Nepal and CEMAT Consultants Nepal entered a contract for Design and Supervision Consultant's Services with Secondary Towns Integrated Urban Environmental Improvement Project (STIUEIP), Project Implementation Unit (PIU), Biratnagar Metropolitan City on 7th December 2011 and DSC started working from 1st January, 2012.

The estimated amount submitted by DSC in Final Report was found to be far higher than the budget approved for the project. Hence work scope was reduced to match the approved amount and drainage and sewerage items at many places were omitted in the bidding process. As per the provision of contract, few items were included in variation orders (1, 2, 3 &4) of phase I contract. However, considering the site requirements and discussion with stakeholders, PCO/ADB agreed to finance additional budget to construct those missing items and it was instructed to prepare and submit final report and bid document. Accordingly DSC submitted proposal on 22nd September 2015 and was approved by BMC. The contract variation order - 3 was signed on 18th March 2016 between the client and consultant to include design review, cost estimate, bid document preparations etc. and few additional works. VO-3 was made as per clause 2.6 'Modification or Variations' of the CONTRACT. The requisite documents have been submitted in November 2016 and the implementation is proceeding as per scheduled programs under the Regional Urban Development Project (RUDP). The Projects' objective is to implement urban environmental improvement program, on an integrated basis, in the areas including sewerage/ drainage, solid wastes and urban roads and lanes. It also includes community development programs such as awareness raising in health and hygiene and 3R (reduce, reuse and recycle), investment in small scale community facilities and strengthen capacity of the Biratnagar .

This Report on Sanitation Plan, Biratnagar has been submitted to the PIU as per request of the client and is based on the previous studies made on STIUEIP and the RUDP Project.

The report has been prepared in close association with RUDP/ PIU/ PMSC/ PCO and BMC. We expect that the Sanitation Plan will help the concerned stakeholders in effective planning, budgeting, human resource mobilization, implementation, monitoring and evaluation and follow up of hygiene and sanitation programs and projects. We also expect that the diverse approaches and modalities will converge to maintain uniformity and standardization in the hygiene and sanitation sector and accelerate the sanitation pace in the city.

2. Rationale

The systematic effort for sanitation promotion in Nepal dates back to the 1980s along with the United Nations (UN) declaration of the International Decade of Drinking Water Supply and Sanitation. Since then, promotion of sanitation has been taking place as an integral component of water supply projects. However, major effort on sanitation is found to have started from the early 90s. In the recent years, sanitation has been recognized as the basis of health, dignity and development.

Despite the gradual achievements in sanitation, still 30% of the country's population lacks access to a toilet. A gap of 13.31 % between people's access to water supply (83.59%) and sanitation (70.28%) facilities stands as a big challenge in achieving the perceived health benefits from water supply and sanitation services. The poor and disadvantaged communities are the most affected, with children and women fairsing worst. Solid waste and wastewater problems are growing rapidly in urban areas.

The trend of toilet coverage indicates that Nepal needs pragmatic vision, operational strategies, strengthened institutional arrangements, adequate resources and stakeholders' collaborative efforts to

achieve the national goal of universal toilet coverage by 2017. Through all South Asian Conferences on Sanitation, Nepal has made firm commitments to develop the Sanitation and Hygiene Master Plan. This commitment was also reinforced through the Nepal Country Plan for the International Year of Sanitation-2008.

The National Water Plan 2005 set a target of total population coverage of basic level drinking water supply and sanitation services by 2017, while the National Urban Water Supply and Sanitation Sector Policy 2009 sets out the principles that should guide the formation of projects and programs to achieve these targets. The Government emphasizes local responsibility in line with its decentralization policy. Other policies include demand driven approach, integration of water supply and sewerage, cost recovery of capital investments and 100 per cent of operation and maintenance etc.

Urban population growth and economic development lead to increasing generation of municipal solid waste (MSW). The use of products that generate hazardous waste is another concern. Unmanaged disposal of medical wastes from hospitals and clinics also contribute to pollution and public health hazards in the localities.

Solid waste from households, market and commercial areas are highly heterogeneous in nature. Thus, they have variable physical and chemical characteristics depending on their original sources. Their composition are yard waste, food waste, plastics, wood, metals, papers, rubbers, leather, batteries, inert materials, textiles, paint containers, demolishing and construction materials as well as many others that would be difficult to classify. The heterogeneity of such generated solid waste is the major setback in sorting and its utilization as material. Therefore, there is a proper need for fractionation and sorting of these wastes before any meaningful treatment process. Sorting and separating of such wastes are one of the most important and traditional methods as essential steps in solid waste management to provide data on the quality of the separated fractions for any potential utilization. Nevertheless, the success of any designed for solid waste segregation depends mainly on the public awareness and the active participation of such waste generators in the different communities. Required special visions to generate solid waste to energy, gaseous emissions and biogas production as a fuel via biological conversion.

Increased generation of solid waste affected dramatically on the sanitary related problems and the basic services such as sanitation facilities, water supply, waste management, and transport infrastructures. Disposal of garbage as solid wastes is a stagnant and widespread problem in both urban and rural areas. Several Canals and drains as open places are widely used to dump varieties of garbage as a source of domestic organic and inorganic waste. Due to the absence of continuous garbage-collection systems, convenient landfills, open canals and drains are being blocked by dumping huge amounts of solid and garbage wastes. Thus, they are no longer in function. These garbage wastes are mostly plastic and papers and little toxic materials. However, such materials represent hazard impact to the environment due to the breakdown of their degradable constituents, a matter that adds significant loads of the BOD to the local eco-system.

SWM is more of a managerial issue than a technical one. Lack of appropriate and sustainable management has created many environmental and social problems in the municipalities and in neighboring village development committees where the waste disposal sites are located which happens due to lack of proper an annual plan for SWM, formulation a short-term plan for SWM and a midterm or periodic plan. SWM is still not a priority in many municipalities despite being one of the basic essential services to be provided for a clean and healthy town.

The Sanitation Plan provides key basic plans for issues such as:

- To achieve the goal of universal sanitation.
- To develop access to safe and hygienic sanitation facility and arrangement (individual or community toilets) to all urban population so that no one defecates in the open.
- To develop adequate availability and 100 percent upkeep and management of Public Sanitation facilities in all urban areas and infrastructures as storm drains, waste water management, water supply and environment protection works.
- To ensure scientific collection, treatment and safe disposal and establish appropriate and

feasible technology of disposal system for solid wastes, human excreta and liquid waste from all sanitation facilities and establish appropriate system of operation & maintenance of the disposal system

Before specific action plans can be implemented, it is imperative to understand the general status of the Metropolitan city, its relation to stakeholders, its preferred future direction expressed in a vision and mission statement and its related strategic goals. Potential actions to strengthen the position of the Metropolitan city should fit within this strategic frame work. Actions which do not fit in the strategic framework should be given a low priority to execute.

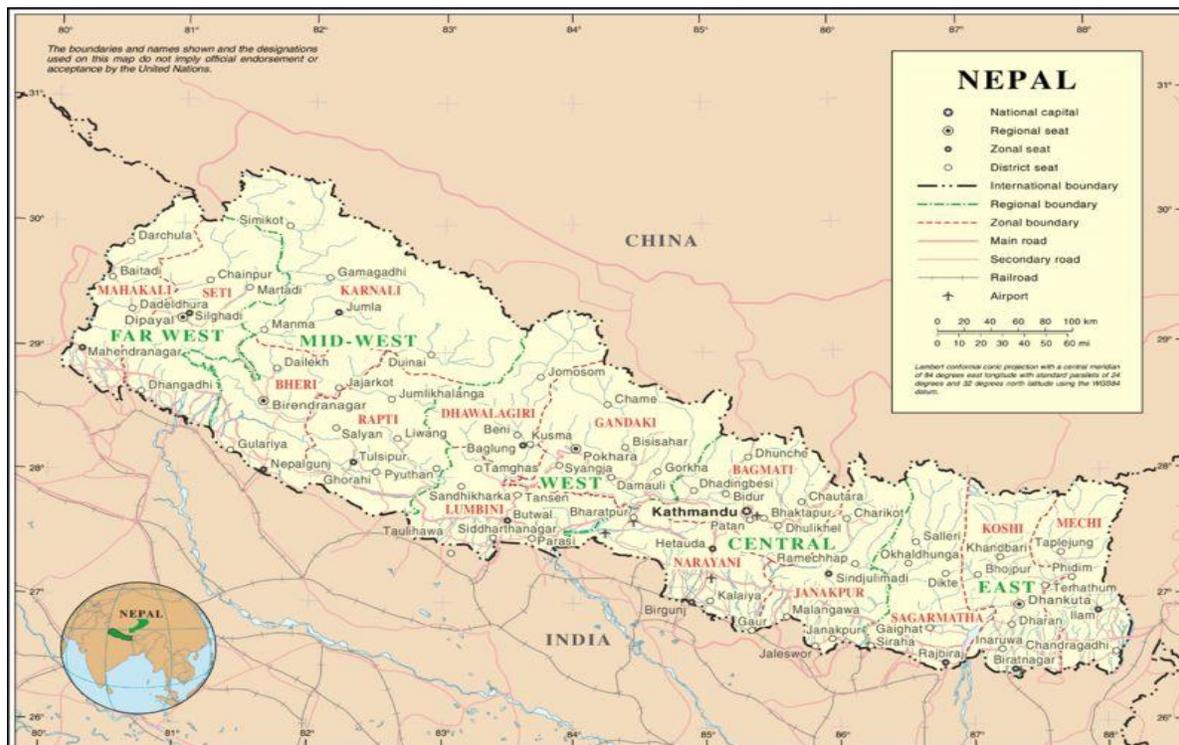
The City Sanitation Plan is hence a vision document on sanitation with long term horizon with short term town level action plans for 5 years to achieve sanitation goals as per above stated objectives.

Thus City Sanitation Plan comprises of two parts. First the Situation Analysis and second the planning for city wide planning. The Situation Analysis provides an insight on the present sanitation practices/situation in the city. Proper analysis of the situation provides inputs for preparing short term action plans with an effective and implementable strategy which is finally translated into a detailed city sanitation plan.

3. Profile of Biratnagar Metropolitan City

Biratnagar Metropolitan City is situated in Koshi zone in Morang district, in Eastern Development Region of Nepal. It is the second largest city of Nepal and is the main economic, industrial and administrative hub of the Eastern Nepal and lies in Province No.: 01. It covers an area of 59.9 sq. kilometers and lies at 26°23'10" to 26°30'44" North and 87°14'27" to 87°18'29" East.

Map of Nepal

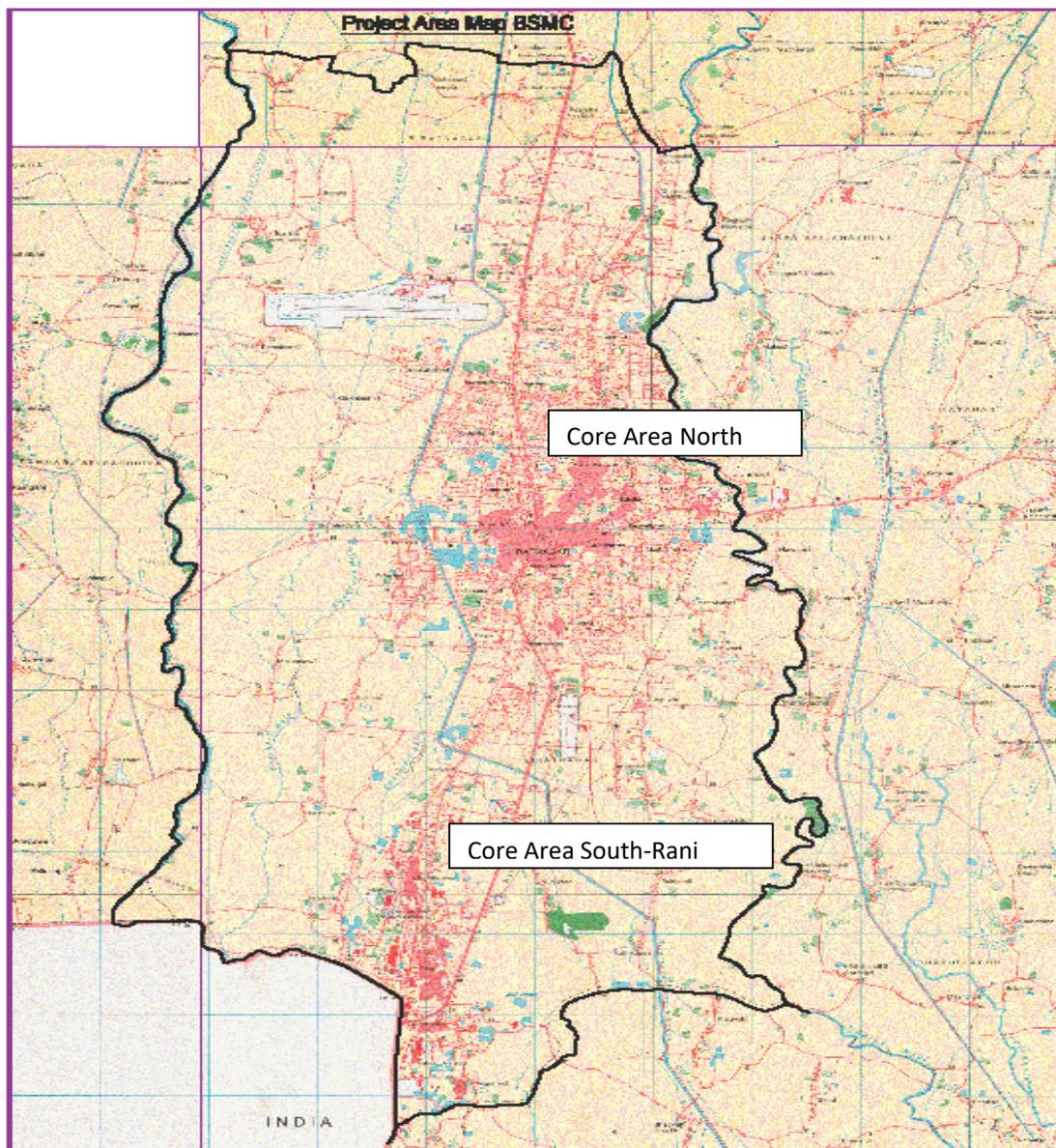


Biratnagar is a fully diversified urban center. It is best known as the Nepal’s oldest industrial centre, based on originally as Jute processing and later diversified in other areas. Biratnagar is also known as eastern gateway of Nepal for imports and exports to India. It also serves the agriculture markets for hinterland. It is 24 Kms south of Itahari where in the East West Highway makes a crossing with the Koshi Highway.

It is to be noted that Biratnagar is strategically located near to the boundary with India and is the second big city of Nepal.

As it is situated in the Indo Gangetic Plain of Terai, It has humid type of climate. The temperature ranges from 9° Celsius in the winter and 34° Celsius in the summer. Almost 75 % of the rainfall occurs during monsoon (June to September). The total mean rain rainfall is 1910.8 mm per year. The topography exhibits a gradual slope from north to south. The average sea level is 70m. Two major rivers are features of Biratnagar, namely, Keshaliya in the west and Singhiya in the east.

The Map of Biratnagar Municipality is presented herewith.



3.1 Project Area and Population

Biratnagar is divided into 19 wards, having a total area of 77.5 km² and being almost 12 Km long from north to south and about 5 Km wide from east to west. DSC is of the opinion that positive growth rate for all wards of BMC is inevitable as the city is rapidly growing and has not reached to its saturation and a fast growth is expected where there are improved facilities made available within the BMC.

The year 2015 has been considered as the base year and projection has been done for the design period of 20 years i.e. up to year 2035. The ward wise population projection of the BMC is presented as hereunder.

According to the 2011 census, the city ranks fourth in population and has a total area of 77.5 km². The ward wise population projection of the Biratnagar metropolitan city is presented hereunder as

depicted in the previous report of STIUEIP. The year 2015 has been considered as the base year and projection has been done for the design period of 20 years i.e. up to year 2035.

Population and Projections

Ward No	Census Year Population	Base Year Population	Design Year Population
Year	2011	2015	2035
1	12614	19412	40380
2	9960	10917	17269
3	16134	18679	38854
4	15312	17728	36876
5	15507	17953	37346
6	17624	20404	42442
7	8723	9560	15123
8	14702	17021	35405
9	7253	7950	12575
10	12658	14655	30485
11	13147	15221	31662
12	15789	18280	38024
13	7121	7805	12348
14	10956	12684	26385
15	12962	14207	22475
16	6572	7203	11396
17	8408	9216	14581
18	New ward	7898	12495
19	New ward	5640	11731
Total	205442	252433	487852

Note:

*Population figure of year 2011 is based on CBS. The adopted growth rate per cent in 2.3 for ward #2,7,9,13,14,15,16,17 &18 and 3.73 per cent for wards # 1,3,4,5,6,8,10,11,12&19

The population growth trend of BMC in relation to national and regional context is as below;

Population Growth Trend Description/ Census Period	Year 1991-2001	Year 2001-2011
National annual growth rate	2.25%	1.35%
Eastern regional annual growth rate	1.84%	0.88%
National urban population	14.2%	17.7%
Urban population growth rate	6.65%	3.4%
Terai urban population	5.54%	3.86%
BMC growth rate	2.57%	2.96% adopted

The average growth factor has been calculated as 2.96% which seems reasonable from overall growth point of view as the Metropolitan City is rapidly changing to development courses and improving its infrastructures in all sectors. The vision identified in the Periodic Plan of Biratnagar Metropolitan City is to develop the city as a prosperous, industrial and commercial center and pollution-free green city of Nepal, along with a child friendly city, in 25 years’ time. Recently, BMC is declared a child friendly city. Newly elected body of the municipal council has modified the vision as **Clean, Green, Safe and Capable City.**

Ward-wise Details of BMC

The location, boundary and clusters that exist in each ward of Biratnagar metropolitan city are given below:

Wards and Main Areas of BMC Ward No.	Particulars
1	Pushpa Lal Chowk, Bargachhi Chowk, Buddha Chowk, Neta Chowk, Shanti Chowk and Pokhariya area. It is situated in the north-east corner of the municipality. ODF declared.
2	Pipal Chowk and Tinpaina area of the municipality, south of ward no.1 and 3. ODF declared
3	This ward is west of ward 1 in the north of the municipality. ODF declared.
4	This ward is in the north-west of the municipality. Ailani Basobas, Jwalatole, Airport, Noble hospital and Pipal Chowk comprise the main areas of the ward. ODF declared.
5	Bishal Chowk, Prithvi Chowk, Samjhana Chowk and Shiv Chowk are the main areas of the ward. It is located to the south of ward no.4. ODF declared.
6	Gudri, Lekhanath Tole and Laliguransh Tole are the main areas of the ward. This ward is surrounded by numbers 5, 7, 11 and Keshliya in the west direction. ODF declared.
7	This ward is densely populated and covers core Biratnagar area. ODF declared.
8	This ward is less populated and situated on the Jatuwa side (north of Jatuwa WWTP). ODF declared.
9	This ward is densely populated and is a core part of the city center. ODF declared.
10	Ward is densely populated and is a core part of city which is south of ward no.9. ODF declared.
11	Ward is less densely populated and located in west of the central area of the city. ODF declared.
12	This ward is thinly populated and situated northwards of ward no. 16. ODF declared.
13	This ward is south of Roadsesh Chowk with a medium density of population. ODF declared.
14	This ward is in east of the Roadsesh Chowk and thinly populated, comprising mostly paddy field. ODF declared.
15	This ward is in the south, with poor sanitation and medium density of population. ODF declared.
16	This ward is in the south of the city and it is bounded by India to the south and west. Nomans land (Dusgaja) belongs to this ward. ODF declared.
17	This ward is in the south-east of Koshi Highway. The ward has paddy fields as well as residential areas within its boundaries. Poor sanitation. ODF declared.
18	This ward is in the south-east of the city. The ward has paddy fields as well as residential areas within its boundaries. Newly added to BMC having the area of Ancient Birat King Palace and Dry port. Municipality has a mission to develop this ward as tourism spot. ODF not yet declared.
19	This ward is in the north-east of the city. The ward has paddy fields as well as sports facilities within its boundaries. Newly added to BMC. Municipality has a mission to develop this ward as sports spot. ODF not yet declared.

3.2 Major Social Features

From the surveys carried out earlier during STIUEIP studies, the following major social indices are observed.

- **Drinking Water Supply**

From the available data obtained from the socio economic data sheet, private hand pump (59%) is the major source of water of the majority of households followed by private tap (about 32%) in all wards. Rests of the people use neighbors / community hand pumps. This shows there is still majority of households that have no available systematic and potable water supply system

- Household Toilet

The data shows about 82 % of households have Sulav type toilet followed by about 13 % in Pit type. Only about 3 % have Cistern type of toilet. About 2 % households have not specified the toilet which indicates the percent of households that defecate outside their premises.

- Waste Water Drain System

About 47 % use pit inside compound for domestic waste water disposal followed by about 29 % in septic tank. Only about 6 % households have sewer/drain connection and about 4 % households have practiced open drain connected to water course nearby. 13 % did not specified. These figures support for the sewer/drains requirements of the BMC.

- Solid Waste Disposal Practices

Of the households surveyed, about 63 % are practicing burning of solid waste disposal followed by 11 % to throw indiscriminately and 9 % keep on roadside to collect by Municipality. Only about 5 % households have practiced to burry and 4 % composting to manage the domestic solid wastes. 7 % have not responded.

- Willingness to pay waste fee

Through awareness trainings & implementation of the mechanism with in BMC to pay the waste fee willingly & adoption of waste segregation practice.

- Waste Segregation Practice

Of the households surveyed, about 54 % have not practiced of waste segregation. Only about 35 % household have practiced the solid waste segregation in their houses. 11 % have not responded.

- Willingness for Sewer Connection

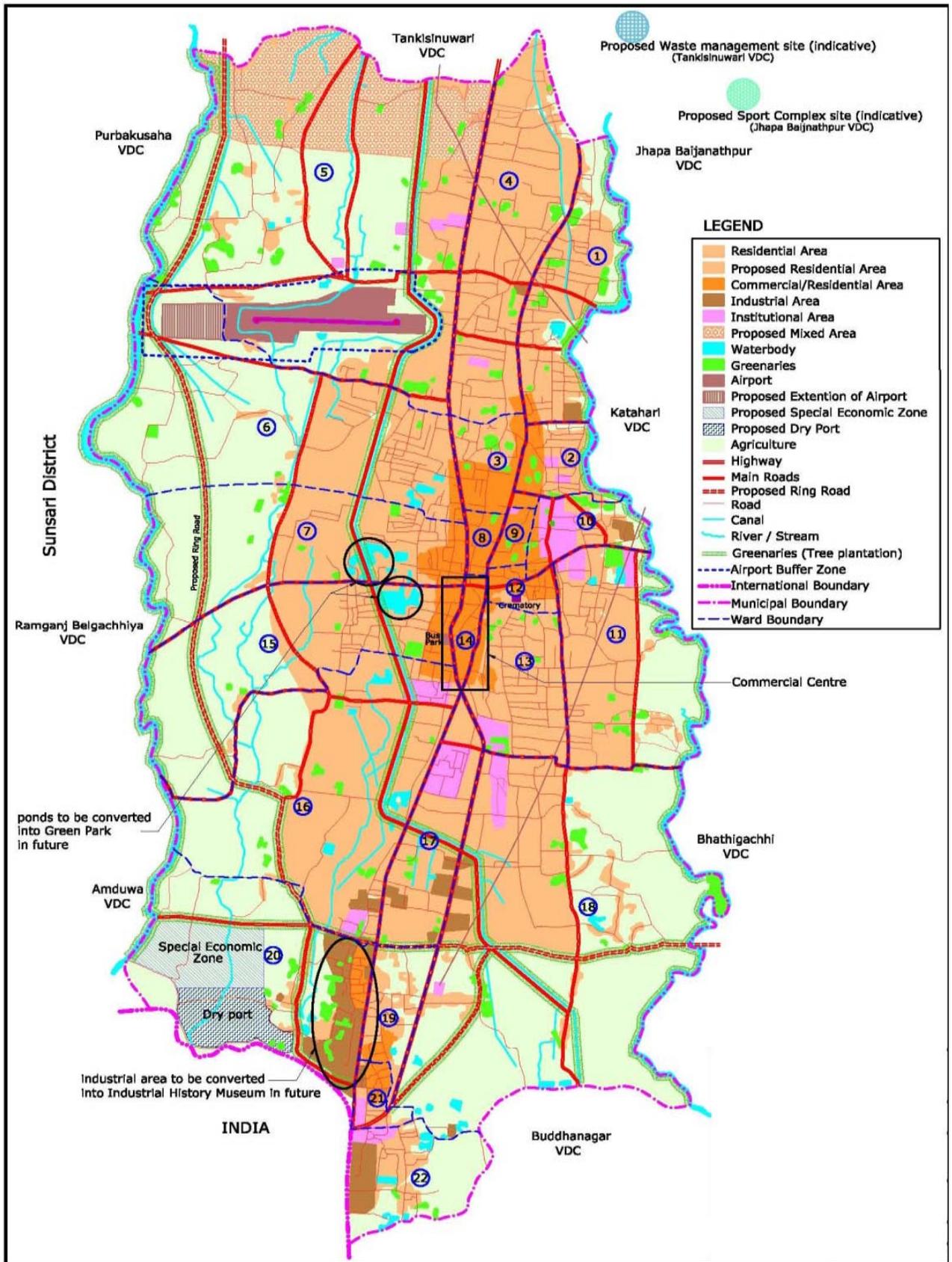
The data shows that about 78 % of the project area households are interested for the sewer connection on their home. Only about 12 % households have not shown their willingness to sewer connection. 10 % did not specify any choice.

4. Urbanization in Biratnagar

Biratnagar Metropolitan City is Nepal's principal industrial and business centre/ foreign trade centre and has experienced rapid growth especially in the past decades because of migration to the city from its peripheral districts and Villages for better livelihood and jobs as in other developing cities. Most of the industries are located in the industrial corridor and along the Highway from Biratnagar to Itahari. As such all urban city related facilities as hospitals, schools, colleges, shopping malls, hotels/ restaurants and transportation, communications are in increasing trends. Consequent is environmental deterioration resulting from inadequate sanitation and drainage, poor air/ water quality and mounting traffic congestion in the city. The individual institutional effort of other the metropolis or the sectorial agencies in addressing these issues has remained uncoordinated and grossly inadequate. Most of the fertile agricultural fields are rapidly converting into residential and commercial areas, among which the northern part of the metropolitan city is observed to have greater impact of change compared to other areas. Western part of the metropolis which lies in the flood prone area of Keshaliya River is also being changed into residential and commercial area due to the population pressure in the metropolitan city.

The infrastructural facilities such as roads, sewer and storm water drains, water supply, needs to be developed to meet the current rate of development, which remains the major future concern. The vision mentioned in periodic plan of Biratnagar Metropolitan City is to develop the city as a

prosperous industrial and commercial center and pollution free green city of Nepal with Child Friendly City in 25 years of time. Proposed land use map which forms the guideline to the city development, pictures out an overall view of BMC and is presented below.



Proposed land use map of BMC

5. Situation Analysis

5.1 Water Supply

Although water supply to Biratnagar is under the jurisdiction of NWSC, the municipality is in possession of some tube well extension works. Sources of water are deep tube wells with a combined capacity of 9.2 MLD. There are 8 tube wells in 4 locations (Thakurbadi, Tinpaini, Rani, and Munal Path). **A large part of the population, deprived of piped water supply depends on private shallow tube wells/ hand pumps.**

5.2 Transport/ Roads

The major mode of transport to the city is road transport. It is also well connected to Kathmandu and other hilly places by air transport. It is easy to travel to and from India by trains from Jogbani railway station, only 8 Km away main Bazar and just across the border to India. **There are about 700 Km of roads within BMC out of which only 226 Km amounts to metallic roads.**

5.3 Storm Water Drainage

Almost 50 Km of road side drains cover the Municipality which has been constructed along the north-south and east- west of the arterial road in the city core area and several nearby streets. These drains were constructed on an ad-hoc basis, without taking into account of the topographical slopes and do not have adequate outlets. Consequently, they are not functioning as intended and that house sewerage also has been connected. **The problem is further aggravated by the annual inundation and flooding from the two rivers – Singhiya in the east and Keshaliya river in west and also due to clogging of the drains. There was no water borne sewage disposal system in BMC.**

5.4 Solid Waste Management

Considering the average HH waste generation rate as 0.33kg/person/day, the daily waste generation of BMC is estimated about 78 tons /day. The door to door collections, street sweepings and other wastes are collected and transported to specific sites (open land/ on stream banks / kholsis etc.) and are dumped. Despite its effective system, **BMC is facing problems of trained personnel, lack of standardized vehicle fleet and frequent breakdowns. There is an urgent need of proper landfill site for sanitary disposal of solid waste. Solid waste Management Plant required for processing and treatment of the disposed waste.**

5.5 STIUEIP / RUDP Projects

Currently, with the support of ADB, the metropolitan city is implemented STIUEIP project and implementing RUDP project to complete the initiations started under STIUEIP. The main aim of this project is to improve the urban environment, health and hygiene of the people through improvement of municipal drainage system and promotion of sanitation awareness.

STIUEIP Project works was started in Biratnagar in FY 2013 and completed in 2018. Major activities under the project are sewerage system, storm water drain, sewage treatment plant and road and lanes development as below.

Sewerage: The proposed sewerage system will cover the 53% only of the design population of 2035. The area covered by the sewerage system is south of Barghachi Chowk, the main core area of BMC and the population covered up to 51,706 in base years 2015 and 96433 in design period 2035. The area covered by the WWTP is about 598.69 hectare. STIEUIP has proposed priority works for 5900 households only.

Wastewater Treatment Plant: The Waste Water Treatment Plant covering an area of 9 ha is provided in Jatuwa at ward no. 14 and consists of Pumping station, ponds and wetlands along with service

buildings. Phase I will serve the areas south of Barghachi Chowk which forms the main core areas of the Biratnagar metropolitan City. The treated water/ effluent from the wastewater treatment plant will be discharged off to Singhiya stream. The quantity of domestic wastewater is calculated using water supply rate at 90 liters per person per day in the design year 2035; out of which 80% is converted to wastewater.

Storm Water Drainage: Four storm water drains are proposed to discharge into Singhiya River and six storm water drains discharging to Keshaliya River on the west of the city. The area covered by northern part includes ward 1 to 14 of BMC. The storm drain will convey all the rain water to Singhiya khola in the east and Basta Nala the tributary of Keshaliya Khola at the west. There are about 36.6 km of major storm drains and about 35km of road-side drains for storm water discharge.

Roads and Lanes Improvement: Road length are sufficient in Biratnagar, however the roads improvements, reinstatement, rehabilitation and upgrading of existing roads and lanes are required. The area covered from Pushpalal Chowk to Bhatta Chowk including foot path has been considered in the proposed project i.e. 3 km. The reinstatement of the road and lane is estimated to be about 40 km where in the sewer net- works are proposed.

5.6 Regional urban development project (RUDP)

Regional urban development project (RUDP) is an additional investment project for the continuation of STIUEIP and will start from FY 2017 and will be completed in 2020. Major scope of the work is to complete initiated activities and address urgent demand of citizen. In addition, the project will support institutional capacity development of the municipality for revenue enhancement and operation and maintenance of the sub-projects. Under the RUDP, the ongoing work will continue and upgraded sewerage, storm water drain and road and lanes improvement. Beside these ongoing works the additional investment planned are proposed such as park and recreational aesthetic beauty i.e. park development and streetlight development. Major activities under the project are Sewerage system, storm water drain and road and lanes as follows:

Sewerage: Waste Water Treatment Plant and major trunk was being constructed by earlier STIUEIP project. The RUDP sub project aims to add most essential element of sewer line for effective utilization of Trunks. The aim of design is not only to make the sewer system functional but also to build the system at low competitive cost with high efficiency. It is estimated that the main coverage of the sewerage system is about 20 km sewerage drain. It is expected that water distribution will improve to cater to a larger percentage of the population. The sewerage coverage will be extended to more households; thereby higher percentage of the population, additional 3400 households will be benefited with the sewerage facility.

Storm Water Drain: In continuation to the STIUEIP the RUDP subproject has considered few very essential storm water catchments/system to add effectiveness and coverage discharging storm water as a whole. The few drainage channels that exist are inadequate to cater for the drainage needs of the city. The scope of works for the northern portion and southern portion of storm drains is estimated to cover 9.9 km works. The proposed Storm Water Drain will cover 53% of the design population i.e. 248,615 out of total design population 463,626 in the design year 2035.

Roads: In Biratnagar Town, almost all streets are already constructed hence the proposed road improvement and development are design based on reinstatement, rehabilitation and upgrading of existing roads and lanes. The geometric design has been carried on existing road networks basically for their improvement which entails geometric improvement, upgrading from earthen/gravel to bituminous standard, reinstatement/rehabilitation of existing asphalt roads and this has been done only for the roads where the sewer networks are being laid.

6. City Sanitation Strategy

The issues related to urban sanitation are becoming more complex. In the context of growing urban population and massive extension of built-up areas, the local government bodies should plan and execute sanitation facilities and services with proper consideration of cost-effectiveness of the technologies, cost-sharing mechanisms and sustainability aspects for O&M. The choice of technologies and investment for sanitation infrastructure should be based on proper assessment of local (financial, technical and institutional) capacities and site-specific considerations in design, construction and operation of the systems. The sustainability of the urban sanitation systems including the storm water drainage should be regularly enhanced through planned monitoring and interventions for improvements in proper coordination and consultations among the sector stakeholders within the respective municipalities, and RMCs. The compliance to prevailing environmental rules and regulations by the local bodies and service agencies in terms of service level, waste disposal standards/criteria etc. will be simultaneously monitored by the concerned agencies assigned by the government. In this regard, the concerned local bodies should be made fully responsible and accountable for improving and maintaining the standards of service and environmental compliance as per the prevailing regulations. The spirit of total sanitation will be sincerely followed while planning and implementing hygiene and sanitation program in semi-urban and urban areas. For effective sanitation management the following strategic activities will be taken into account. The important Terms and definition is presented in Annex-I.

6.1 BMC Sanitation Strategy

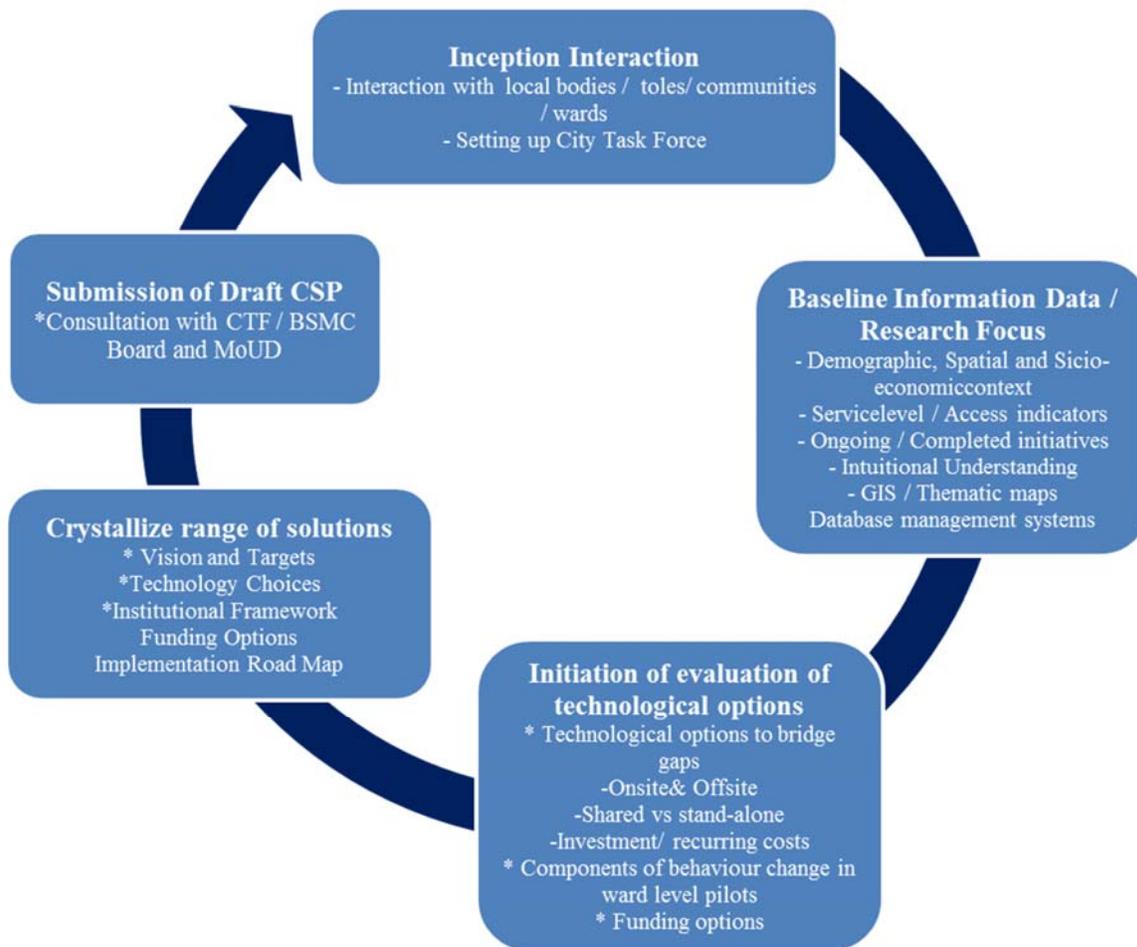
The main objective of the Sanitation Strategy is to develop citywide sanitation plans and implement them by integrating all aspects of sanitation in an effective way. The program implementation strategy is based on the following principles:

- Develop sanitation facilities in the urban areas with special emphasis on the slums, through active participation of the communities, especially women.
- Eradicate the practice of open defecation in the city by providing household toilets, community toilets and public toilets.
- Safe disposal of human excreta, solid and liquid waste, including institutionalizing and provisioning the implementation of policy guidelines of GoN.
- Management of Municipal Solid Waste and Management of treated Biomedical Wastes according to SWM Act 2068.
- Improve the 'quality of life' of the sanitation workers.
- Engage civil societies and communities (women in particular) in awareness generation, hygiene education, creation of sanitation infrastructure and its maintenance
- Strengthen institutional set up and build the capacity of the municipal staff for effective program implementation and meeting the challenges of technology and management.
- Encourage Public Private Partnerships (PPPs) to ensure generation of funds and sustainable program implementation.

7. Methodology of Sanitation Plan

The methodology that is generally adopted for the development of the City Sanitation Plan is depicted in figure below. As this is a planning document of the city and reflects the thoughts, feelings, ideas, and wants of the stakeholder of the city, the molding and formulating of the mission objectives/strategies have to be done by specially established City Task Force (CTF) and develop the detailed sanitation plan. This strategic plan represents the first foundation for a new collective process and is based on previous studies.

7.1 Process flow chart to be adopted for developing the CSP



8. Sanitation Issues in BMC

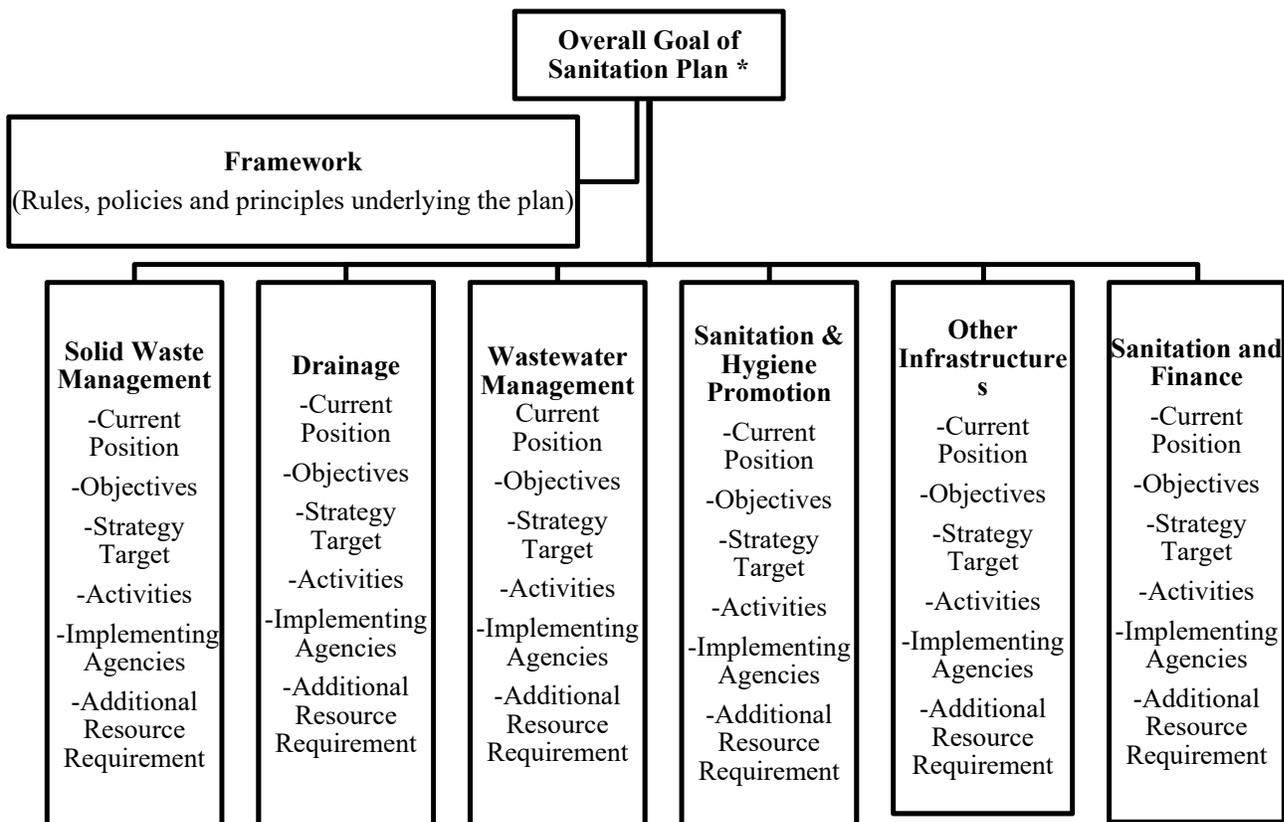
The overall sanitation situation of BMC including situation analysis has been stated in earlier chapter. Obviously, there are many pressing sanitary issues as follows

1. Access to Toilets (Open defecation at low income pockets)
2. Solid Waste Management (Dumping of solid wastes in stream sides and drains)
3. Storm Drains (Flood prone areas, water logging)
4. Waste Water Management (Inadequate Septage management, Limited sewerage coverage)
5. Disparity in water supply

This assessment has been done in order to come up with a City Sanitation Plan for addressing the current issues and future sanitary requirements of BMC through a participatory approach. There is a need to take into account factors such as cross cutting issues, inclusivity of urban poor, prioritization of issues & solutions at ward level and to come up with definite timeline for implementation of

solutions. The above highlighted issues are considered in the CSP. The graphical format is presented below which needs to be detailed in future activity for each component.

8.1 Overall goal of Sanitation Plan



Overall goal of the sanitation plan *

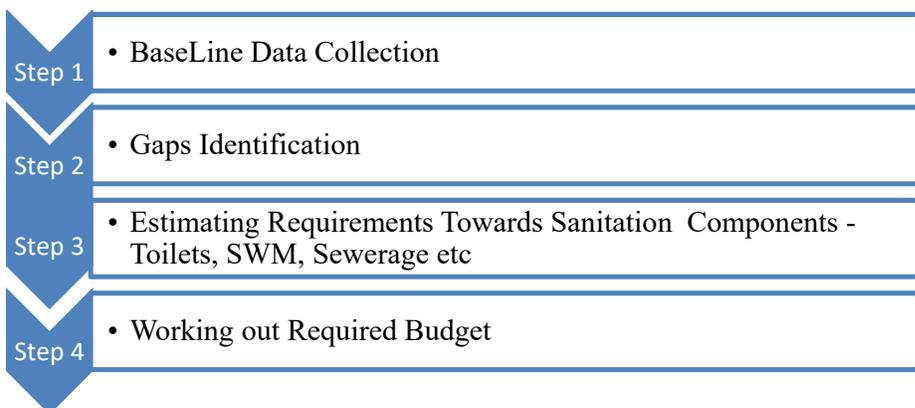
- City must be free of open defecation
- Proper disposal of municipal wastewater and storm water drainage should be arranged
- Recycle and reuse of treated wastewater for non-portable applications should be implemented wherever, possible
- Solid waste should be fully collected and safely disposed off and simultaneously processing & treatment are required to maximize the resources recovery.
- Basic services to the poor should be provided adequately and maintained properly
- Measures for improved public health and environmental standards should be taken
- Awareness generation and behavior change.

9. BMC Vision

As envisaged by GoN, the objective and vision of Biratnagar metropolitan City would be to achieve a 100% Sanitized City at the earliest for which huge amount of funds are required. It will be our utmost responsibility to full fill basis needs of the citizens especially regarding development of infrastructure to make BMC an open defecation free city. This is our first priority followed by storm drains and sewerage management, solid waste management and other infrastructures. The importance of making city fully sanitized should be discussed thoroughly with policy makers which will enable them to reserve a special fund to be incurred on CSP to achieve our objectives. Essential components of totally sanitized city can be defined as sufficient water, zero garbage situations, scientific processing & disposal of garbage, maximum collection and treatment of sewerage, no open defecation, proper disposal of storm water, no flooding points etc. BMC has already taken many initiatives

towards making Biratnagar Metropolitan city a totally sanitized city. City Sanitation Plan will help us to expedite the various projects, plans, pending works etc.

9.1 Steps of CSP



Authentic data needs to be collected from all wards and zones and is to be compiled and analyzed. The present analysis is based on previous studies and their data/ information. The present situation analysis has depicted the gaps in the infrastructure and required estimates are also worked out. CSP is thus formulated with involvement of all officers and technical staff and people from BMC.

10. Aspirations of citizens

Improving Sanitation Facilities – 41%

Proper and hourly cleaning of public latrines is must
 Sulabh toilet units for floating population
 Installation of Male/Female urinals at chowks, markets and bus stations etc.
 Inadequate Septage management
 Separate sewer systems requirement
 On-site Sanitation systems wherever sewerage system not feasible

Improving Solid Waste Management-32%

Composting of bio-degradable waste is must
 Ban plastic and Install litter bins on footpaths
 Allocate garbage collection to different contractors for each zone
 Remove garbage dumps near parks
 Penalize the un-civic behavior (such as spitting, garbage etc.)
 Plan for E waste and biodegradable waste

Environment -27%

Build more storm water drains
 Decrease incidence of water logging and flooding
 Build more parks and green spaces
 Maintaining footpaths and roads
 Provide 24 hour quality water supply
 Facilitate efficient public transport.
 Regular cleaning of storm water drains and sewer lines

11. City Sanitation Plan Elements

11.1 Access to Toilets

Despite a reasonable coverage and access to individual toilets, there is a prevalence of open defecation in a number of low-income pockets/ slums. Open defecation accentuated by influx of migrant labor population has to be looked into. Besides, there is limited availability of public/ community toilets in slum pockets and public toilet facilities in commercial areas.

11.1.1 Budget required for making BMC –“Open defecation Free”

Item	Amount Rs	Remarks
Construction of Individual Toilets	4,500,000	2 % of populations do not have toilet facilities. About 150 toilet need to be constructed
Construction of Public/ Community Toilets at important places	10,000,000	At 10 places
Sulav Sauchalaya	15,000,000	At 2 places
Awareness Campaign in 19 wards- Sanitation week	11,000,000	
Total	40,500,000	

11.1.2 Guiding Principles regarding access to toilets

The fundamental aim is to streamline and synchronize the scattered and uneven efforts of the stakeholders for a common national goal. Therefore, all the concerned government agencies, local bodies, donors, I/NGOs, and other WASH stakeholders should strictly adhere to the following guiding principles while planning and implementing hygiene and sanitation programs in all water supply/ sanitation projects and other concerned program packages and projects including approaches and modalities. The following are some specific notes to be followed.

- **ODF as the Bottom Line**

Total sanitation approach shall be the basic norm to promote hygiene and sanitation in a given area with access to the improved and sustainable toilet for every household and institution. ODF must be the basic minimum and first criteria of total sanitation. All the concerned stakeholders should clearly make provision in the plan and budget for post-ODF activities in the project/ program in order to gain and sustain a sanitized condition along with the provision of waste management in households and institutions in the community.

- **Universal Access to Sanitation in Water Supply and Sanitation Projects**

All new or rehabilitation or reconstruction water supply and sanitation projects must have universal access to sanitation within the project period. As stated in the Rural Water Supply and Sanitation National Policy and Strategy 2004, all the concerned stakeholders shall allocate 20% of the Water Supply and Sanitation Project budget to promote hygiene and sanitation in the water supply scheme areas.

- **Technology choices for Households Toilets**

The communities will be given informed choices of various types of toilets that are low cost, hygienic, users friendly and sustainable. The Plan however, suggests any one of the locally appropriate improved toilet options with permanent structures at least up to the plinth/ floor level for durability and sustainability of the structure.

- **Leadership of the Government Local Bodies**

Efforts of stakeholders shall be synchronized through the respective municipality level with joint plan of action of all the concerned stakeholders in the given area. The BMC shall be responsible for planning, implementation, follow up and monitoring and evaluation in coordination with concerned stakeholders.

- **Municipality is the Minimum Program area for Program Intervention**

The Municipality shall be the smallest basic universe of any hygiene and sanitation program intervention. The ODF status may however take place gradually from a settlement, ward or school catchment area to municipality through total sanitation approaches.

- **Locally Managed Financial Support Mechanism**

A community fund may be established to promote hygiene and sanitation and to stimulate ODF initiatives. This fund may be mobilized in the form of reward-recognition/ revolving fund/ incentives as appropriate locally. BMC can make its own decision to locally mobilize the fund and generate local resources in addition to support from government or other external agencies in a way to ensure the access of poor, disadvantaged and marginalized groups to toilets and achieve ODF status in the given area.

- **Sanitation Facilities in Institutions**

Within BMC, all the institutions including schools, health institutions, municipality building, community buildings and other public offices/ places must have hygienic toilets. These toilets should be users friendly in the local context as far as possible. The school toilets must have Child, Gender and Differently-abled (CGD) friendly water, toilet and hand washing with soap- station/facilities including menstrual hygiene facilities. Separate toilets for girls in schools may also be provided as appropriate.

- **Mandatory Provision of Properly Designed Toilets and Sanitary Systems in New Built up Areas and their Regular Maintenance**

Provision of toilet facilities must be made mandatory to all new houses. Locally required and appropriate toilets with adequate capacity and hygiene facilities will also be promoted in institutions (schools, health facilities, Municipality, other community and government buildings), public places such as bus stands, recreational spots, local Haat Bazar areas, housing areas, dense settlements, roadside hotels / motels / restaurants etc. It will be encouraged to adopt on-site sanitation with septic tank in these new built up buildings.

In the case of new commercial buildings such as hotels, apartments, cinema halls, supermarkets, government buildings etc. however, must have septic tank within the complexes. This provision is expected to decrease load to sewer systems. In case of sanitation system within the complexes is to be connected to sewer, the wastewater should be disposed after proper treatment as per the prevailing environmental and engineering norms, rules and regulations.

11.1.3 Operational Strategies

The following operational strategies based on the guiding principle are to be followed regarding open defecation free city.

- **Local Bodies to Lead for Participatory Planning, Implementation and Monitoring of Hygiene and Sanitation Program:** All the WASH programs are identified, prioritized and planned as per the regular procedures of the Municipality. BMC will develop a multi-year strategic plan for universal sanitation and hygiene coverage with financial requirement and action plans and the concerned stakeholders will contribute to implement the action plan through collaboration.
- **Participatory Approach Crucial for Effective, Inclusive, Gender sensitive, Accelerated and**

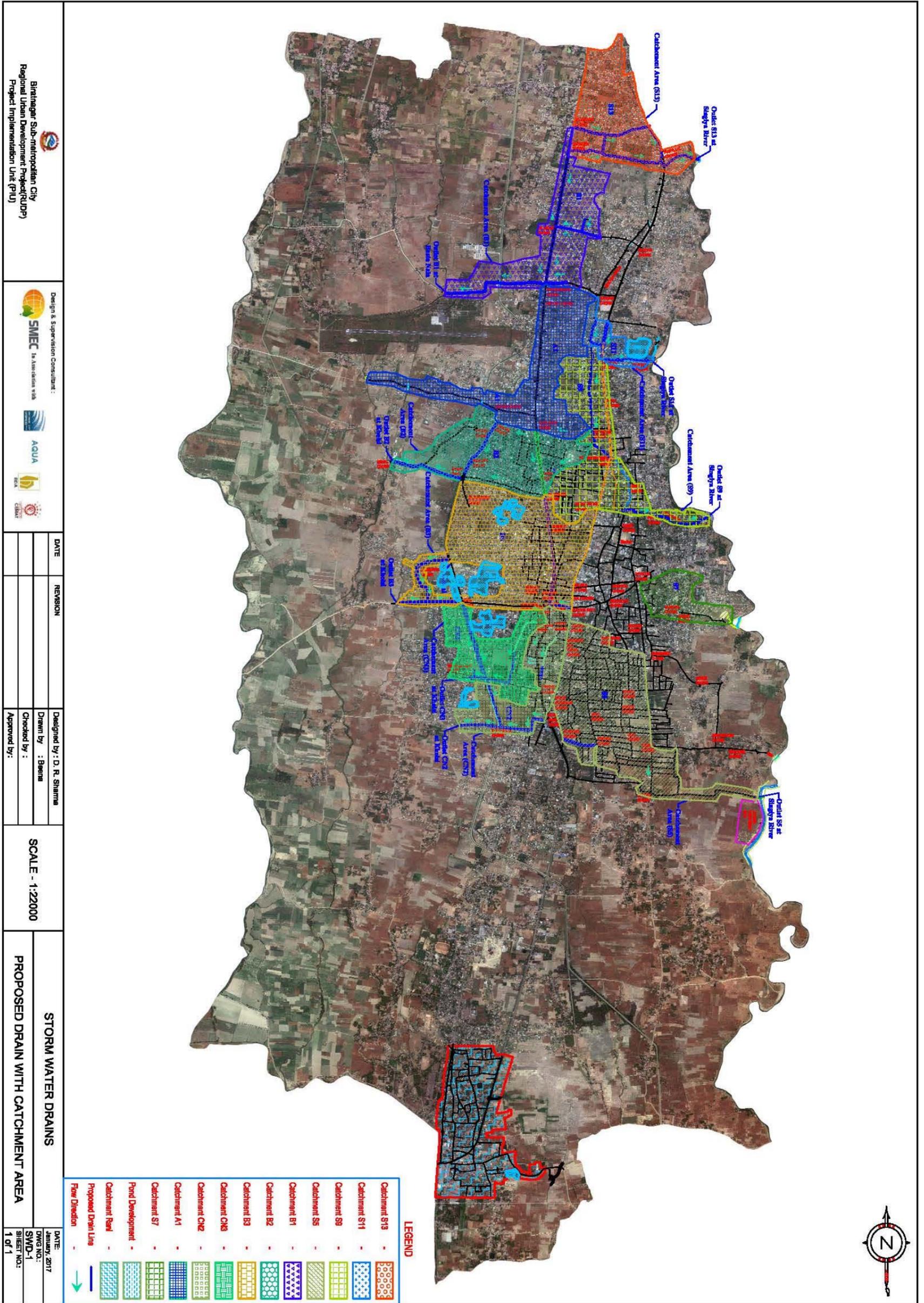
- Sustainable Hygiene and Sanitation Development:** participatory approach is essential to the entire community achieving success in hygiene and sanitation development. Therefore, the promotion of hygiene and sanitation in the communities with the aid and participation of all organizations promises to be more effective, inclusive, gender sensitive, sustainable and accelerated.
- **Memorandum of Understanding (MOU) among Local Bodies and Support Agencies:** While the program would be implemented under the leadership of the BMC, being an autonomous body, the cooperation for sanitation promotion would be based on a Memorandum of Understanding (MoU) to be entered between BMC and the support agencies.
 - **Demand-driven Implementation of Hygiene and Sanitation Programs:** All hygiene and sanitation promotional initiatives, particularly toilet construction, hand washing with soap and total behavioral change in the communities would begin with the promotion of community level health education and mass sensitization activities; particularly spreading the awareness about clear cut linkages of open defecation with many ailments in the communities. It is expected that the DCC/ D-WASH-CC would also organize exposure visits to other successful places in the district or beyond for raising such awareness.
 - **Establishment of a Sanitation Desk and Resource Centers in BMC:** In order to plan and implement the sanitation program, BMC will establish a Sanitation Desk with a Resource Center for enhancing coordination among the members of D- WASH-CC and stakeholders for the overall hygiene and sanitation activities in the municipality.
 - **Reward and Recognition:** A Municipality Sanitation Award (Nagarpalika Sarsaphai Puraskar) will be awarded each year by the Head of Municipality to ODF declared wards and also to individuals, institutions, media, schools or private companies that have outstanding performance and contribution in the hygiene and sanitation sector in the municipality.
 - **Identification and Mobilization of Financial Resources:** In order to meet the financial gap for achieving the National Goal in sanitation, the Plan aims to mobilize the following internal financial resources in order to minimize the dependency on external resources and support
 - **Municipality Fund:** Municipality will allocate some fund annually on hygiene and sanitation promotion as per requirements. The allocation is reflected in the annual and multi-year planning.
 - **Resources of Local Level Organizations:** Municipality will encourage and support FUGs, women's saving groups, micro-credit organizations, cooperative groups, etc for hygiene and sanitation promotion. Toilet promotion activities will have good opportunities through Biogas Support Programs as well. Most importantly, hygiene and sanitation program activities will be linked up with other development endeavors such as poverty alleviation, health, income generation, education, etc. so as to pool the resources and maximize the efforts.
 - **Public Private Partnership** The potential private agencies such as soap manufacturing companies, sanitary unit producers, airlines and other business houses will be encouraged to make a financial contribution the sanitation and hygiene sectors as part of their social services
 - **Community Contribution:** The present sanitation and hygiene development approach largely relies on communities themselves for building toilets, promoting hand washing with soap and adopting water treatment options through the mobilization of human resources, local materials and financial resources. Special consideration should be given to the ultra- poor, disable people, female headed households, and other needy marginalized people in consultation with the local community.

11.2 Storm water drainage

The city's natural drainage pattern is poor, with flat topography and low gradient. There are two major natural streams – Singhiya Khola and Keshaliya Khola and several connecting nallahs running across the city. But with construction and man-made alterations, the natural system has been inadequate and needs to be supplemented by a scientific drainage system. Area drains cover only 27% of the total area.

Flooding is a result of decreased carrying capacity of the drainage due to encroachment, under designs and waste dumping and man-made obstructions and silting. Many of these drains are in poor condition due to dumping of wastes, lack of facilities for cleaning, inaccessibility of cleaning equipment. Both coverage and design needs to be improved. These are being addressed to some extent by the STIUEIP and ongoing RUDP Projects.

11.2.1 Storm water drainage Layout



Biratnagar Sub-metropolitan City
Regional Urban Development Project (RUDP)
Project Implementation Unit (PIU)

Design & Supervision Consultant:
SMIEC is Association of
AQUA
S&S

DATE	REVISION

Designed by : D. R. Sharma
Drawn by : Basma
Checked by :
Approved by :

SCALE - 1:22000

DATE: January, 2017
DWG NO.: SWD-1
SHEET NO.: 1 of 1

11.2.2 Benchmarks for Storm water drainage

S N	Proposed Indicator	Bench Mark	Current Status	Expected Target	Year of Achievement	Remarks
1	Coverage of Storm Water drainage network	100%	27%	30%	2020	After completion of STIUEIP/ RUDP
				60%	2025	
				100%	2035	
2	Incidence of water logging and flooding	0%	45%	30%	2020	After completion of STIUEIP/ RUDP

11.2.3 Budget required for storm water drains**

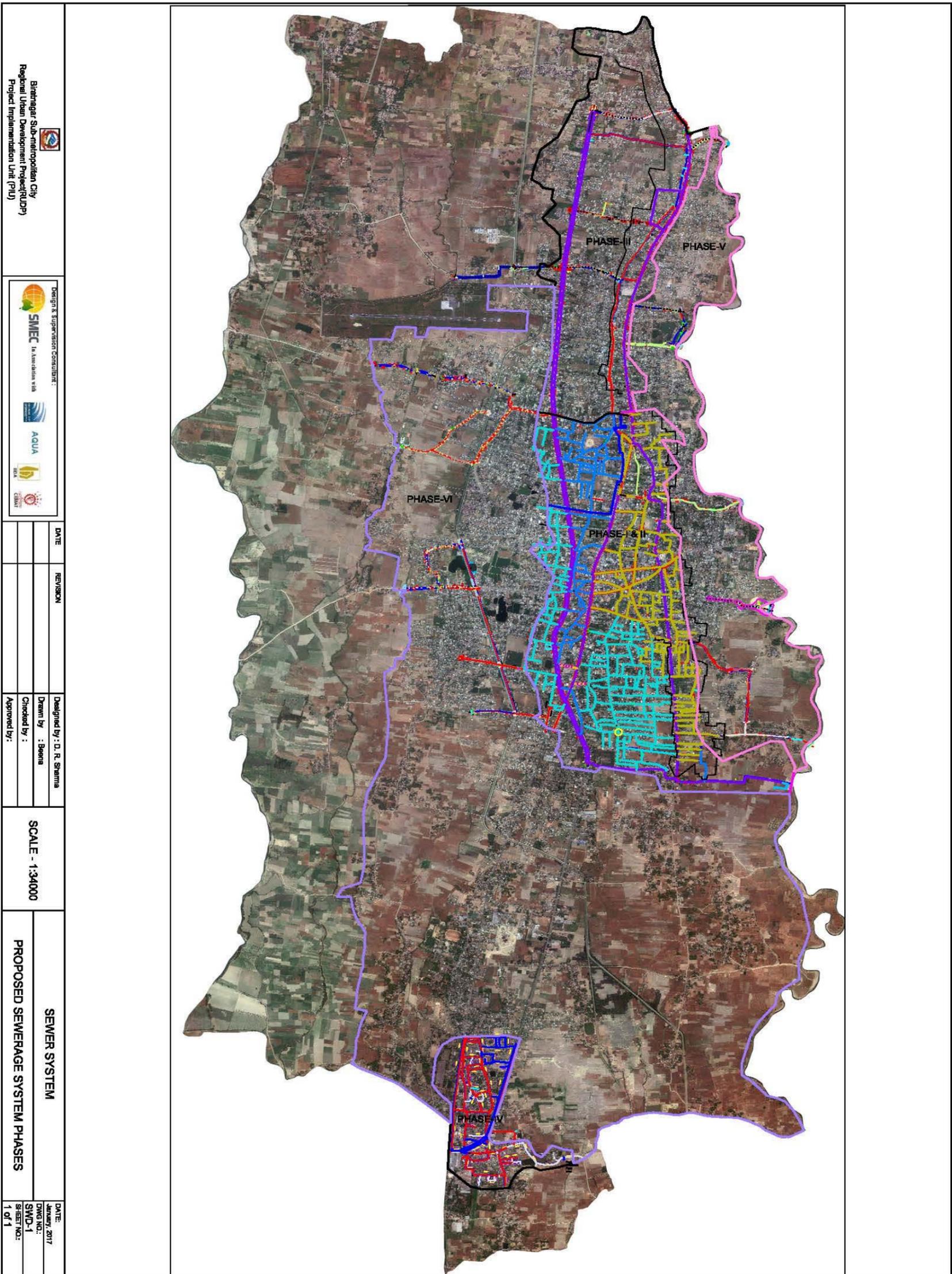
Item	Amount Rs	Remarks
Rehabilitation-repairs of existing drains	48,595,321	Existing Drains need cleaning and repairs and covers
STIUEIP storm drains	782,493,584	After completion of STIUEIP
RUDP Storm drains	373,231,677	After completion of RUDP Project
Storm Drains in remaining areas of BMC in Phases	2,889,788,580	About 75% area of BMC still has no designed built storm drains
Total	2,889,788,580	Proposed

**Above cost includes road side drains in new developing areas, renovation of existing drains, improvement of major and minor natural drain in all zones, and widening and deepening of natural drains etc. and other miscellaneous works. With the improvement, chances of water logging will also come down subsequently.

11.3 Sewerage system

The drainage function of an urban local body is related to the disposal of wastewater and storm water. This is carried out either through underground piped drains (sewers) or surface drains, which may be covered or open. Ideally, storm water drainage should be separate from the wastewater drainage system. But most of the Towns / cities in Nepal do not have an adequate drainage system to carry the wastewater. Very often the sewage flows through surface drains, which are supposed to carry storm water. In the case of BMC, only recently STIUEIP/ RUDP is implementing this sewerage system in the core area. Oversight of on-site sanitation and Septage management is a serious concern on grounds of public health in the entire agglomerate. Wherever sewerage systems are not possible, onsite sanitation activities as community toilets, packaged WWTP s and toilets with septic tanks will be promoted.

11.3.1 Sewerage system Layout



 Biratnagar Sub-metropolitan City Regional Urban Development Project (RUDP) Project Implementation Unit (PIU)		Design & Supervision Consultant :  SMC in Association with  AQUA 	
DATE	REVISION	Designed by : D. R. Sharma	SCALE - 1:34000 SEWER SYSTEM PROPOSED SEWERAGE SYSTEM PHASES
		Drawn by : Beena	
		Checked by : Approved by :	
		DATE: January, 2017	DWG NO.: SMC-1 SHEET NO.: 1 of 1

11.3.2 Benchmark for sanitation and sewerage system

SN	Proposed Indicator	Bench Mark	Current Status	Target	Year of Achievement
1	Coverage of Toilets	100%	17%	90%	2025
2	Coverage of Sewerage Network Services	50%	0	50%	2025
3	Adequacy of Sewage Treatment Capacity	100%	0	50%	2025
4	Quality of sewage Treatment	100%	0	50%	2035

11.3.3 Budget required for sewerage system

Item	Amount Rs	Remarks
Jatuwa System- STIUEIP and RUDP works including Waste water Treatment Plant (Phase I and II)	1,786,400,798	After completion of STIUEIP and RUDP projects
NE Zone and Rani System (Phase III + Phase IV)	857,524,287	
West Zone and East Zone systems (Phase V + Phase VI)	4,227,183,347	
On site Sanitation Systems for Balance Area	3,582,280,676	Proposed
Total	8,666,988,310	Proposed

11.4 Solid Waste Management

Solid waste management of BMC was much worse before recent interventions. The municipality was not able to provide neither a door to door collection nor a sanitary disposal of solid waste. Because of the strength of the local business sector, the municipality had proposed that waste management services should be provided by the private sector. This concept was practiced as early as 1997/98. The Environment section has overall responsibility for waste management. Household collection transportation and dumping of solid waste is presently carried on by the contractor but not in overall areas. Still quite a number of things are necessary for the BMC to manage for Solid Waste. Donors as Finnish Government and Asian Development Bank wanted to participate in this venture but have not materialized. The landfill site proposed was Dangraha, Budhiganga Rural Municipality.

11.4.1 Consideration and immediate needs of BMC

I. Management of Municipal Solid Waste

Municipal Solid Waste includes commercial and residential wastes generated in the municipal areas in either solid or semi - solid form excluding industrial hazardous wastes and including treated bio-medical waste. Components of Municipal Solid Waste are as per following.

- 1) Segregation of Municipal Solid Waste.
- 2) Collection of Municipal Solid Waste
- 3) Transportation of Municipal Solid Waste.
- 4) Disposal and Processing of Municipal Solid Waste.
- 5) Capacity Building.
- 6) Awareness Program and community mobilizations, etc.

II. “Bin Free City” Project

- 1) Segregation of Waste
- 2) Collection of Municipal Solid Waste
 - A) Street Sweeping
 - B) Door to door Collection
 - I) Collection from Residential Areas
 - II) Slums & Congested Localities
 - III) Markets and Commercial Areas
 - IV) Waste from hotel, restaurants, offices, lawns etc.
- 3) Transportation of Municipal Solid waste
- 4) Processing of Municipal Solid Waste
- 5) Storage of Municipal Solid Waste

Under “Bin Free” city project no municipal solid waste is to be stored anywhere with some exception. Garbage collected from household, street sweeping etc. is directly **Waste Management Facility**. In areas where the commercial activity continue through the day have been provided with containers because the process gradually accepted by the communities through various awareness program & capacity building which only be possible by implementation of Frame work for action related to City Sanitation Plan as elaborated in bullet: 15.

Impact of “Bin Free City” Project

- Reduction in the number of bins in the city which achieves only by adopting **public-private partnership (PPP)** Model projects like: bus & door to door collection, etc. help to speculate the concept of Garbage Free City.
- Many open garbage spots have been converted to parking space, tilled and beautified.
- Recyclable material trading with value addition due to segregation.
- Cost savings for municipal body Cleaner and healthier city.

11.4.2 Bench Mark for Solid Waste Management

SN	Proposed Indicator	Bench Mark	Current Status	Expected Target	Year of Achievement	Remarks
1	House hold level coverage of solid waste management	100%	9%	30%	2020	Only 9 % keep liters on roadside for collection
2	Efficiency of Collection of Municipal Solid waste	90%	45%	60%	2020	
Processing Of Solid waste						
3	Extent of segregation of Municipal solid waste	50%	10%	50%	2030	Only 10% practice segregation in homes
4	Extent of Municipal Solid waste Recovered	50%	5%	40%	2030	

11.4.3 Budget required for solid Waste Management

Item	Amount Rs	Remarks
Land fill site at Dangraha and requisite constructions including equipment	2,015,006,000	Land needs to be provided by BMC
(Transportation of solid wastes, Segregation, recycling and processing, Installation of litter bins all included)		

Item	Amount Rs	Remarks
Total	2,015,006,000	Proposed

11.5 Water Supply

Although there are 5 water supply systems within BMC area, still a large part of the population is, deprived of piped water supply and depends on private shallow tube wells/ hand pumps. Water supply is intermittent and ranges from 2 to 4 hours per day. Parts of BMC suffer from very low and unreliable supply in some cases as low as 25-30 LPCD as against the norm of 100 LPCD. Existing facilities (sources, transmission, distribution and treatment capacities) are inadequate to meet the future demands. A comprehensive water management system is therefore a requirement for BMC.

11.5.1 Bench Mark for Water Supply

S N	Proposed Indicator	Bench Mark	Current Status	Expected Target	Year of Achievement
1	Coverage of Water Supply	100%	27%	90 %	2030
2	Per Capita supply of water	100 LPCD	55 LPCD	70 LPCD	2025
3	Continuity of water Supply	24 hours	3 hours for 30% population	For 50% population	2025
4	Quality of water supply	100%	80%	90%	2030

11.5.2 Budget required for Water Supply Systems

Item	Amount Rs	Remarks
Improvement of existing water supply systems for quality improvements	382,232,000	only 32% of the population have piped water supply systems
New systems development for additional coverage	4,873,458,000	Proposed for additional systems
Total	5,255,690,000	Proposed

11.6 Environment

11.6.1 Rejuvenation of Singhiya and Keshaliya Streams

Biratnagar city is blessed with 2 rivers Singhiya and Keshaliya. Besides, it has numerous ponds but has no well-designed public parks and gardens for recreation and health benefits of the industrial/commercial center.

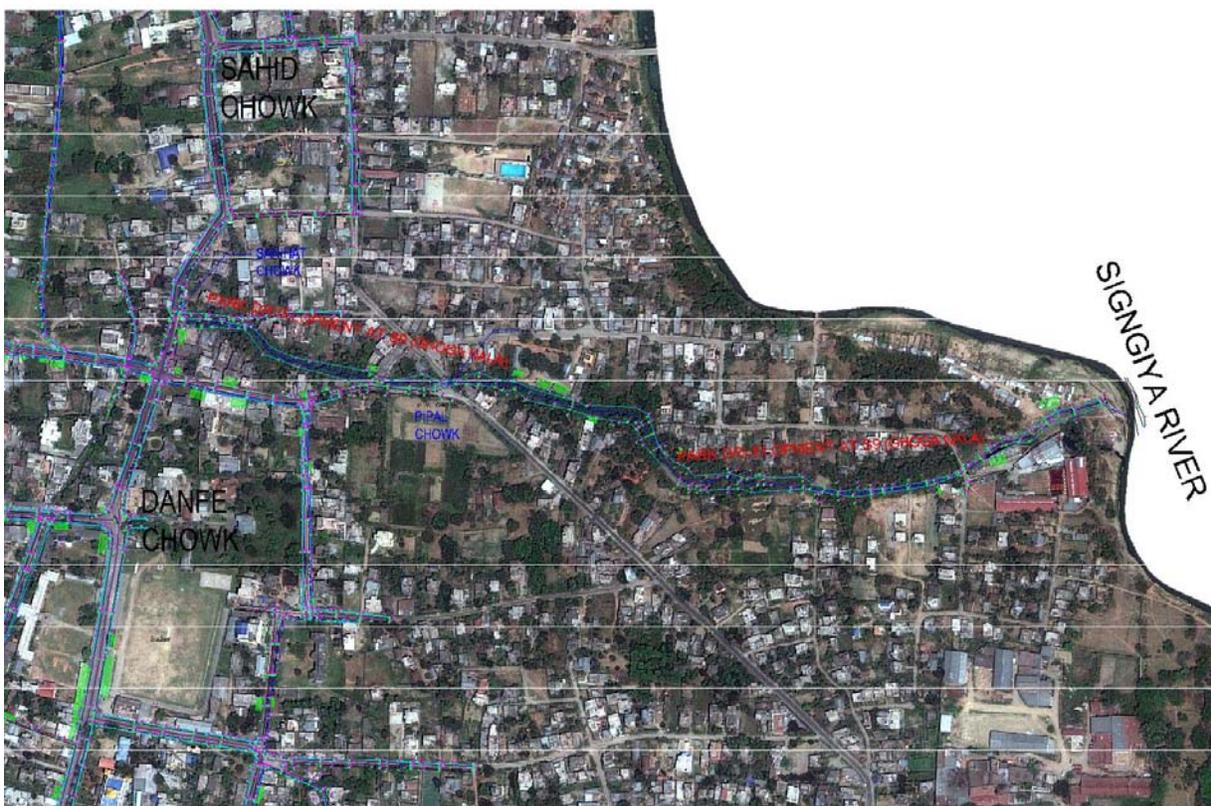
The vision mentioned in periodic plan of Biratnagar Metropolitan City is to develop the city as a prosperous industrial and commercial center and pollution free green city of Nepal with Child Friendly City in 25 years of time.

In context of these, environmental beautification works have to be separately taken up. With the growing population and for environmental protection, it is necessary to rejuvenate these streams and ponds along with building a few parks and gardens. Following are some of these proposed works for environmental protection/ city beautification.

- Ponds Development: There are very many ponds within BMC. These ponds should be developed as storm retention reservoirs for flood controls in rainy season and for recreational uses. These have been proposed for development and included in this CSP. About 255000 Sq

m of ponds shall be perimeter fenced and pathways provided with green plants and flowers. These shall enhance beautifications besides providing water facilities. The tentative water surface area is shown in Figure 3 for preliminary indications.

- Biratnagar is an industrial / commercial center but has no major parks/ gardens for its inhabitants. As such, to increase the aesthetic beauty and facilitate the people for recreational activity, Park development work is proposed from Sanihat Chowk to Singhiya River. The Major Component includes Greenery; Footpath; Drain; Fountain; Toilet; Shed; Parking; Statue; Mound; Basketball court; Sitting Bench; Drinking Water Facilities. It may consist of pedestrian path, green areas, rocks, soil and trees, and also contain buildings and other artifacts such as monuments, sculpture, fountains or play-ground structure. The proposed park is located in the heart of Biratnagar sub-metropolitan city in Ghogha Nala Drain. The park area from Sanihat Chowk to Pipal Chowk consists 3503.1562 sqm, part from Pipal Chowk to Ishwor Marga is 10442.40 sqm, and the part from Ishwor Marga to Singhiya River comprises 3084.94sqm.



11.6.2 Budget required for Environment Protection

Item	Amount Rs	Remarks
Ponds (-water park) Development	999,628,695	There are very many ponds which lie in low lands and could serve as storm retention reservoirs for prevention of flooding at the time of heavy rainfall and also contribute to water recharge. Water parks shall be developed.
Park Development	36,463,285	A sample park along Gogha drain
Solar Street Lighting system	4,127,522	A sample solar street lighting system
Total	1,040,219,502	Proposed

12. Disaster Management cell of BMC

BMC is concerned about the safety and security of the citizens in addition to the provision of Basic Needs Services. Planning of disaster and availability of equipment to control the disaster are equally important. For this purpose, the BMC needs to set up an independent cell of “Disaster Management” and the Fire safety and emergency services department provide 24 hours round the clock service to its citizens.

Disasters in form of Natural and man-made are considered and are tackled through this cell. This includes dewatering of water logging areas in heavy rains, removal and lifting of fallen trees on streets and clearing of streets, flooding or earthquakes and making available all equipment to handle the disaster.

Awareness Programs shall be launched by disaster management cell.

13. Budgetary Requirements

Based on above described sanitation components, a normative and preliminary assessment of capital cost requirements is presented below. The estimated cost requirement over the 15 year period is estimated to be Rs. 19,983 million with priority investments in 8 major heads as follows. O &M budget for all sanitation components are not included as this would be met from tariff collections and revenue earnings of the proposed components which are designed for self- sustainable. Capital costs from STIUEIP and RUDP are not included.

Capital Investment Estimate

SN	Description	Phasing of Investment			Total Amount in Rs. Million	Remarks
		2016- 2020	2021-2025	2026-2030		
1	Access to public Toilets (Open Defecation Free City)	30.5	10.5		40.5	
2	Storm Drainage systems	288.979	1155.916	1444.895	2,889.79	
3	Sewerage and waste water management	0	4404.028	4262.960	8,666.99	
4	Solid waste Management		1007.503	1007.503	2,015.00	
5	Water Supply	191.116	191.116	4873.458	5,255.69	
6	Environmental		140.554	899.666	1,040.22	
7	Project Development and capacity building	25.000	25.000	25.000	75.00	
	TOTAL	535.595	6934.617	12513.48	19,983.19	
	% Budget	2.68	34.70	62.62	100.00	

14. Governance and Institutional Framework

The BMC’s present governance and institutional framework has one main issue of diffused accountability as many organizations are involved in the urban sanitation sector. The BMC is responsible for providing basic infrastructure and other civic services within its jurisdiction. Apart from it, there are quite a number of Government level organizations/ agencies that are also involved within BMC and taking part in development activities. As such, the coordination activity needs to be streamlined. To address this issue, two way approaches will be required.

- BMC should create a **Coordination Committee** to jointly coordinate infrastructure planning and service delivery and to clarify responsibility for various aspects of water and sanitation.
- Support local bodies in implementing local level policy frameworks through **model by laws and guidelines**.
- Undertake an organization Assessment of BMC to fulfill the City Sanitation objectives. The sanitation department should eventually align all sanitation activities covering a) Access to toilets b) Solid waste management c) Waste water management d) Storm drains and water bodies e) water supply
- In order to prepare/ finalize CSP a “city sanitation task force” needs to be established.

15. Frame Work for Action

15.1 Implementation of CSP

A special “city sanitation task force” shall be assigned for taking the responsibility of the City Sanitation Plan. It needs to be made a high powered cell / committee and under its umbrella a **Project Management Division** be set up at the Municipality. This will look after all planning, implementing and monitoring of the CSP. This proposed cell will prepare and finalize the City Sanitation Plan. Municipal chairman will head this cell. It is planned that 5year plan will be prepared and approval from General Body will be taken. After which annual plan will be prepared and this annual plan can demand additional funding from Government. This will help in systematic and regular monitoring of CSP. The additional Roles and responsibilities assigned to “city sanitation task force” will be as under:

- Regular meetings of “city sanitation task force” towards launching “100% sanitation campaign in the city”.
- Coordination with Government and departments.
- Capacity Building of municipal staff
- Awareness of various stakeholders such as academia, medical professionals, media, civil society organizations, NGOS, wards members.
- Facilitating “Sanitation” & health related programs.
- Monitoring & evaluation of 100% sanitation campaign launched within the city.
- Regular Reporting & feedback to government.

15.2 Capacity building of municipal staff

In addition to “Staff Up-gradation Plan” of BMC, and capacity building plan for existing and new staffs, BMC needs to undertake possible mechanization and conversion in phases. MIS needs to be strengthened and work efficiently.

15.3 Proposed studies to be undertaken under CSP

As a part of CSP, DPR for different activity as proposed will be undertaken by BMC involving design consultants.

16. Recommendation/ Conclusion

- A special cell “city sanitation task force” is needed to be placed at BMC for preparation and finalizing the CSP. Municipal chairman will head the cell.
- **BMC** needs Rs. 30341 million for the year 2016-2020 for implementation of all CSP components. DPRs (cost of sewage, drainage etc.) is already submitted and is under implementation through STIUEIP / RUDP projects. BMC will need further budget till the achievement of benchmarks for each component in subsequent years. Government is requested to allocate funds for specific components of sanitation to Biratnagar metropolitan City for achieving its goal of 100% ODF city and meeting other sanitation targets.

Annex- 1

Important Terms and Definitions

The Sanitation Plan adopts the following terms at conceptual as well as operational levels, unless otherwise stated.

i. Improved Sanitation Facilities (Toilet):

According to the Joint Monitoring Program (JMP) of UNICEF and WHO, an improved sanitation facility is defined as one that hygienically separates human excreta from human contact. The JMP uses the following classification for improved sanitation facilities, however, sanitation facilities are not considered improved when shared with other households or open for public use:-

- a) Flush or pour-flush to:- piped sewer system - septic tank - pit latrine
- b) Ventilated Improved Pit (VIP) latrine
- c) Pit toilet with slab and lid
- d) Composting toilet (eco-san)
- e) ECO – Toilet in rural and urban areas

ii. Total Sanitation

Unless otherwise stated, Total Sanitation is a range of facilities and hygiene behaviors that lead to achieve sanitized condition of the designated areas (municipality including settlements, Toles, school's catchments, etc.). Total Sanitation concentrates on ending Open Defecation as a first significant step to an entry point of changing behavior. The second step includes all arrangements leading to sustainable hygiene and sanitation behaviors. Therefore, Total Sanitation is expected to achieve a sanitized condition in two phases in a sustainable manner as follows:-

Phase 1: Open Defecation Free (ODF) Situation Open Defecation (OD) means defecating in the open and leaving the faeces exposed. ODF means 'Open Defecation Free' i.e. no faeces are openly exposed to the air. The collection of faeces in a direct pit with no lid is also a form of OD but with a fly proof lid it then qualifies for ODF. The following indicators/criteria are expected to be prevalent in any given designated areas in order to declare it ODF:-

- There is no OD in the designated area at any given time;
- All households have access to improved sanitation facilities (toilets) with full use, operation and maintenance; and
- All the schools, institutions or offices within the designated areas must have toilet facilities

In addition; the following aspects should be encouraged along with ODF declaration process:

- Availability of soap and soap case for hand washing in all households; and
- General environmental cleanliness including management of animal, solid and liquid wastes is prevalent in the designated area.

Phase 2: Total Sanitized Post-ODF Situation

This phase includes all arrangements leading to sustainable hygiene and sanitation facilities and behaviors. Although municipality itself will identify and implement various hygiene and sanitation parameters during the post-ODF, the following indicators may be suggested

to ensure that a Total Sanitation situation is achieved in the given area:-

A. Five key hygiene and sanitation behaviors

- Use of toilets;
- Practice of hand washing with soap or cleaning agent at critical times;
- Safe handling and treatment of drinking water (e.g. Point of Use treatment) at household's level;
- Maintenance of personal hygiene (regular nail cutting, bathing, cloth washing, daily combing, tooth brushing etc.), and
- Proper solid and liquid management in and out of the home.

B. Household sanitation

- All households should have toilet and hand washing facilities such as soap, washing platform, etc.
- Availability of brush, brooms, cleaning agent, etc. at the toilet;
- Covering food and water;
- Regular cleaning of rooms, yards, and household compound;
- Availability of managed animal shed;
- Availability of covered waste water pit;
- Access of safe drinking water;
- Availability of bins/pits to collect/dispose solid waste, and
- Availability of improved cooking stove/bio-gas (optional).

C. Institutional sanitation

- All institutions should have users-friendly clean, hygienic toilets with hand washing with soap station and proper waste management facilities, and
- All schools must have Child, Gender and Differently-abled (CGD) friendly water, toilet and hand washing (with soap station) facilities including menstrual hygiene facilities. The schools must have garbage pit facilities within the school premise.
- All institutions should keep their premises in clean and hygienic condition.

iii. Child, Gender and Differently-abled (CGD) Friendly Features

- Child friendly features: include water taps, knobs and latches of toilet doors and windows at suitable heights and convenience for children at different ages.
- Gender friendly features: the location of the toilet should be appropriately selected in a safe and secure place and the door, windows and ventilation should safeguard privacy. In addition to water, in schools and other public institutions, the toilet should have facilities for maintaining menstrual hygiene management. For example, a bucket with cover/ lid inside the toilet or an incinerator attached just outside the toilet is essential.
- Differently-abled friendly toilet: should include a ramp up to toilet, sufficient space for a wheelchair in the passage, hand railing in the passage and, within the toilet cubicles, appropriate types of seating arrangements and support on the toilet.

iv. Ultra Poor Households :

Rural Water Supply and Sanitation National Strategy 2004 has indicated some proxy indicators to identify poverty. These are:-

- Households having food sufficiency (security) for less than six months;
- Households having daily wages as the main source of income;
- Female-headed households and/ or households without adult members and/ or households having physically disabled persons, and
- Other relevant indicators agreed by the community.

- v. Stakeholders:**
All the members of the National Sanitation and Hygiene Steering Committee (NSHSC), and regional, district and municipal level WASH coordination committees, local government bodies, schools, child clubs, users committees, any other agencies that have roles in water and sanitation promotion.
- vi. Joint Plan:**
A district, municipality and Village level Strategic Plan/Plan of Action which the central government, local bodies, donors and International/ Non-Governmental Organizations (I/NGOs) follow to promote total sanitation through joint planning, programming, financing and implementation in an unified manner in line with the guiding principles of the Sanitation and Hygiene Master Plan. The District Periodic Plan will also include hygiene and sanitation promotional activities and is endorsed annually in the municipal and district assemblies, as appropriate.
- vii. Universal Sanitation Coverage:**
Cent-percent sanitation (toilet) coverage in a given area.
- viii. Universal Access to Sanitation:**
All users having access to toilet in a given area.
- ix. Total Sanitized City**
A totally sanitized city can be defined as sufficient water, zero garbage situations, scientific processing & disposal of garbage, maximum collection and treatment of sewerage, no open defecation, proper disposal of storm water, no flooding points etc.

Annex- 2

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