Chapter 10
Utilities Management Strategy

Enriching the City with upgraded Utility Services

Efficient Networks of Utility Services running through Every Corner of the City

Utilities Management Strategy

Introduction

Well managed effective utilities network is a key component of a city that enables its efficiency functioning. It is important to have holistic and integrated solutions for city utilities management to ensure wise-resource management, energy conservation and equal access to infrastructure. Identification of demand and ensuring the adequate supply to match with the demand are basic functions of effective utilities management. The reason why a Utilities Management Plan should be combined with the City Development Plan is because it is necessary to ensure that all types of utilities and infrastructure are adequately supplied to meet the future demand that would be created consequent the anticipated developments which are being induced and facilitated through the Plan.

Objective

The objective of Utilities Management Strategy of CCCDP – 2019-2030 is to provide Colombo Commercial City with efficient utilities networks and adequate social infrastructure to facilitate all residents and commuters of Colombo Commercial City and to ensure smooth functioning of socio-economic and socio-political functions of the city.

Approach

Utilities Management Strategy of CCCDP – 2019-2030 is proposed to be implemented through following main approaches.

- **Regulatory approach** *(Including recommendation and guidelines)*
- **Direct interventions of state agencies**

Recommendations and guidelines to provide and improve utilities are based on future forecasting of demand to match with the future predicted population.

Contribution towards the Vision & Goals of CCCDP – 2019-2030

In the path of making "Colombo to be experienced as the Smart, Vibrant and Tropical Water Garden City of South Asia" the city should be provided with modern and adequate utilities and infrastructure facilities to cater all its owners; inhabitants, commuters and tourists.

Utilities Management Strategy contributes to achieve the **Goal 03 –** *'The Smart, Smooth and Sensed Urban Space for all inhabitants'* and its subsequent objectives;

- **Objective 04 – To have optimum utility of the existing and proposed infrastructure systems by 2025**
- **Objective 06 – To have an urban environment with state-of-the-art utilities and smart facilities enjoyable by all residents and commuters of *Colombo Commercial City by 2030*.**

Scope

In order to fulfill the above mentioned two objectives related to utilities management of Colombo Commercial City, three types of broader interventions are made.

- **Ensuring efficient supply of utilities such as pipe-borne water and electricity**
- **Effective management of waste water, solid-waste and storm water**
- **Provision of adequate social infrastructure and smart public facilities to create convenient nodes, streets and public places.**

The Utilities Management Strategy is delivered in the form of recommendations in order to guide the relevant stakeholder agencies to conduct detailed level planning on each above infrastructure facilities as to match with the anticipated future developments of Colombo Commercial City.

10.1. Efficient Supply of Utilities (Project Code – U-1)

Supply of Pipe-borne water and electricity and management of wastewater & sewerage, solid waste and storm water are the key focus areas considered under the broader intervention of efficient supply of utilities. All projects falling within the above focus areas are aligned under the Utilities Management Strategy – Action Project Type – 01 with the project code – U-1.

10.1.1. Pipe-borne Water Supply (Project Code – U-1-1)

The pipe-borne water supply within *Colombo Commercial City* is owned and managed by National Water Supply and Drainage Board of Sri Lanka under the Western Province Metropolitan Area Water Supply Master Plan – 2013 which covers Colombo District and parts of Gampaha and Kalutara Districts. The mainly used surface water sources of the existing system are:

- **Labugama and Kalatuwawa impounding reservoirs**
- **Kelani River and its tributary Seethawaka**
- **Kalu River and tributary Kuda River**

The Kelani River is an important source of drinking water for Colombo District. The Labugama and Kalatuwawa reservoirs are situated around 39 km from Colombo City and, at the border of Colombo and Ratnapura Districts.

a) Pipe-borne water demand

Colombo Municipal Council area has a high pipe-borne water demand compared to the other local authorities. It has estimated that the normal daily water consumption is considered to be 300,000 m³/d including Non-Revenue Water. Ambatale water treatment plant is the main water supplier plant for CMC area.

According to the Western Province Metropolitan Area Water Supply Master Plan (2013), projected water demand of *Colombo Commercial City* is 614,173 m³/d whereas as per the population predictions of **CCCDP – 2019-2030**, pipe-borne water demand of *Colombo Commercial City* is 551,900 m³/d. The Local Authority wise projected pipe-borne water demand distribution of 2030 as per the population predictions of **CCCDP – 2019-2030** is shown in the Table 10.2 and Map 10.1.

Local Authority	2030 - Population	2030 – Water Demand (m3/day)
Colombo MC	687,015	361,570
Dehiwala Mt-lavinia MC	226,155	85,379
Boralesgamuwa	72,595	18,151
Kolonnawa	80,951	20,906
Peliyagoda	35,825	13,323
Wattala Mabola UC	36,811	14,180
Wattala PS	191,242	59,244
Kelaniya PS	143,143	41,420
	1,473,737	**614,173**

Table 10.1: *Water Demand Predictions – 2030 by NWSDB*
Source: *Western Province Metropolitan Area Water Supply Master Plan, NWSDB - 2013*

Local Authority	2030 - Population	2030 – Water Demand (m3/day)
Colombo MC	633,562	335,788
Dehiwala Mt-lavinia MC	283,560	107,753
Boralesgamuwa UC	92,892	23,223
Kolonnawa UC	65,390	17,001
Peliyagoda UC	31,268	11,569
Wattala Mabola UC	38,489	15,011
Wattala PS	64,857	18,809
Kelaniya PS	78,744	22,836
TOTAL	**1,288,763**	**551,990**

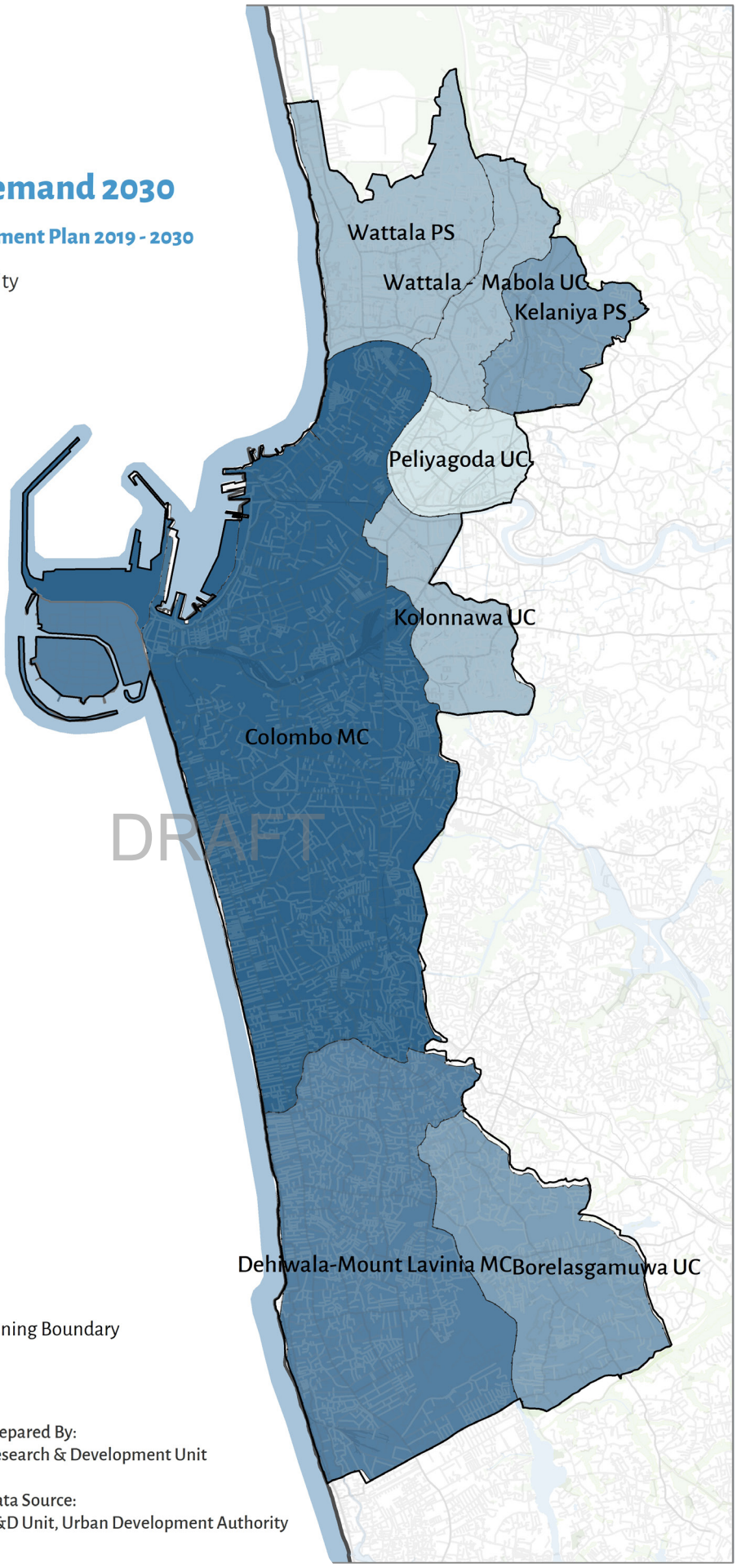
NOTE: *Pipe-borne water demand of Colombo Commercial City was calculated for the predicted population of CCCDP – 2019-2030 based on the assumption that Residential Water Demand Per Person Per Day (lpcd) varies in the range from 120 liters to 135 liters from low density to high density development respectively.*

Table 10.2: *Water Demand Predictions – 2030 (As to match with the forecasted population of CCCDP – 2019-2030)*

Pipe-borne Water Demand 2030

Colombo Commercial City Development Plan 2019 - 2030

Urban Development Authority
December 2018



Legend

Water Demand 2030 (m3/d)

- < 11569
- 11570 - 18809
- 188010 - 23223
- 23224 - 107753
- 107754 - 335788

Local Authority Boundary

Colombo Commercial City Planning Boundary

N
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0 1 2 4 Km

Prepared By:
Research & Development Unit

Data Source:
R&D Unit, Urban Development Authority

Map 10.1: *Pipe-borne Water Demand Distribution– 2030 (As to match with the forecasted population of CCCDP – 2019-2030)*

b) Incorporating Water Supply Improvement Projects proposed by relevant stakeholders (Project Code – U-1-1)

Western Province Metropolitan Area Water Supply Master Plan Update (MPU/2013) serves as the 'blue print' to guide future developments of water supply system of Western Province. It proposes water supply improvement projects which would improve availability and quality of water resources, increase treatment plant capacities, reduce energy consumption in the Western Province Metropolitan Area Transmission Systems reduce water loss in the distribution networks and increase their service levels in order to meet the water demand of western region up to 2040. The Master Plan proposes the implementation of its projects over three main phases such as immediate (2013-20), intermediate (2020-30) and ultimate (2030-40).

As per the demand calculations given in the Section 10.1.1 - (a), it can be identified that the projected water demand by Water Supply Master Plan is higher than the water demand projected by **CCCDP**. As per the recommendations of NWSDB, it is a mandatory requirement to implement the identified water supply projects of Water Supply Master Plan in order to meet the water supply demand forecasted for 2040. However, since the water supply demand projected by **CCCDP** is comparatively lower than the demand projected by Water Supply Master Plan, it can be assumed that the water demand which will be created due to the induced developments by **CCCDP** will be met without major issues if the identified water supply projects are implemented without any disturbances. Hence, **CCCDP – 2019-2030** designates the recommended Water Supply Projects of Western Province Metropolitan Area Water Supply Master Plan Update (MPU/2013) which directly or indirectly contribute to the water supply of *Colombo Commercial City* as high priority projects and incorporate them into **CCCDP – 2019-2030** under the Project Code – U-1-1.

Few of the identified water supply projects which are related to the water supply system of *Colombo Commercial City* as proposed by National Water Supply & Drainage Board are indicated in the Table 10.3.

No	Water Supply Project
01	Development of reservoir in Kelani River
02	Weliwita Water Supply Project
03	Kalu Ganga Water Supply Project – Phase II
04	Kandana Phase II WTP Improvement
05	Kethhena WTP Improvement
06	Water loss reduction in high priority are

Table 10.3: *Few of the Water Supply Projects related to the Water Supply System of Colombo Commercial City as proposed by of MPU/2013*
Source: *Western Province Metropolitan Area Water Supply Master Plan, NWSDB - 2013*

10.1.2. Electricity Supply (Project Code U-1-2)

Colombo Commercial City has 100% coverage of electricity throughout the city and it is supplied from the national grid. There are few power plants located within the Western Region, that are mainly concentrated in Colombo Metropolitan Region, namely Kelanitissa, Sapugaskanda and Kerawalapitiya. The existing electricity demand of *Colombo Commercial City* is around 1,165 MW and 4,822 GWh. As per the recommendations of Ceylon Electricity Board, the supply of electricity to cater the future demand that will be resulted due to increased population and future developments induced by the interventions of **CCCDP – 2019-2030** is possible given the condition that necessary local area network capacity improvements are conducted in appropriate timeframes. Hence, **CCCDP – 2019-2030** recommends immediate attention of necessary stakeholders including Ceylon Electricity Board to identify necessary electricity supply improvement projects in order to ensure adequate supply to meet the electricity demand that will be resulted due to increased population and future developments induced by the interventions of **CCCDP**. Any such electricity supply improvement project that would directly or indirectly contribute to the electricity supply of *Colombo Commercial City* are incorporated into **CCCDP – 2019-2030** under the project code U-1-2.

10.1.3. Wastewater & Sewerage Management (Project Code – U-1-3)

Wastewater systems of *Colombo Commercial City* are owned and managed by the National Water Supply and Drainage Board (NWSDB) and relevant local authorities. The two main wastewater systems currently in operation within *Colombo Commercial City* are Colombo Municipal Council Sewerage System (CMCSS) and Ratmalana Wastewater Management System. In the present context, the Colombo Sewerage System owned and operated by CMC is experiencing many failures due to exceeding of its capacities thus need immediate attention to avoid possible sudden failures of the system threatening public health, safety and city economy. In response to this requirement, Greater Colombo Wastewater Management Project has been proposed by the NWSDB in order to manage the increasing wastewater generation within Colombo Municipal Council Area. Ratmalana Wastewater System which is owned and managed by the NWSDB covers a part of DMMC, part of Moratuwa MC, Boralesgamuwa UC (Proposed), a part of Maharagama UC (Proposed). The plant capacity is 17000 (m3 per day) and its existing usage is 7000 (m3 per day).

a) Future Forecast of Wastewater Generation

In order to manage the increased wastewater generation that will be resulted consequent to the induced high density developments of **CCCDP – 2019-2030**, it is important to have an efficient wastewater system within *Colombo Commercial City*. In the present context, the available wastewater management systems do not cover the entire *Colombo Commercial City* and also lack the adequate capacities to meet the existing demand. According to wastewater generation statistics of 2017, wastewater management capacity of both existing and proposed wastewater treatment plants is 225,000 m^3/d whereas the projected wastewater generation of 2030 is 442,000 m^3/d. It emphasizes that there is a high deficiency in existing wastewater management capacities and future demands. Compared to the projected wastewater generation, the missing wastewater management capacity is about 280,000 m^3/d.

The capacities of exsiting and proposed wastewater treatment plants are indicated in the Table 10.4.

Capacity of Proposed Greater Colombo Wastewater Management Project (GCWMP)	200,000 m3 per day
Population that will served by GCWMP	838,000
Capacity of Proposed Ratmalana – Boralesgamuwa Wastewater Management Project (RBWMP)	17,000 m3 per day
Population that will served by RBWMP	71,000
Total population that will be served by both proposed WMP	909,000
Predicted Total Population of Colombo Commercial City - 2030	1,288, 000
Percentage Population that will be served by proposed WMP	70%

Table 10.4: *Forecasted Waste Water Generation within Colombo Commercial City - 2030*

The Local Authority wise predicted wastewater generation of 2030 is shown in the Table 10.5 and Map 10.2.

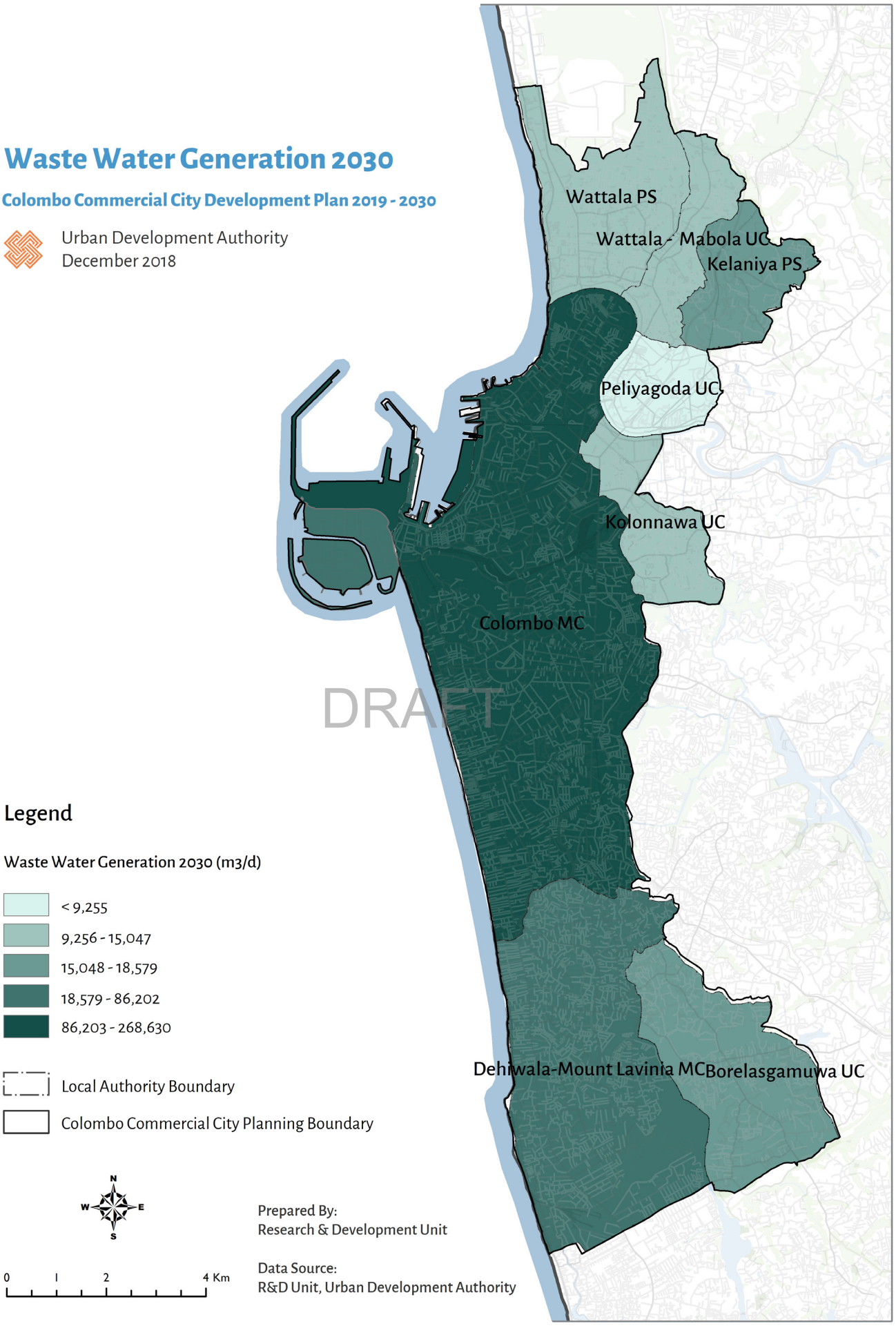
Local Authority	2030 - Population	2030 – Waste Water Generation (m3/day)
Colombo MC	633,562	268,630
Dehiwala Mt-lavinia MC	283,560	86,202
Boralesgamuwa UC	92,892	18,578
Kolonnawa UC	65,390	13,601
Peliyagoda UC	31,268	9,255
Wattala Mabola UC	38,489	12,009
Wattala PS	64,857	15,047
Kelaniya PS	78,744	18,269
TOTAL	**1,288,763**	**441,591**

Table 10.5: *Waste Water Generation – 2030 (As to match with the forecasted population of CCCDP – 2019-2030)*

Waste Water Generation 2030

Colombo Commercial City Development Plan 2019 - 2030

Urban Development Authority
December 2018



Prepared By:
Research & Development Unit

Data Source:
R&D Unit, Urban Development Authority

Map 10.2: *Waste Water Generation – 2030 (As to match with the forecasted population of CCCDP – 2019-2030)*

b) Incorporating Wastewater Management Projects proposed by relevant stakeholders (Project Code – U-1-3)

Even though Table 10.4indicates that approximately 70% of *Colombo Commercial City* will be served by the proposed wastewater management systems, these systems do not adequately cover the areas such as Wattala, Peliyagoda, Kolonnawa and parts of Kelaniya in which considerably high wastewater generation can be expected due to induced developments of **CCCDP**. Hence, **CCCDP – 2019-2030** recommends that there is an immediate requirement to identify wastewater management projects by relevant stakeholder agencies to handle the wastewater generation that can be expected due to the induced developments of **CCCDP**. Any such wastewater management project that would contribute to wastewater management of *Colombo Commercial City* are incorporated into **CCCDP – 2019-2030** under the project code U-1-3.

The ongoing Wastewater Management Projects are indicated in the Table 10.6.

No	Waste Water Management Project	Project Code
01	Greater Colombo Wastewater Management Project	U-1-3-1
02	Ratmalana – Boralesgamuwa Wastewater Management Project	U-1-3-2

Table 10.6: *Ongoing waste water management projects within Colombo Commercial City - 2030*

Under the Greater Colombo Wastewater Management Project, it is expected to improve the existing sewerage system of CMC by installing of a wastewater treatment plant with the capacity of 2000 million liters per day (MLD). It is expected that the improved wastewater management services serve approximately up to 838,000 residents within the project area.

Under the Boralesgamuwa and Maharagama area wastewater project, it is expected to install a wastewater treatment plant with a capacity of 6675 (m3 per day) with 6270 domestic connections and 551 non-domestic connections.

10.1.4. Solid Waste Management (Project Code – U-1-4)

Disposal of solid waste has become a national concern in Sri Lanka. Rapid urbanization has led to the generation of large quantities of solid waste without proper management or sustainable waste disposal measures. Households, markets and commercial places industries, institutions and hospitals, and hotels are the main sources of solid waste generation. Due to plurality of solid waste generation sources, western region and most of the adjacent local authorities face the problem of waste collection and management. Serious issues has arisen especially in finding the locations and establishing the solid waste plants. Against this backdrop, presently Central Environment Authority, National Solid Waste Management Support Center, Waste Management Authority of Western Province and relevant other institutions are taking several actions to minimize these issues.

According to the Table 10.7 Colombo and Dehiwala Municipal Councils are the foremost solid waste generating local authorities exist within the planning area.

Local Authority	Population	Floating Population	Waste Generation (MT)	Present Waste Collection (MT/D)
Colombo MC	555,031	600,000	900	765
Peliyagoda UC	27,392	15,000	21	13.5
Wattala PS	156,050	120,00	50	27.5
Wattala UC	30,917	15,500	28	20
Boralesgamuwa UC	813,78	80,000	56	34
Dehiwala MC	209,943	147000	286	155
Kolonnawa UC	57,285	10,000	40	32
Total	**1,036,618**	**867,500**	**1,381**	**1,047**

Table 10.7: *Local Authority wise Waste Water Generation - 2018*
Source: *Waste Management Authority of Western Province*

a) Future Forecast of Solid Waste Generation

Due to high solid waste generation, existing capacities of sites are becoming inadequate. Existing capacities of Karadiyana and Kerawalapitiya dumping sites are 500 MT per day. The projected solid waste generation calculated based on the population predictions of CCCDP- 2019-2030 is 1500MT per day. The Local Authority wise solid waste generation is shown in the Table 10.84 and Map 10.3.

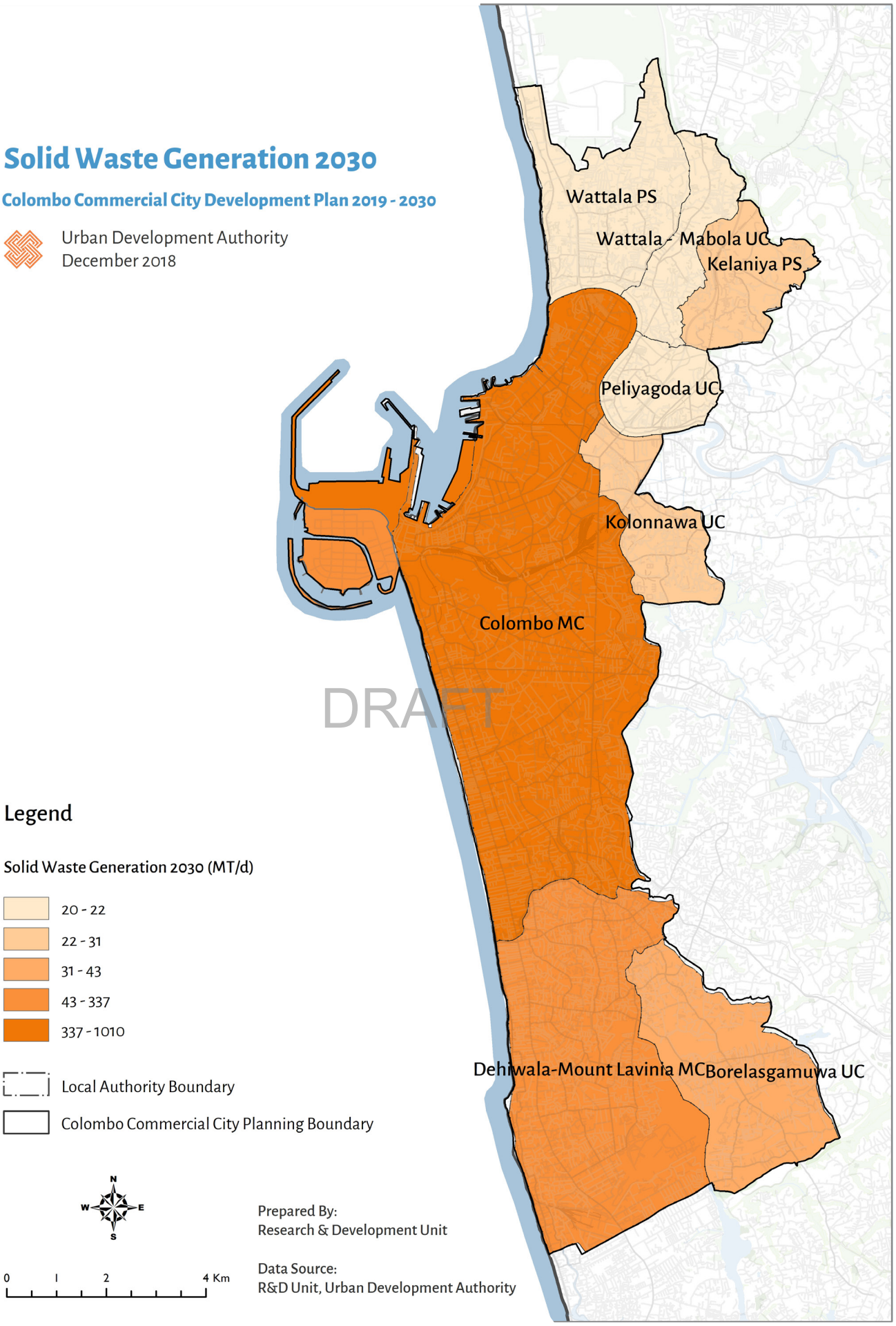
Local Authority	2030 - Population	2030 – Waste Water Generation (m3/day)
Colombo MC	633,562	1,010
Dehiwala Mt-lavinia MC	283,560	337
Boralesgamuwa UC	92,892	43
Kolonnawa UC	65,390	31
Peliyagoda UC	31,268	20
Wattala Mabola UC	38,489	22
Wattala PS	64,857	21
Kelaniya PS	78,744	28
TOTAL	**1,288,763**	**1,512**

Table 10.8: *Solid Waste Generation – 2030 (As to match with the forecasted population of CCCDP – 2019-2030)*

Solid Waste Generation 2030

Colombo Commercial City Development Plan 2019 - 2030

Urban Development Authority
December 2018



Legend

Solid Waste Generation 2030 (MT/d)

- 20 - 22
- 22 - 31
- 31 - 43
- 43 - 337
- 337 - 1010

Local Authority Boundary

Colombo Commercial City Planning Boundary

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W E
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Prepared By:
Research & Development Unit

Data Source:
R&D Unit, Urban Development Authority

Map 10.3: *Solid Waste Generation – 2030 (As to match with the forecasted population of CCCDP – 2019-2030)*

(b) Incorporating Solid Waste Management Projects proposed by relevant stakeholders (Project Code – U-1-4)

Ministry of megapolis has initiated different projects to solve the solid waste problems. Waste to Energy project is one of the key projects that is propsoed to be implemented. Under this project waste dumped in Karadiyana and Kerawalapitiya sites will be used to generate energy. Accordingly, waste collected from Dehiwala – Mt. Lavinia, Moratuwa, Maharagama, Boralesgamuwa, Kesbewa, Piliyandala, Homagama local authorities will be used to generate energy. In addition, a new project has been proposed by the Ministry of Megapolis & Western Development to Transfer of Solid Waste to Aruwakkaru Sanitary Landfill Site at Puttlam.

The Solid Waste Management Projects undertaken by relevant stakeholders within *Colombo Commercial City* are incorporated into **CCCDP – 2019-2030** under the Project Code – U-1-4.

No.	Project Name	Implementation Agency	Project Code
01	Kerawalapitiya Waste to Energy Project (500Mt to 10MW)	Western Power (Pvt) Ltd	U-1-4-1
02	Karadiyana Waste to Energy Project (500Mt to 10MW)	Fairway Holdings (Pvt) Ltd	U-1-4-2
03	Transfer of Solid Waste to Aruwakkaru Sanitary Landfill Site at Puttlam	Ministry of Megapolis & Western Development	U-1-4-3

Table 10.9: *Proposed Solid Waste Management Projects that will be incorporated into CCCDP – 2019-2030*

10.1.5. Introducing Underground Utility Ducts (Project Code – U-1-5)

CCCDP – 2019-2030 identifies the importance of introducing Underground Utility Ducts in order to carry utility lines such as electricity cables, water supply and wastewater pipelines and communication utilities such as fiber optics and telephone cables. There are many advantages of underground utility ducts as they cut down unnecessary costs on digging and reconstruction of roads and pathways for the repairs and management of individually buried different utility lines, avoid unnecessary visual and physical disturbances on road which downgrade the city image, enable easy and efficient management of utility networks and more importantly ensure public safety.

Hence, **CCCDP – 2019-2030** recommends Installing of Underground Utility Ducts (Project Code – U-1-5) as a high priority project which needs to be implemented parallel to the road improvement projects that will be carried out under the project code T-1 of **CCCDP – 2019-2030**.

10.2. Provision of Adequate Social Infrastructure (Project Code U-2)

Provision of social infrastructure is essential in ensuring social development of a community in a city. It ensures the inclusiveness of diverse communities uplifting their quality of life. Therefore, provision of adequate social infrastructure to cater the demand is vital in a development plan.

Colombo City being the country's most demanding city for education, health, sports and recreation facilities has the best social infrastructure facilities compared to the rest of the country. Being the commercial capital of the country, it attracts a huge population flow to the city. However, it was identified in the problem identification as explained in the Volume I of **CCCDP – 2019-2030** that *Colombo Commercial City* has become less user friendly due to lack of some of the vital social infrastructure. In addition, the intention of this section is to evaluate whether *Colombo Commercial City* has adequate social infrastructure of all kind to supply for the future increasing demands.

Consequently, in the path of making "Colombo to be experienced as the Smart, Vibrant and Tropical Water Garden City of South Asia" the city should be provided with modern and adequate social infrastructure facilities to cater all its owners; inhabitants, commuters and tourists.

Colombo Commercial City Development Plan 2019-2030 ensures provision of adequate social infrastructure facilities such as education, health, public markets, sports and recreation facilities, public burial spaces, public sanitary facilities, information centers and public seating areas to ensure more inclusive, comfortable, user friendly city.

10.2.1. Educational Institutions

Education being a fundamental right of every child in Sri Lanka, the State should take responsibility of making education available for all ensuring equity and giving leadership to all providers of school education and State should ensure free education from kindergarten to university and compulsory education to all children aged 5-16 years making it available, accessible, acceptable and adaptable for them (New Education Act for General Education in Sri Lanka, Ministry of Education).

Colombo city is one of the most demanding city for education as it provides various education facilities in primary, secondary and tertiary education sectors. National schools, Provincial schools, Private schools, International schools, Universities, Vocational Training Institutes and other educational institutes have created enormous demand for education within the city.

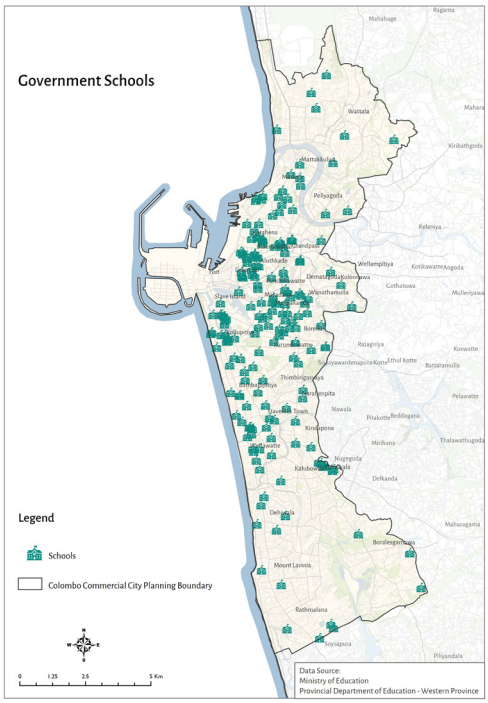

Figure 10.1: *Distribution of Schools within Colombo Commercial City - 2018*

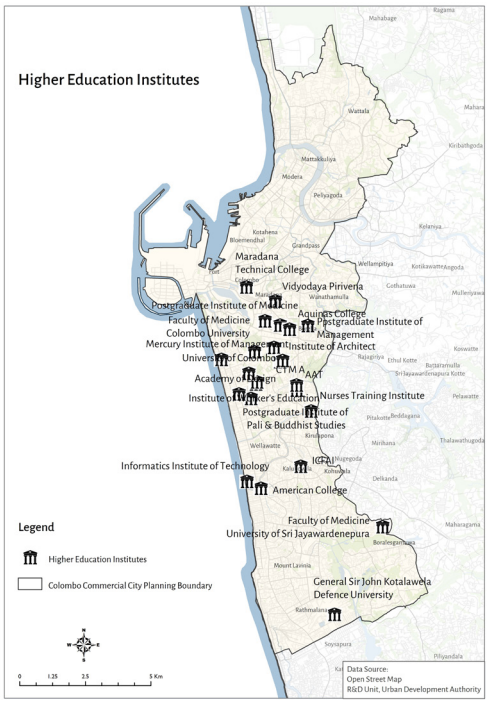

Figure 10.2: *Distribution of Higher Education Institutes within Colombo Commercial City - 2018*

Literacy rate of Colombo District is 98% which is the highest literacy rate in the country whereas the country's literacy rate is 95.7 (Census and Statistics Department, 2012) and world literacy rate is 86.0 (*ourworldindata.org, 2015*). Educated people are a great asset for a country to move forward with the fast developing countries in the world. Thus provision of quality education ensuring the equity is considered a fundamental value in the plan.

Colombo Commercial City comprises 38 National schools, 58 Provincial Schools, 48 International schools and 34 Private schools which have ensured adequate primary and secondary schools to cater the children within the city. *Colombo Commercial City* has many government and private tertiary education providing institutes like University of Colombo, University of Sri Jayawardhanepura, General Sir John Kotalawela Defence University, University of Visual and Performing Arts, British Council, National Institute of Business Management, Institute of Personnel Management, Academy of Design, etc. These higher education institutes attract not only the resident population but also majority of people from all over the country. The spatial distribution of existing schools and higher education institutes are given in Figure 10.1 and 10.2 respectively. When evaluating the future school demand to match with the future forecasted student population, it was identified that the existing number of schools is adequate to meet the demand. However, it is recommended to undertake necessary existing school/ education centre upgrading projects to increase their capacities and quality of services.

10.2.2. Hospitals

Sri Lanka is providing free health services to its citizens as a national priority since the adoption of Free Health Policy in 1951. Government has ensured the health facilities of the country by locating National and Base hospitals around the country. Colombo acts as the main health services providing city in the country having the national hospital and large number of government and private hospitals within the city. Most of these hospitals are equipped with modern health facilities to ensure effective health service provision to its citizens.

Main Government Hospitals located within *Colombo Commercial City* are;

- **National Hospital of Sri Lanka**
- **National Eye Hospital of Sri Lanka**
- **Castle Street Hospital for Women**
- **De Soysa Hospital for Women**
- **National Dental Hospital of Sri Lanka**
- **Lady Ridgeway Hospital for Children**
- **Colombo Central District Hospital - Maligawatte**
- **Colombo South Teaching Hospital – Kalubowila**
- **Ayurvedic Teaching Hospital - Borella**

However, it is recommended to carry out necessary capacity improvements of existing government hospitals and introduce few more government hospitals with considerable capacities to serve northern and southern parts of *Colombo Commercial City* in order to meet the demand for health services created by increasing population. It is also recommended that the private sector has more potential to invest for Private Hospitals within *Colombo Commercial City* in order to serve for the increasing demand.

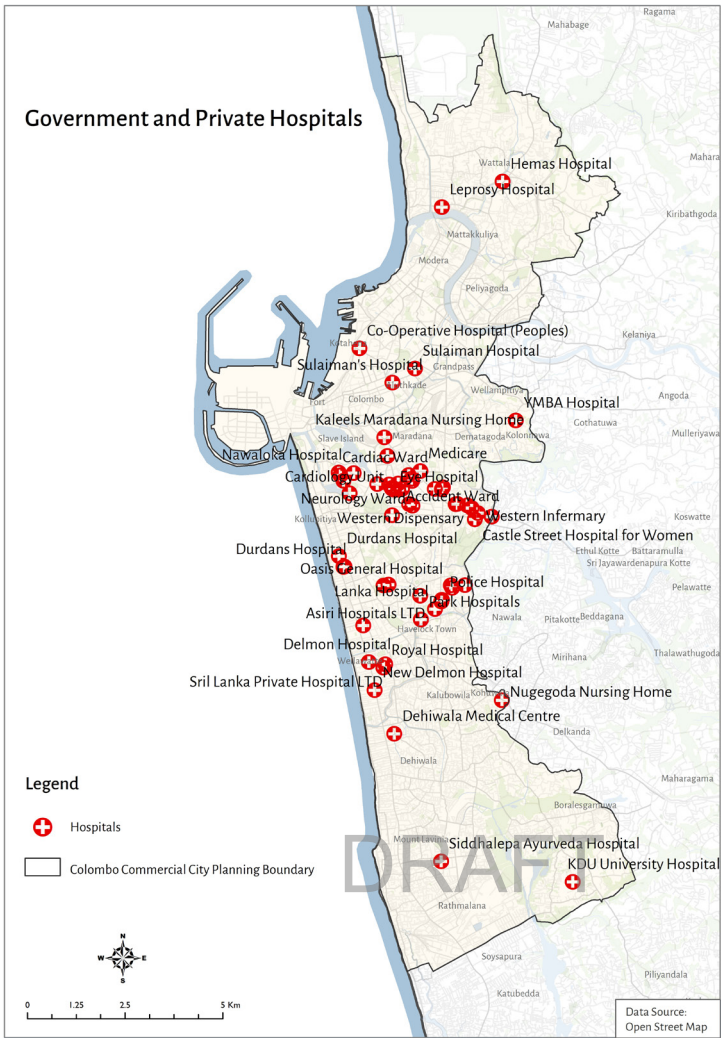

Figure 10.3: *Distribution of Hospital within Colombo Commercial City - 2018*

10.2.3. Public Markets (Project Code – U-2-1)

Figure 10.4: *Distribution of Public Markets within Colombo Commercial City - 2018*

Citizens must be provided with essential every day shopping needs within the city. These should be accessible and affordable for everyone. *Colombo Commercial City* has around 22 public markets to serve its citizens providing sufficient and variety of goods. It has been identified that with the increasing urbanization, the demand for public markets are being replaced by the demand for upcoming modern super markets and department stores. However, **CCCDP – 2019-2030** considers provision and maintaining of public markets with good quality as a mandatory requirement thus incorporates any public market construction or improvement project falling within the limits of *Colombo Commercial City* and being proposed by either UDA or any relevant Local Authority under the Project Code - U-2-1.

10.2.4. Sports and Recreational Facilities (Project Code – U-2-2)

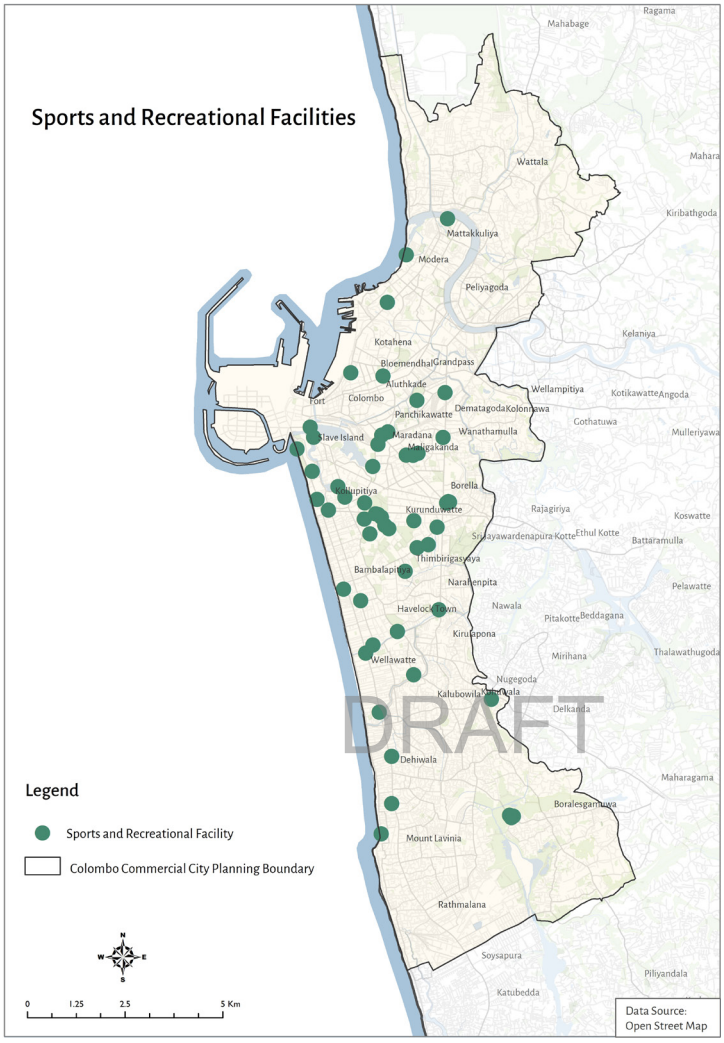

Figure 10.5: *Distribution of Sports & Recreational Facilities within Colombo Commercial City - 2018*

Provision of sports and recreation facilities improves personality and mental health of citizens which ultimately contributes positively for the growth of the city. *Colombo Commercial City* is provided with many sports facilities which are accessible for public such as swimming pools, tennis courts, stadiums, etc. For the recreation purposes, city is comprised with cinemas, art galleries, parks, playgrounds, theaters, theme parks, etc which are currently highly and effectively consumed by the public. Provision of public open spaces are elaborated in the Chapter 11 under the Public Outdoor Recreation Space Management Strategy of **CCCDP – 2019-2030**. Any project that will be proposed by UDA or any other relevant local authority related to provision of Sports & Recreation will be incorporated into **CCCDP – 2019-2030** under the project code U-2-2.

10.2.5. Public Burial Places

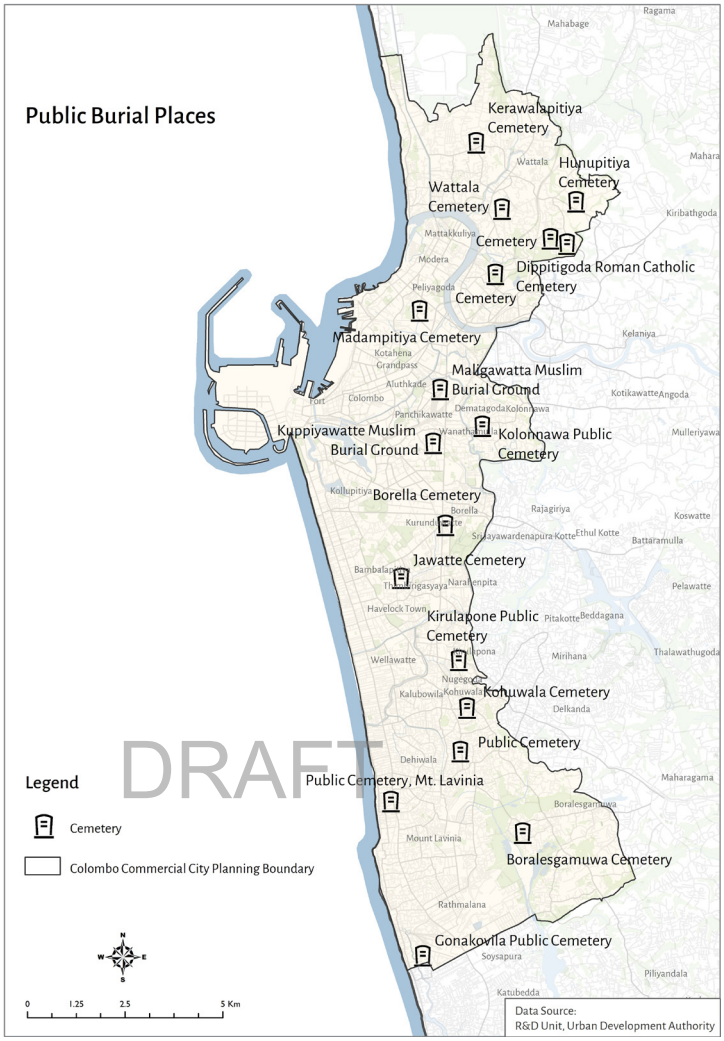

Figure 10.6: *Distribution of Public Burial Spaces within Colombo Commercial City - 2018*

Colombo Commercial City has about 18 cemeteries which is approximately 100 acres of land allocated as public burial space. Although burial space is essential for a city, with the growing demand for land in the main commercial city and as these cemeteries are located in prime locations, it has become more difficult to allocate space as burial space. Therefore, the existing burial spaces will be used in the future without allocating additional spaces. Cremation is encouraged within the city to ease the issue on burial space.

10.3. Making Convenient Nodes by providing Open Public Facilities

Colombo is the most population attracting city in the country and it is expected with nearly total of 2 million population of inhabitants and commuters in 2030. Therefore, the city should be more user friendly and comfortable for everyone.

10.3.1. Public Sanitary Facilities (Project Code – U-3-1)

Provision of public sanitary facilities is essential for a city with a frequent population flow throughout the day. Public sanitary facilities are important especially for older people, disabled people, families (especially those with babies and very young children), women, tourists and visitors. Thus, *Colombo Commercial City* Development Plan ensures public sanitary facilities are to be provided in;

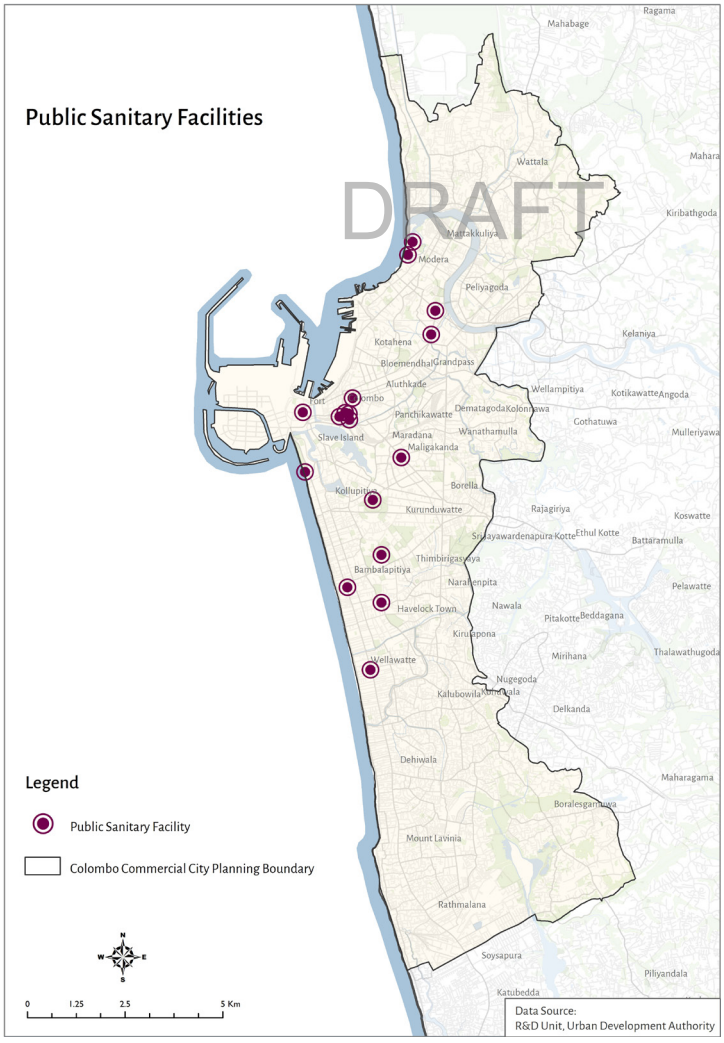

Figure 10.7: *Distribution of Public Sanitary Facilities within Colombo Commercial City - 2018*

- **All 17 nodes proposed within the city**
- **All main public transport terminals and stations and major car parks**
- **Wide range of businesses participate, including pubs, restaurants, cafes, community centers, retail stores, shopping centers and supermarkets**
- **All parks and leisure areas**

Making Convenient Nodes by providing Open Public Facilities

And following facilities are recommended to be provided within the public sanitary facilities;

Public Sanitary Facilities

- **Facilities for disabled people**
- **Baby-change facilities**

Other Public Facilities

- **Bathing areas in main transport terminals (At Pettah and Peliyagoda MMTHs)**
- **Availability through 24 hours (Facilities at MMTHs, stations, car parks, and public leisure areas)**

Further, it is recommended to display direction maps within the city for the easy identification accessibility of public sanitary facilities. In addition, it is recommended to have sound maintenance plans for each sanitary facility directly monitored by the relevant local authority to ensure cleanliness within the facilities. Any of the Sanitary Facility Improvement project undertaken by the UDA or the relevant Local Authorities are incorporated into **CCCDP – 2019-2030** under the project code U-3-1.

10.3.2. Other Public Facilities (Project Code – U-3-2)

(a) City Information Centers (Project Code – U-3-2-1)

City information centers are essential for a city attracts large number of commuters and tourists. Therefore, two city information centers are proposed at Pettah and Peliyagoda Multi Modal Transit Hubs as mentioned in the Table 10.10 as most of commuters and tourists are arriving to the city through these MMTHs.

Information Centers are proposed to be equipped with;

- **Multilingual Support**
- **General Tourist Information**
- **City Maps**
- **Information on Latest Events**
- **Information on Service Providing Institutes**
- **Free Wi-Fi**

No	Waste Water Management Project	Project Code
01	Information Centre at Pettah MMTH	U-3-2-1-1
02	Information Centre at Peliyagoda MMTH	U-3-2-1-2

Table 10.10: *Proposed City Information Centres within Colombo Commercial City - 2030*

(b) Direction Maps (Project Code – U-3-2-2)

Currently only few Direction Maps are displayed within the city. Colombo being one of the busiest and complex city, more direction maps are proposed to be displayed at following locations for the public convenience under the project code U-3-2-2.

- All 17 Nodes
- All main public transport terminals, bus stops, stations and major car parks
- All parks and leisure areas

(c) Seating Areas (Project Code – U-3-2-3)

Colombo Commercial City is used by many population categories; older people, disabled people, families and tourists, etc. These people should be provided with seating areas where they can relax and have a pause between their journeys. Although there are some seating areas provided in the city, those are not sufficient to cater the large population flow. Thus, public seating areas are proposed to be provided at all main public transport terminals and stations and all parks and leisure areas under the project code U-3-2-3.

Introducing Smart Facilities

10.4. Introducing Smart Facilities (Project Code – U-3-3)

A smart city is a highly developed, innovative, environment-friendly city which incorporates relevant aspects of the economy, technology, mobility, quality of life and other aspects that contribute to the well-being of its residents. It is a high-tech intensive city that connects people, information, and city elements using new technologies and infrastructure to create a sustainable, greener city, competitive and innovative economy, and an enhanced life quality (Tahir & Malek, 2016).

Figure 10.8: *Proposed Smart City Concept*

Being the country's one of the well-developed cities, most of the people within the city have relatively high rates of computer and digital literacy rates. Colombo District indicates 48.9% computer literacy rate which is the highest among other districts while the country's literacy rate is 28.3% (Department of Census and Statistics, 2017 *(during 1st 6 months)*). According to the percentage distribution of Internet and E-mail using household population (aged 5 – 69 years), 44.6% use internet while 26.3% use emails in Colombo District (Department of Census and Statistics, 2017 (during 1st 6 months)) which are the highest percentages among other districts. Therefore, there is a high potential to develop the city with technology to improve and ease the lives of inhabitants and commuters.

Smart concept can be associated with areas such as energy, transportation, mobility, parking, infrastructure, waste management, lighting, healthcare, security, construction, communication, etc. As an initiative *Colombo Commercial City Development Plan – 2019-2030* proposes to integrate smart concept into transportation, street lighting and waste management in the city.

10.4.1. Smart Transportation (Project Code – U-3-3-1)

City transportation is an important pillar in a city. Technology can ensure convenient and effective transportation of goods and people and reduce traffic congestion through effective public travel management. Also it can improve reliability of public transportation network by providing easy access to information on arrivals/departures/route information for travelers for a smooth journey. It will also reduce pollution, road accidents ensuring safety and promoting a healthier life.

Figure 10.9: *Proposed Smart Transportation Concept*

It is proposed to introduce Smart Transportation System within *Colombo Commercial City* under the project code – U-3-3-1. Following features are proposed to the Smart Transportation System of the city by *Colombo Commercial City* Development Plan.

- Interactive journey planner for all modes
- Automated Vehicle Location System
- Automated Fare Collection System
- Intelligent Signaling System
- Real Time Monitoring System
- Passenger Information Display

10.4.2. Smart Street Lighting (Project Code – U-3-3-2)

Street lights improves security and safety of people and vehicle users and also it helps for a smooth traffic flow. Use of smart street lighting can reduce the cost and electricity consumption. Intelligent lighting system can dim the lights on streets when there's no traffic and pedestrians. Also street lights can be used with solar powered lights. Smart lighting systems can be equipped with central management software that tracks usage and leads to maintenance efficiency. The surveillance cameras attached to light posts can be used for traffic monitoring and security enhancement of the city.

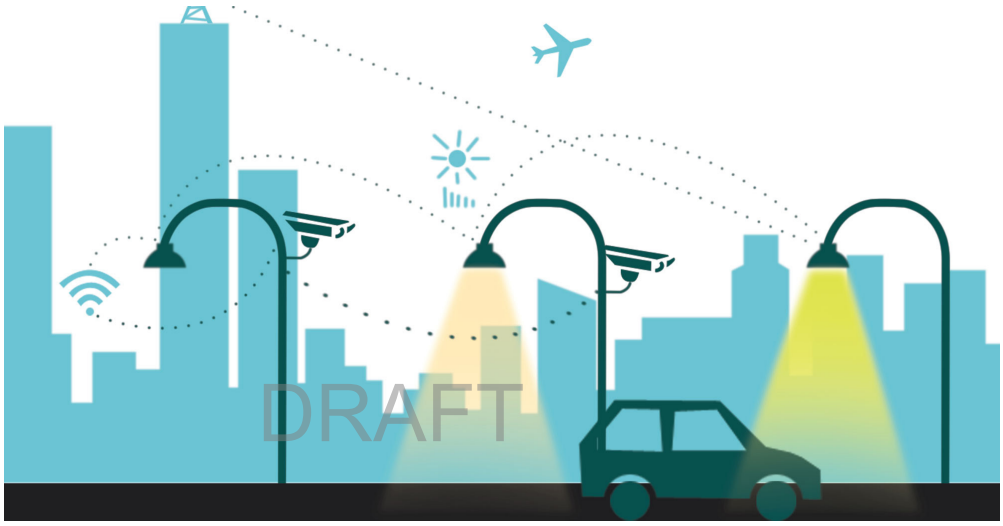

Figure 10.10: *Conceptual Image of Smart Street Lighting*

Therefore, it is proposed to introduce Smart Street Lighting within *Colombo Commercial City* under the Project Code – U-3-3-2. Features to be incorporated for the Smart Street Lighting System of the City are;

- **Energy Efficient Lights**
- **Street Light Control (On/ Off/ Dimming)**
- **Wi-Fi**
- **Traffic Monitoring**
- **Enhance Security**

10.4.3. Smart Waste Management (Project Code – U-3-3-3)

Waste Management has become a major issue in the city. This can be critically monitored in most of the public gathering places in several locations of *Colombo Commercial City* which has contributed for the pollution of natural environment and bad odor. The main issue for this is the improper solid waste management system of the city.

Colombo Commercial City Development Plan propose installing sensors inside the bins which are kept at MMTHs and all major parks and leisure areas, which would help in monitoring the levels of trash in each bin. Then the bins can be emptied only when they are full without following the standardized process to collect the waste bins frequently. When the bins are full, the respective local authority and the collecting vehicles will get notifications through the sensors where they can empty the bins. It is proposed to introduce Smart Waste Management within *Colombo Commercial City* under the project code – U-3-3-3.

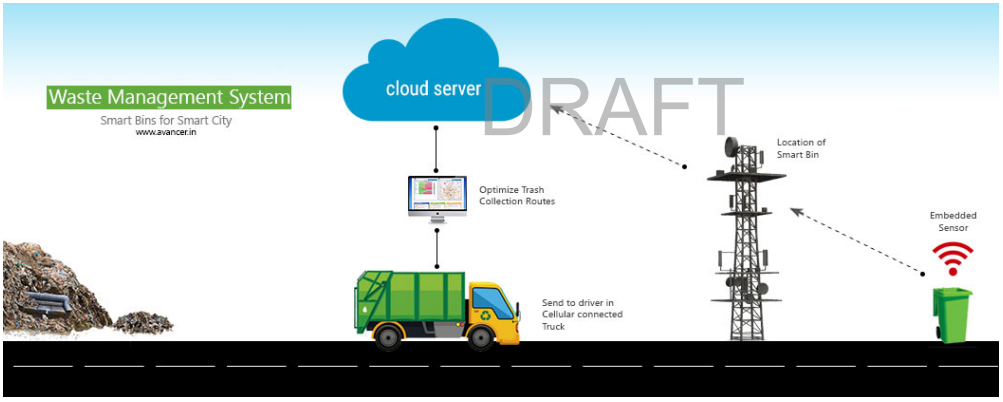

Figure 10.11: *Proposed Smart Waste Management Concept*