ANNEXURE 3

NDMC

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3.1 NDMC City Profile (REF: Section A – Question 1)

- The administrative responsibilities of the National Capital Territory of Delhi (NCT) are shared by five local bodies:

- New Delhi Municipal Council (NDMC) is responsible for the NDMC area
- NDMC area covers 43.7 km²
- NDMC is governed by a council, which currently includes the Chief Minister of Delhi, being the MLA of New Delhi Legislative Assembly
- 48 % green cover against Delhi's 21 %
- The NDMC is also known as Lutyen's Delhi and has historically been the seat of power of Union of India.
- Density of resident population is 7000 persons per sq. km
- Resident population 0.3 Million
- Floating population during day time 1.6 Million

3.2 Recent Smart Projects undertaken by NDMC (REF: Section A – Question 1)

3.2.1 AREA- BASED PROJECTS

3.2.1.1 Redevelopment of Connaught Place

The 100 years old Central Business District: Connaught Place is the main business hub. NDMC undertook redevelopment of Connaught Place at a cost of approximately Rs.671 Crores for restoration of façade, retrofitting and surface development, Utility Duct - 7 X 7mtr in the middle circle measuring 1.2 KM in length, including two subways.

3.2.1.2 Construction of automated Multilevel Parking.

One automated Multi Level Parking at BKS Marg with capacity of 1404 ECS and another at Sarojini Nagar Market with 824 ECS were developed under PPP mode and are fully functional. Another Multilevel Parking at Shivaji Stadium with capacity of 731 ECS were constructed.

3.2.1.3 Parking Automation

Modernize parking lots, to provide better facilities to people. Installed boom barriers, entry and exit terminals, vacancy display boards at 17 parking lots. At the remaining 77 parking lots, deployed handheld terminals with GPRS and contactless smart card reader/writer for issuing parking tickets.

Centralized parking database helps in disseminating real-time parking availability position to public and giving inputs on effective traffic and parking planning in the NDMC areas.

Mobile app - POOCHO developed, which can help citizen to locate a vacant parking space & guide it through the traffic to reach it.

3.2.1.4 Municipal Solid Waste Management- Door to Door collection.

NDMC generates about 325 TPD of MSW. About 300 Metric Ton is sent to Waste to Energy Plant Okhla and rest to decentralized composting pits.

100% House to House collection of Municipal Waste is being done through a concessionaire. For implementation it has deployed 26 Auto Tippers and 15 Mechanical Compactors with GPS monitoring system.

3.2.1.5 Construction of Public Toilet Units.

245 PTUs are being maintained by NDMC on PPP basis. Service is provided free of charge to citizens.

3.2.1.6 Waste to Energy Plant

NDMC is in the process of establishing a decentralized compact Waste to Energy Plant under PPP Model based on hybrid gasification techniques. Plant is being set up on 1000 sq. m. area with 70 TID capacity and will generate 1.4 MW energy.

3.2.1.7 Solar City Project

NDMC has been declared Solar City by the Ministry of Non-Renewable Energy (MNRE). Solar Panel on NDMC owned roofs with 4MW expected power generation has been awarded through an open tender. Plant implementation has already been started.

3.2.1.8 City wide Wi-Fi

Undertaken pilot projects at Connaught Place and Khan Market for providing 20 minutes of free Wi-Fi and which are operational.

3.2.1.9 Smart living and Happiness enhancement

NDMC has been organizing Rahagiri each Sunday between 6.00 AM to 9.00 AM from July to December, in Connaught Place with the objective of promoting culture of physical fitness & non-motorized activities and community unions.

NDMC has established open gymnasiums at 33 locations which are accessible to all citizens free of cost.

3.2.2 PAN CITY PROJECTS

3.2.2.1 Online services provided to citizens

Electricity and water connection applications, Barat Ghar Booking, Property Tax, Vendor payment status, Printing of various forms, Hospital data of Birth & Death, Building Plan Approval- advance stage, Unauthorized construction complaints, General Complaints and grievances, Area inspections reports – Zonal Officer Observation and Monitoring System (ZOOM) and e-payments for Electricity, Water and Tax bills.

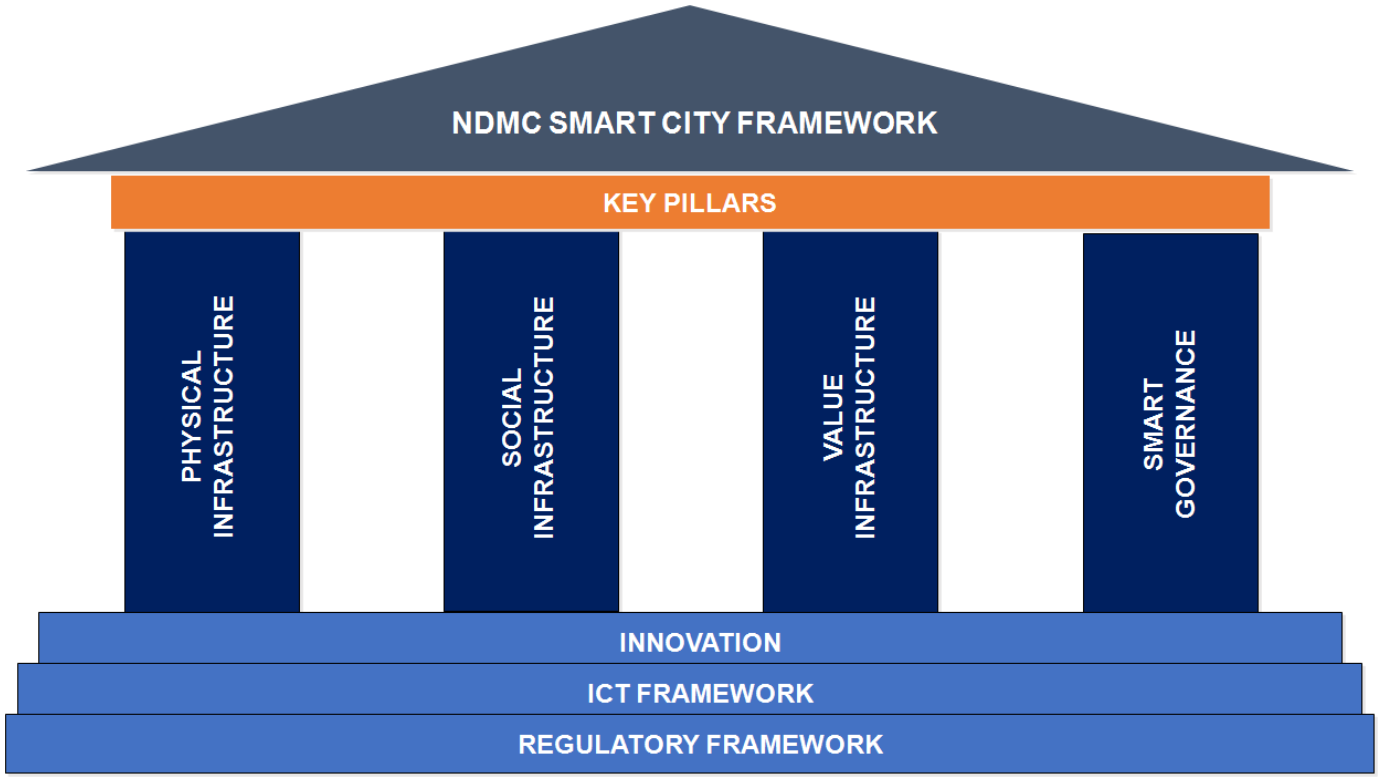
3.2.2.2 Mobile Apps for citizens to register complaints - launched in Nov. 2014

Mobile App for citizen grievance management system for Android and IOS users. The App – NDMC PLEASE FIX is a photograph snapping application directly received at the NDMC control room from where it is communicated to the field staff for action. The complaint gets automatic acknowledgment and complaint registration number also. Citizen can lodge complaints of road damage, garbage, water logging, fire, sewerage maintenance etc.

3.2.2.3 Bio-Metric attendance System

NDMC has installed Bio-Metric Machines – Fixed and GPRS Based mobile device for recording / monitoring the attendance of its employees.

3.3 Smart City Framework (REF: Section A – Question 4)



3.4 NDMC Smart City Vision Development (REF: Section A – Question 5)

Smart City Framework → **Vision & Sub-Goals Creation**

- **Urban mobility** – Enhanced access to sustainable public transport, smart parking, non-motorized vehicles (NMVs) and last mile connectivity
- **Inclusive city** – Address the needs of the most vulnerable citizens including women, children, disabled and transgender individuals
- **City planning and design** – Improved quality of life through citizen focus planning
- **Social development** – Focus on improved education and healthcare through incorporation of ICT
- **World's capital** – Setting global standards to meet citizens aspirations

NDMC Smart City Framework			
Physical Infrastructure	**Social Infrastructure**	**Value Infrastructure**	**SMART Governance**
Sanitation	Education	Mixed Use Development	Intelligent Government Services
Underground Electric Wiring	Public Open Spaces	Air Quality	Citizen Participation
Waste Management	Energy Efficiency	Safety and Security	IT Connectivity
Housing	Health	Identity and Culture	
Water Supply	Economy and Employment		
Water Management			
Waste Water Management			
Compact City			
Transportation			
Walkability			
Energy Supply			
Energy Source			
ICT Framework			
INNOVATION			
Regulatory Framework			

"To be the Global Benchmark for a Capital City" — *Vision*

- Physical Infrastructure
- Social Infrastructure
- Value Infrastructure
- SMART Governance

Sub-Goals

Enabled by :
- ICT Framework
- Innovation
- Regulatory Framework

3.5 Citizen Engagement (REF: Section A – Question 6, 21 & 22)

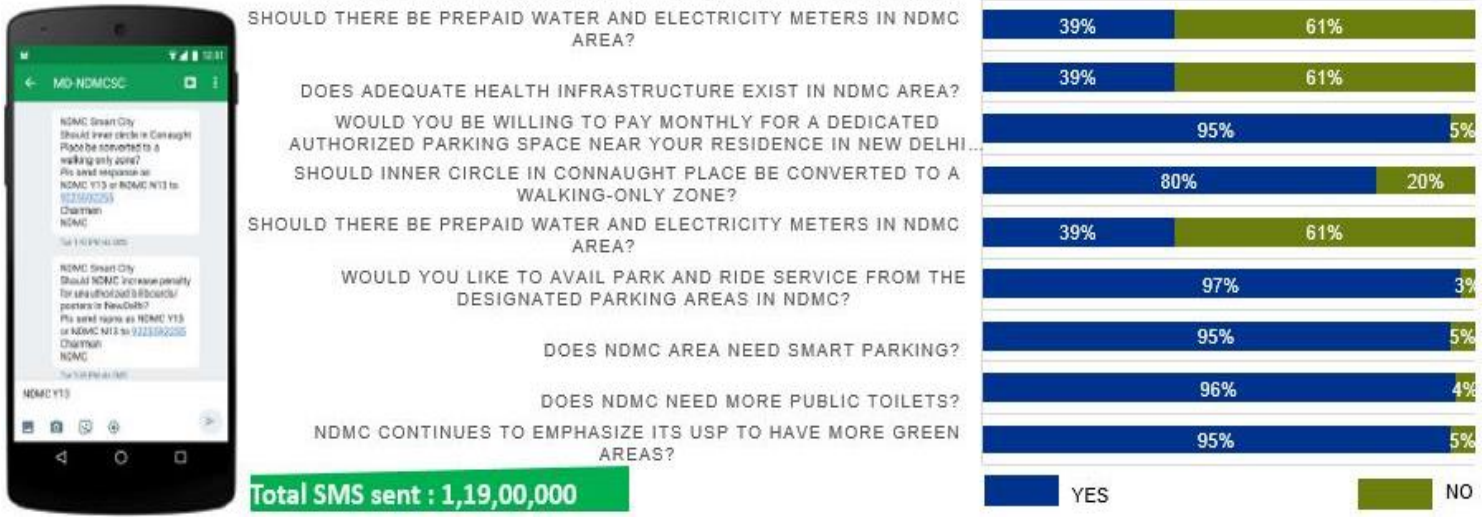
Citizen Consultation	Touch points
a) Face-to-face consultations	5250
Embassies	40
JJ Cluster	5000
Resident Welfare Association (RWA)	100
Women Associations	60
Hotel Associations	50
b) Online crowd-sourcing	3070
myGOV	1041
Social Media	2030
c) Mobile Polling	1,08,00,000

3.5.1 Face to Face Stakeholder Consultation

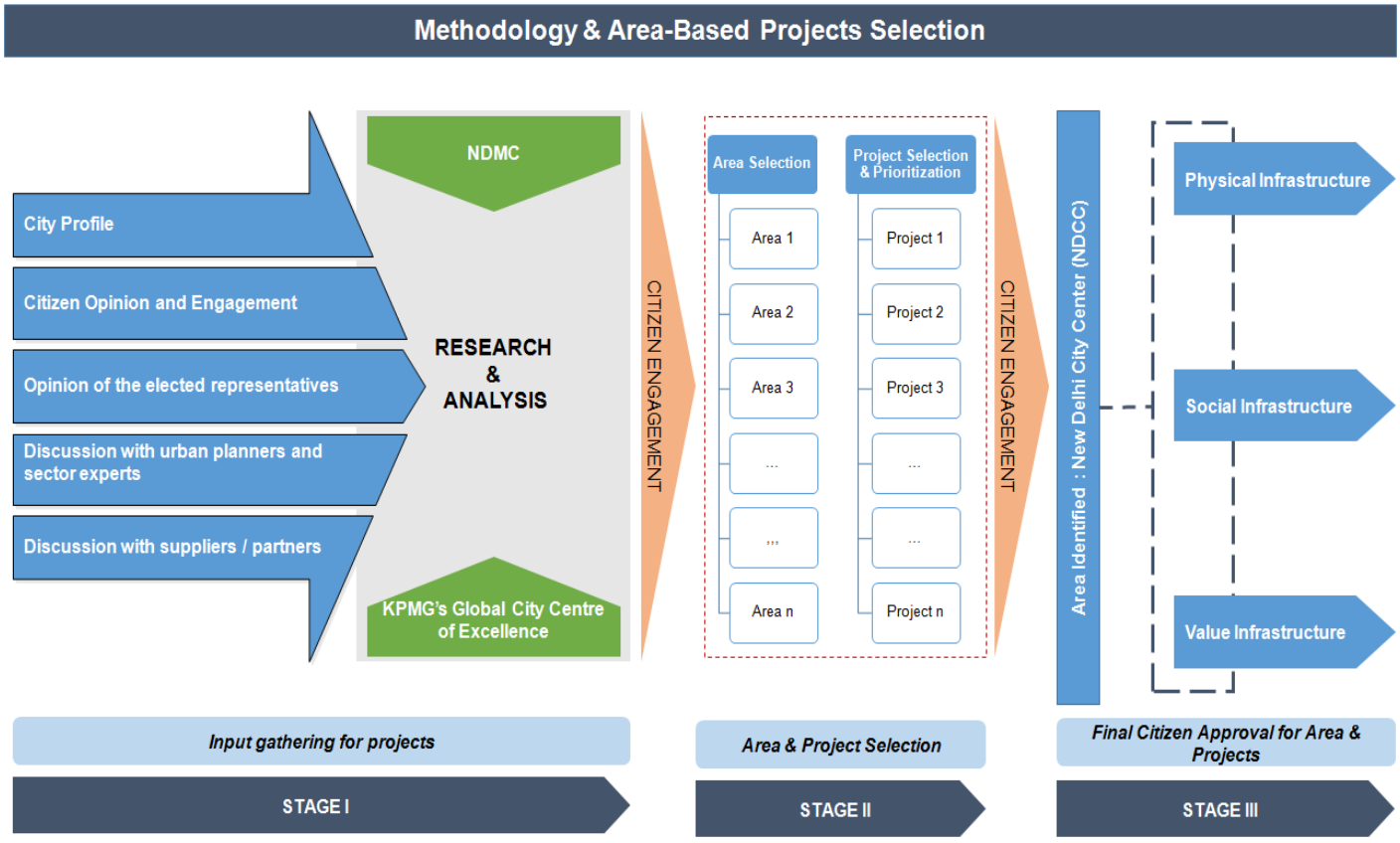
3.5.2 On-line Consultations

Landing portal for Smart New Delhi: www.smartnewdelhi.in

3.5.3 Consultations through Mobile Phones



3.6 Methodology – Area-Based Project Selection (REF: Section B – Question 10)



Area-based projects emerging from methodology

1. Urban Mobility & Smart Parking
2. Sensor based Common Service Utility Duct
3. Transformation of electric-Poles into Smart Poles
4. Hierarchical Command and Control Centre
5. Rooftop Solar Panels (Renewable Energy)
6. Happiness area for the cultural and social needs of citizens
7. Transforming sub-ways into vibrant spaces
8. Signature Giant Smart Digital Screen
9. Municipal Solid Waste Management

1. Transforming Public Toilets into Smart Public Amenities Centre
2. Financial, Identity, Ticketing & Access inclusion

1. Introducing signature initiative to the city's Identity and Culture
2. Behavioural transformation

3.7 Rationale for the selection of NDCC area (REF: Section B –Question 10)

The criteria for selecting the area for proposing of area based projects was mainly based on the stakeholder consultations, desk research, features to serve the larger community and inherent

capabilities for implementation of integrated projects. On the basis of such criteria, three areas were placed for selection namely, Chanakyapuri, Sarojini Nagar, New Delhi City Centre (**NDCC**) area.

The New Delhi City Centre (NDCC), consisting of Connaught Place and contiguous surrounding areas of approx. 550 acres, has been selected for undertaking the retrofitting model of development and the underlying need to transform the area as a 'World Class' Urban Area based on stakeholder consultations and desk research.

The following features have been considered for finalizing the NDCC area:

i) Important markets such as Connaught Place (CBD), Bengali Market, Janpath, Gole Market & State Emporiums.

ii) Jantar Mantar and Agrasen Ki Baoli, Free Cathedral Church, Sacred Cathedral Church and Connaught Place are the heritage important places and first two are protected monuments.

iii) Foreign Embassies / Mission offices as Nepal Embassy, British Council, Max Muller Bhawan, Iran Embassy, Soviet Cultural centre and American library are existed in the area.

iv) Large public space as Connaught Place, State Emporia, Baba Kharak Singh Marg, Janpath and Mandi House Hub of recreation centre are situated in the area with seamless connectivity with public and private transport.

v) Public transports as Metro stations - Mega Terminal Rajeev Chowk, Mandi House & Barakhamba and DTC Bus Terminal - Shivaji Stadium and 14 no. BQS are existed and are connected with Markets, Public Plaza.

vi) Central Park Connaught Place, Hanuman Lane Park, Palika Bazar/ Parking Parks etc.

vii) Religious places such as Prachin Hanuman Mandir, Churches (Sacred Cathedral & Free Cathedral), Mosques (Aulia Mosque, Irwin Mosque) and Gurudwara Bangla Sahib.

viii) Five Star Hotels – The Imperial, The Janpath, The Lalit, The Park and The Metropolitan are existed along with famous restaurants – Coffee Home, Alka, My bar, BoomBox, The Vault etc.

ix) Major Multistorey Private & Public / Govt. Offices such as – Palika Kendra, Bank of Baroda, State Bank of India, Allahabad Bank, Gopal Dass Building, FICCI, Doordarshan Bhawan, Statesman House, Scindhia House, DMRC Bhawan etc.

3.8 ICT Architecture (REF: Section C – Question 20)

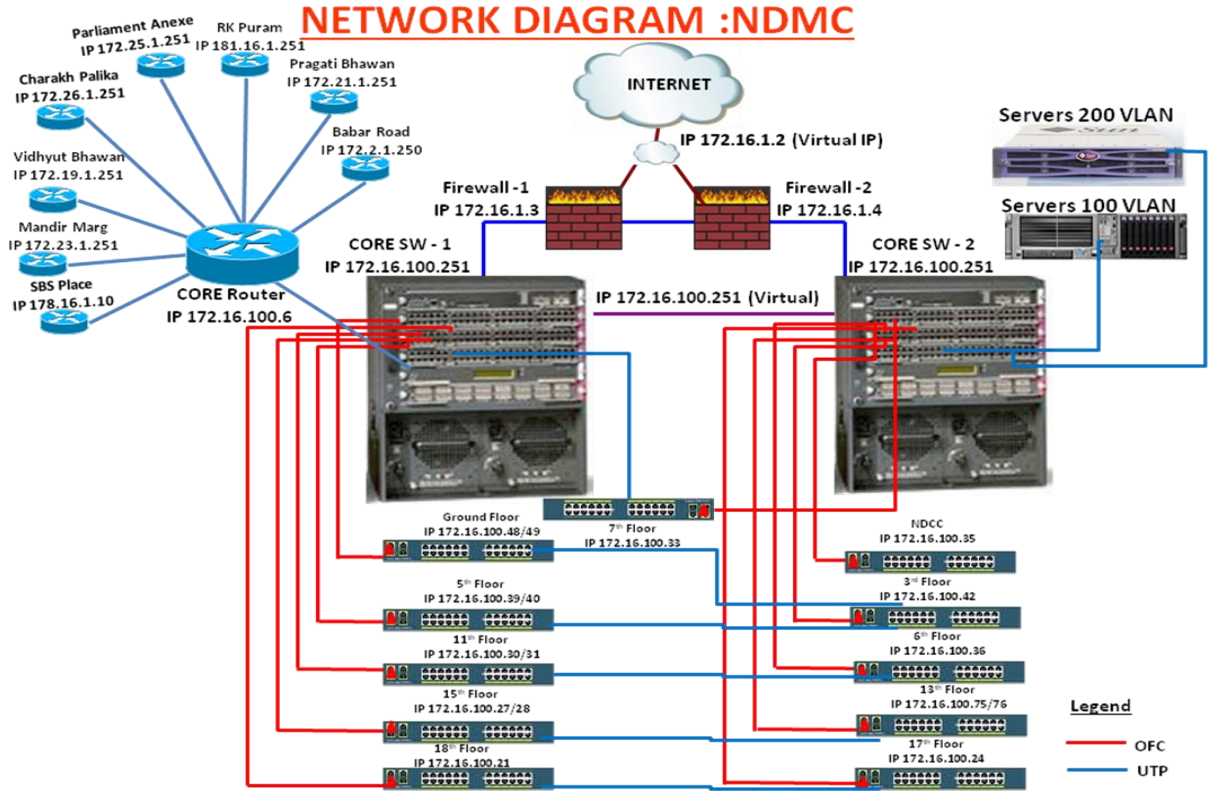
New Delhi Municipal Corporation (NDMC) aims to implement a high quality, efficient ICT-supported hybrid platform to simplify hosting, enablement and access to an umbrella services for its smart city initiative.

Current Physical Infrastructure

New Delhi Municipal Council has own Data Centre established in year 2004, with following hardware infrastructure:

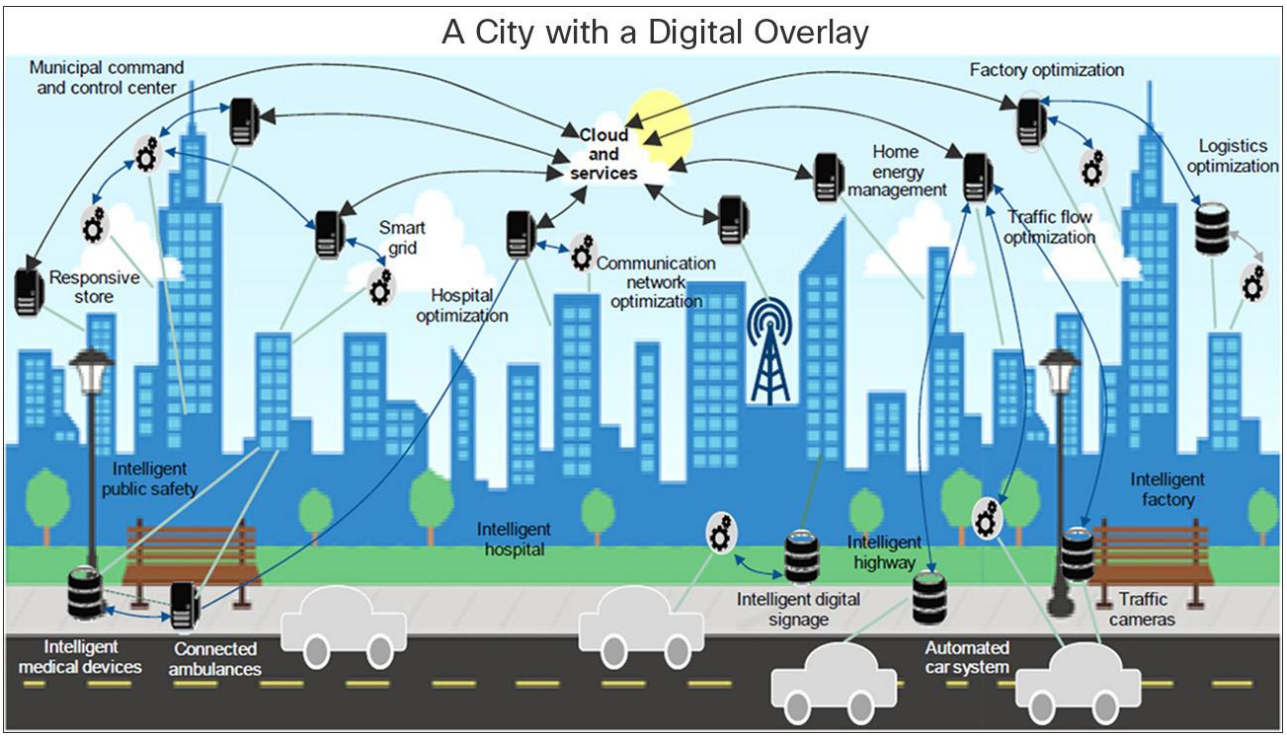
- **Servers**: NDMC Data Centre has 23 physical blade servers which are running in virtual environment through which 40 applications with databases are running.
- **Storage**: There are two enterprise level SAN Storage (60 TB each) which is connected with all the servers through fiber.
- **Cloud Infrastructure**: NDMC has server level virtualization cum cloud environment which is used for optimum utilizations of server resources on the basis of requirement of Applications/Databases, i.e. demand computing.

- **Network Infrastructure**: NDMC has enterprise network which is the backbone for communication between computers and related devices across Departments, 11 Citizen Facilitation Center (CFC's) and Remote offices for facilitating service delivery to the Citizens of NDMC. Data Centre of NDMC has State of Art enterprise networking solutions i.e. Core Switches, Firewalls and Layer-2 Switches which are providing uninterrupted online facilities to Citizens of NDMC. NDMC has 2 dedicated internet lease lines with a speed of 120mbps and 14 P2P lines connecting remote offices with the CFC's.



The NDMC's network is designed and configured to deliver high performance and reliability to meet the needs of the operations while providing a high degree of access controls and range of privilege restrictions.

NDMC's ICT Infrastructure Plan for Smart City

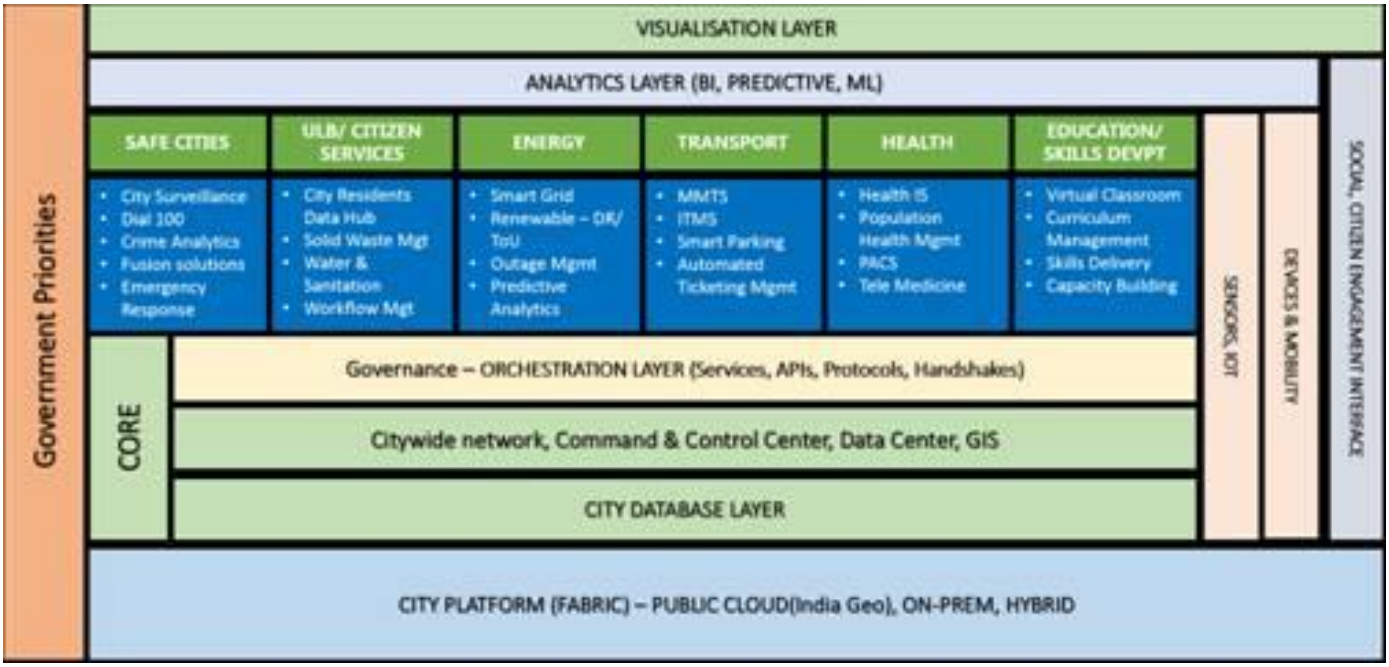


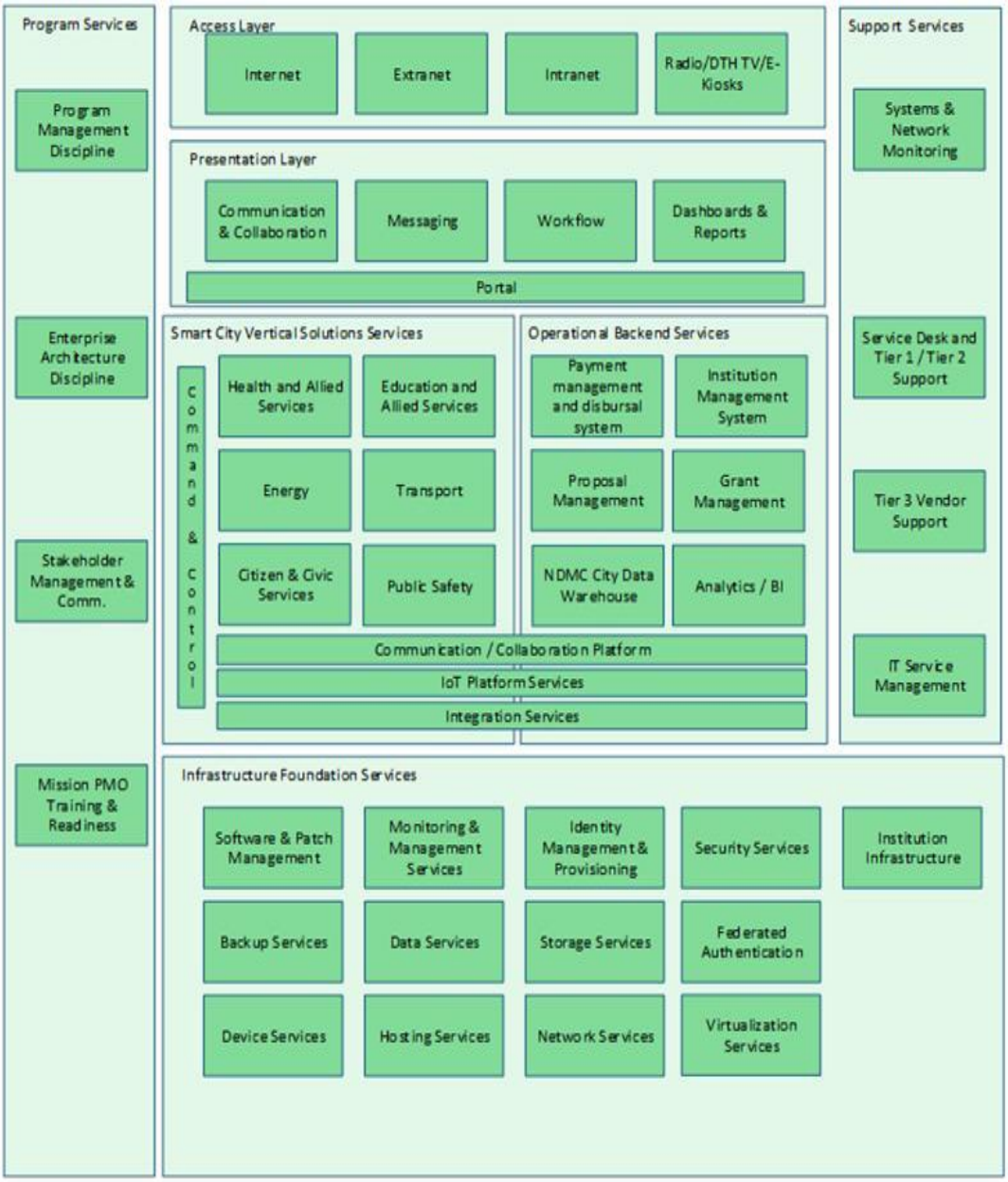
The key value driver will be as below:

- **Employee productivity**: Mobile collaboration tools drive a productivity improvement of multi fold a year for each knowledge worker. Worldwide studies show that proper utilization of 10 video cameras can free up one policeman to concentrate on more immediate tasks at hand.
- **Reduced costs**: Use of smart infrastructure like Smart LED lighting and Smart Electricity metering can significantly reduce total cost of operations and can save considerable amount of money for the City administration. NDMC plans to use public cloud with ISO 27018 - Security & Privacy standard for Smart Cities.
- **Citizen Experience**: Citizen experience is one the most important factor driving a smart city infrastructure. E.g. faster traffic flow, shorter online search times, more efficient healthcare, and cleaner air owing to increased monitoring and analysis of particulate matter. More specifically, smart scheduling of transport vehicles as well as providing information back to citizens can improve city transport services and can provide an overall smart experience to the citizens. Safety of citizens is of another importance where a unified roadside infrastructure can provide a tight integrated system providing video surveillance, Smart Lighting as well and traffic monitoring. It is possible to reduce crime rate by implementing smart lighting that can be used to lit up an area based on various factors e.g. situation, time of day, etc.
- **Increased revenue**: While all the smart infrastructure provide a much better experience and an integrated platform for monitoring city infrastructure, it is worthwhile to note that most of these infrastructure has a very strong revenue generation capability e.g. Using Kiosks for Ad promotions, Smart parking can actually provide better management and more number of parking thus generating more revenue.

Smart Connected City

City Platform Framework





Layer	Capability	Description
Infrastructure Services	Software & Patch Management	Providing central software and patch management to the virtual machines, desktops, laptops and mobile devices deployed in the environment.
Infrastructure Services	Monitoring & Management Services	Providing the capability of monitoring of the environment, including all server systems and applications deployed within the production environment.
Infrastructure Services	Identify Management & Provisioning	Providing identity management and provisioning services to automatically provision and manage user identities of administrative staff, citizens and service providers, including automated (based on data from the integration services when implemented) creation and disabling of user accounts and group memberships and self-service resetting of passwords.
Infrastructure Services	Security Services	Providing data, application and host protection services including endpoint protection as well as regulating access to and from the internet and ensuring privacy of data.
Infrastructure Services	Backup Services	Providing backup and restore services to systems deployed within the NDMC platform environment as well as the user data that exist within the various data stores.
Infrastructure Services	Data Services	Providing Data Service to different components of the solution that require these. For example, the data retrieval and Operations and Reporting systems.
Infrastructure Services	Storage Services	Providing File Services to centrally store documents and other data that is automatically backed up and protected.
Infrastructure Services	Virtualisation Services	Providing a virtualization environment within the central data centre to host the products as specified within the project objectives of this proposal.
Infrastructure Services	Access Services	Provide citizen with access services that allows access to the portal and other NDMC services, including their personal data, e-content, e-assessment from out and in-side the smart city area premises (anywhere and anytime).
Infrastructure Services	Hosting service	Providing institutions and various stakeholders and program partners access to infrastructure with connectivity, devices and any other accessories to host mission services continuously or for a scheduled duration on public cloud with financially backed SLAs.
Infrastructure Services	Federated Authentication	Providing authentication services that span credentials stored in NDMC identity system or a partner institution identity system that implements federation.
Infrastructure Services	Institution Infrastructure	Providing connectivity, compute and storage (where needed) for administrative staff and agency staff to host allied services that connect to NDMC platform.
Infrastructure Services	Data Centre Services	Providing state-of-the-art Data Centre Services, including Data Centre Building, Networking, Storage and Operations Systems seamlessly integrating with public cloud to host the services and solutions envisioned for India NDMC initiative.
Infrastructure Services	Search and Indexing Services	Providing indexing capability for all text, audio and video digital content stored in NDMC Platform and partner systems along with contextual search capabilities
Operational Backend Services	Payment Management and disbursal system	Providing automated payment services for the mission programs to institutions (for fund disbursal of research programs), citizens (for automated settlement and tracking) and service providers (for various mission program incentives).
Operational Backend Services	Institution Management System	Providing a complete solution to cater for the administrative needs of the various smart city mission agencies and departments, including: ▪ Records Management ▪ Project Management ▪ Staff/Institution - citizen Identity Mapping and Management
Operational Backend Services	Proposal Management	Providing a complete proposal Management solution, to publish proposals, manage applications, selection and approval of applications and program manage the tasks.
Operational Backend Services	Grant Management	Providing a comprehensive solution to plan and disburse grants to various institutions/agencies for various mission programs and report/track/analyse grant effectiveness
Operational Backend Services	NDMC City Data Warehouse	Providing a single data repository independent from operational systems supporting in-memory processing capabilities to collect, process, maintain and disseminate core mission services and system data and information on all participating institutions/agencies, stakeholders and citizens.
Operational Backend Services	Analytics / BI	Providing Analytics and Business Intelligence enabling Machine Learning and Sentiment Analysis capabilities on top of the NDMC City Data Warehouse provide users individual reports and administration with insights, reports and dashboards to enable strategic planning and decision making.
Smart City Vertical Solution Services	Public Safety	Providing a comprehensive solution for public safety needs of city with the ability for police, citizens and allied security agencies in NDMC area to provide, track and collaborate on providing services related to safety of citizens and assets in the city.
Smart City Vertical Solution Services	Citizen and Civic Services	Providing a comprehensive solution to access and act on citizen and civic service capabilities like waste management, sanitation, utility services like water, drainage, street upkeep, etc. hosted on public Cloud.
Smart City Vertical Solution Services	Health and Allied Services	Providing an extensible solution for healthcare needs of city with the ability for all health service providers and care providers to participate in healthcare activities in a coordinated fashion.
Smart City Vertical Solution Services	Education and Allied Services	Providing an extensible solution for educational needs of city with the ability for all schools and higher education institutions in NDMC area to provide, track and collaborate on providing outcome-based Citizen services including social Citizen.

NDMC High Priority Capabilities Requirement

The capabilities identified represent the high priority capabilities needed to build the smart city platform and host the form factor agnostic services:

Layer	Capability	Description
Smart City Vertical Solution Services	Energy Services	Providing an extensible solution for integrated energy needs of city with the ability for service providers, citizens and energy management agencies in NDMC area to provide, track and collaborate on providing efficient energy services to citizens and businesses.
Smart City Vertical Solution Services	Transportation Services	Providing an extensible solution for integrated transportation needs of city with the ability for police, public transport service providers, citizens and traffic management agencies in NDMC area to provide, track and collaborate on providing efficient transportation services to citizens.
Smart City Vertical Solution Services	Command and Control Services	Providing a secure, near real-time platform for the mission program office to monitor programs and services related to all mission activities. It shall address: citizen voice, hospital systems, education systems, pollution sensors, traffic situation, surveillance cameras, weather information and resilience plan that ensures NDMC infrastructure in available for National Disaster Management Authority (NDMA) and National Disaster Response Force (NDRF).
Presentation Layer	Communication & Collaboration	Presenting Enterprise level VoIP enabled communication and collaboration systems to the end user with Presence, White boarding, Polling & desktop sharing.
Presentation Layer	Messaging	Providing a middleware messaging system to allow inter-application or service communication.
Presentation Layer	Workflow	Presenting workflows to the end user.
Presentation Layer	Dashboards & Reports	Presenting dashboards and reports to the end user with Self service capabilities using regular MS Office tools.
Presentation Layer	Portal	Providing framework and tools for hosting various features of the mission program as standardized forms, workflows, collaboration and communication tools and dashboards and reports. Portal broadly contains: 1) Content hosted by portal accessed in open section where content is accessed primarily through search metaphor 2) Content hosted by portal and accessed by registered authenticated users with personalized dashboards and widgets as the primary content access method. Content created using Drag and Drop functionality with real-time co-editing by multiple creators. 3) Sites and content from other participating institutions presented and made available through integration layer with a well-defined open standard(like OPENXML based)
Access Layer	Internet	Providing access to the systems and services over the internet, for example for any citizen to access any city or civic-service related information through the internet.
Access Layer	Extranet	Providing access to the systems and services over the extranet, for example connect the nodal agencies that enable smart city services through VPN or other means.
Access Layer	Intranet	Providing access to the systems and services over the internet, for example within the NDMC program office to securely access and maintain draft information before it is published to public domain.
Support Services	Systems & Network Monitoring	Providing monitoring of IT systems, including the network, servers, applications and services.
Support Services	Service Desk and Tier 1 / 2 Support	Providing service desk and Tier 1 and Tier 2 support for the services provided to the citizen, agencies and institutions.
Support Services	Tier 3 Vendor Support	Providing Tier 3 support through the vendor to address incidents and problems that need intervention of the vendor.
Support Services	IT Service Management	IT Service Management is the discipline to manage and operate IT systems, including the following processes: Incident and Problem Management Configuration and Capacity Management Change Management Service Provisioning and Reporting IT Service Management is a mature practice following standard frameworks like the Information Technology Infrastructure Library (ITIL).
Program Services	Enterprise Architecture Discipline	Providing guidance on the overarching enterprise architecture for the infrastructure and application systems and services for the NDMC mission initiative and program(s). Ensure the alignment of the architecture to business needs. Providing technical advisory input into tendering and tender review process. Performing quality assurance, including scheduling design reviews and business/technical walkthroughs.
Program Services	Stakeholder Management & Communication	Developing an overall communication strategy to ensure that consistent and controlled messages are provided for the NDMC programs and initiatives to all stakeholders.
Program Services	Training & Readiness	Assessing the training and readiness requirements of the NDMC programs and initiatives to build and implement a readiness roadmap.

3.9 Rainwater Harvesting: Pan-City Project Selection (REF: Section C-Question 20)

1. Details of existing and proposed Rain Water Harvesting (RWH) Pits

Sl. No.	Division	Nos. of Existing RWH Pits	No. of Proposed RWH Pits
1	R-I (Roads & Parks)	40	—
2	R-II (Roads & Parks)	39	—
3	R-III (Roads & Parks)	11	20
4	R-IV (Roads & Parks)	31	37
5.	R-V (Roads & Parks)	17	41
6.	CP (Roads & Parks)	2	—
7.	Building Maintenance (School and Community Centers and Residential Complex)	50	—
	TOTAL	***190***	***98***

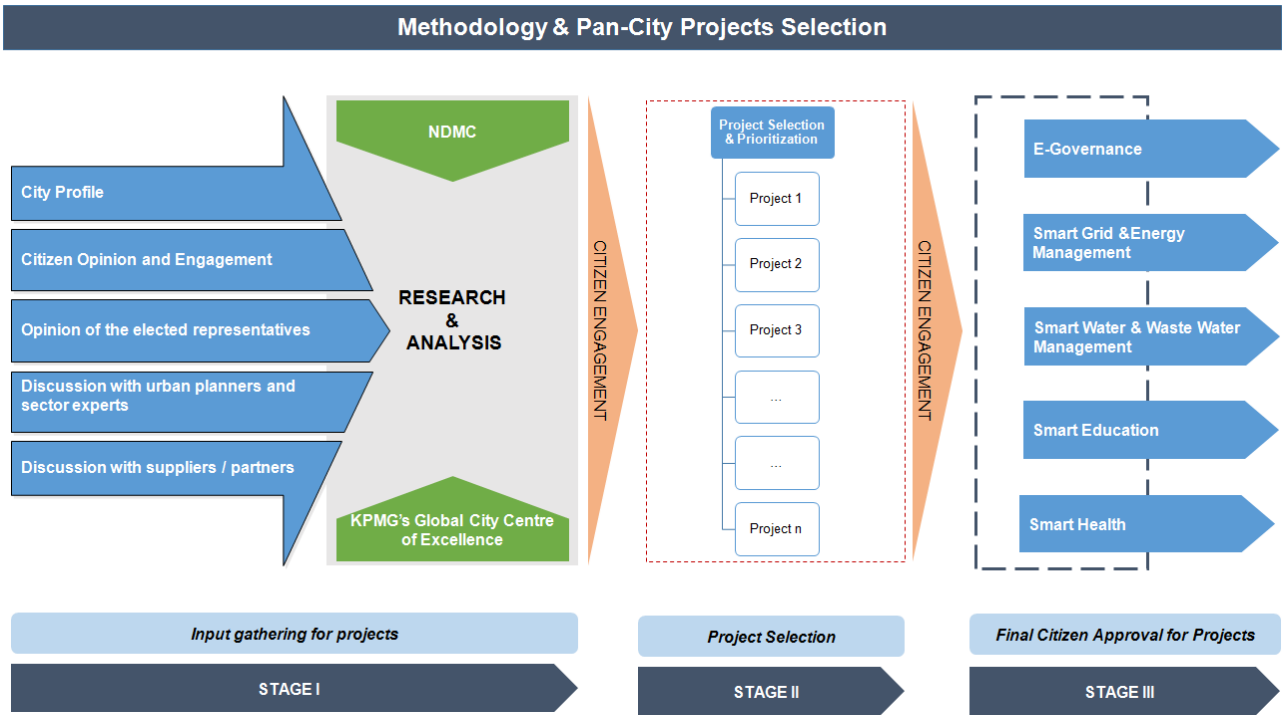
2. New Proposal

- Construction of 98 RWH pits at locations approved by the Central Ground Water Board (CGWB) in CPWD Colonies of Moti Bagh, Netaji Nagar, Sarojini Nagar, Laxmi Bai Nagar, Chanakya Puri and DIZ area Gole Market.
- Estimate has been prepared and will be implemented in 2016-17.
- Approximate expenditure for construction of one RWH pit of size 4x2x2m = 16m^3 is Rs. 4.50 lacs and covers a catchment area approx. 6000-7000m^2.

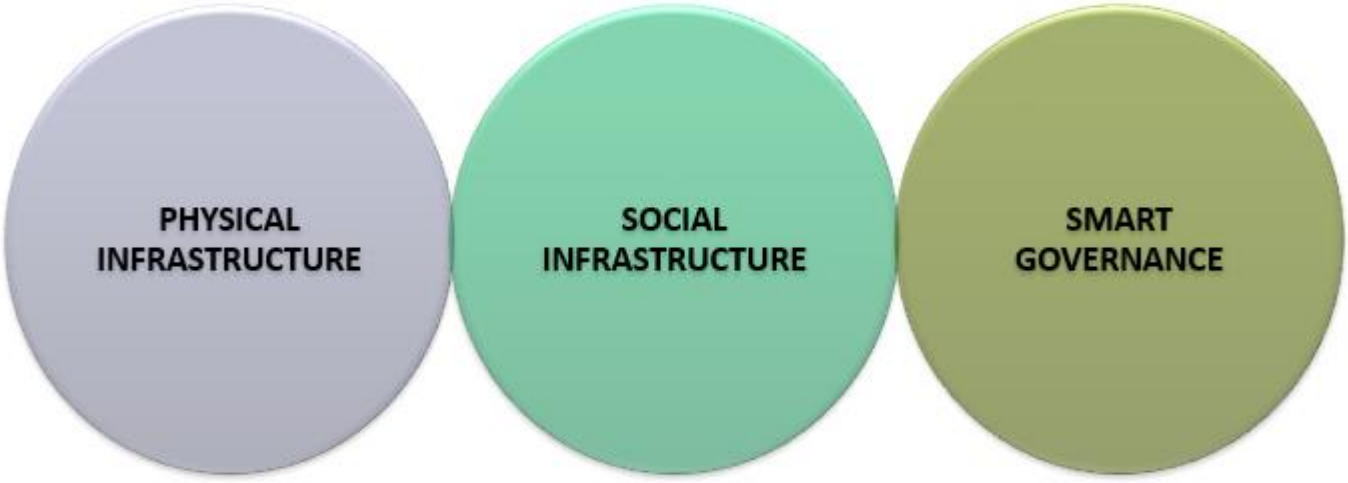
3. Regulatory action

- All the building plans which come for approval to NDMC, have to have provision of Rain Water Harvesting as per Building Bye-Laws. The provision of Rain Water Harvesting is examined at the time of submission of Building Plan and the same is seen at the time of Completion Certificate also.

3.10 Methodology – Pan-City Project Selection (REF: Section C – Question 21)



Pan-city projects emerging from methodology

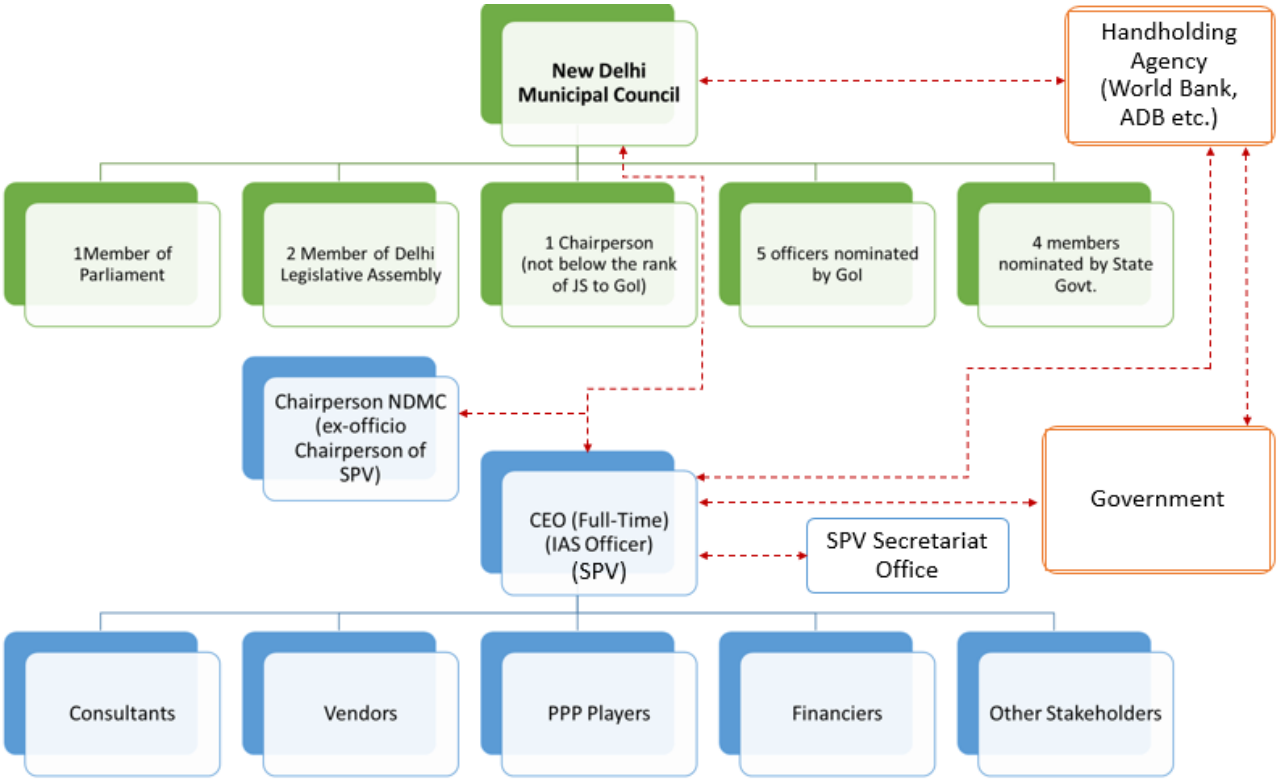


1. Smart Grid and Energy Management
2. Smart Water and wastewater Management

1. Smart Education
2. Smart Health

1. E-governance
   - Citizen Feedback System

3.11 Organogram of Relationship between SPV & Stakeholders (REF: Section D – Question 36)



3.12 Sub-components cost break-up of area-based and pan-city projects (REF: Section E – Question 37, 38 and 40)

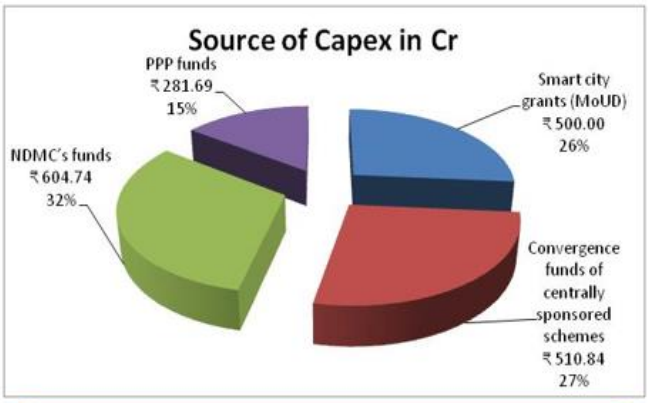
(All figures in Rs. Crores)

S. No. (1)	Components of the Project (2)	CAPEX*				O&M Cost* (for 5 yrs.)			Lifetime Cost (10) = (3) + (7)
		CAPEX Cost (3) = (4) + (5) + (6)	GoI* Funds (4)	NDMC & Smart City Funds (5)	PPP* (6)	O&M Cost (7) = (8) + (9)	NDMC Funds (8)	PPP (9)	
AREA BASED PROJECTS									
A	**Urban Mobility & Smart Parking**	256	9.1	49.0	197.90	102.72			358.72
i)	Para-transit facilities including PELICAN crossing	5	4 AMRUT	1	0	0.65	0.65	0	5.65
ii)	Electric Vehicles (EV's) based last mile connectivity	25	0	25	0	12.50	12.50	0	37.5
iii)	EV charging facility at parking bay	1	0.1 NEMP	0	0.9	0.14	0	0.14	1.14
iv)	App integrated cycle tracks	2	0	2	0	0.5	0.50	0	2.5
v)	e-surveillance including e-challan for traffic violation	5	0	5	0	2.0	2.0	0	7
vi)	Parking for Intermediate-Public-Transport	1	0	1	0	0.13	0	0.13	1.13
vii)	Smart Bus Stops	1	0	0	1	0.40	0	0.40	1.4
viii)	Multi-level automated parking at KG Marg, Shivaji Terminal & near IOC Building	190	0	0	190	76.00	0	76.00	266
ix)	Sensor based Smart Parking	6	0	0	6	2.40	0	2.40	8.4
x)	Pedestrianization of Inner Circle Connaught Place	20	5 AMRUT	15	0	8.00	8.0	0	28
B	**Sensor based Common Service Utility Duct**	150	0	150	0	60.00	60.0	0	210
C	**Transformation of electric-Poles into Smart Poles with LEDs having incident-driven-controllers; communication-infrastructure, Wi-Fi access points, air-quality sensors, noise-pollution sensors**	25	0	0	25	10.00	10	0	35
D	**Hierarchical Command and Control Centre**	15	0	15	0	2.00	2	0	17
E	**Happiness area**	35	0	35	0	14.00	14	0	49
i)	Happiness area for the cultural and social needs of citizen	10	0	10	0	4.00	4	0	14
ii)	Renovation of Gole Market, adding Interactive Museum on History of Indian Civilization	25	0	25	0	10.00	10	0	35
F.	**Transforming sub-ways into vibrant spaces ATM/pet adoption centre/Advt. etc.**	5	0	5	0	2.50	2.5	0	7.5
G.	**Signature Giant Smart Digital Screen: Traffic Info/Social Messaging/Alerts/Cricket/Advt**	20	0	20	0	10.00	10	0	30
H.	**Rooftop solar panels**	105	15.74 JNSM	33.47	55.79	26.25	0	26.25	131.25
i)	Rooftop solar panels in public buildings up to 7.5 MW	52.5	7.87	33.47	11.16	13.125	0	13.125	65.625
ii)	Rooftop solar panels in Pvt. Sector up to 7.5 MW	52.5	7.87	0	44.63	13.125	0	13.125	65.625
I.	**Municipal Solid Waste Management**	40.6	0	40.6	0	25.15	23.00	2.15	65.75
i)	Geo tagging of bins	1	0	1	0	0.25	0.25	0	1.25
ii)	Providing new bins	1	0	1	0	0.25	0.25	0	1.25
iii)	Automatic sewer cleaning machine	14	0	14	0	10.50	10.50	0	24.5
iv)	Augmenting existing mechanized road cleaning machines	16	0	16	0	12.00	12.00	0	28

v)	Green (Horticulture waste) to Gas Smart plant	8.6	0	8.6	0	2.15	0	2.15	10.75
J	**Transforming Public Toilets into Smart Public Amenities Centres**	4.5	0	4.5	0	9	9	0	13.5
K	**Financial, Identity, Ticketing & Access inclusion**	5	0	2	3	0.25	0.25	0	5.25
L	**Introducing signature initiative to the city's Identity and Culture**	3	0	3	0	116.50	50.00	66.50	119.5
i)	Gateway to the World: On-street Live Video Conferencing between people of Delhi and multiple Global Cities	3	0	3	0	1.50	0	1.50	4.5
ii)	Delhi International Festival	0	0	0	0	50.00	50.00	0	50
iii)	Global Capital City Award	0	0	0	0	65.00	0	65.00	65
M	**Behavioral transformation**	5	0	5	0	30	30	0	35
	Total	**669.1**	**24.84**	**362.57**	**281.69**	**408.37**	**234.40**	**173.97**	**1077.47**
PAN CITY PROJECTS									
A	**E-governance**	10	0	10	0	10	10	0	20
B	**Smart Grid and Energy Management (ongoing)**	958	461	497	0	53.5	0	53.5	1011.5
i)	Smart Grid Implementation	528	396 IPDS	132	0	0	0	0	528
ii)	40 MW Solar Power Projects	430		430	0	53.5	0	53.5	483.5
C	**Smart Water and waste-water Management**	190.42	90 AMRUT	100.42	0	357.95	357.95	0	548.37
D	**Smart Education**	45	0	45	0	22.5	22.5	0	67.5
i)	eLearning Solution in all NDMC schools, Virtual Labs	35	0	35	0	17.5	17.5	0	52.5
ii)	Centralized Student's health e-records	10	0	10	0	5	5	0	15
E	**Smart Health**	24.75	0	24.75	0	12.38	12.38	0	37.13
i)	Integrate all public medical facilities through Cloud-based e-healthcare system (Cloud provided by NIC under Digital India	20	0	20	0	10	10	0	30
ii)	Centralised Hospitalization facilitation for EWS for enabling them to access private hospital beds reserved for EWS, & provision of transportation service for transfer to private hospitals	1.75	0	1.75	0	0.88	0.88	0	2.63
iii)	Virtual medical service	3	0	3	0	1.5	1.5	0	4.5
	Total	1228.17	486	742.17	0	456.33	402.83	53.5	1684.50
	Grand Total	1897.27	510.84	1104.74	281.69	864.7	637.23	227.47	2761.97

Total Project Cost = INR 1897.27 Cr.

Summary of the Funds Sources (Rs. in Crores)						
Capital cost / O&M cost for 5 yrs.	**Project type**	**Smart city grants (MoUD)**	**Convergence funds of centrally sponsored schemes**	**NDMC's funds**	**PPP funds**	**Total**
CAPEX	Area based	164.10	24.84	198.47	281.69	669.10
	Pan city	335.90	486.00	406.27	0	1228.17
TOTAL		500	510.84	604.74	281.69	1897.27
OPEX	Area based	0	0	234.40	173.97	408.37
	Pan city	0	0	402.83	53.50	456.33
TOTAL		0	0	637.23	227.47	864.7
Grand Total		**500**	**510.84**	**1241.97**	**509.16**	**2761.97**



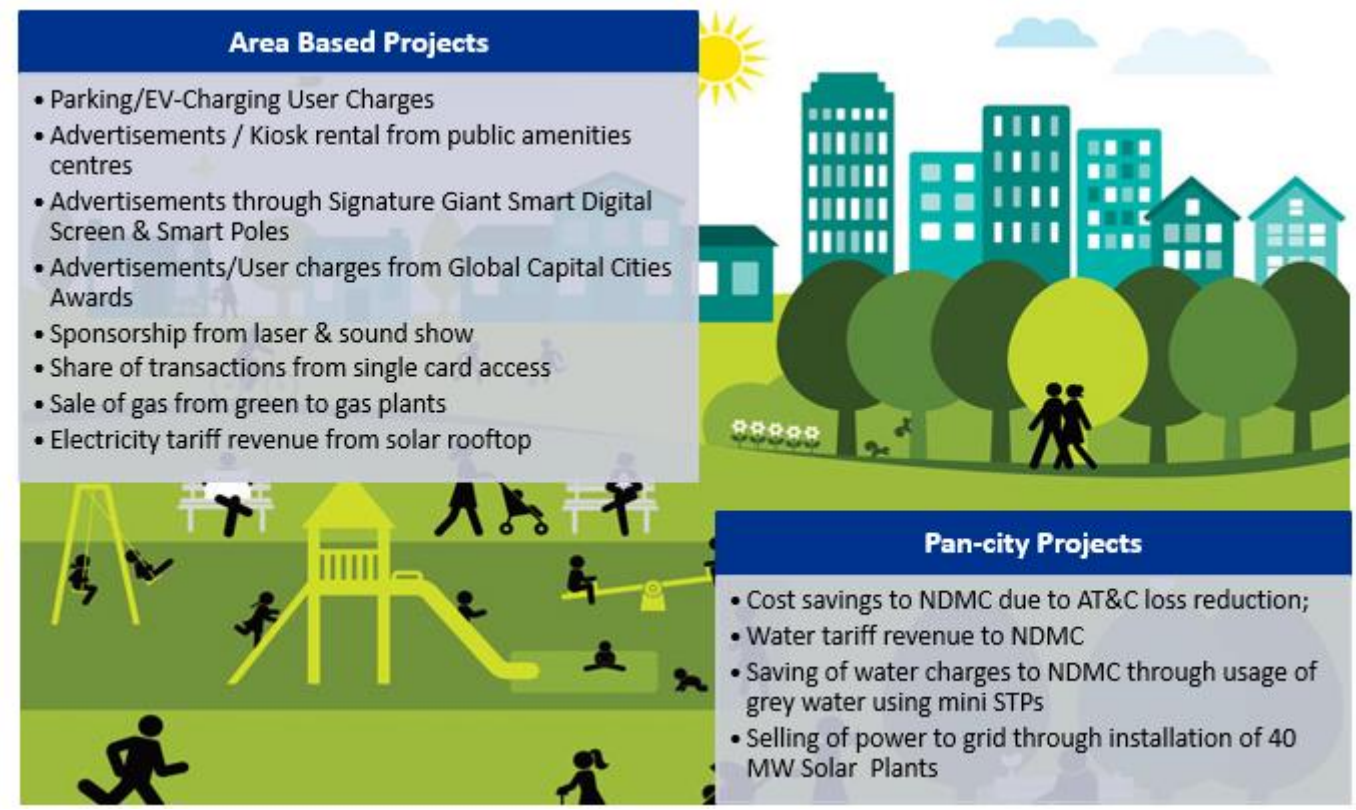
32 % of the total CAPEX shall be funded by NDMC Funds

- The estimated O&M cost in the Area-based-Project will be borne by the NDMC (Rs. 234.40 cr) and the private party (Rs.173.97 cr) investing in the project.
- The estimated O&M cost in the PAN-City Project will be borne by the NDMC (Rs. 402.83 cr) and the private party (Rs.53.50 cr) investing in the project.

***Acronyms**

GoI	- Government of India
CAPEX	- Capital expenditure of the projects
O&M	- Operational & Maintenance Cost
PPP	- Public Private Partnership

Revenue Streams



3.13 NDMC Current Robust Financial Health (REF: Section E – Question 43)

Unique Highlights:

- NDMC is a debt free municipality since 2009- 2010;
- NDMC has been granted "AA" credit rating by M/s Fitch India Ratings, which is the highest credit rating which a ULB can get;
- **NDMC annual budget has been surplus consistently.** Total receipts and expenditure during last four years showing surplus funds consistently:-

(Rs. In Crores)

Year	Total Receipts	Total Expenditure	Surplus/Deficit
2012-13	2365.14	2094.27	(+) 270.87
2013-14	2777.81	2627.54	(+) 150.27
2014-15 (RE)	3017.81	2927.87	(+) 89.94
2015-16 (BE)	3153.22	3126.01	(+) 27.21

- The sources of funds for the financial year 2015-16 (BE) are from (i) Fees & User Charges (42%); (ii) Interest (15%); (iii) Licence Fee (14%); (iv) Tax Revenue (13%); (v) Other Receipts (10%); and (vi) External Assistance (6%);
- The major four sources of Revenue are Fee and User Charges, Licence Fee, Interest on Investments and Tax Revenue. Constituting 84% of the total revenue sources;
- NDMC has been able to generate sufficient revenue receipts to not only meet the revenue expenditure but also to finance the annual capital expenditure through its own resources;
- NDMC has been able to create enough reserves to meet its future liabilities viz. Pension and Retirement Benefits, Replacement of Assets etc.;
- License fee collection shows an increase of 102.78% in last 5 years from Rs. 212.52 crores in the year 2010-11 to Rs.430.95 crores in the year 2015-16 (BE);
- Revenue receipts shows growth by 70% from Rs.1662.32cr in 2009-10 to Rs. 2835.72cr in 2015-16 (BE).

3.14 NDMC Spending Pattern (REF: Section E – Question 43)

(in Rs. Lakhs)

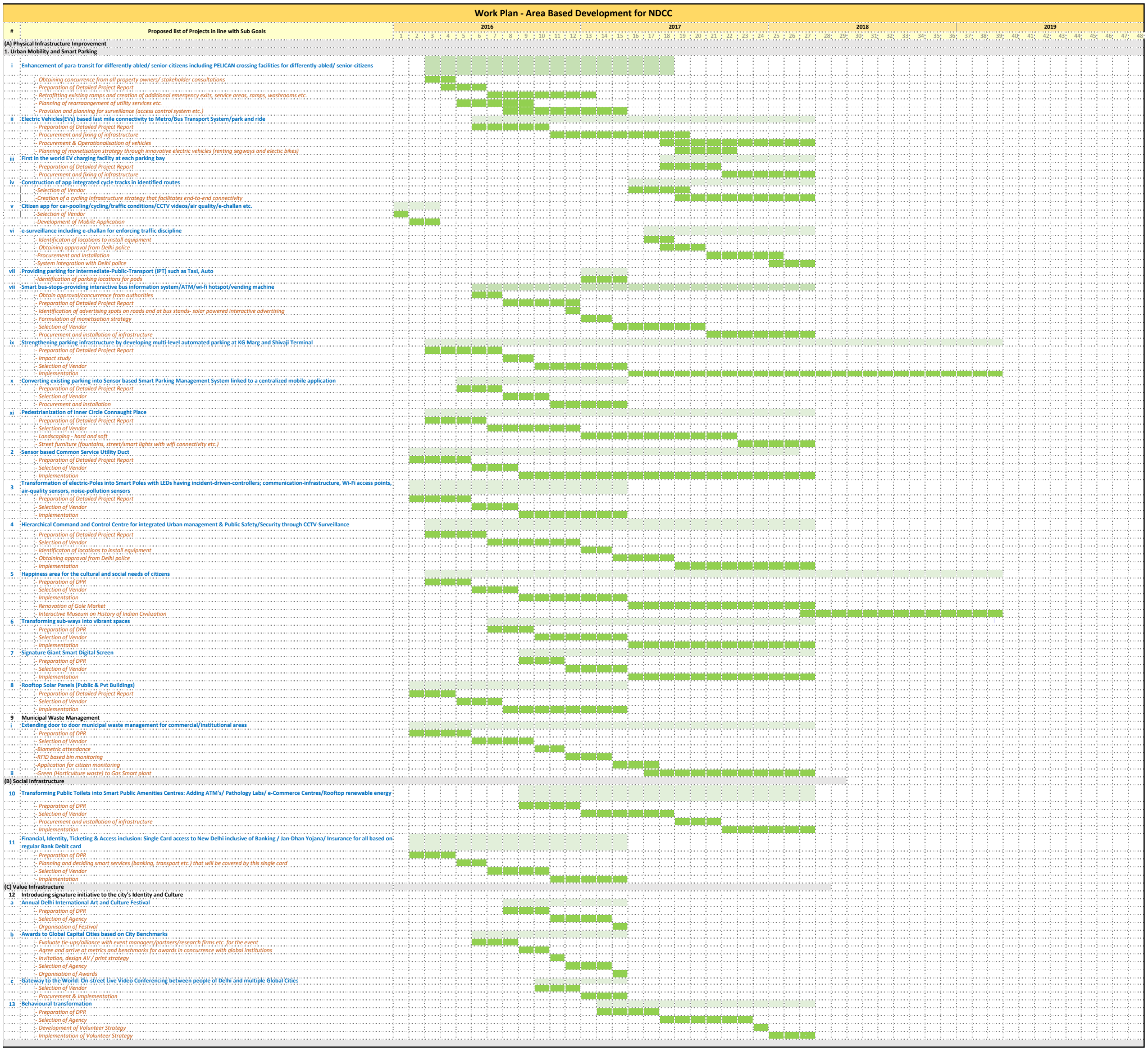
Description	2010-11 Actuals	2011-12 Actuals	2012-13 Actuals	2013-14 Actuals	2014-15 Revised Estimates	2015-16 Budget Estimates
ROADS AND PAVEMENT,SUBWAYS & CAUSEWAYS & STORM WATER DRAINS						
REPAIR & MAINTENANCE-INFRASTRUCTURE ASSETS	1109.09	1118.80	1306.86	1504.37	1753.60	1767.60
CAPITAL WORK	14956.24	6322.98	3840.83	2862.35	3823.61	5131.31
TOTAL	**16065.33**	**7441.78**	**5147.69**	**4366.72**	**5577.21**	**6898.91**
STREET LIGHTING						
OPERATIONS & MAINTENANCE	721.97	578.36	487.42	1200.06	1500.00	1500.00
CAPITAL WORK	101.49	208.64	68.64	185.05	299.20	552
TOTAL	**823.46**	**787**	**556.06**	**1385.11**	**1799.2**	**2052**
PUBLIC HEALTH						
OPERATIONS & MAINTENANCE	**26.96**	**35.73**	**25.2**	**41.39**	**54.59**	**56.59**
EPIDEMIC / PREVENTION CONTROL, PRIMARY HEALTH CARE & HOSPITAL SERVICES						
REPAIR & MAINTENANCE-INFRASTRUCTURE ASSETS	623.84	610.59	790.19	900.48	1076.90	988.90
CAPITAL WORK	183.05	116.13	427.24	769.13	444.00	452.00
TOTAL	**806.89**	**726.72**	**1217.43**	**1669.61**	**1520.9**	**1440.9**
SOLID WASTE MANAGEMENT						
OPERATIONS & MAINTENANCE	1414.19	1033.47	1262.65	1453.56	2605.00	1780.00
CAPITAL WORK	11.27	0.00	0.00	0.00	405.00	150.00
TOTAL	**1425.46**	**1033.47**	**1262.65**	**1453.56**	**3010.00**	**1930**
PUBLIC CONVENIENCES						
OPERATIONS & MAINTENANCE	0.00	0.00	3.75	65.53	118.3	118.30
CAPITAL WORK	0.00	13.84	29.98	19.98	28.50	25.35
TOTAL	**0.00**	**13.84**	**33.73**	**85.51**	**146.80**	**143.65**
WATER SUPPLY & SEWERAGE						
REPAIR & MAINTENANCE-INFRASTRUCTURE ASSETS	394.69	462.49	531.53	551.59	543.69	593.69
CAPITAL WORK	2206.81	549.61	674.35	194.19	316.90	1236.00
TOTAL	**2601.50**	**1012.10**	**1205.88**	**745.78**	**860.59**	**1829.69**
FIRE SERVICES & DISASTER MANAGEMENT						
OPERATIONS & MAINTENANCE	249.76	272.09	189.12	166.9	181.68	181.98
CAPITAL WORK	321.67	198.48	353.51	137.54	331.00	210.00
TOTAL	**571.43**	**470.57**	**542.63**	**304.44**	**512.68**	**391.98**

Description	2010-11 Actuals	2011-12 Actuals	2012-13 Actuals	2013-14 Actuals	2014-15 Revised Estimates	2015-16 Budget Estimates
COMMUNITY/MARRIAGE CENTERS						
ANNUAL REPAIR & MAINTENANCE	0.00	3.91	9.81	9.44	49.11	249.11
CAPITAL WORK	1518.77	1051.47	385.39	163.64	142.50	312.50
TOTAL	**1518.77**	**1055.38**	**395.20**	**173.08**	**191.61**	**561.61**
AMUSEMENT						
REPAIR & MAINTENANCE-INFRASTRUCTURE ASSETS	1.61	13.84	122.46	113.31	107.37	153.37

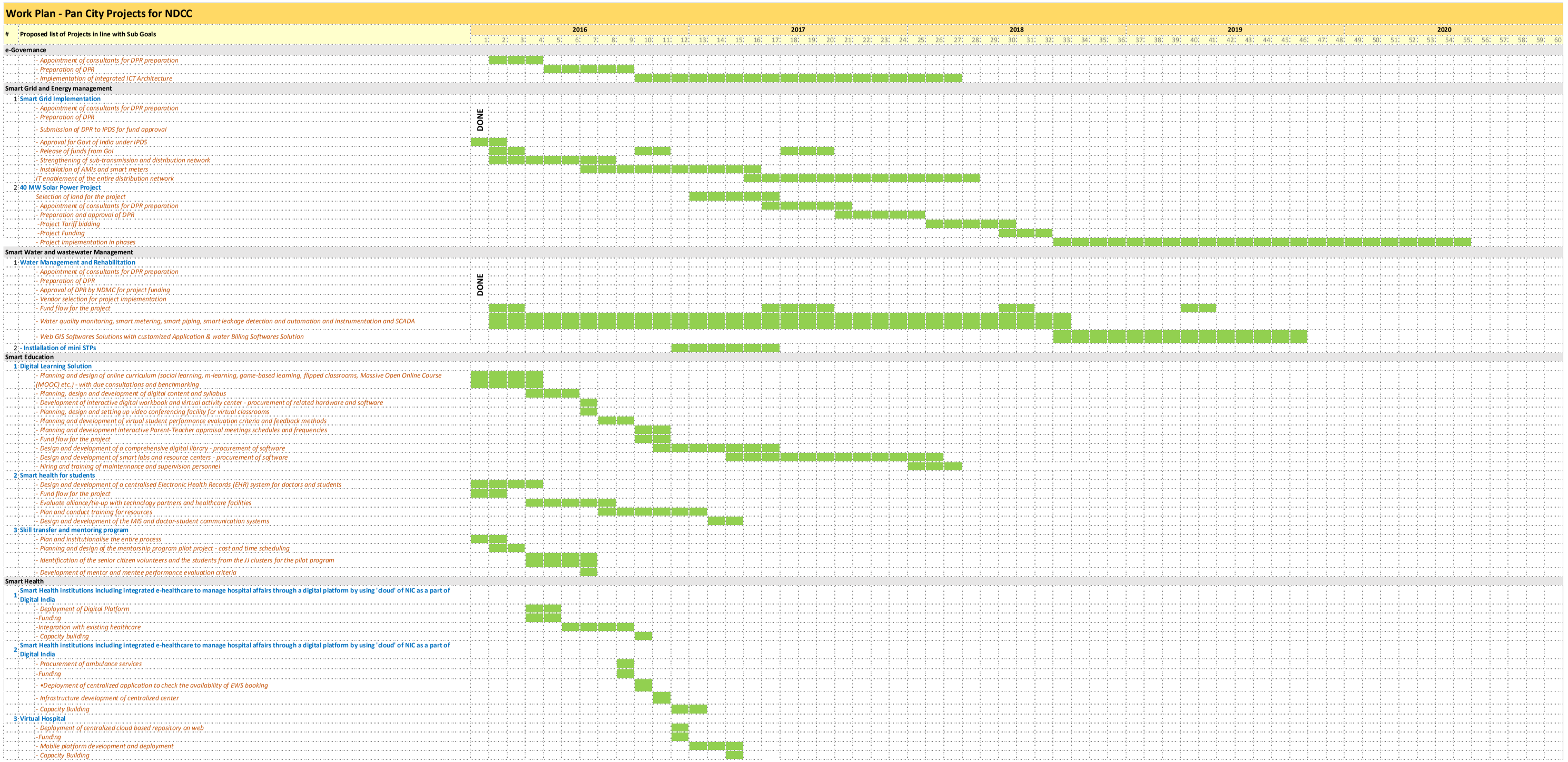
CAPITAL WORK	5074.94	1148.40	686.82	443.35	558.00	672.00
TOTAL	**5076.55**	**1162.24**	**809.28**	**556.66**	**665.37**	**825.37**
MUNICIPAL MARKETS						
REPAIR & MAINTENANCE-INFRASTRUCTURE ASSETS	14.10	66.12	97.41	180.90	245.70	245.70
CAPITAL WORK	10486.67	7299.44	10521.8	5633.24	2424.00	2167.00
TOTAL	**10500.77**	**7365.56**	**10619.21**	**5814.14**	**2669.70**	**2412.70**
PARKS, GARDENS						
REPAIR & MAINTENANCE-INFRASTRUCTURE ASSETS	966.10	824.06	1090.90	1755.22	1901.28	1891.99
CAPITAL WORK	576.03	488.27	312.21	243.78	615.90	297.50
TOTAL	**1542.13**	**1312.33**	**1403.11**	**1999.00**	**2517.18**	**2189.49**
SLUM IMPROVEMENTS						
CAPITAL WORK	**0.00**	**3.16**	**81.78**	**282.43**	**1162.19**	**1007.86**
ELECTRICITY						
REPAIR AND MAINTENANCE	829.82	850.35	1103.79	997.05	1127.77	2193.27
CAPITAL WORK	15323.08	3606.83	6807.09	3111.24	5667.46	7975.19
TOTAL	**16152.9**	**4457.18**	**7910.88**	**4108.29**	**6795.23**	**10168.46**
EDUCATION						
REPAIR & MAINTENANCE-INFRASTRUCTURE ASSETS	288.29	352.50	369.46	380.37	588.02	622.02
CAPITAL WORK	437.31	254.32	515.15	531.39	427.50	436.65
TOTAL	**725.60**	**606.82**	**884.61**	**911.76**	**1015.52**	**1058.67**

GRAND TOTAL OF ABOVE FUNCTIONS						
Description	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**
	Actuals	**Actuals**	**Actuals**	**Actuals**	**Revised Estimates**	**Budget Estimates**
GRAND TOTAL: REPAIR & MAINTENANCE	**6640.42**	**6222.31**	**7390.55**	**9320.17**	**11853.01**	**12342.52**
GRAND TOTAL: CAPITAL WORK	**51197.33**	**21261.57**	**24704.79**	**14577.31**	**16645.76**	**20625.36**
GRAND TOTAL (R&M +CAPITAL)	**57837.75**	**27483.88**	**32095.34**	**23897.48**	**28498.77**	**32967.88**

Gantt Chart for Area-based proposal (REF: Question 32)



Gantt Chart for pan-city proposal (REF: Question 32)



ADDENDUM TO ANNEXURE III

Area based Development (**ABD**) requires real time involvement of numerous property owners and NDMC plans to secure their continued commitment to the proposal. For each ABD project, it has been identified whether it impacts the property owners (directly or indirectly), and the following action plan has been formulated on how to involve them:

Sl. No	Project	Property Owner Involvement	Type of Involvement	Action Plan
1	Enhancement of para-transit including PELICAN crossing facilities for differently-abled/ senior-citizens (NDMC already has dedicated pedestrian corridors having access for differently-abled)	No	Not Applicable	Not Applicable
2	Electric Vehicles (EV's) based last mile connectivity to Metro/Bus Transport System/park and ride facility	Yes	Indirect	NDMC will keep the respective property owners duly informed
3	First in the world EV charging facility at each parking bay	No	Not Applicable	Not Applicable
4	Construction of mobile application integrated cycle tracks in identified routes	Yes	Indirect	NDMC will keep the respective property owners duly informed
5	Citizen application for car-pooling/cycling/traffic conditions/CCTV videos/air quality/e-challan etc	No	Not Applicable	Not Applicable
6	e-surveillance including e-challan for enforcing traffic discipline (vii) Providing parking for Intermediate-Public-Transport (IPT) such as Taxi, Auto	No	Not Applicable	Not Applicable
7	Smart bus-stops-providing interactive bus information system/ATM/wi-fi/ vending machine	No	Not Applicable	Not Applicable
8	Strengthening parking infrastructure by developing multi-level automated parking at KG Marg, Shivaji Terminal & near IOC Building	No	Not Applicable	Not Applicable
9	Converting existing parking into Sensor based Smart Parking Management System linked to a centralized mobile application	No	Not Applicable	Not Applicable
10	Pedestrianization of Inner Circle CP, free from unauthorized hawkers in accordance with Street Vendors Act(2014)	Yes	Indirect	NDMC will strictly abide by the Street Vendors Act(2014 in the removal of unauthorized hawkers and the property owners will be duly informed

ADDENDUM TO ANNEXURE III

11	Sensor based Common Service Utility Duct	Yes	Indirect	
12	Transformation of electric-Poles into Smart Poles with LEDs having incident-driven-controllers; communication infrastructure, Wi-Fi access points, air-quality sensors, noise-pollution sensors	No	Not Applicable	Not Applicable
13	Hierarchical Command and Control Centre for integrated Urban management & Public Safety/Security through CCTV-Surveillance	No	Not Applicable	Not Applicable
14	Happiness area for the cultural and social needs of citizens (i) renovation of Gole Market, adding Interactive Museum on History of Indian Civilization	Yes	Direct	Judgment has been passed by the high court on the redevelopment of Gole market area as museum. So property owners in that area are already aware of the situation
15	Transforming sub-ways into vibrant spaces ATM/pet adoption centre etc.	Yes	Indirect	NDMC will keep the respective property owners duly informed
16	Signature Giant Smart Digital Screen: Traffic Info/Social Messaging/Alerts/Cricket	Yes	Indirect	NDMC will keep the respective property owners duly informed
17	Rooftop Solar Panels (Public & Pvt Buildings)	Yes	Direct	NDMC will reach out to the residents in the NDCC area through organizing knowledge dissemination workshops once in every quarter in the next 2 years on rooftop solar to educate the people on financial incentives extended by Government of India and other financial institutions. This will help in penetration of the technology of rooftop solar in the NDMC area
18	MSWM (i) Extending door to door MSW for commercial/ institutional areas, including biometric attendance, RFID based bin monitoring, app-based citizen monitoring (ii) Green(Horticulture waste) to Gas plant.	Yes	Direct	NDMC will send notifications to all households on this initiative of MSWM

ADDENDUM TO ANNEXURE III

19	Transforming Public Toilets into Smart Public Amenities Centres: Adding ATM's/ Pathology Labs/ e-Commerce Centres/Rooftop renewable energy	Yes	Indirect	NDMC will keep the respective property owners duly informed
20	Financial, Identity, Ticketing & Access inclusion: Single Card access to New Delhi inclusive of Banking / Jan-Dhan Yojana/ Insurance for all based on regular Bank Debit card	No	Not Applicable	Not Applicable
21	Introducing signature initiative to the city's Identity and Culture (a) Annual Delhi International Art and Culture Festival	No	Not Applicable	Not Applicable
22	Behavioural transformation	No	Not Applicable	Not Applicable

ADDENDUM TO ANNEXURE III

The following are the metrics for city vision of the base year i.e. January 2016 and proposed goals as on 31st March 2019:

Sl. No	Metric	NDMC (as on 1st January 2016)	NDMC "to-be"status as on 31st March 2019
1	Percentage of female school-aged population enrolled in schools	100%	100%
2	Percentage of students completing primary education: survival rate	100%	100%
3	Percentage of students completing secondary education: survival rate	100%	100%
4	Primary education student/teacher ratio	20	10
5	Percentage of city population with authorized electrical service (core indicator)	100%	100%
6	Percentage of total energy derived from renewable sources, as a share of the city's total energy consumption	1%	20%
7	Fine particulate matter (PM 2.5)	153	117
8	Fine particulate matter (PM 10)	286	198
9	Greenhouse gas emissions measured in tonnes per capita	2.34	2.2
10	Capital spending as a percentage of total expenditures	6.24%	11.95%
11	Own-source revenue as a percentage of total revenues	94.57%	94.60%

ADDENDUM TO ANNEXURE III

12	Percentage of women employed in the city government workforce	20.00%	25.00%
13	Average life expectancy	75.9	77.4
14	Under age five mortality per 1,000 live births	75	20
15	Square meters of public indoor recreation space per capita	.08 sq m	0.1 sq m
16	Square meters of public outdoor recreation space per capita	17sq m	17 sq m
17	Percentage of city population living in slums	16%	9%
18	Number of homeless per 100 000 population	0	0
19	Total collected municipal solid waste per capita	100%	100%
20	Percentage of the city's solid waste that is recycled	100% [30% composting and others and 70% Waste to Energy]	100% [20% composting and others and 80% Waste to Energy]
21	Number of internet connections per 100 000 population	16000	24000
22	Number of cell phone connections per 100 000 population	100%	100%
23	Kilometres of high capacity public transport system per 100 000 population	14	20
24	Kilometres of light passenger public transport system per 100 000 population	72	72

ADDENDUM TO ANNEXURE III

25	Annual number of public transport trips per capita	131	260
26	Number of personal automobiles per capita	0.5	0.6
27	Green area (hectares) per 100 000 population	180.53	185.86
28	Percentage of city population served by wastewater collection	100%	100%
29	Percentage of the city's wastewater receiving primary treatment	100%	100%
30	Percentage of the city's wastewater receiving secondary treatment	60%	100%
31	Percentage of the city's wastewater receiving tertiary treatment	Nil	5%
32	Percentage of city population with potable water supply service	100%	100%
33	Percentage of city population with sustainable access to an improved water source	100%	100%
34	Percentage of population with access to improved sanitation	100%	100%

ADDENDUM TO ANNEXURE III

The details of the technology to be adopted for rainwater harvesting, water management along with solar installation are as follows:

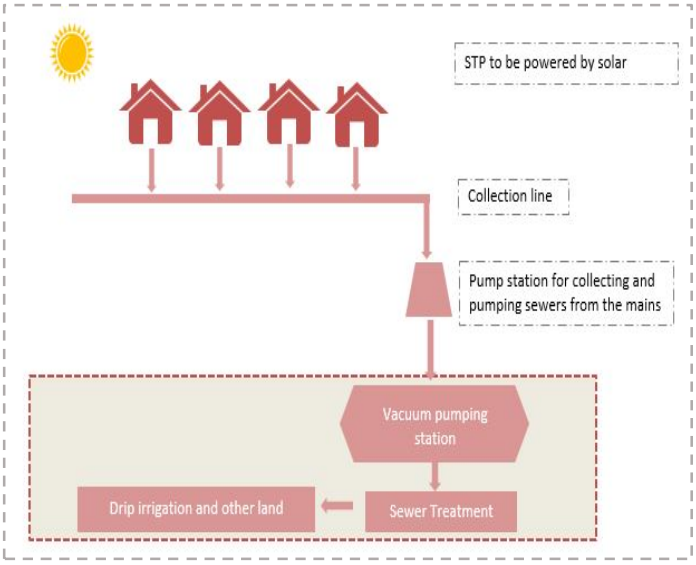
SMART MINI SEWAGE TREATMENT PLANT (SMART MINI STP)

NDMC proposes the installation of smart mini sewage treatment plants in various areas of a municipality. This solution of installation of a smart STP should involve the feature of the intelligent water system which improves the efficiency of water resources in a particular region by combining the aspects of Information Technology, data analytics, smart energy management, storm water treatment, grey-water treatment and re-use for horticulture purposes with various different water treatment systems to make effective use of recycled water. The technology and operating model of one such technology is described herewith:

Operating Model of SMART MINI SEWAGE TREATMENT PLANT

The operating model involves creation of a decentralized **"Zero Discharge"** smart mini sewage treatment plants that can serve a community of approximately 1000 houses. Treatment plant will be of low energy consumption type that can be powered by renewable energy. These plants will reduce the sewage load on treatment systems and potentially aid to restore ground water table in the region.

- **Collection Line**: The sewerage would be collected from service area and would then be diverted to the treatment facility.
- **Vacuum Sewers**: In case, sewerage doesn't exist and trenching is required, vacuum technology can be used to collect sewerage. The installed vacuum sewers would make use of small trenches and not manholes. Vacuum sewers can also be used for collecting only the sewers instead of combined sewers (storm water and sewer water together). This would, in turn, reduce the footprint on the sewage plants.



- **Treatment system**: A low-tech sewage treatment plant such as recirculating Granular Media can be used. Avoiding the use of aerators and blowers can reduce the system's energy demand.
- **Drip irrigation**: The treated effluent from the treatment system would be reused using drip irrigation system. This can provide irrigation and or ground water discharge too.
- **Renewable energy**: Energy for the plant can be provided space permitting utilizing solar panels with battery storage to provide for the requirement for the pumps.

ADDENDUM TO ANNEXURE III

"Smartness of the solution"

The key innovations which also contributes to the "smartness" of this solution are:

ENERGY OPTIMIZATION

- Low-tech treatment system will not need any aerators or blowers thereby lowering the energy demand for the system
- 100% of the energy consumption can be through renewable energy
- Energy for the plant can be provided through utilizing solar panels with battery storage.

DATA ANAYTICS

- Integrated with simulation software to predict effluent quality in real time and manage quality risks throughout its lifecycle.
- This software would help in minimizing
    - Operating and maintenance cost by predicting the performance of the plant, ensuring management of energy and chemicals
- Providing real time data and feedback for inspection and operations

- Water of highest quality
- Greater availability to citizens
- Minimal energy footprint

STORM WATER MANAGEMENT

- Equipped to handle both storm water along with normal sewage
- Storm and sewage water can be isolated using a new sewage system operating in parallel to the existing sewer

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